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Gold for Secrets: The Hartlib Circle and The Early English Empire, 1630-1660

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## ABSTRACT

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In this thesis I place the intellectual and practical work of Samuel Hartlib and his associates in its appropriate imperial and global settings, notably in the Atlantic World of mid-seventeenth-century English colonialism. I argue that the participation of the Hartlib Circle in the improvement programme that contributed to the construction of English colonies has been insufficiently recognised, either in scholarship on the Hartlibians or in the general literature on early modern English colonial expansion. This study addresses this issue through a detailed examination of private and official correspondence, chronicles, sermons, legislation, journals, and other texts that directly or indirectly related Hartlib and his allies to the Early English Empire. In order to properly address the full extent of the participation of Hartlib and his network in English imperialism, the thesis draws on approaches in the history of science and imperial history to examine four Atlantic English colonial regions during the period 1630-1660. As a result, this thesis reveals for the first time Hartlib's extensive participation in efforts to use empirical practical methods to improve Ireland, New England, Virginia, and the West Indies from the reign of Charles I, through the civil wars, Commonwealth and Protectorate, and to the Restoration.



## LONG ABSTRACT

Gold for Secrets: The Hartlib Circle and The Early English Empire, 1630-1660

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Historians of the Early English Empire have long discussed how its colonies were settled in the New World, while historians of the life and work of Samuel Hartlib have examined his role as the central organizing principal of a large correspondence network that promoted 'improvement' in a broad range of places and societies. However, despite a vast range of references to colonial locations in his writings, there has been little attempt to demonstrate the relationship between Hartlibians and the early English imperial project. Imperial historians have recognised the significance of English colonial presence in Ireland during the period, as well as the strategic importance of the American colonies, but they have ignored the keen and active interest in these locations shown by members of the so-called 'Hartlib Circle'. Likewise, although scholars have explored extensively Hartlib's role as a driving force for the Baconian improvement of England, and as an advocate for continental scholars emigrating to England during the Thirty Years War, they have largely ignored his interest in colonialism. With a few partial exceptions, historians have been generally unconcerned with the nature and purpose of Hartlib's Atlantic-facing interests. In this thesis I attempt to correct this situation by examining how the textual and practical activities of Hartlib and his wider network were bound up with the ebbing fortunes of mid-seventeenth-century English imperial expansion.

Hartlib lived in interesting times. As many historians have noted, he was motivated by a combination of deeply held millennial beliefs and a commitment to a practically oriented empirical science. In this thesis I first examine Hartlib's participation in the 'improvement' of

Ireland, and show how Hartlib and his associates, several of whom were employed in Ireland as bureaucrats or land-owning adventurers, sought to document the island's natural history, improve economic activities, and facilitate the extraction of its wealth for the common English good. Secondly, I explore Hartlib's varied connections to the colonies of New England from the founding of the Massachusetts Bay Colony until the Restoration. Many of his collaborators, several of them working in the region as entrepreneurs, sought to document the area's natural history, improve economic activities and education, and promote the evangelisation of the Native Americans. Thirdly, I examine Hartlib's participation in Virginia from the demise of the Virginia Company until 1660. Hartlib and his associates promoted and facilitated trade, campaigning for agricultural diversity to balance the colony's economy during the initially baneful effects of a singular commitment to tobacco. Finally, I assess the effects of Hartlib's interest in the Anglophone West Indies, from the founding of the colony of Barbados until the period immediately after the capture and settlement of Jamaica. Hartlib's extended network served as a resource for planters as well as for the English government, both of which struggled to provide sufficient labour in the Caribbean, improve navigation and preservation of trans-Atlantic supplies, and conduct trials to improve the production of commodities such as sugar.

This analysis of Hartlib's participation in these important colonial plantations is based on the analysis of a wide range of primary sources. I reveal the impact of the Hartlib Circle by examining correspondence dealing with larger political, military, and economic themes; by comparing topics of discussion with subsequent government policies and actions; and by looking at both projected and actually attempted improvements in the colonies effected by his correspondents. A fresh approach to the uses of natural history, a typical Hartlibian enterprise, flowed from communication between philosophers, merchants, diplomats, and others, who were themselves in communication with colonists of all kinds. Numerous letters and documents show that Hartlib was an invaluable resource in the period to those interested in knowing the

latest and best information regarding these colonies, and for over two decades his London homes were a necessary passage-points for those going to or coming from the English colonies.

To address Hartlib's participation in empire-building, the chapters that structure this thesis demonstrate his work in informing and inspiring dozens of adventurers, bureaucrats, educators, merchants, missionaries, politicians, sailors, scholars, and soldiers. Each chapter, however, reveals a slightly different facet of Hartlib's work, as activities were fashioned to meet the needs of each location. Every plantation faced a different range of obstacles, and Hartlib's network of associates was able to formulate appropriate solutions as well as original ideas to match the opportunities in each new space. Thus, chapter one illustrates the challenge of developing a nearby island with a large and densely populated landscape, which was also hostile to English impositions. Ireland became a valuable laboratory for Hartlibians as several improvement ideas were tested before being transferred to the New World. Chapter two demonstrates how Hartlibians led the surveying of a New World Colony, locating and developing natural mineral resources within the context of a local, politically and theologically intolerant colonial establishment. New England, however, provided an extraordinary workspace for improvements in mining and manufacturing.

The disadvantages of dedication to a monocrop agriculture is established in chapter three. Hartlibians struggled to encourage agricultural diversity in Virginia, while also assisting planters with improvement in the production of tobacco. Virginia presented a greater range of improvement possibilities for Hartlib but the distraction of political conflict there hindered the migration of people from within his local network and limited the number of his contacts. Finally, in chapter four I continue the discussion of monocrop cultivation, this time the development of sugar production in the West Indies. I show how the struggle for improvement took place within the broader context of Spanish domination of the region, piracy, and a chronic

shortage of labour. Plantation agriculture in Barbados and Jamaica became increasingly reliant on African slavery as it gave rise to an exponential and previously unexpected need for labour.

Having established Hartlib's participation in these four regional colonies, this thesis addresses themes that were common to all Early English plantations. The last three chapters provide multiple examples of New World plants that were imported to England for trials and Old-World plants that were exported for experiments in America. Carefully collated records were shared and preserved as various species thrived or failed due to climate, soil quality, pests, or disease. Secondly, Hartlib was ever vigilant for opportunities to promote Christianity among native populations and other labourers transplanted for service. Some of his allies served on national committees to propagate the Gospel, while others argued for policies in parliament to assist missionaries who worked among the natives, whether this was to establish schools, build churches, or assimilate them into the English population. Thirdly, Hartlibians were instrumental in lobbying parliament for legislation favourable to English trade, the establishment of colonies, and the improvement of distant and diverse plantations. Hartlib and several of his associates were advocates for several persecuted populations who sought new spaces in which to settle peacefully and live freely to improve the land, advance education, and worship as they believed appropriate, whether they were 'Antilians' in Prussia, Huguenots in France, or non-conformists in New England.

Finally, in every colonial region, Hartlib sought to gather a library of written sources regarding the place in order to learn and disseminate as much knowledge as possible to his associates. Where these natural histories did not already exist in print, he led efforts to create a textual source or to have an unpublished manuscript sent to the press. Based on his advocacy for colonies, the positive pressure he applied to Parliament for legislation favourable to plantations, his promotion of the assimilation of native populations, and his dissemination of

useful knowledge, I argue that Hartlib and his allies played a highly significant role in the establishment of the Early English Empire.



for “Granny”

Willa Mae Thackston Hancock

1927-2016



## PREFACE

I was first introduced to Samuel Hartlib as a master's student at Georgia State University in Atlanta, Georgia by my English MA supervisor, Dr Nick Wilding. A Cambridge graduate, Dr Wilding is a scholar of Galileo but was keenly aware of the Hartlib Papers, then only recently made available online. He encouraged me to consider this little-understood seventeenth-century character who had received such high praise from John Milton, Robert Boyle, and others. As I investigated Hartlib, it quickly became apparent that there was far more to this "polymath" or "intelligencer" than the promotion of innovative domestic agricultural methods. The 'invisible college' discussed by members of the Hartlib Circle was marshalled by an invisible man who deserved to be 'raised from the dead', having been effectively buried by the seismic shifts in seventeenth-century politics and theology that characterised post-Restoration English society. His achievements, and his subsequent reputation were effaced by both enemies and allies, the latter of whom were forced to find new allegiances and identities in a changing political economy.

The more I learned about this shadowy figure, the more my interested I became in discovering the rest of his story. Once I had assembled more than enough to complete my MA thesis, Dr Wilding wisely advised me to postpone the role of Hartlib in empire and preserve the topic for this doctoral project. He encouraged me to contact Dr Rob Iliffe, then a professor of History at the University of Sussex and apply for supervision. Dr Iliffe and I were drawn together by our common interest in Hartlib and empire and our surprise that no one had previously approached this topic at any length. Although the dissertation builds on the work of other historians, its central thesis results from a gap in the historiography of Hartlib's life and work that surrounds the relationship between Hartlib, his close associates, and the workings of the mid-seventeenth-century English colonial programme.

I hope that my re-evaluation of Hartlib's legacy leads to a better understanding of his role in supporting the aims and activities of the early Stuart and Republican English state. In particular, I suggest that the history of efforts to 'improve' Ireland and the New World colonies is incomplete without including the work of key members of the Hartlib Circle in the narrative. As a result, I believe that my work makes an important contribution to the history of English colonial activities, by showing that Baconian knowledge and imperial power were closely intertwined in a group of interlocking projects and programmes. Second, with regard to Hartlib and his associates, I am seeking to turn historical attention away from the Hartlibians' much studied Continental European concerns towards their largely ignored Atlantic interests, and to re-establish these concerns as a key part of the history of Hartlib's life and work. With his papers now readily available online, I hope that this thesis, with its wide-ranging implications, will encourage others to continue revealing the remarkable energy of the invisible man who corresponded so often with so many, regarding such a monumental number of topics.

## ACKNOWLEDGEMENTS

While the content of this thesis originated with me and all errors therein are my responsibility, a work such as this is not possible without the several contributions of mentors, colleagues, friends, and family. First and foremost, I am thankful for my supervisor, Dr Rob Iliffe, who believed in my project from the beginning and believed in me enough to have me follow him from Sussex to Oxford after only one year of research. Our multitude of meetings required much patience on his part, but in the process, he led me to understand the early modern period and the seventeenth-century history of science. Despite my struggles, he never gave up helping me improve my writing style and strengthen my arguments.

I would also like to thank other mentors who offered valuable constructive criticism. These include Dr Charles Webster who, in retirement, encouraged me to finish this connection between Hartlib and empire and who gave me a sense of academic legacy as a Hartlibian scholar. Dr David Cram, linguist at Jesus College, adopted me for no other reason than to be helpful to my project and because he shared a curiosity about Hartlib. Drs Paul Slack, William Poole, Pietro Corsi, Erica Charters, and Philip Beeley all agreed to meet with me and to engage in periodic correspondence about Hartlib and empire, as well as my personal well-being. Dr Mark Greengrass and Dr Thomas Leng agreed to exchange email early in the project and encouraged me to continue the work, affirming there was more to be done with the Hartlib Papers. Dr Jerry Pendrick in Georgia and Dr Ida Toth in Oxford helped me with Latin while Rebecca Hutton and Henrik Prieger assisted by translating papers in German. I am happy to acknowledge the support of my pastor at Abbey Baptist Church in Abingdon, Dr Clive Bowsher, and the chairman of the Abingdon Abbey Buildings Trust, Bryan Brown, who allowed me to be curator of the medieval Abingdon Abbey Buildings which provided accommodation after the first two years of my course. As it turned out, a seventeenth-century

English cottage where my south-facing window overlooks the River Thames was an excellent place for an American to write a thesis about Hartlib and empire.

I am thankful for the encouragement and friendship that was given to me by members of my international Oxford cohort – Sotirios Triantafyllos, Dr Zhaoyuan Wan, Dr Cornelis Schilt, who also transferred from Sussex, and Lucia Bucciarelli and Vincent Roy who joined us. I am especially grateful for Dr Wesley Correra, who found me in Latin class and has since become one of my dearest friends.

I am blessed to have my parents in America, Earl and Charlotte Miller, who have encouraged me to “hurry up and finish” as well as my children, Ben, Eli, and Sara. I thank my wife, Brandi Simpson-Miller, who encouraged me while completing a thesis of her own as a student at SOAS (School of Oriental and African Studies). Through her support, she has proven how resilient she is by managing me, her work, her part-time jobs, and our household, simultaneously all while living in a ‘foreign’ country, partly during a global pandemic.

I chose to dedicate this thesis to my late grandmother, Willa Mae Thackston Hancock who was primarily responsible for my interest in history. She gave me a blank book in 1972 when I was nine years old and encouraged me to keep a journal. In her honour, I have attempted to write something of my life every day since. Because of ‘Granny’ I travelled, saw the wonders of the world, and read as many history books as I could find. Although she was not able to travel as much when she grew older, she always told me to “bring me a rock”. Later, she would say, “I probably won’t live until you get back”. I proved her wrong many times, returning from three years in seminary, seven years in Alaska, a year in the Dominican Republic, but then ‘Granny’ passed away in 2016 while I was in the UK. She was eighty-eight years old.

## Table of Contents

LIST OF ILLUSTRATIONS .....	xix
LIST OF ABBREVIATIONS .....	xx
NOTE TO THE READER.....	xxi
INTRODUCTION .....	1
i. Hartlib's Reputation .....	1
ii. The Hartlib Circle .....	12
iii. Hartlib and Empire .....	21
iv. A Millennial Empire .....	25
CHAPTER I: HARTLIB AND IRELAND .....	29
1.1. Irish Plantation History: Before 1640 .....	29
1.2. Hartlib and Ireland .....	36
1.3. The Natural History: Hartlib and the Boates .....	47
1.4. Reconquest: Hartlib and Boyle .....	56
1.5. The Surveys: Worsley and Petty .....	62
1.6. The Debenture Plan and The Office of Address .....	76
1.7. Conclusion .....	82
CHAPTER II: HARTLIB AND NEW ENGLAND .....	87
2.1. Introduction.....	87
2.1.1. Background of the English Empire in America.....	87
2.1.2. Hartlibian Interest in America .....	89
2.1.3. Hartlib and New England .....	92
2.2. Hartlib and the Political Context of New England .....	96
2.2.1. The Political and Religious Nature of the Colonies .....	96
2.2.2. Hartlib and John Cotton.....	98
2.2.3. Educational and Theological Projects in New England.....	102
2.3. Hartlibian Improvement Projects in New England.....	107
2.3.1. 1620s: Davenport and St. Stephens, Origin of the New Haven Colony.....	107
2.3.2. 1630s: Winthrop in the Field and Vane in the Colonial Court .....	109
2.3.3. 1640s: Winthrop and Child.....	115
2.3.4. Early 1650s: Starkey in London .....	126
2.3.5. Late 1650s: Winthrop and Hartlib Reunited.....	131
2.3.6. 1660s: Hartlib and Winthrop .....	134
2.4. The Huguenot Petition .....	138
2.5. Conclusion .....	146

CHAPTER III: HARTLIB AND VIRGINIA .....	149
3.1. Introduction.....	149
3.1.1. The English Empire and Virginia .....	149
3.1.2. The Hartlibian Interest in Virginia.....	156
3.1.3. Hartlib and Virginia .....	158
3.2. Scientific Improvement: Colonisation, Classification, and Evangelism .....	161
3.2.1. A Dedicated Hartlibian Colony .....	161
3.2.2. Colonization and the Natural History of Virginia .....	167
3.2.3. Evangelism of Native Americans in Virginia: 1608-1640s.....	172
3.3. Political Improvement: Worsley’s Plan of Reform .....	176
3.3.1. The Context of Poor Colonial Government in Virginia .....	176
3.3.2. Desperate Measures and Conflicting Loyalties .....	181
3.3.3. Crafting and Shepherding a Reforming Initiative.....	183
3.4. Economic Improvement: Agricultural Diversification in Virginia.....	195
3.4.1. Hartlib and the History of Silk.....	195
3.4.2. The Monoculture of Tobacco .....	198
3.4.3. A Variety of Agricultural Alternatives to Tobacco .....	205
3.4.4. Alternatives to Tobacco .....	209
3.5. Conclusion .....	216
CHAPTER IV: HARTLIB AND THE WEST INDIES .....	221
4.1. Introduction.....	221
4.2. The Hartlibian Interest in the West Indies .....	223
4.3. Early Barbados Before Sugar: 1625-1641 .....	227
4.4. Barbados After Sugar: 1641-1655 .....	235
4.5. Self-Pivoting Propellers, Colored Colts, and Mechanical Carts.....	248
4.6. The Relief of Poverty.....	253
4.7. Jamaica: 1655-1660 .....	268
4.8. Conclusion .....	280
CONCLUSION.....	284
SELECTED BIBLIOGRAPHY .....	290
Manuscript Collections .....	290
Primary Sources .....	291
Secondary Sources .....	299

## LIST OF ILLUSTRATIONS

### Introduction

- x.1: Sample pages from Hartlib's journal *Ephemerides* in his hand . . . . . 15

### Chapter I: Hartlib and Ireland

- 1.1: The Four Major Regions of Ireland (Connaught, Leinster, Munster, and Ulster) . . . . . 30  
1.2: The Major Areas of Irish Plantation during the reign of Elizabeth I . . . . . 33  
1.3: Signature of Hugh L'Amy and Peter Le Pruvost, Huguenot Adventurers . . . . . 45  
1.4: Sample diagram from Cressy Dymock's 1653 *A Discoverie* . . . . . 68  
1.5: Sample map from William Petty's Down Survey of Ireland (1658) . . . . . 75

### Chapter II: Hartlib and New England

- 2.1: Modern map of 1652 Colonial New England . . . . . 88  
2.2: Portrait of John Cotton, Non-conformist Puritan minister of Boston . . . . . 99  
2.3: Portrait of John Rulice, student of John Cotton and associate of Hartlib . . . . . 100  
2.3: Portrait of John Davenport, co-founder of the New Haven Colony . . . . . 108  
2.4: Portrait of John Winthrop, Jr, entrepreneurial improvement empiricist . . . . . 110  
2.5: Winthrop's 1650 New London Grist Mill as it appeared in 1910 . . . . . 111  
2.6: Portrait of Henry Vane, Jr, governor of the Massachusetts Bay Colony . . . . . 111  
2.7: Spanish Map of Bermuda (1594) . . . . . 123

### Chapter III: Hartlib and Virginia

- 3.1: Painting of the Jamestown Fort, first permanent English-speaking settlement in America  
. . . . . 150  
3.2: Tobacco growing in a Virginia field . . . . . 152  
3.3: 1616 Engraved portrait of Pocahontas . . . . . 174  
3.4: Sir William Berkeley, governor of the Virginia Colony . . . . . 183  
3.5: The Signature of Benjamin Worsley from a letter to Hartlib . . . . . 186  
3.6: Frontispiece of *The Reformed Virginian Silk-Worm* . . . . . 196

### Chapter IV: Hartlib and The West Indies

- 4.1: A Modern Map of the West Indies to easily locate English Colonies . . . . . 226  
4.2: Map of the Island of Barbados . . . . . 227  
4.3: Map of the Bahama Islands showing the prominence of the name 'Providence' . . . 247  
4.4: Frontispiece of *Adam Out of Eden* by Adolphus Speede, 2<sup>nd</sup> edition . . . . . 261  
4.5: Map of Jamaica (c. 1700) . . . . . 268  
4.6: Frontispiece of *Histoire Naturelle et Morale Des Iles Antilles de l'Amerique* by  
Charles de Rochefort's (1658) . . . . . 275  
4.7: The Queen Pine from *History of Barbados* by Richard Ligon . . . . . 276

## LIST OF ABBREVIATIONS

A&O	<i>Acts and Ordinances of the Interregnum</i> , ed. C. H. Firth and R. S. Rait, London 1911.
BL	British Library, London
<i>Boyle Works</i>	<i>The Works of the Honourable Robert Boyle</i> , ed. T. Birch. 6 vols, London, 1772.
<i>CJ</i>	<i>The Journals of the House of Commons</i>
<i>CSPC</i>	<i>Calendars of State Papers, Colonial Series (1574-1676)</i> , ed. W. N. Sainsbury. London, 1869-96.
Ephemerides	Samuel Hartlib's Journal, <i>Hartlib Papers</i> , MS61, Special Collections, Western Bank Library, University of Sheffield.
<i>HDC</i>	G. H. Turnbull, <i>Hartlib, Dury and Comenius: Gleanings from Hartlib's Papers</i> (London, 1947).
<i>HP</i>	<i>The Hartlib Papers</i> , eds. Greengrass, M., Leslie, M. and Hannon, M. Sheffield: The Digital Humanities Institute, 2013. [ available at: <a href="http://www.dhi.ac.uk/hartlib">http://www.dhi.ac.uk/hartlib</a> ].
<i>JRSAI</i>	<i>The Journal of the Royal Society of Antiquaries of Ireland</i>
<i>ODNB</i>	<i>Oxford Dictionary of National Biography</i>
<i>SHUR</i>	<i>Samuel Hartlib and Universal Reformation: Studies in Intellectual Communication</i> , eds. M. Greengrass, M. Leslie and T. Raylor (Cambridge 1994).
Wintrop	The Winthrop Papers, <i>Collections of the Massachusetts Historical Society</i> . 6 vols, Boston, 1863.
Worthington	John Worthington, <i>Diary and Correspondence</i> , ed. J. Crossley. 3 vols, Chetham Society, Manchester.

## **NOTE TO THE READER**

Dates are given in old style (O.S.), with the exception that the new year is dated from 1 January. Because the new style (N.S.) was not adopted in England and Wales, Ireland, and the English colonies until 1752, the O.S. was the standard used by Hartlib in England and when writing to the New World.

The original spellings have been retained in manuscript transcriptions, with the occasional exception that abbreviations and contractions have been expanded when the meaning of the original text is not obviously clear to the average reader. Expanded letters are italicised, following the Hartlib papers electronic edition conventions.



## INTRODUCTION

*Well, doe you know any man that hath any secrets, or good experiments?  
I will give him gold for them.*

-Traveller, *Macaria*

### **i. Hartlib's Reputation**

Between 1630 and 1660, as printing censorship eased in London, and Puritanism was ascending in political power and cultural influence, twenty-two works were published and dedicated to the English Parliament by a man named Samuel Hartlib.<sup>1</sup> Ultimately, he published at least sixty-five different works of his own. Many of the leading figures of mid-seventeenth-century natural philosophy knew Hartlib personally or knew of him, most corresponded with him, and many spoke highly of him to others. These men and women represented a range of academic disciplines and mechanical vocations, and their visionary projects promised great scientific and technological advances along with ensuing social benefits. Numerous lesser-known individuals were also caught up in Hartlib's web, all with skills that could contribute to the benefit of the commonwealth, and many with plans for new machines and marvellous inventions.<sup>2</sup> Hartlib worked with others on improvement projects, actively supporting the development of engines, pumps, calculators, copy machines, microscopes, telescopes, seed machines, and siege engines, among others.<sup>3</sup> Literary exchange lay at the heart of the Hartlibian enterprise, and John Milton claimed that Hartlib's correspondents were "some of the highest authority among us".<sup>4</sup>

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<sup>1</sup> See Timothy Earl Miller, "Pleasure, Honor, and Profit: Samuel Hartlib in his Papers 1620-1662", (MA Thesis, Georgia State University, 2015).

<sup>2</sup> *Samuel Hartlib and the Advancement of Learning*, ed. Charles Webster (Cambridge, 1970), p. 22.

<sup>3</sup> *Ibid.*, p. 32.

<sup>4</sup> *The Works of John Milton: Historical, Political, and Miscellaneous*, ed. Thomas Birch (London, 1753), p. 5. For justification in using the term 'Hartlibian' to describe the philosophy of the Hartlib Circle and its

Although Hartlib is normally identified as either German, Polish, or Prussian his background is complicated. He was born in the City of Elbląg, located on the Baltic coast of Poland, one of the oldest cities in the area.<sup>5</sup> The city was also Polish at the time of Hartlib's birth, but was transferred to Prussia in the first Polish partition of 1772 and remained so until the end of the Second World War. Elbląg was member of the Hanseatic League and flourished as a trading port during the seventeenth-century. Hartlib was born to a Lithuanian father and an English mother. He explained that his father, never named in the record, was living in Elbląg because he was a merchant while his mother, Elizabeth Langton, was there because she was the daughter of John Langton who was known for having brought the "English company", or the Eastland Trading Company, to the city in 1604.<sup>6</sup> The date of Hartlib's birth is uncertain but he could not have been born before the company's arrival.<sup>7</sup> Henry Roesler addressed him as an *adolescenti* in 1621 making it less likely he could have been born before 1604 or later than 1607.<sup>8</sup> Hartlib never gave his birthdate or referred to his age. In fact, he wrote very little about himself, never explicitly naming his parents even though he identified their nationalities and his father's occupation. He confessed to John Worthington in August 1660 that he had been "upbraided" for neglecting his "pedigree" yet wrote nothing to resolve the neglect.<sup>9</sup>

Hartlib indicated to Worthington that he had come from a wealthy and respectable family, saying his "family was of a very auncient extraction in the german empire", and adding

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relationship to Baconianism, see the Introduction to this thesis and, for example, *Winstanley and the Diggers, 1649-1999*, ed. Andrew Bradstock (New York, 2014), p. 135; Prasanta Chakravarty, *Like Parchment in the Fire: Literature and Radicalism in the English Civil War* (Milton Park, 2006), pp. 17, 137, 138, 196; Alistair Crombie and Michael A. Hoskin, *History of Science* (New York, 1959); *Restoration Ireland: Always Settling and Never Settled*, ed. Coleman Dennehy (Milton Park, 2008); and Anne Dunan-Page, *The Religious Culture of the Huguenots, 1660-1750* (Milton Park, 2017).

<sup>5</sup> *HDC*, p. 11. Elbląg is the Polish name for the city also known in German as Elbing and in Old Prussian as Elbings. It is located on the northern coast of modern Poland and on the eastern edge of the Żuławy region.

<sup>6</sup> J. K. Fedorowicz, *England's Baltic trade in the early seventeenth century: A study in Anglo-Polish commercial diplomacy* (Cambridge, 1980), pp. 46-7.

<sup>7</sup> Henryk Zins, *England and the Baltic in the Elizabethan Era* (Manchester, 1972), pp. 67, 104, 112, 124.

<sup>8</sup> Henry Roesler to Hartlib, 15 Oct 1621, *HP* [49/33/1A-2B].

<sup>9</sup> Hartlib To Worthington, 3 Aug 1660, *HP* [26/1/1A-2B].

that his father worked for the King of Poland, and had built a dye-works after he had moved to Elblag.<sup>10</sup> His father was married twice before being wed to his mother, both women of nobility. Because this was his third marriage and her first, Hartlib's father must have been much older than his mother. Both of Elizabeth Langton's sisters married English nobility, the first to Sir Richard Smith, son of the Lord Mayor of London, and then to Edward Savage and Hartlib's cousin was Sir Anthony Erbes, a member of Parliament. He thus had solid English familial connections and, I suggest, did not sound like a foreigner to Englishmen, having his mother's English for his first language.<sup>11</sup> Moreover, although he spoke five languages, he wrote his personal journal, the notes he created for none but himself, in English.

According to John Dury, one of his closest associates, Hartlib was fluent in four languages (Polish, Dutch, English, and Latin), and since there are several letters written in Hartlib's hand in German, we may safely add German to Dury's list.<sup>12</sup> Hartlib began his studies at Brieg in Silesia on the Oder in 1612. The oldest surviving letter addressed to him, from Richard Perham, was sent to Brieg in 1620 but by that time he was studying at Königsberg (now Kaliningrad) where he may have been since 1614. Hartlib's move to England may have coincided with his father's death since there is no indication his father ever migrated to England. His mother, however, died in London.<sup>13</sup> This seems far more plausible as a rationale for his move to England than the frequently repeated theory he was as a refugee of the Thirty Years War. Letters addressed to him in London as early as 1621 prove his early migration and several other letters addressed both to and from him in Cambridge (Trinity College) prove his

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<sup>10</sup> Hartlib To Worthington, 3 Aug 1660, *HP* [26/1/1A-2B].

<sup>11</sup> See Toni G. Cross, "Mother's speech adjustments and child language learning: Some methodological considerations," *Language Sciences* 1:1 (March 1979): 3-25 and Catherine E. Snow, "Mother's Speech to Children Learning Language," *Child Development* 43:2 (June 1972): 549-65.

<sup>12</sup> Charles I – vol. 296: 19-31 Aug 1635 in *CSP: Charles I, 1635*, ed. John Bruce (London, 1865), 339-64.

<sup>13</sup> *Marriages and Burials, 1538-1812*, London Metropolitan Archives; Ref.: P69/DUN2/A/003/MS010344.

presence there from 1621 or 1622 until 1626.<sup>14</sup> No record of Hartlib's matriculation at Cambridge has been found but he may have studied in some capacity without matriculating, an assumption based on several references to the university made in his letters.<sup>15</sup>

Hartlib returned to London in 1626 and two years later married Mary, the daughter of Peter Burmingham and Elizabeth Maye, at the St. Dionis Backchurch in the Langbourn Ward.<sup>16</sup> They lived at Duke's Place "by the Living Vine" in Christchurch Lane where they raised at least four children until 1650, except for one year spent in Chichester and six months in Reading with Mary's family. Hartlib founded a school in Chichester that failed after only one year and he removed the family from London in 1636 to Reading because of the plague.<sup>17</sup> From 1650 until Mary died in 1658, the Hartlibs lived in Charing Cross "over against Angel Court".<sup>18</sup> According to the Parliamentary Survey of 1650, Hartlib lived in an East-facing house next door to Angel Alley, with a Dr Medcroft (to the north) and Lady Dorelton (to the south). His house had a "large dyneinge roome and three other chambers" on the first floor with eight more chambers above on the second and third floors and was said to be worth £40.10 per year.<sup>19</sup> This information and records of payments received by Hartlib from Parliament prove that this family was not "poor", "destitute", or living in a house with only "sticks" of furniture as some have written.<sup>20</sup> Poverty is a relative term and sympathetic letters from friends regarding finances do

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<sup>14</sup> Henry Roesler to Hartlib, 15 Oct 1621, *HP* [49/33/1A-2B]. See also *HDC*, p. 15.

<sup>15</sup> See Hartlib to Johann Reusner, 1 Jul 1625, *HP* [38/4/6A-B]; Hartlib to Matthias Pasor, 12 Nov 1625, *HP* [38/4/7A-B]; Hartlib, 21 Dec 1625, *HP* [38/4/15A]; and Hartlib, 1 Jan 1626, *HP* [38/4/15A-B].

<sup>16</sup> *Maryages, Christenynges, and Buryalles*, Book 25, St. Dionis Backchurch - Parish Register (City of London).

<sup>17</sup> See, for example, John Stoughton to Hartlib, undated [1636? - Death Of Nat. Rich], *HP* [46/11/5A-6B].

<sup>18</sup> For example, see Nicholas Mercator To Hartlib, 23 May 1657, *HP* [56/1/54A].

<sup>19</sup> "Between Naunton House and the passage to Spring Gardens," in *Survey of London: Volume 16, St Martin-in-The-Fields I: Charing Cross*, ed. G. H. Gater and E. P. Wheeler (London, 1935), 104-110.

<sup>20</sup> See, for example, Carol Pal, *Republic of Women: Rethinking the Republic of Letters in the Seventeenth Century* (Cambridge, 2012); Leigh T. I. Penman, "Omnium Exposita Rapinae: The Afterlives of the Papers of Samuel Hartlib", *Book History* 19 (2016): 1-65; and Robert E. Stillman, *The New Philosophy and Universal Languages in Seventeenth-Century England* (Cranbury, NJ, 1995), p. 47.

not accurately tell us anything regarding Hartlib's net worth, especially in view of the evidence which indicates he was profligate in helping others.<sup>21</sup>

During the periods of the civil wars, the Commonwealth and the Protectorate, Hartlib moved in lofty circles. One close friend, Robert Boyle, became a board member of the East India Company and, later, a founding member of the Royal Society.<sup>22</sup> John Winthrop Jr, called Hartlib "the Great Intelligencer of Europe"<sup>23</sup> and Milton said that he was "a person sent hither by some good providence from a far country to be the occasion and the incitement of great good to this island".<sup>24</sup> Hartlib met several times with Oliver Cromwell and Parliament Speaker John Pym, and he was invited to speak to parliament on a variety of subjects more than once as an independent expert witness. To the modern reader, Hartlib seems to have exercised a disproportionate influence on his surroundings, which causes one to wonder whether contemporary authors were exaggerating in their praise, or if there is more to this mysterious character, who loomed so large for three decades but who was then ruthlessly expunged from the historical record after the Restoration. Such was his precipitous decline in reputation that references to his name in print are not found for seven decades after his death in 1662.

Seventy-two years after Hartlib's death, Thomas Birch made a few brief and indirect references to him in the entries on John Dury, John Milton, John Pell, William Petty, Sir Walter Raleigh, and John Sadler in his 1734 expansion of Pierre Bayle's *General Dictionary, Historical and Critical*.<sup>25</sup> Birch appears to have known nothing of Hartlib, and every reference was limited to his name included as parts of titles or dedications, except for the brief note on

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<sup>21</sup> See, for example, Hartlib To Worthington, 3 Aug 1660, *HP* [26/1/2A].

<sup>22</sup> *Samuel Hartlib and Universal Reformation: Studies in Intellectual Communication*, eds. M. Greengrass, M. Leslie and T. Raylor (Cambridge 1994), p. 2.

<sup>23</sup> *Correspondence of Hartlib, Haak, Oldenburg and Others of the Founders of the Royal Society with Governor Winthrop of Connecticut 1661-1672*, ed. Robert Charles Winthrop (Boston, 1878), p.1.

<sup>24</sup> *The World's Great Classics: Essays of British Essayists*, eds. Timothy Dwight and Julian Hawthorne (New York, 1899), p. 89.

<sup>25</sup> Pierre Bayle, *A General Dictionary, Historical and Critical* (10 vols, London, 1734), vii, pp. 250-1, 353-5, 568, 678, ix, p. 20, and x, p. 579.

Raleigh in which the author states that Hartlib “endeavoured to revive” the Office of Address.<sup>26</sup> In 1769 Hartlib was mentioned for the second time in Richard Weston's *Tracts on Practical Agriculture and Gardening*, as one who had contributed to husbandry in the seventeenth-century.<sup>27</sup> Weston wrote that Hartlib “was a German gentleman by birth, a great promoter of husbandry, during the times of the common wealth, and much esteemed by all ingenuous men in those days”.<sup>28</sup> A few of his former associates wrote about him privately, and some of their unpublished journals came to light in the eighteenth and nineteenth centuries before the recovery of Hartlib’s private papers. Scholars such as Weston knew him only as a forgotten figure who was associated with agricultural schemes. Citing Weston, Hartlib was next briefly acknowledged in the 1797 edition of the *Encyclopaedia Britannica*, under the entry on agriculture.<sup>29</sup>

In 1832, Hartlib was mentioned once in Alexander Chalmers’ *Biographical Dictionary* as the recipient of a letter from John Worthington, Master of Jesus College, Cambridge, in 1661,<sup>30</sup> while in 1838 Robert Vaughan mentioned Hartlib indirectly ninety-eight times in his *Protectorate of Oliver Cromwell*, mainly because of several letters that he sent to John Pell between 1656 and 1658. For the first time in 176 years, Vaughan’s readers learned that there was more to Hartlib than agriculture, as the author referenced Hartlib for his promotion of self-powered (horseless) chariots and the art of flying.<sup>31</sup> In 1854 Hartlib was granted three pages in John Donaldson’s eight-volume *Agricultural Biography*; the biographical information

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<sup>26</sup> Bayle, *A General Dictionary*, vii, pp. 250-1, 353-5, 568, 678, ix, p. 20, and x, p. 579.

<sup>27</sup> Richard Weston, *Tracts on Practical Agriculture and Gardening* (London, 1769), pp. viii, 266, 268, and cat., pp. 13, 15, 16, 18.

<sup>28</sup> *Ibid*, cat., p. 16.

<sup>29</sup> *Encyclopaedia Britannica; or, A Dictionary of Arts, Sciences, and Miscellaneous Literature*, eds. A. Bell and C. MacFarquhar (3 vols, Edinburgh:, 1771), i, p. 248.

<sup>30</sup> Alexander Chalmers, *The General Biographical Dictionary: Containing An Historical and Critical Account of the Lives and Writings of the Most Eminent Persons in Every Nation; Particularly the British and Irish, from the Earliest Account to the Present Time* (London, 1816), p. 27.

<sup>31</sup> Robert Vaughan, *The Protectorate of Oliver Cromwell and the State of Europe During the Early Part of the Reign of Louis XIV* (London, 1838), pp. 432-477.

Donaldson gave was almost identical to what was given by Hartlib to Worthington in a letter of 1660, indicating that he must have had at least indirect access to that manuscript.<sup>32</sup> Donaldson identified Hartlib as “the propounder of an agricultural college”, and noted that he “assisted in establishing the embryo” of the Royal Society, but then he added that the time of his death was unknown. The same year, Hartlib’s name appeared in Daniel Benham’s *A Sketch of the Life of J. A. Comenius*.<sup>33</sup> Indeed, most references to Hartlib before the rediscovery of his archive are in biographical works about his associates, such as Rev. Henry John Todd’s *Life of Milton* (1809)<sup>34</sup> or S. S. Laurie’s *John Amos Comenius: Bishop of the Moravians* (1904).<sup>35</sup>

Without knowledge of Hartlib’s papers, in 1865 Henry Dircks published, at the request of the Commissioner of Patents Bennet Woodcroft, *A Biographical Memoir of Samuel Hartlib, Milton’s Familiar Friend* based on the few references to Hartlib in the works of Evelyn, Milton, and Weston.<sup>36</sup> Woodcroft, whom Dircks praised for completing the work Hartlib began, was interested in the history of the steam engine for the purpose of accurately granting patents on the same subject.<sup>37</sup> His investigation prompted the first work devoted to Hartlib, published over two centuries after his death. Dircks confessed his surprise at finding Hartlib to be “a man universally respected during the period in which he flourished”, known for “spreading knowledge”, and “doing good”, and noted that Hartlib had used his “influence to mitigate the severe pressure of those terrible times”.<sup>38</sup> Dircks concluded that Hartlib must have been a significant person in the seventeenth-century, but with little primary or secondary material

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<sup>32</sup> John Donaldson, *Agricultural Biography: Containing a Notice of the Life and Writing of the British Authors on Agriculture from the Earliest Date in 1480 to the Present Time* (London, 1854), p. 21.

<sup>33</sup> Daniel Benham, *A Sketch of the Life of J. A. Comenius* (London, 1858.)

<sup>34</sup> Henry John Todd, *Some Account of the Life and Writings of John Milton* (London, 1809), p. 7, 191.

<sup>35</sup> S. S. Laurie, *John Amos Comenius: Bishop of the Moravians* (Cambridge, 1904).

<sup>36</sup> See John Evelyn. *The Diary and Correspondence of John Evelyn F.R.S.*, New Edition, 4 vols., ed. William Bray (London, 1854).

<sup>37</sup> Henry Dircks, *A Biographical Memoir of Samuel Hartlib, Milton’s Familiar Friend* (London, 1865), pp. iv, vi-vii.

<sup>38</sup> *Ibid*, p. v.

available, struggled to explain how or why. He noted that “The life of a man like Samuel Hartlib has many rare claims on human intelligence, sympathy, and respect”, but he failed either to list any of these claims or to explain specifically what Hartlib had done.<sup>39</sup>

In 1905, John William Adamson included Hartlib as one of the central characters in his *Pioneers of Modern Education in the Seventeenth Century: 1600-1700*.<sup>40</sup> Adamson alluded to the idea that Hartlib promoted several scientific schemes long before those ideas became a reality and his book went through several subsequent unedited printings, a reflection of its ongoing relevance to modern educational theory. Without knowledge of the Hartlib archive, Adamson wrote in his preface that Hartlib was foremost of those “pioneers” of education in England who had been forgotten yet deserved to “be honoured by all friends of education”.<sup>41</sup> Adamson then wrote about Hartlib and pansophy, *Macaria*, The Office of Public Address, and other topics important to Hartlib’s broader educational work.

In 1920, the Professor of Literature at Liverpool University, George Turnbull (1879-1961), published his own biography of Hartlib. Like Adamson, Turnbull was unaware that Hartlib’s papers had survived, but was drawn to his subject both because of Adamson’s book and on the grounds of his own interest in the history of education. Having dutifully assembled all that was known of Hartlib at the time, Turnbull’s initial offering was no more than a pamphlet.<sup>42</sup> In due course he became a professor of education at the University of Sheffield and it was there in 1933 that he received his first intimation of the existence of Hartlib’s papers. Based on his study of these manuscripts, Turnbull published his second Hartlib-related work in 1947, *Hartlib, Dury and Comenius: Gleanings from the Hartlib Papers*, which amounted to

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<sup>39</sup> Dircks, *Milton’s Familiar Friend*, p. x.

<sup>40</sup> John William Adamson, *Pioneers of Modern Education in the Seventeenth Century: 1600-1700* (New York, 1905).

<sup>41</sup> John William Adamson, *Pioneers of Modern Education*, p. viii.

<sup>42</sup> See George Henry Turnbull, *Samuel Hartlib: A Sketch of His Life and His Relations to J. A. Comenius* (Oxford, 1920),

almost 500 pages. In this work he affirmed Donaldson's earlier connection of Hartlib to the Royal Society and described the men whom Hartlib knew at Gresham College who were then incorporated into the Society in 1662.<sup>43</sup> However, Turnbull showed that Hartlib was involved in a much larger range of projects, and knew a far greater variety of individuals than had previously been imagined. Writing of the papers, and the enigmatic historical status of Hartlib, Turnbull observed that the archive raised a host of new questions about who Hartlib was, and what influence he exerted on his contemporaries.<sup>44</sup>

Thirteen years after the publication of *Hartlib, Dury, and Comenius*, Hugh Trevor-Roper met Turnbull and subsequently published "Three Foreigners", a lengthy article about the same three reformers.<sup>45</sup> Trevor-Roper reported that he was shown "six crates of papers and Turnbull's transcription of Hartlib's diary".<sup>46</sup> In his chapter, which drew more from a study by Oxford Headmaster William Vincent than from Turnbull's work, Trevor-Roper argued that Hartlib must be understood within a broader intellectual tradition and in the context of the violence of the Thirty Years War.<sup>47</sup> Three years after Turnbull's death in 1961, the Hartlib Papers were deposited at the University of Sheffield by his widow, although legal ownership remains with the present Lord Delamere, whose seventeenth-century ancestor purchased them from the Brereton estate.<sup>48</sup> Placement of the papers in the Western Bank Library provided access to other scholars and, as a result, several new works about Hartlib appeared. The Marxist historian Christopher Hill noted that for two decades Hartlib popularised in England a

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<sup>43</sup> George Henry Turnbull, *Hartlib, Dury and Comenius: Gleanings from Hartlib's Papers* (London, 1947), p. 33.

<sup>44</sup> Turnbull, *Samuel Hartlib*, p. vi.

<sup>45</sup> Hugh Trevor-Roper, *From Counter-Reformation to Glorious Revolution* (Chicago, 1992), p. 225.

<sup>46</sup> Mark Greengrass, "Three Foreigners: The Philosophers of the Puritan Revolution" (unpublished article 2014), [https://www.academia.edu/6130097/Three\\_Foreigners\\_and\\_the\\_Philosophy\\_of\\_the\\_Puritan\\_Revolution\\_-\\_Hugh\\_Trevor-Roper\\_Conference\\_January\\_2014\\_](https://www.academia.edu/6130097/Three_Foreigners_and_the_Philosophy_of_the_Puritan_Revolution_-_Hugh_Trevor-Roper_Conference_January_2014_) (accessed 19 Oct 2014).

<sup>47</sup> Trevor-Roper, *Counter-Reformation*, p. 227. See also William Alfred Leslie Vincent, *The State and School Education, 1640-1660, in England and Wales* (London, 1950).

<sup>48</sup> Greengrass, *Three Foreigners*, p. 3.

programme of social, economic, religious and educational reform which influenced men such as Robert Boyle and William Petty.<sup>49</sup> More importantly, in his 1965 *The Intellectual Origins of the English Revolution* Hill had concluded that the Comenians (Hartlib, Dury, and Comenius), together with Gresham College, should be seen as the crucial agents that brought together the group that later formed the Royal Society.<sup>50</sup> Although his treatment of Hartlib was limited to a ten-page section in *The Intellectual Origins*, Hill was the first to clearly define Hartlib's impact on the society and culture of his age, and he demonstrated why Hartlib's life and influence was central to a proper understanding of the longer seventeenth-century.

In 1970, the historian Charles Webster edited *Samuel Hartlib and the Advancement of Learning* and in 1975 published *The Great Instauration: Science, Medicine and Reform 1626-1660*, a work that, because of its depth and breadth of archival research, has become the foundation for all serious Hartlibian scholarship. As one reviewer wrote in 2003, "It has been a staple of academic debates, reading lists, and footnotes since its first appearance".<sup>51</sup> Webster provided an encyclopedic account of the vast range of individuals and interests that formed the extended network of Hartlib's acquaintances. While almost all of those who signed up to the Hartlibian approach were opposed to scholastic methods and ideas, Webster showed that there was a plurality of intellectual traditions that together constituted mid-seventeenth-century natural philosophy. Of equal importance, Webster took the Hartlibians' Protestant eschatology much more seriously than previous writers. He pointed to the powerful religious interests of those natural philosophers drawn into Hartlib's web and put forward a superbly documented case for the interpenetration between Protestant faith and a practically oriented Baconian natural history. The comprehensiveness of *The Great Instauration* was such that the challenge

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<sup>49</sup> Christopher Hill, *The World Turned Upside Down* (London, 1973), p. 288.

<sup>50</sup> Christopher Hill, *The Intellectual Origins of the English Revolution* (Oxford, 1997), p. 97.

<sup>51</sup> Patrick Wallis, "Charles Webster, *The Great Instauration: Science, Medicine and Reform 1626-1660*", *Social History of Medicine* 16:2 (August 2003): 304-5.

for anyone writing about Hartlib after 1975 has been both to build on and distinguish their work from Webster's monumental achievement.<sup>52</sup>

A few biographies of Hartlib's associates such as J. H. Adamson and H. F. Folland's *Sir Harry Vane: His Life and Times 1613-1662* provided some additional information about Hartlib but their work failed to utilize the available Hartlib Papers.<sup>53</sup> However, biographers of his friends and colleagues have increasingly used the papers and have provided further insights into Hartlib and his work.<sup>54</sup> Most important for Hartlib scholarship was the 1992 Sheffield conference which gathered under the banner of "Peace, Unification, and Prosperity: The Advancement of Learning in the Seventeenth Century".<sup>55</sup> The event was focused on Hartlib's papers and in 1994 it resulted in a published selection entitled *Samuel Hartlib and Universal Reformation*. Now that the papers are readily available and searchable online, information from the collection is continuing to inform studies of Hartlib's correspondents and hundreds of topics from the seventeenth-century. The papers reveal that Hartlib was an *auctor prudens* of seventeenth-century England, an indispensable link between the history of science and the history of empire.<sup>56</sup> Moreover, based on these tremendously rich resources, historians have shown that Hartlib's network was far larger and more complex than previously imagined.<sup>57</sup>

Clearly numerous aspects of Hartlib's life work and influence must be re-evaluated now, almost 50 years since Webster's *Great Instauration*. This thesis argues that Hartlib's impact went well beyond the history of agriculture or education, by describing his participation in the establishment and improvement of the Early English Empire of the mid-seventeenth-

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<sup>52</sup> Charles Webster, *The Great Instauration: Science, Medicine and Reform 1626-1660* (London, 1975), p. 487.

<sup>53</sup> J. H. Adamson and H. F. Folland, *Sir Harry Vane: His Life and Times 1613-1662* (London, 1973).

<sup>54</sup> See, for example, Michael Hunter, *Boyle: Between God and Science* (New Haven, 2009); Thomas Leng, *Benjamin Worsley (1618-1677)* (Woodbridge, 2008); and Ted McCormick, *William Petty: And the Ambitions of Political Arithmetic* (Oxford, 2009).

<sup>55</sup> See *SHUR*.

<sup>56</sup> *Auctor prudens* or 'wise author' is a term coined by the author to better define Hartlib's identity.

<sup>57</sup> Michael Hunter, *Science and Society in Restoration England* (Cambridge, 1981), p. 49.

century. Throughout the dissertation, I argue that one cannot properly grasp the imperial project from the end of the rule of Charles I to the start of the reign of Charles II without an understanding of Hartlib and his network of correspondents.

## ii. The Hartlib Circle

Although Hartlib's influence was felt across an extended, international group of correspondents, for convenience in many places I describe the 'core-set' of his correspondence network as the 'Hartlib Circle'. Hartlib occupied a central, coordinating presence within a diverse array of associates, distinguished by age, class, education, ethnicity, experience, language, location, qualification and specialisation. Hartlib drew them together to understand the "secrets" of nature for the common good and the glory of God.<sup>58</sup> The term 'Hartlib Circle' is a late nineteenth-century coinage, first used in English by Timothy Corcoran.<sup>59</sup> Margaret Bailey referred to a "group of friends" to which Hartlib introduced John Milton,<sup>60</sup> and David Masson used the phrase "the circle of Hartlib's friends" to include Milton.<sup>61</sup> The likely source for these authors was Johannes Kvacala who referred in 1904 to the "*Hartlibschen Kreis*" or "Hartlib Circle".<sup>62</sup> The term *kreis* was more popular among German writers during the nineteenth century than "circle" was in English to describe a group of related scholars.<sup>63</sup> Earlier still, Rudolf Kirsten had used the term "*Comenius-Hartlibschen Kreis*" to designate those

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<sup>58</sup> See, for example, Ephemerides 1653 Part 2, [2 Mar – May], *HP* [28/2/56A-B].

<sup>59</sup> Timothy Corcoran, *Studies in the History of Classical Teaching* (Dublin, 1911) and Charles Webster, e-mail message to author, 28 Apr 2017.

<sup>60</sup> Margaret Lewis Bailey, *Milton and Jakob Boehme: A Study of German Mysticism in Seventeenth Century England* (Oxford, 1914), pp. 120-121.

<sup>61</sup> David Masson, *The Life of John Milton*, (5 vols, London: Macmillan, 1877), iii, p. 466.

<sup>62</sup> Johannes Radomil Kvacala. "The Educational Reform of Comenius in Germany up to the End of the XVIIth c." in *Monumenta Germaniae Paedagogica*, ed. Karl Kehrbach, (Berlin, 1904), xxxii, p. 39.

<sup>63</sup> Charles Webster, Interview by the author, Personal conversation, Oxford, 27 Apr 2017.

associated with John Comenius and Hartlib.<sup>64</sup> Finally, the term “circle” appears in the Hartlib archive itself, in a letter from John Dury to Sir William Boswell in 1640, in which Dury referred to “the Circle wherein I am able to walke may be usefull unto the publique” in the context of describing his work with Hartlib.<sup>65</sup>

Among other things, the Hartlib Circle constituted a vibrant intellectual space where scholars could discuss ideas, experiments and conclusions. Coordinated by Hartlib himself, it facilitated collaboration, peer review and sponsorship of appropriate activities. I use the term ‘Hartlib Circle’ frequently in this thesis to describe those scholars and practically-minded individuals with whom Hartlib maintained an active correspondence; that is, it describes his network of *close* associates.<sup>66</sup> Whether individual academics, adventurers, authors, mechanics, natural philosophers, politicians and theologians belonged to this broadly defined group is subject to debate, but the criteria for membership must include the number of surviving letters exchanged with Hartlib himself, the frequency of names appearing in his personal journal, shared interest in natural philosophy and technology, as well as correspondence and relationships with other known members of the network. On this topic, one should bear in mind that less than half of Hartlib’s original archive has survived and that, according to John Worthington, seventeenth-century contemporaries were given a chance to remove their own personal papers from Hartlib’s collection before he placed them into storage.<sup>67</sup> Based on a standard of more than a hundred surviving letters exchanged with Hartlib, for example, an ‘inner sanctum’ of his network must include at least 15 correspondents, including John Beale,

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<sup>64</sup> Rudolf Kirsten, *Studie Über das Verhältnis von Cowley und Milton: Inaugural-Dissertation zur Erlangung der Doktorwürde der Philosophischen Fakultät der Universität Leipzig* (Leipzig, 1872), p. 18.

<sup>65</sup> [John Dury] To William Boswell. 9 Jun 1640, *HP* [6/4/58A-59B].

<sup>66</sup> See Penman, “Omnium Exposita Rapinae”. Penman suggests the term “Hartlib Circle” may be a contraction of “Hartlib’s circle of friends”.

<sup>67</sup> John Worthington, *The Diary and Correspondence of Dr. John Worthington: From the Baker Manuscripts in the British Museum and the Cambridge University Library and Other Sources* (London, 1886), iii, p. 226 and Charles Webster, personal interview, 27 Apr 2017.

Robert Boyle, Frederik Clodius, Jan Amos Comenius, Sir Cheney Culpeper, John Dury, Joachim Hübner, Robert Moray, Johann Moriaen, Henry Oldenburg, John Pell, William Petty, Johannes Rulice, Benjamin Worsley, and John Worthington. Considering the location of many correspondents in London and the convenience of a personal visit above a written letter and expanding the criteria to 50 letters or more exchanged with Hartlib, the number of secondary-level associates balloons substantially.

Hartlib attempted to ground his work in what he termed an 'Office of Address', which was to have been a permanent material institutionalisation of his programme. Inspired by the work of Francis Bacon, Hartlib built a network of correspondents that was intended to have a physical presence in the form of offices located throughout the Early English Empire.<sup>68</sup> These were designed to promote exploration and discovery, the collection and preservation of information, the testing of knowledge for all possible applications, and the organisation of established knowledge for redistribution to all interested persons. Hartlib summarised these and other purposes with the Baconian phrase 'the advancement of learning'.<sup>69</sup> This term encompassed a range of activities and initiatives including the promotion of inventions, the expansion and improvement of education, the establishment of trade, and the implementation of a range of social programmes such as criminal reform, health care, and poverty relief.

The early seventeenth-century Stuart kings were almost wholly uninterested in the practical implementation of Baconian reforms, but the Interregnum provided the opportunity both for Baconian technical goals to be realised, and for natural philosophy to break away from the scholastic tradition which had dominated teaching and research since the medieval period.<sup>70</sup>

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<sup>68</sup> See Francis Bacon, *The New Organon* (London, 1620).

<sup>69</sup> Francis Bacon, *The Advancement of Learning* (London, 1605). See, for example, *Draft? Act for Erecting An Office Of Address In Scribal Hand?*, undated, HP [63/7/8A-9B] or Letters In Scribal Hand B, Abraham Wheelock To Hartlib, 12 Nov 1647, HP [33/4/1A-4A].

<sup>70</sup> John Gascoigne, *Science in the Service of the Empire: Joseph Banks, The British State and the Uses of Science in the Age of Revolution* (Cambridge, 1998), p. 18.

In this context, Hartlib consistently lobbied government to endorse and fund various empirical projects for the benefit of the public, which he referred to as the “common good”. In 1640, for example, he wrote that

The way to advance learning is not to get a Collegium of Learned Men together and to set them to elaborat certain works. This is subject to too many inconveniencys of ambition jealousy lazines and every way to the abuse of such a benefit. But [it is] rather to observe the predominant genius of Men and where they stick to helpe them ... to free such a one from distracting cares of the world that hee may wholly intend those his proper studys. In like manner to allow him meanes within compasse for experimenting etc.<sup>71</sup>

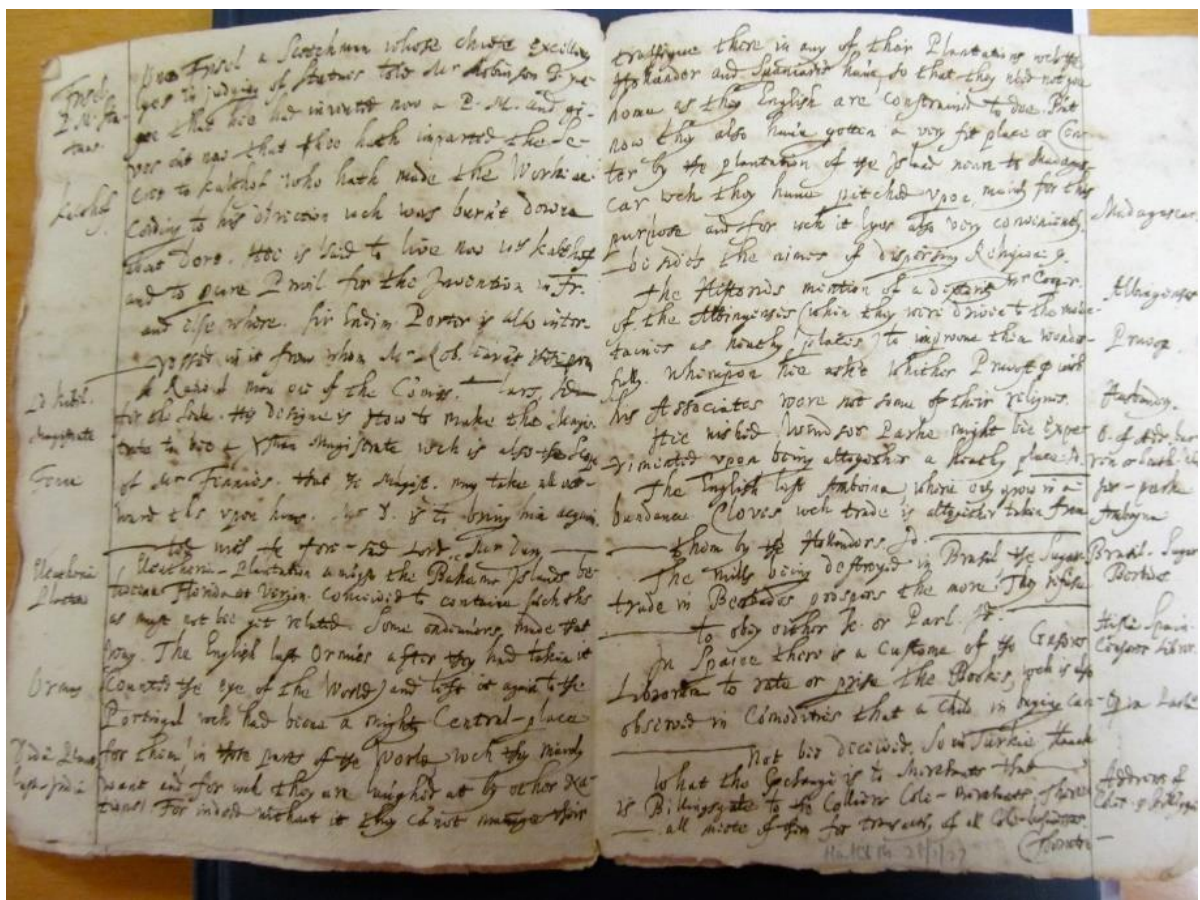


Figure x.1: Sample pages from Hartlib’s journal, *Ephemerides*, in his hand

<sup>71</sup> *Ephemerides* 1640 Part 4 (After Aug), *HP* [30/4/61A].

To some extent, Hartlib must also have been inspired to build his network of correspondence and Office of Address by Théophraste Renaudot's *bureau d'adresse* in Paris. Like Renaudot, Hartlib was interested in improving medicines and alleviating poverty, and both were interested in keeping current with news from those who were busy exploring new places for potential medicines and experimenting on substances closer to hand.<sup>72</sup>

At its core, the Hartlib Circle was a loosely connected research team designed to discover, apply, and preserve useful knowledge. The monarchy and the Commonwealth depended on independent scholars for expertise to conduct diplomacy, national security, and research new technology, which impacted engineering, military capacity, navigation, production, and preservation of resources. Natural philosophers were often also consultants and technical experts, and Hartlib's associates mixed scholarship with politics before, during, and after the English civil wars. His group was functionally independent of the government because his friends worked on practical projects on their own time, even if they were otherwise employed by the state. Hartlib petitioned the government for financial support, but he also carefully guarded his independence in order to develop and maintain his private correspondence network. Government leaders used Hartlib and his associates as a diplomatic and scientific resource, while he was a source of encouragement to many within and without the Circle, guiding the curious to the specialised experts of the time by writing, printing, and preserving information. His genius lay in transplanting expertise to where it was needed and where it could best be used for every level of advancement. He communicated and demonstrated an ethic of sharing concise and practical information, and he strongly discouraged correspondents from attempting to personally profit from discoveries on both practical and moral grounds. As one determined to reveal secrets for the public good, he did

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<sup>72</sup> Charles Webster, *Great Instauration*, pp. 68, 69, 76, 305, 375.

not tolerate keeping secrets for personal gain; indeed, withholding valuable knowledge for one's private benefit caused a number of individuals to be shunned by Hartlib and his immediate associates.<sup>73</sup>

Hartlib's correspondents occasionally disagreed over the direction and priorities of their work, and how best to apply it to colonies, but they were united in their dedication to the advancement of learning and the common good. Associates discussed ideas regarding state-sponsored improvement of colonies in America and Ireland, even though not every Hartlibian 'acquaintance' agreed with the political identification or the religious priorities of the core group. Occasionally there was a competition between theories or a conflict of interpretation within the network, but the correspondents invariably agreed that a committed, pious and empirically-focussed group of scholars could find solutions to difficult social problems by working together.<sup>74</sup> They believed that secrets were divinely built into the natural world for the benefit of humanity and, once discovered, would unlock unimaginable improvements. Human labour, for example, would be multiplied and increased production would raise standards of living for all classes of people.<sup>75</sup> These achievements would produce less expensive, healthier food and drink, better medical care, full employment, and a sustainable population growth; all of these in turn would lead to territorial expansion and additional discoveries of technological wonders. All of these programmes were embedded in a profoundly sacred conception of historical time, and the majority of Hartlib's correspondents believed that at some imminent point in the future, humanity would be ushered into the millennial reign of Christ.

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<sup>73</sup> Stephen Clucas, "Samuel Hartlib's 'Ephemerides', 1635-59, and the Pursuit of Scientific and Philosophical Manuscripts: The Religious Ethos of an Intelligencer", *The Seventeenth Century* 6:1 (Spring 1991): 36.

<sup>74</sup> Patrick Eamonn Carroll, "Engineering Ireland: The Material Construction of the Technoscientific State" PhD diss., University of California, San Diego, 1999, *Proquest Dissertations Publishing*, 9935447, p. 25.

<sup>75</sup> J. R. Jacob, *Robert Boyle and the English Revolution: A Study in Social and Intellectual Change* (New York, 1977), p. 17.

When discussing the links between Hartlib's network and the Early English Empire, a proper understanding of several terms is critical. The word “scientist”, for example, was not used by the mid-seventeenth-century correspondents who preferred the term “natural philosopher”. The word “science”, however, was often used by the correspondents to describe knowledge, or the pursuit thereof and where relevant it is used here. “Baconianism” is more difficult to define since there were different versions of Bacon’s philosophy, which were applied in various ways by his disciples. Hartlib’s version was centred on the practical, utilitarian application of empirical methods for improving the health and well-being of as many people as possible.<sup>76</sup> To accomplish this, he promoted the use of the human senses, rather than human reason alone to reliably uncover, understand, and record the secrets of God in nature. For Hartlib, the world could best be understood and managed in practical agricultural or mechanical terms by trained or experienced artisans, and so Hartlibians sought to deploy the latest advances in chemistry, mathematics, and physics on farms, in home laboratories, shops, mines, and shipyards.<sup>77</sup>

Hartlibian Baconianism was rooted in Puritan theology.<sup>78</sup> The term “Puritan” is crucial for understanding the politics and world views of Hartlibians such as Hartlib and Boyle, who were members of St. Martin’s-in-the-Field Church of Charing Cross. Some of his allies were ordained Anglican ministers who felt that the church’s Protestant tendencies had become lukewarm, while others identified as non-conformists who nevertheless distinguished between friends and enemies in the established church. I use the term ‘non-conformist’ for one who remained part of the Anglican communion but who refused to ‘conform’ to the high church

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<sup>76</sup> H. F. Kearney, “Puritanism and Science: Problems of Definition” in *The Intellectual Revolution of the Seventeenth Century*, ed. Charles Webster (London, 1974), p. 239.

<sup>77</sup> J. A. Bennett, “The Mechanics’ Philosophy and the Mechanical Philosophy”, *History of Science* 24 (1986): 1-28.

<sup>78</sup> Theodore K. Rabb, “Religion and the Rise of Modern Science” in *The Intellectual Revolution of the Seventeenth Century*, ed. Charles Webster (London, 1974), p. 268.

tradition of Archbishop Laud (i.e. John Cotton, John Davenport, etc.), ‘separatist’ for one who separated from the established Church of England (Anabaptists, Baptists, Presbyterians, Quakers, etc.), and ‘Puritan’ to mean those English Christians, both within and without the established church, who wanted a more ‘complete’ English reformation of religion. Puritans thought the Reformation begun under Henry VIII had been stalled and diluted by subsequent monarchs and was in deperate need of completion. These ministers and church members were hostile to rituals that they took to be a papist legacy of the traditional church, and were more concerned with an internal and individualistic Calvinist faith based on the literal interpretation of the Scriptures, priesthood of the faithful, autonomy of the local church, and personal relationship with God. Puritans outside the Church of England preferred a congregational church government of autonomous local parishes, and they were hostile to an episcopal hierarchy with a single authority at the top, whether the office was held by a Pope, king, or the Archbishop of Canterbury. Puritans believed in a personal conversion experience and the priority of preaching in worship,<sup>79</sup> and their core theological doctrines were easily translated to form new theories of political thought which included limited democracy, manifested in elected representative local assemblies established in colonial regions.

Puritans were at once religious and political. Sceptical of one-man rule and quick to support supremacy of power in a representative Parliament, they believed in the accountability of those in power and were harsh in punishing those who abused the public trust for selfish reasons. The vast majority of Puritans respected the monarchy throughout the 1630s as the established form of government but raised little protest at the execution of Charles I in 1649 after he had demonstrated his unwillingness to compromise with the desires of the people as

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<sup>79</sup> See David R. Como, *Blown by the Spirit: Puritanism and the Emergence of an Antinomian Underground in Pre-Civil-War England* (Stanford, 2004) and William Lamont, *Puritanism and Historical Controversy* (Montreal, 1996).

expressed in the elected national assembly.<sup>80</sup> Hartlib and many members of the Circle can be loosely classed as Puritans, but they were more tolerant than many individuals denoted by that term due to their emphasis on the unification of all Protestants and the ecumenical outlook that underpinned their empirical quest for knowledge. Baconianism and Puritanism thus formed a natural alliance in Hartlibianism, linking empiricism to agricultural and technological improvement, all performed in the expectation of an imminent millennial empire.<sup>81</sup>

Through a multitude of activities, Hartlibians attempted to implement their own brand of Baconianism in England and its colonies. Because their vision was large, the work was divided into intermediate and manageable steps just as Hartlib outlined them in his plan for the Office of Address. Hartlib subtly prioritised and delegated assignments in his communications with associates.<sup>82</sup> Some correspondents such as John Beale, Cheney Culpeper, or Adolphus Speede were leading agriculturalists, while Boyle, Benjamin Worsley, and Johann Moriaen were involved in theoretical and practical aspects of what has broadly been described as ‘chymistry’. Hartlib grouped others as mathematicians, engineers, educators, or experts in economics.<sup>83</sup> The new science grew as it was applied and tested in Ireland and America, where Hartlib’s real interests lay. He did not seek a leadership role in the movement, but believed he was the right person to coordinate activity because it was a godly vocation. He was invited by the government, adventurers, and merchants to do what no one else either would or could do.

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<sup>80</sup> See Michael G. Finlayson, *Historians, Puritanism, and the English Revolution: The Religious Factor in English Politics before and after the Interregnum* (Toronto, 1983); Peter Lake, *Anglicans and Puritans? Presbyterianism and English Conformist Thought from Whitgift to Hooker* (London, 1988) and *The Antichrist’s Lewd Hat: Protestants, Papists and Players in Post-Reformation England* (New Haven, 2002); John Spurr, *English Puritanism 1603-1689* (New York, 1998); and Tom Webster, *Godly Clergy in Early Stuart England: The Caroline Puritan Movement c. 1620-1643* (Cambridge, 1997).

<sup>81</sup> Rabb, *Religion and the Rise*, p. 269.

<sup>82</sup> Ted McCormick, “Projecting the Experiment: Science and the Restoration” in *From Republic to Restoration*, ed. Janet Clare (Manchester, 2018), p. 16. See also Adam Fox, “Printed Questionnaires, Research Networks, and the Discovery of the British Isles, 1650-1800”, *Historical Journal* 53 (2010): 593-621.

<sup>83</sup> William R. Newman and Lawrence M. Principe, “Alchemy vs. Chemistry: The Etymological Origins of a Historiographic Mistake”, *Early Science and Medicine* 3 (1998): 32-65.

### iii. Hartlib and Empire

The argument of this thesis is driven by two contrasting lacunae in the historical literature. Firstly, the existing historiography of the English colonization of Ireland and America is largely silent on the Hartlibian project, although Hartlib worked diligently for three decades to support English imperial expansion and colonial improvement.<sup>84</sup> Conversely, the Hartlibian literature, and that on key members of his circle, has almost completely ignored the significance of his colonial interests and activities, concentrating instead on his work and connections in England or Continental Europe.<sup>85</sup> As I show throughout this thesis however, Hartlib regularly corresponded with allies and others regarding the possibility of improving locations in Ireland and America, recorded his personal thoughts on related topics in his journal, and often spoke with government officials about issues connected to the imperial project.<sup>86</sup>

Hartlib's significance in the history of the Early English Empire has never been explored in detail, although he established relationships with a number of colonists in Ireland, New England, Virginia, and the West Indies. In connection with these pursuits, he wrote to, and personally visited numerous academics, activists, investors, merchants, ministers and

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<sup>84</sup>See Susan Dwyer Amussen, *Caribbean Exchanges: Slavery and the Transformation of English Society, 1640-1700* (Chapel Hill, 2007); Kenneth R. Andrews, *Trade, Plunder and Settlement: Maritime Enterprise and the Genesis of the British Empire 1480-1630* (Cambridge, 1984); *The British Atlantic World, 1500-1800*, eds. David Armitage and Michael J. Braddick (New York, 2002); James Axtell, *The Invasion Within: The Contest of Cultures in Colonial North America* (Oxford, 1985); *Strangers within the Realm*, eds. Bernard Bailyn and Philip D. Morgan (Chapel Hill: University of North Carolina, 1991); Nicholas Canny, "The Origins of Empire" in *The Oxford History of the British Empire*, ed. Nicholas Canny (Oxford, 1988); Alison Games, *The Web of Empire: English Cosmopolitans in an Age of Expansion 1560-1660* (Oxford, 2008); Hugh Thomas, *The Slave Trade: The History of the Atlantic Slave Trade 1440-1870* (London, 1997).

<sup>85</sup> P. G. Dale, *Sir W. P. of Romsey* (Romsey, 1987); Dircks, *Milton's Familiar Friend*; Jacob, *Robert Boyle*; *Samuel Hartlib*, eds. Greengrass, Leslie and Raylor; Michael Hunter, *Boyle and Robert Boyle Reconsidered* (Cambridge, 1994); Leng, *Benjamin Worsley*; Flora Masson, *Robert Boyle: A Biography* (London, 1914); McCormick, *William Petty*; Turnbull, *HDC and Samuel Hartlib*; and Charles Webster, *Samuel Hartlib and Great Instauration*.

<sup>86</sup> Charles Webster, *Great Instauration*, p. 462.

politicians, and in turn, many sought him out in London for his knowledge and connections to colonies.<sup>87</sup> Hartlib discussed plans for improvement with all, and when it was relevant, he collaborated with them on developing practical plantation strategies for the colonies.<sup>88</sup> He made hundreds of journal entries between 1630 and 1660 regarding the western colonies<sup>89</sup> and recorded the visits to his home of many of the most significant colonial figures of his time, including governors, investors, merchants, and adventurers. The most common topics in the correspondence reflect the challenges of planting colonies in climates unfamiliar to Englishmen, and they address subjects such as soil quality, the presence of natural resources; indigenous pests and diseases, and how all these impacted food production and preservation; and the availability of a fresh water supply. The preponderance of conversation regarding sugar or tobacco may not have been Hartlib's personal preference, but it reflects the undeniable reality of improvement projects in specific colonies.

Hartlib and his associates showed a keen interest in supporting English colonial projects at a moment when the risks associated with imperial expansion seemed to be paying dividends. English claims for the right to create colonies in the New World were rooted in the 1495 patent of King Henry VII (r. 1485-1509), which John Beale summarized in 1649 for Hartlib and which argued for the legality of an English presence in America.<sup>90</sup> Three years after Columbus returned to Spain, the English king had sent John Cabot to explore the east coast of America.<sup>91</sup>

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<sup>87</sup> D. R. Ransome, "John Ferrar of Little Gidding", *Journal of the Huntingdonshire Local History Society* 3:8 (2000): 16-24. See also A. L. Maycock, *Chronicles of Little Gidding* (London, 1954); *Conversations at Little Gidding*, ed. A. W. Williams (Cambridge, 1970); and E. Cruwys Sharland, "Introduction" in Nicholas Ferrar, *The Story Books of Little Gidding: Being the Religious Dialogues Recited in the Great Room, 1631-2*, (London, 1899).

<sup>88</sup> *HDC*, pp. 9, 69, 99, 102.

<sup>89</sup> See Michael Braddick, "Civility and Authority" in *The British Atlantic World: 1500-1800*, eds. David Armitage and Michael J. Braddick (New York, 2002), p. 105.

<sup>90</sup> Letter Justifying the Action of Virginia In John Beale's Hand, undated, *HP* [33/2/23A-26B].

<sup>91</sup> John Brereton. *A Briefe and true Relation of the Discoverie of the North part of Virginia; being a most pleasant, fruitfull and commodious soile* (London, 1602), p. 15 and Bernard Sheehan, *Savagism & Civility: Indians and Englishmen in Colonial Virginia* (Cambridge, 1980), pp. 131-3.

This Venetian navigator and explorer arrived at Newfoundland in 1497, representing Henry VII, and was the first early modern European to explore this part of the New World. Cabot provided the English with a claim of first discovery to certain parts of mainland North America, although extending the claim into the Caribbean necessarily meant conflict with Spain, which maintained a very real presence in the West Indies from 1492.

One later Hartlib correspondent, John Brereton, argued in 1602 that England, of all nations, was “most fit for a discovery and planting in remote places” such as Virginia and the islands of the West Indies.<sup>92</sup> “Unless we plant first”, he wrote, England’s claim would never be recognised by the world. He understood that while other nations might have been the first to discover locations mentioned in his work, France, Portugal, Spain and others had only built temporary fortifications for the extraction of natural resources and were not planting permanent colonies, nor were they attempting to expand their sovereign borders to annex new lands. Sir Walter Raleigh, like Francis Bacon, and Hartlib himself, always envisioned English imperialism to be a planting process of colonies composed of families to permanently occupy and develop territory in the New World.<sup>93</sup> Improvement work provided its own imperial legitimacy to Hartlibian adventurers who settled there.

A need for national security, a desire for economic benefits, and the quest for a favourable geography for agricultural development underpinned England colonial ambitions. Hartlib was generally interested in all the English plantations, but he was most focused on Ireland and the New World. The Hartlibians set out to enhance the potential of colonies by proposing and executing ideas for improvement in areas such as agriculture, engineering, fishing, military, and mining. Hartlib promoted the compilation of broad and rich descriptions

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<sup>92</sup> Brereton, *A Briefe and true Relation*, p. 20.

<sup>93</sup> Charles Webster, *Great Instauration*, p. 45. See also Paul Slack, *The Invention of Improvement: Information & Material Progress in Seventeenth Century England* (Oxford, 2015).

of each colony, and his support helped the production and printing of natural histories and surveys such as Gerard Boate's *Ireland's Naturall History*. Following Bacon's advice, Hartlibians advocated a full understanding of the animal, mineral, and plant life in each of the colonies, and they were intensely interested in those valuable elements and species that could be transplanted to other climes, including England, where they could be nurtured to build prosperity for those who were spiritually worthy. They favoured colonisation insofar as it promoted the domestication of animals and plants, the production of useful commodities for trade and consumption, and the civilisation of "wild" people and places.<sup>94</sup> Hartlib was willing to work with peaceful natives who might be incorporated into this plan of instauration, but was also willing to tolerate measured conquest and control when less cooperative peoples, such as the Irish and certain American tribes, were obstructive of imported improvement programmes.

Discoveries of mineral deposits or potentially useful flora and fauna were highly significant for constructing colonies that would benefit an expanding nation. Correspondents gave useful information to planters and settlers and assisted them in their work of extracting personal profits in exchange for access to plantations and the necessities encountered in the work. This activity spanned several different trades and industries, such as iron mining in New England, tobacco in Virginia, or sugar in the West Indies. Hartlib actively participated in the colonial programme by advising government and corresponding with a multitude of officials – up to and including Oliver Cromwell. He published a library of directional works, encouraged associates in his network to conduct experiments, make exploratory journeys and write detailed accounts of work done, and he coordinated the work of these same individuals to avoid duplication. Some of his associates travelled, observed, and surveyed foreign locales, while others performed experiments or produced inventions. They often wrote up their own accounts

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<sup>94</sup> Notes on Natural History in Ireland in Various Hands, Signed by Miles Symner, undated, *HP* [62/45/1A-7B].

and gave their notes to Hartlib, who published them as independent works or combined them with other related accounts, for the benefit of other researchers.

#### **iv. A Millennial Empire**

Hartlib prepared for the millennium by advocating the recovery of prelapsarian knowledge, gathering the secrets found in new lands, and improving on them to create a New Jerusalem, a term used throughout the period by associates including Joseph Mede, Beale, and Worthington.<sup>95</sup> As Bacon had noted, the prophecy of Daniel 12:4 depicted a future time in which the frequency of new global discoveries and practical inventions and public knowledge would increase. For Baconians that time was now; Hartlibians knew they were living in a period where the advancement of learning would benefit the universal common good, and “improvement” became the Hartlib Circle’s major goal. Secondly, coupled with Hartlibian millennialism, was the complementary theme of evangelism.<sup>96</sup> John Dury, for example, was fascinated by the possibility that Native Americans were the ten lost tribes of Israel and he promoted evangelistic work among them as part of a fulfilment of Biblical prophecy regarding the millennial theme of Jews embracing Christ as the Messiah in the last days. Boyle supported this same missionary work, serving on a council for the propagation of the Gospel.<sup>97</sup> This motivation to share Christianity was not merely a personal and eternal benefit to the new believer but was a necessary component of civilisation (i.e. improvement). Here, then is

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<sup>95</sup> See Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge, 2007); Howard Hotson, *Paradise Postponed: Johann Heinrich Alsted and the Birth of Calvinist Millenarianism* (Dordrecht, 2000); Jeffrey K. Jue, *Heaven Upon Earth: Joseph Mede (1586-1638) and the Legacy of Millenarianism* (Dordrecht: Springer, 2006). For examples of references to “New Jerusalem”, see John Beale to Hartlib, 10 Jan 1659 *HP* [55/23/11B]; and Joseph Mede to Hartlib, 29 Jan 1638, *The Works of Joseph Mede*, ed. J. Worthington, 4th edn. (London, 1677). iv, pp. 877-8.

<sup>96</sup> Dury to Hartlib, 30 May 1645, *HP* [30 May 1645].

<sup>97</sup> Jacob, *Robert Boyle*, pp. 148-50.

evidence of the deep interpenetration of religion and science within the Hartlibian world, which saw no conflict between natural philosophy and the Bible.<sup>98</sup>

Hartlib was interested in colonies because he believed that scientifically managed plantations would strengthen national security diplomatically, economically, and politically. This allowed the English government to support him and his projects to varying degrees, but foreign Protestant government officials also appreciated the work he and his associates were performing. To Hartlib, promoting unity among Protestants was a moral responsibility, which required sharing scientific information gathered from colonies with other Protestant nations to strengthen them against the religious and political menace of Catholicism. Not only did this unity protect these friendly populations and the Protestant faith, but medicinal and technological secrets, for example, could raise standards of living by reducing infant mortality, expanding education, eradicating disease and eliminating famine. Colonies in the West Indies might allow England to achieve a level of economic self-sufficiency that would free the country from economic dependence on continental trade and enable the nation to assist others from a position of strength. Hartlib and his friends were major proponents of increased trade, and as a mercantilist he knew the advantage of maintaining a positive trade balance. Having a wealth of resources would allow England to participate in global trade as a producer rather than a consumer nation and would ensure a sustainable trade surplus.<sup>99</sup>

This system of mercantilism connected back to the earlier themes of the Hartlibian philosophy because rational and properly-directed productivity would allow England to become spiritually and economically wealthy.<sup>100</sup> Descriptions of peace and prosperity within

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<sup>98</sup> For example, see Culpeper to Hartlib, 21 Jan 1645, *HP* [13/65A]; John Hall to Worsley, 5 Feb 1647 [36/6/1A]; Worsley to Dury, 27 Jul 1649? [33/2/18A-19B]; Beale to Hartlib? 9 Apr 1657 [52/11A]; and Dury to [Hartlib], Oct 1661 [4/4/36A].

<sup>99</sup> Charles Webster, *Great Instauration*, pp. 67, 325, 350, 356, 375, 422-3, 429-35, 436, 442, 443, 450, 453, 463.

<sup>100</sup> For example, see *Proposals Relating to Poor Relief*, undated, *HP* [15/2/47A-50B]; [John Dury] to? 1646? [17/9/1A-10B]; and *Londons Charity Enlarged*, 1650 [57/4/13/1A-12B].

the Hartlib Circle border on utopian literature but, to Hartlib, colonies were real world laboratories that could actually bring into existence what others only imagined in fiction.<sup>101</sup> Many Hartlibians found the improvement of colonies attractive for their potential to be havens for friendly populations suffering political or religious persecution. America was remote and the great distance from Europe would insulate fragile refugee populations, hard-working Protestants, from wild seventeenth-century fluctuations in English and continental politics.<sup>102</sup> Attempts to create safe plantations for these groups are detailed in the subsequent chapters, but the desire to do so is partly why empire was so important to the Hartlib Circle.

In this thesis, I aim to bridge the gap between the historiography relating to Hartlib's life and work, and the literature on the Early English Empire by restoring the colonies to their pivotal place in the Hartlibian project. Four chapters shed light on this intervention in mid-seventeenth-century Stuart imperialism, one for each of four colonial regions. In the first, I explore Hartlibian participation in the English plantation of Ireland by focussing on Gerard Boate's production of *Ireland's Naturall History*, William Petty's survey, and Benjamin Worsley's plan to use Irish property to fund the Office of Address, itself to be a centre of global imperial improvements. In the second chapter I focus on the seventeenth-century settlement and improvement of New England, and examine the work of associates such as Robert Child, William White, and John Winthrop Jr. 'New England' is a collective regional term for several English colonies in the north-eastern corner of North America, such as Massachusetts and New Haven, and I show that Hartlib participated in each of them. The third chapter investigates Hartlib's participation in Virginia and features his attempts to diversify the economy of the colony by promoting alternatives to tobacco, even while encouraging improvements to the

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<sup>101</sup> See Robert Appelbaum, *Literature and Utopian Politics in Seventeenth-Century England* (Cambridge, 2002); J. C. Davis, *Utopia and the Ideal Society: A Study of English Utopian Writing 1516-1700* (Cambridge, 1981); and Nell Eurich, *Science in Utopia: A Mighty Design* (Harvard, 1967).

<sup>102</sup> Printed Booklet, *The Moderate Intelligencer* No. 160. 6-13, Apr 1648, *HP* [39/2/74/3A].

growth and preservation of the same. In the final chapter I detail Hartlib's ongoing work to promote the colonisation of the West Indies, where he supported efforts to extract and in some cases process resources from several islands and the mainland for transport to England. I also show how he supported the development of new technology for the harvesting of those resources on specific island plantations such as Barbados and Jamaica.

## CHAPTER I: HARTLIB AND IRELAND

Níl tuile dá mhéad nach dtránn  
(All floods will pass)

-Old Irish Proverb

In this chapter I consider the place of Ireland in the various schemes of Hartlib and his associates and I show how Hartlib and his associates worked to transform the landscape into a productive centre of improvement. This chapter illustrates these activities by first reviewing the historical context for the English plantation of Ireland. I then explore Boate's natural history, Petty's survey, and Worsley's funding plan, and situate these within the contexts of the 1641 rebellion and the role of Oliver Cromwell. Hartlib earned considerable praise from contemporaries as the head of a leading independent seventeenth-century scientific research team offering to guide government policy and private investment in colonial Ireland.

### 1.1. Irish Plantation History: Before 1640

The native Irish of the four traditional kingdoms of Ireland were Gaelic speaking and Roman Catholic, loyal to their local family units, and bitterly resistant to English encroachments.<sup>1</sup> Expansion of English and Scottish colonists into Ireland began when Scottish immigrant settlers were given Irish land as payment for military service by Henry III in the thirteenth century. The English king claimed sovereignty over Ireland and encouraged more Scots to follow the mercenaries and to settle the island. An active trade arose between Ulster and southern Scotland as the population of Scots-Irish grew.<sup>2</sup> Despite geographical proximity,

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<sup>1</sup> James Graham Leyburn, *The Scotch-Irish: A Social History* (Chapel Hill, 1962), p. 84.

<sup>2</sup> Cyril Falls, *The Birth of Ulster* (London, 1936), p. 13.

however, few marriages and little cultural assimilation took place between the native Irish and the Scots-Irish over the subsequent four centuries.

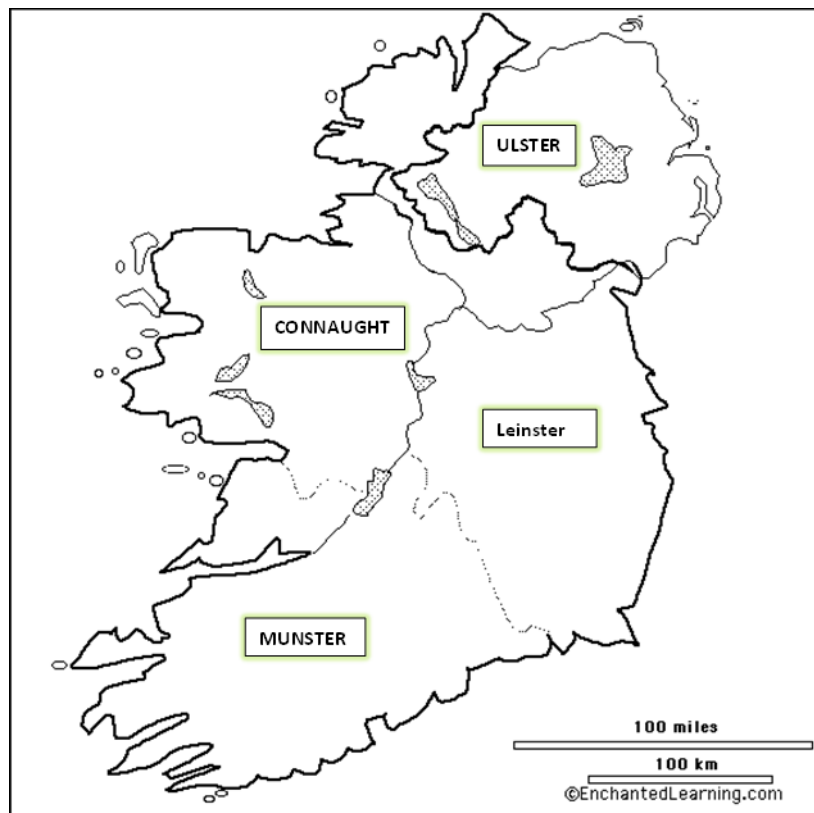


Figure 1.1: The Four Major Regions of Ireland.

Toby Barnard has argued that by the time Henry VII reaffirmed the Statues of Kilkenny in 1497, a number of social, religious and political features had combined to inspire and encourage the English to “improve” Ireland.<sup>3</sup> For example, Augustine’s frankness regarding the depravity of man was widely used in the English reformation to show that people were basically uncivilized without the indwelling of true Christian faith. Erasmus’ writings on the capacity of humans to exercise free will were also well received by Calvinists. It supported their view that the Irish Catholics were responsible for their own spiritually depraved condition, but it offered hope that this condition could be improved through appropriate civilizing

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<sup>3</sup> Toby Barnard, *Improving Ireland? Projectors, Prophets and Profiteers 1641-1786* (Dublin, 2008), p. 18.

practices. Enlightenment meant the assimilation of the Irish to English culture in speech, dress, faith, and social structure, but during the English reformation the brutal efforts to ‘civilize’ the indigenous people provoked several periods of resistance, beginning with the Kildare Rebellion of 1533.<sup>4</sup> Unlike the Scots-Irish of Ulster, English settlers in Leinster were assimilated to Gaelic culture and became known as the Old English. After Henry VIII’s declaration of ecclesiastical sovereignty in 1536, the mission to Ireland became a predominantly religious one, and the Protestant Irish parliament forbade appeals to Rome and voted to abolish the jurisdiction of the Pope in Ireland.<sup>5</sup> In response, the Pope sent missionaries into Ireland to strengthen this outpost and the competition for Ireland began in earnest.<sup>6</sup> Alliances vacillated during the sixteenth century, but the Irish consistently and vigorously resisted both English sovereignty and Scottish settlement.

In 1571, Queen Elizabeth I authorised settlement of additional English planters on confiscated Irish land. Threats from Spain added a security aspect to English interest in Ireland as the Protestant kingdom sought to exclude the possibility of Catholic nations launching an invasion of England from the west. Five reasons may be identified to explain why James I chose to continue the imperial policies initiated by Elizabeth and why he not only continued the plantation of Ireland but increased the urgency of overwhelming the native population. Firstly, James wanted political, cultural, and spiritual unity. As plantation evolved, “civilisation” in Ireland increasingly meant “Anglicisation” or conformity to a united faith.<sup>7</sup> Secondly, plantation of Ireland decreased the risk of foreign invasion of England from the West.<sup>8</sup> Thirdly, some English, including James, felt a moral obligation to ‘civilise’ the Irish

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<sup>4</sup> Derek Hirst, *Dominion: England and Its Island Neighbours, 1500-1707* (Oxford, 2012), p. 33.

<sup>5</sup> See Alan Ford, “Apocalyptic Ireland: 1580-1641”, *Irish Theological Quarterly* 78:2 (2013).

<sup>6</sup> Falls, *The Birth of Ulster*, p. 13.

<sup>7</sup> Jane Ohlmeyer, *Making Ireland English – The Irish Aristocracy in the Seventeenth Century* (New Haven, 2012), p. 170.

<sup>8</sup> Michael Sheane, *Ulster Blood: The Story of the Plantation of Ulster* (Torrns Park, UK, 2005), p. 34.

and a religious duty to deliver them from the bondage of Gaelic Catholic culture. Gerald Boate later wrote in *Ireland's Naturall History* of “The great pains taken by the English, ever since the conquest, for to civilise them, and to improve the country”<sup>9</sup> and to the English, the Irish were “wild”, not unlike the natives in North America. Boate reflected this when he added that “in all manner of wildness they may be compared with the most barbarous nations of the earth”.<sup>10</sup> The Irish Lord Deputy, Arthur Chichester, referred to the Irish as “an unprofitable burden of the earth, cruel, wild, malefactors, thieves”<sup>11</sup> and James, though often misquoted, made two statements that were merged and frequently repeated as one. In a letter to Chichester, the king wrote, defending the purpose of plantation:

If we had intended only our present profit, we might have converted these large territories to our escheated lands, to the great improvement of the revenue of our crown there; but, we chose rather for the safety of that country, and the civilizing of that people, to depart with the inheritance of them at extreme undervalues, and to make a Plantation of them.<sup>12</sup>

Earlier, James’ words were incorporated into the 1613 charter of The Irish Society in which he declared that his most “kingly” purpose was to advance his religion and that this was done by improving depraved men previously “lost in superstition” in uncultivated lands.<sup>13</sup>

Fourthly, James needed an inexpensive means to reward those several men who had claims on his patronage and who fought in his armies. Undertakers paid for land in Ireland, but James made grants to others, most of whom were rewarded for prior, faithful military service. Finally, the plantation of Ireland was also a means to relieve the population growth in Scotland, which was believed to be the cause of famine. Fifty thousand Scots had migrated to

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<sup>9</sup> Gerard Boate, *Ireland's Naturall History* (London, 1652), p. 7.

<sup>10</sup> *Ibid*, p. 7.

<sup>11</sup> Letters patent and correspondence addressing critical issues such as religion and the conditions for planting, London Metropolitan Archives, Irish Society Records, Ref.: CLA/049/AD/01/001-005. See also, Jonathan Bardon, *A History of Ulster* (Belfast, 1992), p. 124.

<sup>12</sup> Letters patent and correspondence addressing critical issues such as religion and the conditions for planting, London Metropolitan Archives, Irish Society Records, Ref.: CLA/049/AD/01/001-005.

<sup>13</sup> Charters 1613-1671, London Metropolitan Archives, Irish Society Records, Ref.: CLA/049/AD/13/001-006.

France, Holland, and Poland during the sixteenth century, in addition to those thousands who moved to Ireland.<sup>14</sup>

Plantation was profitable. Undertakers paid to participate and continued to pay annual rents, as long as they owned their estates in Ireland. Richard Boyle, having been named a member of the Privy Council of Munster in 1606, and in 1612 a member of the Privy Council

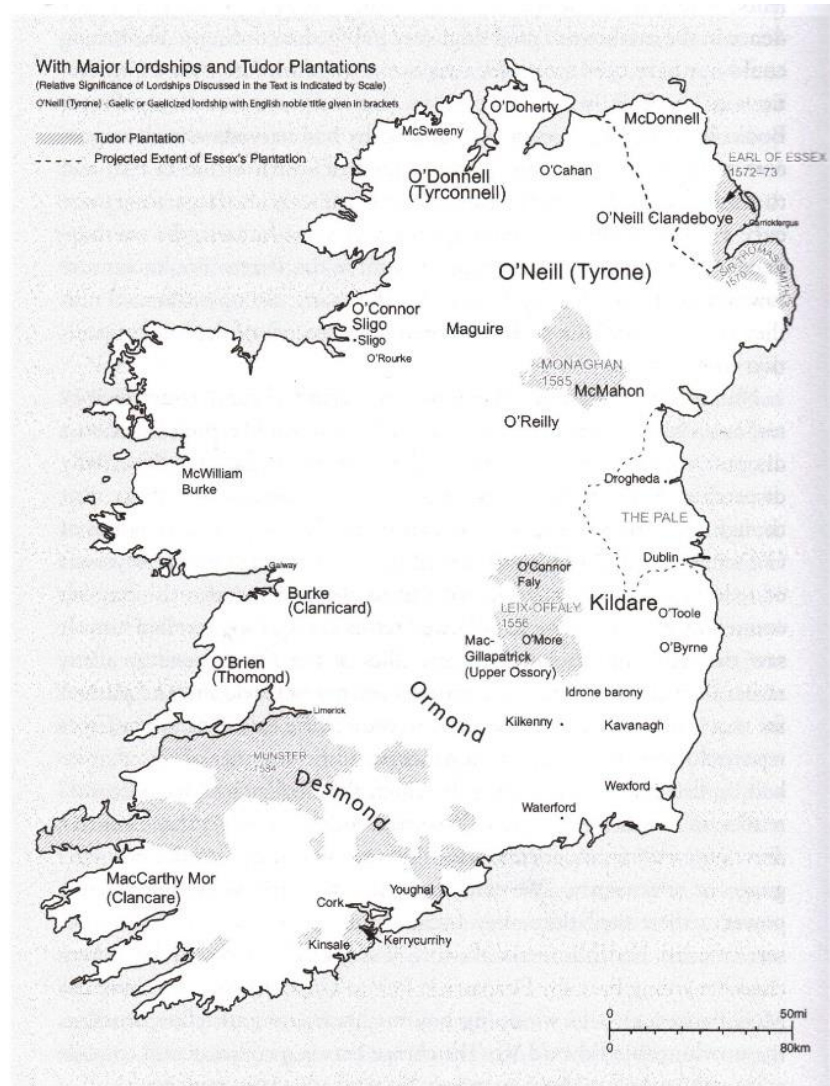


Figure 1.2: This map illustrates the major areas of plantation during the reign of Elizabeth I along with the locations of major towns and the most powerful Irish chieftains with their traditional territorial claims.<sup>15</sup>

<sup>14</sup> Sheane, *Ulster Blood*, p. 15.

<sup>15</sup> Hirst, *Dominion*, p. 62.

of all Ireland, purchased the Bandon estate in Munster and founded iron-smelting and linen-weaving works there, while also building bridges, castles, churches and roads.<sup>16</sup> In 1614, he became a member of the Irish Parliament, was made Baron of Youghal in 1616 and finally, was elevated to the Earldom of Cork in 1620. As planters like Boyle sought to recruit English settlers, James expected many in overcrowded London to sign up. Those who volunteered were asked to “conform themselves in religion”, which meant conformity to the Book of Common Prayer.<sup>17</sup> By 1610, an Irish Society was established as a committee of plantation commissioners to enforce the rules of James’ plantation and administer a land redistribution process.<sup>18</sup> James wanted to further amend plantation policy to ease religious tension while ensuring control of the Catholic Irish.<sup>19</sup> When Boyle became Lord Treasurer in 1631, he purchased the properties of Sir Walter Raleigh, and added 42,000 acres to his estate. He and Adam Loftus attempted to maintain a peaceful balance in Ireland among the 1.5 million native Irish, almost 500,000 Old English, 16,000 to 25,000 Scottish settlers concentrated in Ulster, and the fewer 'New' English concentrated in Dublin.<sup>20</sup>

Thomas Wentworth, 1<sup>st</sup> Earl Strafford, was appointed Lord Deputy of Ireland in 1632. As a leading planter serving as Lord Treasurer, Boyle had been an obvious candidate for the post, and many expected his appointment. Charles I, however, chose Wentworth, whom he could trust to centralise power in the crown, and Wentworth arrived in Dublin in July 1633. Having been led to believe there was “hardly a papist in Dublin”, Strafford was surprised to

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<sup>16</sup> Carroll, *Engineering Ireland*, p. 5.

<sup>17</sup> *A Collection of Such Orders and Conditions, as Are to Be Obserued by the Vndertakers, Vpon the Distribution and Plantation of the Escheated Lands in Vlster* (London, 1608).

<sup>18</sup> M. Perceval-Maxwell, *The Scottish Migration to Ulster in the Reign of James I* (London, 1973), p. xii.

<sup>19</sup> William Sheehan and Maura Cronin, *Riotous Assemblies: Rebels, Riots and Revolts in Ireland* (Cork, 2011), p. 65.

<sup>20</sup> *Scotland and the Ulster Plantations: Explorations in the British Settlements of Stuart Ireland*, eds. William P. Kelly and John R. Young (Belfast, 2009), p. 84 and Diane Purkiss, *The English Civil War: A People’s History* (New York, 2006), p. 88.

find that there were “infinite swarms of friers”.<sup>21</sup> He dismissed several inefficient English bureaucrats from the government, began trade with Spain, promoted textile manufacturing, and encouraged the development of Ireland’s natural resources. As customs duties rose, Strafford raised an army, ended piracy, stimulated the English Church of Ireland, and took steps to alleviate poverty among the poorest of English settlers. His reforms, sometimes going against his directives from Charles, made enemies, none more determined to undermine him than Richard Boyle.<sup>22</sup>

Although written in 1596, Edmund Spenser’s *A View of the Present State of Ireland* was published in 1633 and had a substantial impact on English public opinion on Ireland at that time. Spenser was used by some activists to challenge Strafford’s Irish Policy in the 1630s, even though Spenser himself simply reflected the attitudes of bureaucrats and undertakers from the earlier period.<sup>23</sup> The unpublished manuscript influenced another text, John Davies’s *Discovery of the True Causes Why Ireland was Never Entirely Subdued*, of 1612. Both works shaped the English attitudes to plantation by calling both for the direct and complete control of Ireland and, in effect, for giving Protestant Ireland representation in the English Parliament. They laid a foundation for public debate about Irish policy, which would continue well past the Hartlibian period. One philosophy of plantation would have the Irish changed and assimilated over time, the other would remove them completely by violent methods of transplantation and even extermination. Although Hartlib and his associates seem to have favoured assimilation before 1641, frustrated by the ongoing rebellion in the 1640s, they came to support a less

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<sup>21</sup> Sheehan and Cronin, *Riotous Assemblies*, p. 76.

<sup>22</sup> R. F. Foster, *Modern Ireland 1600-1972* (London, 1988), pp. 78, 81; Hirst, *Dominion*, pp. 171, 173-4; and Hugh F. Kearney, *Stafford in Ireland 1633-1641: A Study in Absolutism* (Cambridge, 1959), p. 70.

<sup>23</sup> Kathleen M. Noonan, “‘The Cruell Pressure of an Enraged, Barbarous People’: Irish and English Identity in Seventeenth-Century Policy and Propaganda”, *The Historical Journal* 41:1 (1998), p. 153.

tolerant transplantation of the native Irish, especially after the labour shortage in the West Indies became a crisis.<sup>24</sup> Hartlib did not, however, accept extermination of the native Irish.

## 1.2. Hartlib and Ireland

There is no evidence that Hartlib thought of extending his schemes for improvement to Ireland until 1634, but by that time he was already corresponding with William Bedell, the Bishop of Ardagh, and had likely read and digested Bacon's *Certain Considerations Touching the Plantation in Ireland*, which was presented to James I in 1609.<sup>25</sup> Hartlib and Dury were both close to Bedell, Bishop John Richardson, and Archbishop James Ussher.<sup>26</sup> Dury was offered the position of chaplain to Wentworth by Robert Sidney, 2<sup>nd</sup> Earl of Leicester, in 1640, and considered the offer seriously until ultimately choosing to continue his work on the continent for Protestant unity. Hartlib had established contacts in Ireland by this time and was beginning to form his own opinions regarding the Irish question. Evidence of his longstanding interest in Ireland comes from a letter Richardson wrote to him in 1634, thanking him for a 'previous' kindness and confessing his debt to him. This was, therefore, not the first letter between the two, since Richardson also indicated they had met in person, and mentioned their wives' acquaintance with each other.<sup>27</sup> Richardson had been in Ireland since 1600, when he

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<sup>24</sup> See, for example, [John Dury] To [Hartlib & Sir Thomas Roe], 29 May – 22 Jul [1636], *HP* [9/1/28B]; Arguments For Safety Of The Realm, Dr. L., 1641, *HP* [66/26/1A-2B]; and Memo On Cessation In Ireland In Scribal Hand B, Anon, undated, *HP* [43/78A-79B].

<sup>25</sup> For Bacon's works, see also, *A Declaration of the Practices and Treasons attempted and committed by Robert late Earl of Essex and his complices against Her majesty and her kingdoms* (London, 1601) and *An apology concerning the earl of Essex* (London, 1604). More broadly, see Vivian Salmon, *Language & Society in Early Modern England* (Amsterdam, 1996) and *The Study of Language in the Seventeenth Century* (Amsterdam, 1988).

<sup>26</sup> See J. A. Carr, *The Life and Times of Archbishop James Ussher: An Intriguing Look at the Man Behind the Annals of the World* (Manchester, 2006) and R. Buick Knox, *James Ussher: Archbishop of Armagh* (Cardiff, 1967).

<sup>27</sup> John Richardson To Hartlib, 5 May 1634, *HP* [5/16/1A-2B].

graduated from Trinity College Dublin. Although he left Ireland before the rebellion in 1641, he was prominent as the Bishop of Ardagh and was keenly interested in the work of Dury, which he followed through his communications with Hartlib.<sup>28</sup>

Hartlib had come to a conscious determination by 1635 to collect manuscripts on a range of subjects -- including Irish topics -- in order to preserve and disseminate knowledge. He believed that keeping potentially useful manuscripts in private hands constituted an unacceptable hoarding of secrets that was damaging to the common good.<sup>29</sup> Thomas Goodwin, one of Hartlib's most admired theologians, told him in 1634 that "the best things" were in manuscripts as opposed to printed works.<sup>30</sup> Exploration, then, not only applied to uncharted lands, but to uncatalogued private libraries and as yet undiscovered manuscripts.<sup>31</sup> Hartlib was aware of both the enormity of the task and the brevity of life, so he worked to coordinate the research of his correspondents as much as possible.<sup>32</sup> While he collected manuscripts in London, members of his expanding network were gathering information in the field, an arena that increasingly included Irish locations. In 1636, for example, his correspondent William Brereton travelled to Ireland and observed Gaelic culture, which he later described in *Travels in Holland and the United Provinces, England, Scotland and Ireland*.<sup>33</sup>

Even as he was working for Protestant unity on the European continent, Dury was interested in Ireland as a fertile ground for various Baconian projects. Writing from Stockholm in 1636, he reminded Hartlib to keep him informed regarding the progress of events in Ireland,

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<sup>28</sup> See Elizabethanne Boran, "Propagating Religion and Endeavouring the Reformation of the Whole World": Irish Bishops and the Hartlib Circle in the Mid-Seventeenth Century', in *Taking Sides? Colonial and Confessional Mentalities in Early Modern Ireland: Essays in Honour of Karl Bottigheimer*, eds. Vincent P. Carey and Ute Lotz-Heumann (Dublin, 2003), pp. 165-184.

<sup>29</sup> Ephemerides, 1635, *HP* [29/3/11B].

<sup>30</sup> Ephemerides, 1634, *HP* [29/2/53B-54A].

<sup>31</sup> Clucas, *Ephemerides*, p. 36.

<sup>32</sup> Ephemerides, 1639, *HP* [30/4/27B].

<sup>33</sup> William Brereton, *Travels in Holland and the United Provinces, England, Scotland and Ireland* (London, 1644).

asking what was being done in “all affaires, which wee haue set a Worke”.<sup>34</sup> One should note the intimation that the ‘work’ had been started by 1636, as well as the fact that there was a collective mentality expressed by his use of the first person plural. A month later, he wrote to Hartlib to ask about the work in Ireland and asked again to be kept informed.<sup>35</sup> Dury had settled in Stockholm to work for peace in “all parts” by correspondence, but because he anticipated having more time for his other interests, he offered to trade news with those in Ireland; he must have intended Bedell, Richardson, and Ussher when he wrote, “tell *them* that I will let *them* know”.<sup>36</sup> Dury's interest in Ireland stemmed from his concern with Protestant unity, while in London Hartlib was increasingly focussed on the larger correspondence network and more practical topics relevant to the colonial project.<sup>37</sup>

The Irish uprising of 1641 had a major impact on English sensibilities regarding colonisation and caused many to abandon the more peaceful approach of gradual assimilation. Support for the transplantation, if not the full extermination of the native Roman Catholic population, increased substantially. The rebellion had a substantial impact on the various projects of the Hartlibians in Ireland because it convinced many that the native Irish would never voluntarily allow the English improvements they were promoting to be successful. Although the resistance obstructed the work of improvement, Hartlib continued to push for reforms and technical and agricultural innovations while working to encourage peace with the native Irish. “Mee thinks the tyme drawes neere”, he wrote in 1640, “that this Grande [sideration?] allsoe shall be fulfilled for some noble ends which Gods providence aymes at”.<sup>38</sup> The grand “sideration” was the Advancement of Learning in Ireland, and shortly after he wrote

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<sup>34</sup> [John Dury] to [Hartlib & Sir Thomas Roe], 17 Jun 1636, *HP* [9/1/29A].

<sup>35</sup> [John Dury] to [Hartlib & Sir Thomas Roe], 19 Jul 1636, *HP* [9/1/31B].

<sup>36</sup> [John Dury] to [Hartlib], 19 Jul 1636, *HP* [9/1/31B].

<sup>37</sup> Jacob, *Robert Boyle*, p. 17.

<sup>38</sup> Hartlib, Copy Letter in Scribal hand F, Hartlib To? 20 Feb 1640, *HP* [7/43A-B].

this he drew attention (in a letter to an unnamed recipient) to a “Mr Johnson”, likely Robert, a Protestant minister serving under William Bedell who was also working on a universal language project based on mathematical characters, and who had written a book called *Real Characters* (which Hartlib mentioned in his journal of 1641). Hartlib went on to note in the same document that Ireland was fertile ground for inventing and testing new machines.<sup>39</sup>

Bedell himself was a committed Baconian and in 1640 he wrote to Hartlib, curious to know what was being done by way of furthering the great project to advance learning.<sup>40</sup> He offered information of varying degrees of usefulness, reporting that the Bishop of Dremore, Theophilus Buckwort, had seen a man who was able to cross a river by carrying a large stone to give him firmness. This, unsurprisingly, was labelled a “strange invention” by Hartlib.<sup>41</sup> During this time Hartlib was already communicating to his correspondents about “a physical place where people could deposit, acquire, and exchange information of all kinds”, as if they were transacting business at a commercial bank.<sup>42</sup> He would develop these ideas over time and publish them in 1648 as *A Further Discoverie of The Office of Publick Adresse for Accomodations*. As Ireland became a laboratory for colonial projects, the Office of Address was intended to be the centre of empirical imperial improvement, based in London but intimately tied to all the English colonies.

Once the 1641 rebellion began, the revolt spread among the native Irish who began attacking Scots-Irish settlements.<sup>43</sup> Debt, shrunken land-holdings, bad harvests, discrimination against natives, and unhappiness over mandatory tithes and fees to support the English Church

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<sup>39</sup> Ephemerides, 1641, *HP* [30/4/71B]; M. M. Slaughter, *Universal Languages and Scientific Taxonomy in the Seventeenth Century* (Cambridge, 1982), n. 31, p. 235; and Nancy S. Struever, *Language and the History of Thought* (Rochester, 1995), p. 68. See Henry Jones, *A Remonstancie of Diverse Remarkable Passages Concerning the Church and Kingdom of Ireland* (London, 1642), p. 37 and Webster, *Great Instauration*, p. 127.

<sup>40</sup> Dury to Bishop of Kilmore. 1 May 1640, *HP* [5/12/9A-12B].

<sup>41</sup> Boate, *Ireland's Naturall History*, p. 59.

<sup>42</sup> Rob Iliffe, “Hartlib’s World” in *London and Beyond: Essays in Honour of Derek Keene*, eds. Matthew Davies and James Galloway (London, 2012), p. 101.

<sup>43</sup> *Stuart Ireland*, eds. Kelly and Young, p. 123.

drove the rebels to stage mock trials, destroy English and Scottish livestock, and desecrate Protestant Bibles.<sup>44</sup> Native Irish leaders proposed alliances with both the Old English and the disaffected Scots in Ulster to strengthen their position. The Old English initially hesitated to openly unite with the Catholic Irish but stood by as Protestant towns were attacked. By the end of winter (1641-1642), up to 4,000 Protestants were dead. When some Puritans in Ireland accused Charles I of using Catholics to kill Protestants, the Irish Rebellion became a key feature of the parliamentary efforts to restrict the authority of the king. On 1 January 1642, Charles condemned the rebellion but stopped short of condemning Irish Catholicism. The king's proclamation was too late to stop the Irish Rebellion or to halt the rush to reforms in Parliament, which was becoming ever bolder in its willingness to question the king and to grasp for independence.<sup>45</sup> Many of Hartlib's Irish contacts left Ireland or lost their positions because of the rebellion, and many planters were unprepared for the uprising.<sup>46</sup> Richard Boyle, for example, failed to anticipate the scale of the conflict and endured great financial losses. Although his children recovered his estates after the rebellion, the war destroyed his personal income, then worth £20,000 per year, and he died in Youghal in 1643.<sup>47</sup> His family, including his son Robert and his daughter Katherine, fled the island and survived to prosper in England. At his death, the Earl of Cork was the wealthiest and most successful English planter in Ireland, although he lamented "I know I am the greatest looser of any man in this kingdome".<sup>48</sup>

In 1641, just as the rebellion began, Hartlib published Gabriel Plattes' *Macaria*, the clearest and most detailed statement of Hartlibian Baconianism printed in the period.<sup>49</sup> This

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<sup>44</sup> Hirst, *Dominion*, 188.

<sup>45</sup> J. C. Beckett, *A Short History of Ireland* (Belfast, 1952), pp. 74-80; Foster, *Modern Ireland*, pp. 79-100; and Hirst, *Dominion*, pp. 178-203.

<sup>46</sup> Barnard, *Improving Ireland?*, p. 19.

<sup>47</sup> *Ibid*, p. 44.

<sup>48</sup> Peter Pett, *A Discourse Concerning Liberty of Conscience* (London, 1661), pp. 21-22.

<sup>49</sup> See, Jacob, *Robert Boyle*, p. 17.

seventeen-page ‘utopia’ was a manifesto on behalf of the Hartlib Circle and was addressed to members of Parliament.<sup>50</sup> *Macaria* revealed that Hartlib and his correspondents were attempting to build a new world in the final days of the old one.<sup>51</sup> The work may have been written by Gabriel Plattes, who was then living with and working for Hartlib, but the ideas expressed were Hartlib’s. In *Macaria*, Plattes imagined a peaceful world domesticated by agriculture and colonisation. Citing Bacon, the work called for the Office of Address to be based on an active empirical natural philosophy instead of on unproven barren speculation regurgitated over the centuries. *Macaria* did not mention Ireland by name, but the island was clearly a plausible template for the sort of colony described in the text. A Council for New Plantations was one of five councils proposed in the work for improving England and its colonies; in this Council, Plattes wrote, “there is established a law, that every yeere a certaine number shall be sent out, strongly fortified, and provided for at the publike charge, till such times as they may subsist by their owne endeavours: and this number is set downe by the said Councell”.<sup>52</sup> The book is commonly understood as an example of seventeenth-century utopian literature, but for Hartlib it depicted a real programme for the transformative use of technical inventions and practical scientific knowledge.<sup>53</sup>

Despite the early success of the Irish Rebellion, the speakers of the Lords and Commons issued a joint statement in 1642 expressing the optimism of the English government in the eventual triumph of England and the successful resumption of the plantation agenda, “Where by the bowels of very many Protestants in that miserable waisted and yet bleeding kingdome

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<sup>50</sup> Gabriel Plattes, *A Description of the Famous Kingdome of Macaria; Shewing its Excellent Government; Wherein The Inhabitants live in great Prosperity, Health, and Happiness; the King obeyed; the Nobles honoured; and all good men respected, vice punished, and virtue rewarded: An Example to other Nations* (London, 1641), p. A2.

<sup>51</sup> Harrison, *The Fall of Man*, p. 188.

<sup>52</sup> Plattes, *Macaria*, p. 5.

<sup>53</sup> Davis, *Utopia*, p. 229.

of Ireland haue beene refreshed and relieved”.<sup>54</sup> With no objection from the assembly, Parliament passed the Adventurers’ Act and offered a share of 2.5 million forfeited Irish acres to Protestant adventurers who were willing to help ‘reduce’ the rebels and invest in the Plantation project.<sup>55</sup> Wealthy individuals proved more than willing to loan money to the government for use in re-conquest and development in exchange for a future return in land or money. This amounted to re-establishing order on the island and an expansion of English control, carried out using both public and private funds. Although full implementation of this act was delayed, it is an example of the continuity of plantation in Ireland and the desire to reincorporate private investors alongside public programmes, with or without the advice of the Crown. One of those adventurers was Hartlib’s associate Gerard Boate, soon to be the author of *Ireland’s Naturall History*, who “having ventured great part of his estate upon escheated lands there, according to the several Acts made by the King and Parliament”, had invested in line with the Act.<sup>56</sup> Among those Hartlibians who subsequently went to Ireland, and who were given responsibility for executing the act, were his present and future associates Robert Child, William Petty, Miles Symner, Robert Wood, and Benjamin Worsley.<sup>57</sup>

In March 1642, several nobles of the Irish Catholics signed a Catholic Remonstrance clarifying their goals in writing. The outbreak of civil war in England later that year meant the Irish rebellion lasted much longer and increased the hope among its supporters that it would be successful. In October, a Catholic Confederation was established at Kilkenny, strengthening the rebellion by formally uniting the Irish Catholic nobility, the Irish Catholic clergy, the native Irish military leaders, and the Old English under the command of Phelim O’Neill. The

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<sup>54</sup> “Statement by the Speakers of Both Houses”, undated, *HP* [20/9/21A-B].

<sup>55</sup> J. H. Andrews. “How many acres? A cartometric exercise of 1642”, *Irish Geography* 34:1 (2001): 1-10.

<sup>56</sup> Boate, *Ireland’s Naturall History*, p. 7.

<sup>57</sup> Toby Barnard, “Miles Symner and the New Learning in Seventeenth-Century Ireland”, *JRSAI* 102:2 (1972): 130.

Confederacy proposed an alliance with Charles I, who initially agreed to join one, even though their mutual enemy was made up of Charles' own English and Scottish Protestant subjects. The treaty provoked such hostility from Protestant Royalists in Ireland, however, that Charles was forced to revoke it as soon as it was made. News of the creation of the Confederation drew 13,000 English soldiers into Ireland, and by summer 1642, the rebels were being contained, running out of supplies, and preparing to temporarily flee the island for safety.<sup>58</sup>

Thousands suffered through the 1640s on all sides of the wars and the number of refugees streaming into London and other cities increased dramatically.<sup>59</sup> Some of those affected among the English included members, friends, and family of the Hartlib Circle. For example, Dury's wife Dorothy Moore wrote to Hartlib in 1644, recommending her nephew to Hartlib for a seat in the Westminster Assembly. This young man was William Caulfield, 5<sup>th</sup> Baron Caulfield, whose two older brothers, Toby and Robert, had already been killed in the war, and Dorothy stressed that their mother, her sister Mary King Caulfield, had "suffered soe much by the Rebels in Irland".<sup>60</sup> Instead of joining the religious conference, William eventually served in the army and participated in the capture of Phelim O'Neill in 1653, ordering O'Neill to be executed for his leadership of the rebellion and for the murder of his brothers.<sup>61</sup>

A number of Hartlib's correspondents fled Ireland as refugees and came to London during the rebellion, and he became renowned as someone who gave special assistance to refugees. In 1645, a certain Samuel Harmer wrote asking help for a 23-year old widow and victim of the war, appealing to Hartlib as "a Gentelman that pittieith the misery of strangers".<sup>62</sup>

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<sup>58</sup> Beckett, *A Short History of Ireland*, pp. 74-80; Foster, *Modern Ireland*, pp. 79-100; and Hirst, *Dominion*, pp. 178-203.

<sup>59</sup> Henry Jones, *A Remonstance*, p. 11, 15-16, 69.

<sup>60</sup> Dorothy Moore to Hartlib, 17 [No Month or Year], *HP* [21/5/9A-10A].

<sup>61</sup> Leng. *Benjamin Worsley*, p. 80.

<sup>62</sup> Samuel Harmar to Hartlib, 20 Aug 1645, *HP* [43/31A].

The woman had come from Cork six weeks earlier with her husband who, Harmer said, had been “the chiefest man that kept the custome house at Corke”. As such, he would have been well known to the Boyles. The refugee organizer had attempted to flee Ireland with his young wife, 18-month-old child, seven other men, their wives, and a few servants, but he and his group had been attacked by native Irish rebels, who killed the men and took their possessions before releasing the women and children. Harmer told Hartlib that the woman had come to London, even though she had no friends there and had been living homeless with other English refugees near the Tower, scarcely 400 metres from Hartlib’s home, for three weeks.<sup>63</sup> There is no indication as to whether Hartlib was able to help the widow or how Harmer decided to write to him, but the letter proves that he had a reputation in London as someone who was willing to assist those in need and who understood what was happening in Ireland.

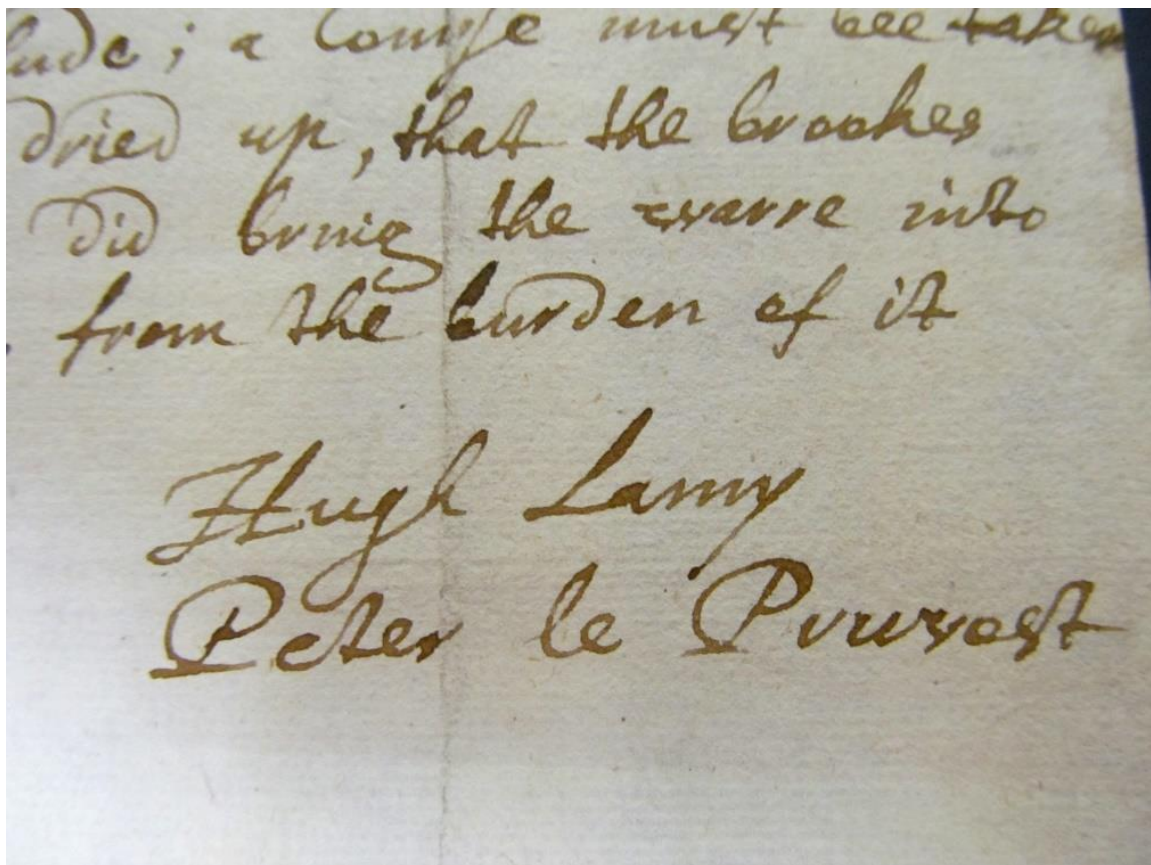
Amidst the political, religious and social turmoil, Hartlib remained focussed on the improvement of Ireland and in 1645, he encouraged Peter Le Pruvost and Sir Hugh L’Amy, wealthy French Huguenots promoting the migration of Huguenots from France, to compose a treatise concerning the island’s economic potential. They were also interested in America, as I show in the following chapter, but at this point Hartlib encouraged them to consider Ireland. A copy survives among Hartlib’s papers of a text by Pruvost and L’Amy describing a process by which -- as they put it -- “in few years (at the most three)”, Ireland would be brought “to perfect obedience”.<sup>64</sup> The plan was to lay a foundation for the complete reduction of Ireland, with the approval and authority of Parliament, by annually sending increasing numbers of trained and loyal settlers who would not be diverted from their appointed purpose of depriving the native Irish of resources and displacing them with expanding numbers of Protestant adventurers.

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<sup>63</sup> Samuel Harmer to Hartlib, 20 Aug 1645, *HP* [43/31A].

<sup>64</sup> Extract in Scribal Hand B, Le Pruvost & L’Amy Concerning Ireland, undated, *HP* [53/14/35A].

L’Amy acknowledged Hartlib in the same document for his public spirit and commitment to the Protestant faith, and he affirmed Hartlib’s noble motives. He gave voice to the goal “to lay a foundation for the reduction of Ireland to a full obedience unto England”, as “scipio did Bring the warre Into Affrica to [deliver?] Italie from the burden of it”, because, “Ireland as every one doth know did begin the quarrel”.<sup>65</sup> In collaboration with Hartlib, L’Amy and Pruvost promoted the idea of a military conquest to clear Ireland of the Irish for colonisation by migrating Protestant families.<sup>66</sup> The warm welcome Hartlib gave to this scheme suggests that by this time he had abandoned any theory of colonisation of Ireland by assimilation and had embraced transplantation and/or removal the native Irish in the service of improvement.



lude; a course must be taken  
dried up, that the brookes  
did bring the warre into  
from the burden of it

Hugh Lamy  
Peter le Pruvost

Figure 1.3: Signatures of Hugh L’Amy and Peter Le Pruvost from their letter to Hartlib

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<sup>65</sup> Extract in Scribal Hand B, Le Pruvost & L’Amy Concerning Ireland, undated, *HP* [53/14/35A].

<sup>66</sup> Copy Memo on Ireland in Dury’s Hand, Hugh L’Amy & Peter Le Pruvost, undated, *HP* [12/115A-116B].

In 1646, as the first civil war was ending, Hartlib wrote *The Parliament's Reformation*, an essay in which he called for acts to employ the poor, to suppress “counterfeits” or prosecution of deceivers feigning poverty, and to promote the public education of poor children. In addition to this, he lobbied Parliament to appoint “honest gentlemen of London” to implement this “good work” throughout the kingdom. This ‘department’ of his Office of Address would also build houses, raise livestock, create jobs, and order society. A cover sheet to a booklet from this period among Hartlib’s papers, written by a royalist, suggested that the war in Ireland might ultimately unify the English, while the booklet itself advocated fasting as a means for private individuals to fund poor scholars.<sup>67</sup> The booklet urged that English supporters of worthy, independent scholars should skip meals each week and give the money they would have spent on food to the scholarship fund. Ending the wars would allow the resumption of Baconian exploration and discovery by scholars, many of whom were poor and needed financial assistance. Hartlib himself had a keen interest in both ending conflict and funding research, since both topics were intimately related to the Irish project. In his introduction to Gerard Boate’s natural history of Ireland, written after the rebellion had ended, he indicated his belief that the path was now clear for adventurous Hartlibian scholars to begin a new push for improvement on the island.<sup>68</sup>

As an independent activist, Hartlib lobbied Parliament and enjoyed excellent relations with a number of Parliamentarians who had significant political influence. He kept an active correspondence with rising stars who were advancing in the government bureaucracy or on the battlefield, and who demonstrated leadership qualities that were potentially beneficial to his work. For example, he wrote to Oliver Cromwell even before he became the executive of the

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<sup>67</sup> Printed Booklet on Fasting to Fund Scholars, Anon: Printed Leaf as Cover. 11 Sep1646, *HP* [66/17/1A-9B].

<sup>68</sup> Hartlib, “Introduction” in Boate, *Ireland's Naturall History*, p. A4b.

Commonwealth. His first surviving letter is dated 6 December 1647 and was a thank you note to Cromwell for “such an aspect from your hands” (most likely a financial gift), with a request to meet when Cromwell returned to London. Hartlib wrote that he had some ideas that would make Cromwell “through the favour of Heaven”, not only an English gentleman but a general, like Titus Vespasian of Rome.<sup>69</sup> The effect Hartlib’s ideas made on Cromwell is impossible to discern, but his parallel between Cromwell and Titus, given less than two years before the reconquest of Ireland, was prophetic to say the least. Keeping up the fight in Ireland was a foregone conclusion for Parliament but Cromwell’s decision to personally lead an army to permanently disperse the rebels was in no small part the result of the encouragement he received from men like Hartlib.

### **1.3. The Natural History: Hartlib and the Boates**

One project Hartlib badly wanted to see completed was a natural history of Ireland, because he knew how critical geographical knowledge was to the success of colonial projects. Accordingly, Ireland needed to be properly mapped before it could be developed.<sup>70</sup> Natural histories of the area before the 1640s had been relatively superficial and Hartlib called for a more detailed survey for the use of adventurers that would be practical and systematic.<sup>71</sup> Modern readers should understand that the term ‘history’ in ‘natural history’ was not historical at all but referred to a narrative documentation of the natural world at a specific point in time. As a laboratory for empirical research, Ireland presented Hartlibians with a divinely given

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<sup>69</sup> Hartlib To Oliver Cromwell. 6 Dec 1647, *HP* [7/20A-20B].

<sup>70</sup> Barnard, *Improving Ireland?*, p. 20.

<sup>71</sup> Charles Webster, *Great Instauration*, p. 420.

opportunity for scientific inquiry.<sup>72</sup> It was not too large, it was near England, and as Hartlib saw it, was grossly undeveloped. With the rebellion coming to an end, and so many veterans and civil servants remaining in the country, Hartlibian interests and political necessity coincided; it was an ideal location about which to write a comprehensive natural history.<sup>73</sup> Boate's *Ireland's Naturall History* is one of the two most important examples of Hartlibian achievements in Ireland, and Hartlib recorded that someone from the North of Ireland known only as 'A King' was brought to him in London by John Graunt in 1652 to thank him for publishing it. This otherwise anonymous resident of Ulster in London told Hartlib that the book had done a great deal of good in and for Ireland. Hartlib further noted in his same journal entry that King was well acquainted with both Petty and Worsley who were recently arrived in Dublin.<sup>74</sup>

By promoting and sponsoring a natural history of Ireland, Hartlib was bringing to fruition Bacon's rationale for transforming the material world by means of empirical science.<sup>75</sup> With Ireland understood by Hartlibians as a blank slate that was ripe for improvement, *Ireland's Naturall History* was supposed to orient willing participants to the arena in which they could do God's work.<sup>76</sup> Hartlib argued that such a project was part of an international undertaking to unify all like-minded Protestants such as the Boates in divine service.<sup>77</sup> Gerard edited information submitted to him by several individuals with a diversity of experiences in Ireland, including his brother Arnold, the adventurers William and Richard Parsons, and numerous other planters. He synthesized their contributions into chapters describing the

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<sup>72</sup> Patricia Coughlan, "Natural History and Historical Nature: The Project for a Natural History of Ireland" in *SHUR* (Cambridge, 1994), p. 302.

<sup>73</sup> Charles Webster, *Great Instauration*, p. 428.

<sup>74</sup> Ephemerides, 1652. 7 Oct – 31 Dec, *HP* [28/2/43A].

<sup>75</sup> Bacon, *Works*, iii, p. 156.

<sup>76</sup> Coughlan, "Natural History", p. 302.

<sup>77</sup> Stanley G. Mendyk, "Gerard Boate and *Ireland's Naturall History*", *Journal of the Royal Society of Antiquaries of Ireland* 115 (1985): 5-12.

situation, shape, provinces, counties, cities, and towns of Ireland.<sup>78</sup> Earlier writers such as John Norden, George Owen, and John Speed had attempted to comment on certain features of the island, but none had achieved anything like the comprehensive detail accomplished by Boate. He gave simple and factual descriptions, provided examples of Irish culture which involved geographic features such as the story of the cave on the island of Lough Derg, and made significant contributions to the strategic goals of the Hartlib Circle such as when he noted that Ireland was better for pasture than for tillage.<sup>79</sup> The conclusion for Hartlibian-inclined readers was that Ireland was a land of astonishing potential that was so far unrealized only because of the ineptness and backwardness of the native Irish.<sup>80</sup>

Boate opened up typical Hartlibian questions and concerns such as whether the native Irish could be taught to improve their own land or be used to labour under English supervision, and he queried whether they should be removed to allow improvement to take place.<sup>81</sup> He did not deliver the usual defamatory portrayal of the Irish people, and even wrote admiringly of certain indigenous skills (such as how the people crossed the deepest bogs with ease). Nevertheless, historians have argued that the project was flawed in direct proportion to the level of its intolerance and incomprehension of Irish culture on the part of Boate's informants.<sup>82</sup> In terms of physical geography, he provided the guidance needed by Hartlib for a usual range of improvement projects such as his descriptions of the number and quality of iron mines and the climate of the island.<sup>83</sup> Hartlib consistently argued that improvements made in Ireland would benefit the surviving native Irish as well as the English. His original sentiment was not to displace the Irish but to assimilate them into English culture; only as a result of ongoing Irish

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<sup>78</sup> Mendyk, "Gerard Boate", p. 6.

<sup>79</sup> Boate, *Irelands Naturall History*, pp. 82, 88, 93, 90, 104, 119.

<sup>80</sup> Mendyk, "Gerard Boate", p. 9.

<sup>81</sup> Boate, *Irelands Naturall History*, p. 59.

<sup>82</sup> Coughlan, "Natural History", p. 298.

<sup>83</sup> *Ibid*, p. 301.

resistance to English intrusions did Hartlib's opinion alter in favour of a plan of measured displacement and transplantation, which as I show later, was further fuelled by the need for labour in the West Indies.

A Dutch surgeon trained in Leiden who had migrated to London in 1630 to practise medicine with his brother Gerard, Arnold Boate became the personal physician to Robert Sidney, later Lord Deputy of Ireland. Arnold, who was also keenly interested in reading the Bible in its original languages, was invited to Ireland as early as 1636 by Ussher to be his own personal surgeon. Arnold's first book, published in 1630, was not concerned with medicine or natural history, but was an examination of the Greek text of the New Testament. Detained by these and other responsibilities, he did not physically arrive in Ireland until 1644.<sup>84</sup> Arnold and Gerard were both associates of Hartlib and had already collaborated with him in writing *Philosophia Naturalis Reformata* (1641), a vigorous assault against Aristotelianism. With a view to determining what benefits might be derived from different locations in Ireland, Gerard started the research for the natural history in 1645, based on information supplied by Arnold and several Irish Protestant refugees, and completed it in 1647. It should be pointed out that Gerard did not visit Ireland until after he completed the book, only arriving in 1649 after his appointment as physician to the Dublin hospital, and indeed he died there the following year. By that time, Arnold had published several more works, including a number of books on medicine, and he had become surgeon-general to the English army in Ireland.<sup>85</sup>

Hartlib was unable to get *Ireland's Naturall History* published until 1652 because Gerard's single copy manuscript had been misplaced in his own archive. Arnold wrote to express his gratitude that Hartlib had found the manuscript "perusing those books and papers

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<sup>84</sup> Mendyk, "Gerard Boate", pp. 5-12.

<sup>85</sup> See F. Elrington Ball, *The Judges in Ireland 1221-1921* (2 vols, London, 1926); Coughlan, "Natural History", pp. 307-8; and Elizabethanne Boran, "Boate, Arnold (1606-1653), biblical scholar and writer on natural history", *ODNB* (23 Sep. 2004).

of his” and added that he was delighted that the book was to be printed.<sup>86</sup> He told Hartlib that his brother had intended the history, “if God had given him longer life”, to be four volumes, with the additional books to be surveys of Irish plants, animals, and people.<sup>87</sup> As it happened, the one complete instalment became a popular reference for adventurers interested in Ireland for development, investment, and settlement. Ireland became a popular destination for young, ambitious English men of that time to make their fortune, and the book was republished in 1657. It appeared with Hartlib’s introduction and another from Dury, and the 24-chapter work detailed the location of potential harbours, fertile fields, sources of fresh water, and mineral deposits.<sup>88</sup> Boate described the physical geography of Ireland in detail; his narrative began with an account of the outer parts of the island and then he described the interior. He organized the contents of his survey under separate headings which covered a range of topics such as climate, minerals, topography, and waters. He said nothing about Irish genealogy and heraldry but gave a great deal of detail about the quality of air, dew, earthquakes, and the full range of the elements of Irish weather.<sup>89</sup>

The first chapter of the book described these topics generally and was not dissimilar from earlier topographical histories. One-third of the work was focused on the coastline, and in bringing together information from a number of different sources, Boate emerged as a pioneer in geomorphology. His writing is detailed enough to indicate that his informants had personally made notes on site of each geographic feature discussed; for example, he meticulously described principal promontories such as capes, sandbanks, and offshore rocks. Boate extended this approach to the interior, cataloguing fountains, lakes, mountains and rivers with detailed descriptions of each. In the conclusion, he included the less profitable regions

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<sup>86</sup> Boate, *Ireland’s Naturall History*, first page of “To The Reader”.

<sup>87</sup> Boate, *Ireland’s Naturall History*, p. 7.

<sup>88</sup> Boate, *Ireland’s Naturall History*, pp. 12-13.

<sup>89</sup> See Boate, *Ireland’s Naturall History*, pp. 163-77, 179 and Mendyk, “Gerard Boate”, p. 6.

such as bogs but assured the reader that since they were of recent origin, drainage to uncover additional fertile land would not be difficult for experienced engineers. He catalogued multiple examples of eight different types of bogs, and in acknowledging the lack of trees in Ireland and the associated lack of fuel and construction materials, he promoted the use of alternative and sustainable fuels such as turf and sea coal, which he argued could be supplemented with coal imported from England. A reprint of the book half a century later removed Hartlib's preface, though the new editor of the text urged his readers to take advantage of the accumulated experience and knowledge of others in approaching the improvement of Ireland.<sup>90</sup>

Boate unsurprisingly presented the political situation from a Protestant perspective and portrayed the planters as "the introducers of all good things in Ireland".<sup>91</sup> He praised Protestant families such as the Boyles, Coots, Parsons, and others who were in Ireland before 1641, citing examples of their achievements.<sup>92</sup> Boate also surveyed what had been lost in the rebellion. The work assumed that the English plantation project, directed by Parliament, would be successful in transforming and pacifying the island and he expressed confidence that the adventurers would create economic growth in Ireland through the application of ingenious projects and the application of hard work. Boate proposed applying Bacon's inductive method to all the sciences including medicine, ethics, and politics, and he encouraged adventurers to assist in establishing new, practical principles in these disciplines by synthesizing their observations and experiences with those of others.<sup>93</sup> *Ireland's Naturall History* was a collaborative effort, and it benefitted from cooperation through correspondence within the Hartlib Circle, precisely as an example of the synthesizing Boate promoted. His book constituted not only a descriptive natural history but, more importantly, a methodological blueprint for improvement projects in

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<sup>90</sup> Gerard Boate, *A Natural History of Ireland*, ed. Thomas Molineux (Dublin, 1725), p. iv.

<sup>91</sup> See Boate, *Ireland's Naturall History*, p. 89, 114 and Mendyk, "Gerard Boate", p. 114.

<sup>92</sup> Barnard, *Improving Ireland?* p. 22.

<sup>93</sup> Charles Webster, *Great Instauration*, p. 421.

the other English colonies. It gave a new and accurate account of the natural history of Ireland, but it also spoke to improvements in agriculture, industry, trade, while offering a detailed if predictably biased social analysis.

Boate's work, despite lacking maps or illustrations, was successful in opening the minds of a new, younger generation of English adventurers to the possibilities across St. George's Channel. In the 'Preface', Hartlib himself recommended the work to adventures and planters, and the Ireland depicted in Boate's work became, in Hartlib's analysis, a land of promise to the English colonial imagination. Ample rewards awaited adventurers willing to migrate for exploration, investment, and improvement, which by this time also meant intervention, manipulation, and transformation.<sup>94</sup> Indeed, *Ireland's Naturall History* served as the foundation for an expanding understanding of improvement. Before the English plantation movement there were no hospitals, infirmaries, or dispensing chemists in Ireland,<sup>95</sup> but by the later seventeenth-century, all of these could be found in the larger Irish towns, perhaps the result of Hartlib's Baconian recommendations, which increasingly involved topics such as air, medical recipes (prescription drugs), food, sanitation, waste, water, and the proper construction of shelter for livestock.<sup>96</sup>

The narrative of *Ireland's Natural History* owed much to the Protestantism of the Hartlib Circle.<sup>97</sup> The work gave evidence of the Puritan association of godliness with cleanliness, and of papism with filth; in Hartlib's vision, no one would "goe filthily and slovenly in their face and hands, and Clothes".<sup>98</sup> In his introduction to Boate's volume he noted

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<sup>94</sup> Carroll, *Engineering Ireland*, p. 5.

<sup>95</sup> Patrick Eamonn Carroll, *Science, Culture, and Modern State Formation* (Berkeley, 2006), p. 133.

<sup>96</sup> *Ibid.*

<sup>97</sup> Barnard, *Improving Ireland?*, p. 20.

<sup>98</sup> Samuel Hartlib, *The Parliament's Reformation Or a Worke for Presbyters, Elders and Deacons To Engage themselves, for the Education of all poore Children, and imployment of all sorts of poore, that no poore body young nor old may be enforced to beg within their Classes in City nor Country* (London, 1646), p. 6.

that *Ireland's Naturall History* was published “For the Common Good of Ireland and for the benefit of the Adventurers and Planters therein”, as well as “to further the settlement thereof”.<sup>99</sup> Hartlib wrote that he hoped to soon replant Ireland with “exiled Bohemians” and other Protestants based on Boate’s information, referring to the congregation of his friend Jan Amos Comenius. Indeed, the book contains several Scriptural references and it was explicitly framed as a religious text inasmuch as “nature makes the atheist more guilty” because such people failed to consider creation to be the result of God’s work.<sup>100</sup>

Hartlib was determined to see Boate’s four-volume project completed and at various points he urged several different trusted associates to finish it. In succession, he courted Arnold Boate, Robert Boyle, Robert Child, Miles Symner, Robert Wood, Benjamin Worsley, and Katherine Boyle Jones (Lady Ranelagh), to accept the assignment. The job description called for someone who understood England and Ireland both before and after the rebellion.<sup>101</sup> Arnold Boate had been the primary source of information for his brother and was a good candidate, despite being only recently arrived in Ireland. He had the requisite skill and knowledge to complete the subsequent volumes, was committed to the Protestant interest in Ireland, and was willing to take the job but died in 1653 before he was able to begin. Hartlib then urged Boyle, who was the only associate to have been born in Ireland. Although he lived most of his life in England, he knew Ireland, was personally close to Hartlib, and shared the Hartlibian vision. Boyle also wanted to see the natural history completed and offered his assistance but told Hartlib he was too busy to be the primary author. Child empathized with Hartlibian Baconianism, was interested in both Irish agriculture and improvement, and was living in Ireland. He agreed to continue Boate’s work, but he too passed away before he was able to

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<sup>99</sup> Hartlib, “Introduction” in Boate, *Ireland's Naturall History* (London, 1652), pp. A2-7.

<sup>100</sup> *Ibid.*, p. A2.

<sup>101</sup> Coughlan, “Natural History”, p. 308.

begin. Symner had been in the Protestant army of Ireland since 1648 and had risen to the rank of major and chief engineer.<sup>102</sup> He had mechanical skills, was a professor at Trinity College Dublin and possessed a well-qualified knowledge of Ireland. Having lived in Ireland longer than any of the potential candidates, he would have been an excellent author of the natural history. He contributed to the collection of information for the project by sending his notes to Hartlib, but like Boyle, he apologised for being too busy to see the work through to completion.<sup>103</sup>

The son of a minister, Robert Wood studied at Oxford and was best known for translating William Oughtred's 1647 *Clavis Mathematica* as a student of the author.<sup>104</sup> Licensed to practise medicine, he was primarily interested in decimal coinage and he was early on drawn to become a loyal Hartlib associate. Wood arrived in Ireland in 1656 and within two years had visited 24 of Ireland's 32 counties. If the Boate project had survived Hartlib's death in 1662, Wood might have completed it, but his late arrival prevented him from beginning the natural history before Hartlib courted others. Wood eventually catalogued the Bodleian Library, became a retainer for Henry Cromwell in Scotland, a fellow of Durham College, and was a member of the Rota Club founded by James Harrington. Having been a visitor with Hartlib in London, the two remained close until Hartlib's death, commonly discussing monetary policy, a reformation of the system of weights and measures, and equine veterinary science.<sup>105</sup>

Worsley and Katherine Jones were both willing to assist in the task of completing Boate's work, but each in turn declined Hartlib's encouragement to be the primary author.

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<sup>102</sup> Barnard, "Miles Symner", p. 130.

<sup>103</sup> *Ibid*, p. 135.

<sup>104</sup> Charles Webster, *Great Instauration*, p. 416.

<sup>105</sup> See Robert Wood to Hartlib, 27 May 1657 *HP* [33/1/15A-16B]; 14 Jul 1658 [33/1/29A-29B]; 13 Oct 1658 [7/116/1A-2B]; and 1658 & 11 May 1659 [26/75/1B-2A].

Hartlib received several contributions that could have been material intended for the project and might have authored the work himself without having been to Ireland, as Boate himself had already done. The contributions, however, were far short of what was needed, so Hartlib was only able to publish them as an appendix to the *Legacy of Husbandry* as the “Alphabet of Interrogatories”. These short bits of information would have been helpful to adventurers and those interested in the study of Ireland, but they were insignificant compared to the envisaged four-volume work. The subsequent volumes never appeared.

#### **1.4. Reconquest: Hartlib and Boyle**

Robert Boyle arrived in London in 1644 and within two years was living with his sister Katherine Jones. By that time, Dury had proposed to Dorothy Moore, the daughter of the adventurer John King and widow of the Boyles’ uncle John Moore, like King an adventurer in Ireland who owned 1,000 acres there. Dury wrote to Katherine in December, 1644, apologising “for a fault committed” and declaring his intention to propose to Dorothy Moore.<sup>106</sup> After her husband had died, Dorothy had lived with Gerard and Katherine Boate in London, and after Gerard’s death, she sold her Irish estate to Boate’s widow. These personal connections, and the fact that Hartlib and Katherine lived near one another, are strong evidence that Hartlib knew her personally by the mid-1640s.<sup>107</sup> She was not mentioned in his papers until 1648, but by that time there were many indications of a mature friendship and mutual admiration in the language of their correspondence.<sup>108</sup> Because of her social standing and personal qualities, both of which

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<sup>106</sup> Copy Letters, John Dury To Lady Ranelagh & Dorothy Moore To [Lady Ranelagh]. 14 Dec 1644, *HP* [3/2/92A-95B].

<sup>107</sup> For Katherine Jones (Lady Ranelagh after 1643), see Ruth Connelly, “A Proselytising Protestant Commonwealth: the religious and political ideals of Katherine Jones, Lady Ranelagh (1614-1691)”, *The Seventeenth Century*, 23 (2008), 244-64.

<sup>108</sup> Ephemerides, Jun/Jul 1648, *HP* [31/22/14A-20B, 29A-32B, 25A-26B].

caused Gilbert Burnet to describe her hyperbolically as making “the greatest figure in all the Revolutions of these Kingdomes for above fifty years”, Katherine’s spacious and conveniently located home became a meeting place for like-minded scholars.<sup>109</sup> The Ranelagh circle was drawn together by enthusiasm for Baconian natural history and an anti-authoritarianism in both natural philosophy and medicine.<sup>110</sup> The circle connected Katherine to the Boates, Dury, Hartlib, John Sadler, Symner, and Worsley, and the regular correspondence that continued between Katherine and Hartlib for the remainder of his life indicates that they were frequent visitors in one another’s homes.

Although the earliest surviving letter between Hartlib and Robert Boyle dates from 1647, their relationship also began years earlier, since the oldest letters show that they already had an established association. Boyle, only seventeen years old in 1644, became an instant favourite of the forty-year-old Hartlib who shared his vision with the younger man. The devout Boyle’s interests were diverse but colonial activity presented an opportunity to share the Gospel with native populations and provided a reason for translating theological books, while answering a need to print Bibles in native languages.<sup>111</sup> Boyle quickly moved to the centre of the Hartlib Circle and began a close relationship with Hartlib that would last until the latter’s death.<sup>112</sup> They lived in the same London neighbourhood and attended the same parish church

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<sup>109</sup> Gilbert Burnet, *A Sermon Preached at the Funeral of the Honourable Robert Boyle at St Martins in the Fields* (London, 1692), p. 33. See also Charles Webster, *Great Instauration*, p. 62.

<sup>110</sup> Charles Webster, *Great Instauration*, p. 65 and Lynette Hunter, “Sisters of the Royal Society: The Circle of Katherine Jones, Lady Ranelagh” in *Women, Science, and Medicine, 1500-1700: Mothers and Sisters of the Royal Society*, eds. Lynette Hunter and Sarah Hutton (Stroud, 1997), pp. 178-91. See also Michelle Marie DiMeo, “Katherine Jones, Lady Ranelagh: (1615-91)” (PhD thesis, University of Warwick, 2009); Michelle Marie DiMeo, “‘Such a Sister became such a brother’: Lady Ranelagh’s Influence on Robert Boyle”, *Intellectual History* 25:21-36 (2014): 21-36, and Connolly, “A Proselytising Protestant Commonwealth”, pp. 244-64.

<sup>111</sup> Sarah Irving, *Natural Science and the Origins of the British Empire* (Milton Park, 2008), p. 83.

<sup>112</sup> See Hunter, *Boyle*, p. 5; and Antonio Clericuzio, “Carneades and the chemists: a study of *The Skeptical Chymist* and its impact on seventeenth-century chemistry” in *Robert Boyle Reconsidered*, ed. Michael Hunter (Cambridge, 1994), p. 79.

with Sir Henry Vane the Younger and John Temple.<sup>113</sup> They must have seen each other at least weekly and heard the same sermons, then preached by Gabriel Sangar, vicar of St. Martin's-in-the-Fields from 1648-1661 and listed among Hartlib and Dury's subscribers in 1654.<sup>114</sup> Little else is known of Sangar, but St. Martin's was known as a strongly Puritan congregation where Donations for Irish relief remained steady for two decades.<sup>115</sup>

Through Hartlib, Boyle met other scholars who were not members of their parish church, including Child, Comenius, Culpeper, John Hall, and Petty. Hartlib and his friends were a source of information and inspiration for Boyle.<sup>116</sup> He described the Hartlib Circle as "our invisible college" and as a "philosophical college", emphasizing that it valued no knowledge that had no use.<sup>117</sup> In other letters, Boyle wrote that the college met at his house and he noted Hartlib's deep involvement in it.<sup>118</sup> The college was invisible precisely because it had no physical presence in the form of property, no government funding, and the bulk of communication took place in conversation or in private correspondence. Its reach stretched to Ireland, and in 1650 Child informed Hartlib he was attempting to organise a sub-group of the Invisible College for chemists in Ulster, naming potential members.<sup>119</sup> Hartlib urged his contacts in Ireland to send him their reports and ideas, and by this time there were "many endeavours" going on to "regulate, replant, and reduce that country to its former flourishing condition", according to William Petty.<sup>120</sup>

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<sup>113</sup> Noonan, *The Cruell Pressure*, p. 174.

<sup>114</sup> Letter and Enclosure, John Dury to Hartlib, 22 Jul 1654, *HP* [4/3/17A-21B].

<sup>115</sup> Noonan, *The Cruell Pressure*, p. 175. See also Joseph Cope, "Fashioning Victims: Dr. Henry Jones and the Plight of Irish Protestants, 1642", *Historical Research* 74:186 (Nov 2001): 374-5.

<sup>116</sup> Jacob, *Robert Boyle*, p. 25.

<sup>117</sup> Boyle to Isaac Marcombes. 22 Oct 1646. *The Works of Robert Boyle*, Vol. I, p. 42.

<sup>118</sup> Boyle to Hartlib, 8 May 1647. *The Works of Robert Boyle*, Vol. I, p. 58.

<sup>119</sup> *Ephemerides 1650*, *HP* [28/1/61B].

<sup>120</sup> William Petty, *History of the Cromwellian survey of Ireland, A.D. 1655-6, commonly called the 'Down Survey'*, ed. Thomas Aiskew Larcom (Dublin, 1851), p. 1.

Miles Symner, later the first professor of Mathematics at Trinity College Dublin in 1652, did not meet Hartlib or any of his correspondents in person before 1648.<sup>121</sup> Nevertheless, he had developed Baconian views independently of any Hartlibian influences and in 1648 he described his own struggle with scholasticism and empiricism and how he came to embrace a more productive view of education. “In all these studyes”, he wrote to Robert King in that year, “my scope is for reall and experimentall learning. I abhor all those ventosities, froth & idle speculations of y<sup>e</sup> schooles”.<sup>122</sup> He remarked that most students came to the universities “shipwracke[d]” because of scholastic methods. He believed they were undeservedly proud because they had mastered their courses, but they remained unqualified for university studies.<sup>123</sup> Symner was enthusiastically drawn to Hartlib and through their common interests and correspondence Trinity College Dublin became linked to the Hartlibians’ European network of associates.<sup>124</sup>

In 1649, Cromwell launched the brutal re-conquest of Ireland. The nature of his intolerance for rebellion was made clear in the massacres that took place at Drogheda in September and at Wexford in October. Royalists were punished severely, whether they were Old English or New, Protestant or Catholic. Civilians were slaughtered and Catholic clergy were executed. The re-conquest was a clear victory for Cromwell and opened an opportunity for significant reform. Constructive reform, however, was frustrated by the desire of many to punish the Irish.<sup>125</sup> By law, half of all Irish males should have been executed for rebellion but, in reality, a few hundred were so condemned. 34,000 were sent from Ireland for military service abroad and as many as 24,000 were transported to the West Indies as labourers. Irish labour

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<sup>121</sup> Barnard, “Miles Symner”, p. 132.

<sup>122</sup> Miles Symner to Sir Robert King, undated but c. 1648, *HP* [47/6/1A-B] and BL, Sloane MS 427, f. 85.

<sup>123</sup> Copy Letter In Scribal Hand B, William Petty To Hartlib? undated, *HP* [7/123/1A-2B].

<sup>124</sup> Carroll, *Engineering Ireland*, p. xii.

<sup>125</sup> Hirst, *Dominion*, p. 222.

was still required in Ireland, otherwise the former number could have been far greater. According to the Adventurers' Act, English soldiers, along with those lending to adventurers, were then owed land as payment for their service or as compensation for their investments. Over eight million acres were granted to 35,000 English soldiers and investors.<sup>126</sup> Most chose to sell their claims at a discount, but 30 percent of the adventurers held out for land. Before the Irish Rebellion of 1641 began, 60 percent of Ireland had been owned by Irish Catholics. By 1650, 94 percent of Ireland was owned by Protestants. 40,000 Scottish and English families arrived to settle in Ireland, encouraged to migrate there and promised protection by the new government.<sup>127</sup>

The war in Ireland was seriously disruptive to many different sorts of political, social and other activities, and Hartlib's associates based in Ireland felt the frustration of the delayed advancement. However, the situation was obviously worse for the Irish people, and contemporaries spoke of a famine so extreme that the dead of certain counties had been made "the dayly foode of the liveinge".<sup>128</sup> Whether these claims were true or exaggerations of lesser atrocities, they affected the assessment of the events among the Hartlibians. One writer suggested "the Irish now suffer vnder this terrible hand of God for their Creweltie to the English we bring the like vpon our selues by our Creweltie to them".<sup>129</sup> Another, who could have been Hartlib, suggested that the "innocent" children of Ireland be transported to England at public expense, be dispersed to the towns of the kingdom, and placed as apprentices to learn "such trade as they shall be thought Capable of where also they may be instructed in the Knowledge and feare of God".<sup>130</sup> This plan would have advanced the process of assimilation but was never

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<sup>126</sup> Barnard, *Improving Ireland?*, p. 19.

<sup>127</sup> Hirst, *Dominion*, p. 225.

<sup>128</sup> Copy Extracts Relating Conditions in Ireland, Anon, undated, *HP* [19/1/65A]. See also Henry Jones, *A Remonstancie* and Cope, "Fashioning Victims", pp. 370-91.

<sup>129</sup> Copy Extracts Relating Conditions in Ireland, Anon, undated, *HP* [19/1/65A].

<sup>130</sup> Copy Extracts Relating Conditions in Ireland, Anon, undated, *HP* [19/1/65B].

employed on a national scale. In his *Political Anatomy of Ireland* of 1691, Petty estimated that 618,000 persons died on the island between 1641-1653.<sup>131</sup> Forty percent of the pre-war population perished, 167,000 in war and 451,000 by famine and disease, such as the plague and typhus. The war was obviously corrosive to the policies set by Parliament for plantation; the loss of population meant that desirable tenants were so scarce that adventurers chose to forgive past due rents, allowed reductions in rent, accepted goods or labour for payment, and accepted Catholics as tenants. For these owners, because of post-war conditions, production meant more than maintaining religious discrimination.<sup>132</sup>

Opportunities abounded in Ireland, however, for new investors from England and settlers who wished to migrate. New adventurers prepared to cross the channel along with Protestant landowners who were returning to rebuild their ruined estates. The new head of the Boyle family, Richard Jr., returned in 1649 to take control of his family's traditional Munster holdings. Optimistic that the economy would recover, Richard Boyle granted only short leases of no more than three years at terms more favourable to potential tenants.<sup>133</sup> The earl proved in practice what Hartlib was promoting in correspondence, namely that a planter could simultaneously earn a decent profit from the land and promote faithful Protestant interests. Another keen Baconian, the younger Boyle set an example for other planters in Munster by introducing new building methods, foods, industries such as textiles, and even recreational activities. He revived the iron works of his father, traded books, clippings, produce, saplings, and seeds with neighbours, loaned animals for breeding, and continued experiments in mining and agriculture.<sup>134</sup> In the 1650s and 1660s, he took advantage of opportunities to expand the size of his estate and increase the number of acres under his control.

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<sup>131</sup> William Petty, *The Political Anatomy of Ireland* (London, 1691), p. 18.

<sup>132</sup> Barnard, *Improving Ireland?*, p. 32.

<sup>133</sup> Barnard, *Improving Ireland?*, p. 32.

<sup>134</sup> Barnard, *Improving Ireland?*, p. 32.

Richard's younger brother Robert spent the best part of two years in Ireland to "settle [his] affaires" between 1652-1654.<sup>135</sup> Hartlib wrote to him in Munster, lamenting "I am sorry, that the transplantation of the Irish should be the dismal occasion of your stay", and adding that he missed their personal contact.<sup>136</sup> He admitted that the work of colonialism was not always pleasant but was necessary for the greater good. In a letter to John Mallet one month before, Robert Boyle, sounding more like an adventurer than a philosopher, had complained of the high taxes in Ireland, the condition of the land that had resulted from the rebellion and subsequent re-conquest and referred to the "threatened transplantation".<sup>137</sup> Boyle's experience shows that being on the ground could dampen the optimism regarding the long-term prospects for improvement. On his way back to England, he wrote to Hartlib's son-in-law, Frederick Clodius, to say that his native land was "a barbarous country".<sup>138</sup> Nevertheless, before leaving Ireland he spent time in Dublin where he had a chance to conduct dissections and strengthen his relationship with another Hartlibian, William Petty.<sup>139</sup>

### **1.5. The Surveys: Worsley and Petty**

Strong personalities occasionally caused divisions in Hartlibian unity, a fact that occasionally impacted the success of improvement projects. Worsley and Petty, who would fall out spectacularly, were initially attracted to one another by their common empirical interests, their mutual relationship with Hartlib, and by their separate but individual appointments to Ireland. Worsley was part of Hartlib's circle of associates from soon after he

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<sup>135</sup> Boyle to John Mallet. 23 Sep 1653. *The Works of Robert Boyle*, p. 146.

<sup>136</sup> Hartlib to Boyle, 28 Feb 1654. *The Works of Robert Boyle*, Vol. I, p. 167.

<sup>137</sup> Boyle to John Mallet. 22 Jan 1654. *The Works of Robert Boyle*, Vol. I, p. 169.

<sup>138</sup> Boyle to Frederick Clodius. 3 Jul 1654. *The Works of Robert Boyle*, Vol. I, p. 166.

<sup>139</sup> McCormick, *William Petty*, p. 55.

left Ireland as a refugee in 1644 until Hartlib's death in 1662. In 1645 he was twenty-seven years old and was already acquainted with Hartlib, the Boates, and William Wheeler. He had studied at Trinity College Dublin and shared an interest in alchemy.<sup>140</sup> Worsley met Petty in 1647 and his oldest letters in the Hartlib Papers are dated from that year. In 1648 Worsley visited Glauber in the Netherlands at Hartlib's request and in 1649 he traded at least fifteen known letters with Hartlib and Dury from Amsterdam. When he returned to Ireland in 1652, Worsley's prospects were much improved; he was now a physician to the army and soon became secretary to the state council seated in Dublin. In 1653 he became the surveyor-general, a post in which he was directed to conduct a gross survey of confiscated Irish land set aside for distribution to English soldiers as compensation for their service in Cromwell's reconquest.<sup>141</sup>

Hartlib was initially introduced to Petty by Sir Cheney Culpeper, who told Hartlib in December 1647, "I very much admire Mr Petty's faculties in writing & printing".<sup>142</sup> Culpeper wrote to Hartlib several times in 1648, praising the 24-year-old: "I am a hearty wellwisher to Mr Petty", he told Hartlib, and remarking that he was "exceedingly taken" with him.<sup>143</sup> Culpeper was convinced that Petty's ideas for inventions of multiple writing and printing would soon be a reality for the benefit of the common good. Petty did not come from a wealthy colonial family like Boyle but, more typical of so many among Hartlib's younger associates, was the son of clothiers in Romsey. Unwilling to follow the path of his ancestors, he chose in 1637 to become a cabin boy in the English navy. After breaking his leg on board, the precocious young man was cast ashore in Normandy and was soon studying Latin with Jesuits at Caen,

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<sup>140</sup> William R. Newman and Lawrence M. Principe. *Alchemy Tried in the Fire: Starkey, Boyle, and the Fate of Helmontian Chemistry* (Chicago, 2002), p. 239.

<sup>141</sup> Leng, *Benjamin Worsley*, pp. 80-8.

<sup>142</sup> "The Letters of Sir Cheney Culpeper, 1641-1657", ed. M. J. Braddick and Mark Greengrass in *Seventeenth Century Political and Financial Papers; Camden Miscellany XXXIII*, 5<sup>th</sup> series (Cambridge, 1996), vii, p. 314.

<sup>143</sup> "The Letters of Sir Cheney Culpeper, 1641-1657", p. 318.

then anatomy in Holland. For a short time, he was the personal secretary of Thomas Hobbes, through whom he met foreign luminaries such as Descartes, Gassendi, and Mersenne. When he met Hartlib, he had recently returned to England and was eager to further his studies in medicine at Oxford.<sup>144</sup>

Considering Culpeper's lengthy introduction, it is possible that Petty wrote his *Advice of W. P. to Mr Samuel Hartlib for The Advancement of Some Particular Parts of Learning* before meeting Hartlib,<sup>145</sup> and if so, the work may have been an attempt to gain an introduction. In it, Petty expressed an interest in many topics that were interests of the Hartlib Circle. However, there is no known letter between Petty and Hartlib until 1650<sup>146</sup>, no journal entries about Petty until 1649 (Hartlib documented Petty having visited him 29 October), and no other reason to believe the two were corresponding before 1647.<sup>147</sup> Hartlib never recorded his opinion of the work, but when he first described Petty to Boyle, he presented him as "a perfect Frenchman, and good linguist in other vulgar languages besides Latin and Greek, a most rare and excellent anatomist, and excelling in all mathematical and mechanical learning, a young man of varied abilities and interests".<sup>148</sup>

Both Worsley and Petty were physicians and mathematicians with an interest in alchemy; on the same boat to Ireland in 1652. Worsley returned as secretary to Lord Deputy Charles Fleetwood and the executive council just as Petty arrived as chief physician to the army.<sup>149</sup> Petty wrote in his *History of the Survey* that he "was advised to goe into Ireland"<sup>150</sup>

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<sup>144</sup> BL MS Sloane 2903; Petty Tracts, iv; and McCormick, *William Petty*, p. 41.

<sup>145</sup> William Petty, *The Advice of W. P. to Mr Samuel Hartlib for the Advancement of Some Particular Parts of Learning* (London, 1647).

<sup>146</sup> Petty to Hartlib, 16 Dec 1650. *The James Marshal and Marie-Louise Osborn Collection*, Beinecke Rare Book and Manuscript Library, Yale University, Document 21.

<sup>147</sup> *Ibid.*

<sup>148</sup> Hartlib to Boyle, 16 Nov 1647. *The Correspondence of Robert Boyle*, eds. Michael Hunter, Antonio Clericuzio, and Lawrence Principe (London, 2001), Vol. I, pp. 63-64.

<sup>149</sup> Leng, *Benjamin Worsley*, p. 80.

<sup>150</sup> Petty, *The History of the Survey*, p. 1.

without indicating who gave such advice, and he later protested that he would have been better off if he had never left London.<sup>151</sup> At the time Worsley enjoyed the larger salary, greater prestige, and closer relationship with the Boyles, and Petty wrote to Hartlib after his arrival complaining that Worsley had already attacked his reputation to Sir Henry Vane.<sup>152</sup> Worsley and Petty had much in common as Hartlibians but became bitter enemies.<sup>153</sup> Before Worsley and Petty undertook their surveys of Ireland, a major survey had been undertaken by William Parsons, surveyor-general of Ireland since 1602 and Lord Justice since 1640. Hartlib called him “a very rational gentleman” though others accounted him “suspicious and fanatical”.<sup>154</sup> Parsons had supervised the Stafford survey in 1637, named for the then presiding Lord Lieutenant, but the work proved inadequate for the distribution of vast swathes of real estate after the rebellion of 1641. Through the entire period, more than ten thousand estates had been lost by native Irish landowners by war, plague, dislocation, and famine. Up to one third of a prewar population of perhaps 1.8 million Irish had been killed directly or by famine and disease resulting from war, 35-40,000 had migrated to the continent, and 15-25,000 had been transported to the West Indies and Virginia.<sup>155</sup> Connaught became a ‘reservation’ for the native Irish, and as many as 45,000 chose to relocate there during 1653-54 to avoid further confrontation with the Protestant government. As a result, Leinster, Munster, and Ulster became theoretically available for settlement by Protestant English and Scottish adventurers.

In 1653 Parliament passed the *Act for the speedy and effectual satisfaction of the Adventurers for land in Ireland, and of the Arrears due to the Soldiery there* to compensate soldiers and make land available to adventurers investing and migrating to Ireland as part of

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<sup>151</sup> McCormick, *William Petty*, p. 84.

<sup>152</sup> William Petty to Hartlib, 23 Oct 1652. *Marshal Osborn Collection*, Document 23.

<sup>153</sup> Leng, *Benjamin Worsley*, p. 80; and McCormick, *William Petty*, pp. 99, 101.

<sup>154</sup> Ephemerides 1648 Part 3, Jun/Jul-Dec, *HP* [31/22/40B] and Coughlan, “Natural History”, p. 300.

<sup>155</sup> McCormick, *William Petty*, p. 93.

the grand colonisation process.<sup>156</sup> Those responsible for executing the act, however, were unaware exactly how much land was available and of what quality it was, without a credible survey of forfeited tracts. The act called for a complete survey (though historians often divide the work into three), and the responsibility for it fell upon Worsley, who had been appointed to the office of surveyor general. Because the government was under tremendous pressure from the army to begin distribution of land to soldiers as quickly as possible, the initial survey was to be a very general or ‘gross’ assessment of the more detailed tasks that would be completed later by more specific work. Worsley had estimated that a perfectly detailed survey could take up to twenty years, and he was in the process of producing this initial ‘gross’ survey when Petty approached him to discuss the project. Petty had taken Worsley’s position as Secretary to the State Council and Worsley did not receive his concerns as constructive, rebuffing him completely.<sup>157</sup>

Petty soon began to file complaints with the council regarding the quality and efficiency of Worsley’s work, and hostility grew between them. The schism was personal, philosophical, and political.<sup>158</sup> Petty became so concerned that his rivalry with Worsley was eroding his relationship with Hartlib and others in the Hartlib Circle, such as Katherine Ranelagh, that in March 1653, he confessed to Hartlib, “I wish Mr Worslyes heartburning towards Mee produced no strangeness <in> [Lady Ranelagh] towards mee”.<sup>159</sup> Petty argued that a better, more complete survey of all Irish land was possible and indeed necessary, but when Worsley countered that it would take too long, Petty argued that he could do it in only thirteen months. He petitioned the council with six reasons why Worsley’s survey was inadequate and urged

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<sup>156</sup> C.J., vii., 323–4 and Scobell, ii., 240–50 in “Table of acts: 1653” in *Acts and Ordinances of the Interregnum, 1642-1660*, ed. C H Firth and R S Rait (London, 1911), xc-xciv.

<sup>157</sup> McCormick, *William Petty*, p. 95.

<sup>158</sup> *Ibid.*, p. 96.

<sup>159</sup> William Petty to Hartlib, 1 Mar 1653. *Marshal Osborn Collection*, Document 24.

them to authorise a new one.<sup>160</sup> Petty claimed that the cost of Worsley's survey had risen to a price 12 times the original quote, it was not subject to review, and it was grossly inaccurate because Worsley had an inferior grasp of the country and lacked reliable measurements of its main features. He also questioned the competence of Worsley as a surveyor, adding that only he himself was capable of introducing "geometricall surveys". Worsley, he remarked, was only very roughly surveying land to be distributed to soldiers, and he was seeking to preserve the traditional baronies which could vary in size from a few thousand to over one hundred thousand acres.<sup>161</sup>

In the meantime, before Petty began his survey, Hartlib had written and published the introduction to Cressy Dymock's anticipatory *A Discoverie for Division or Setting out of Land, as to the Best Form*. The book contained instructions for the most efficient use of land, agricultural advice to farmers, an essay on productivity of plants, and an essay by William Potter regarding the best way to improve land to facilitate increased the trade and revenue of the nation. Hartlib wrote the preface in which he promoted work as service to others and the benefit of full employment.<sup>162</sup> Hartlib and Dymock included illustrations or "charts" to communicate a method of situating 16 large farms containing one hundred acres each and 16 small farms containing twenty-five acres. Another chart focused on the division of land for any of those farms individually.<sup>163</sup>

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<sup>160</sup> Petty, *The History of the Survey*, p. 2.

<sup>161</sup> Petty, *The History of the Survey*, p. 3.

<sup>162</sup> Hartlib, "To the Reader" in Cressy Dymock, *A Discoverie* (London, 1653), p. A3.

<sup>163</sup> See fig. 1.4, p. 69.

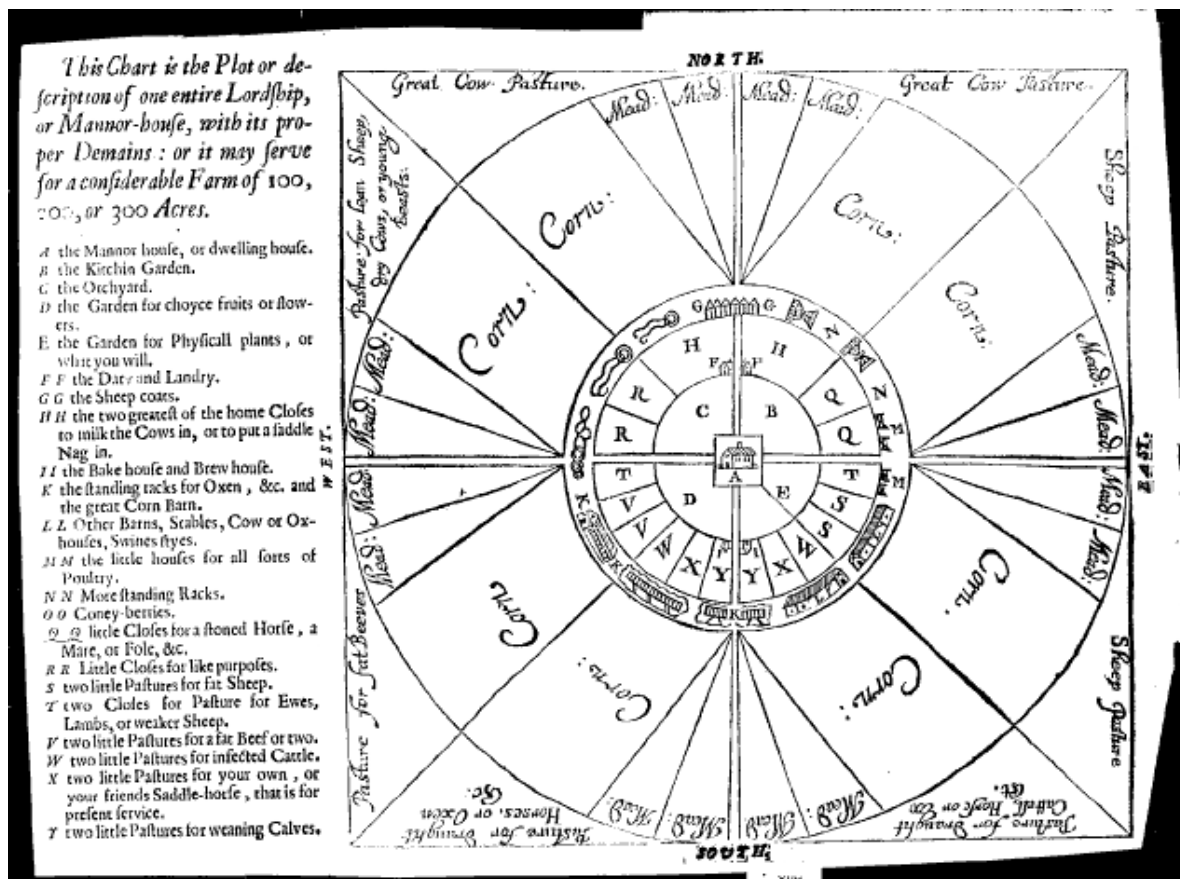


Figure 1.4: This diagram from Cressy Dymock's 1653 *A Discoverie for Division or Setting out of Land*, as to the best Form illustrates Hartlib's recommendation of how to organise a plantation farm for maximum efficiency.

Hartlib noted that the book was aimed at directing adventurers in England, Ireland, and “other waste and undisposed places” to greater advantage and profit.<sup>164</sup> The short work was produced to promote plantation, and he claimed that its ideas would benefit private persons even if they were never adopted by the government. Hartlib wrote that such works could remedy the defects and disorders that had arisen in the plantations and he added that such manuals could enhance trade and commerce. He boasted that if his recommendations were undertaken, “incredible” effects would be produced. The purpose of *A Discoverie* was “to lay

<sup>164</sup> Samuel Hartlib, “Introductio” in Cressy Dymock, *A Discoverie For Division or Of Setting out of Land, as to the best Form* (London, 1653), title page.

open the mischievousness, disorderliness and confusion, either the root or effect of all the evils of this world whether soul or body, private or public, and bring to righteous order”.<sup>165</sup> Reading like a Puritan sermon, Hartlib went on to explain in a supplementary essay how productivity of the land and the development of resources could be increased through properly directed hard work, thereby reducing unemployment and poverty. Like all Puritans, he believed that idle hands were the tools of the Devil, and he argued that new methods would increase trade, while revenue from this business would fund public projects such as libraries, colleges, and hospitals. He added that increased trade would promote peace between nations and reduce the likelihood of wars.<sup>166</sup>

The *Discoverie* and its methods may have been new but Hartlib assured his readers that he had been working on these problems for many years.<sup>167</sup> To establish his personal credibility with readers he stressed how he had continued through numerous difficulties and all “our changes”, adding that he had spent himself on necessary duties without having been encouraged from abroad. Hartlib indicated his intention to continue the work as long as he was able, and he quoted a piece of Scripture that may be considered his life verse: “And I will very gladly spend and be spent for you; though the more abundantly I love you, the less I be loved. But be it so, I did not burden you”.<sup>168</sup> He flagged for his readers the fact that he was committed to the public good, whether or not he received appreciation or compensation from those he intended to benefit.

With detailed proposals for standardization of the work and division of labour among a large staff in order to work efficiently and quickly, Petty convinced the Irish Council in April 1654 to halt Worsley’s survey, authorize a new one, and hire him as a private contractor to do

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<sup>165</sup> Hartlib, “Introductio”, p. A2.

<sup>166</sup> Ephemerides Apr-Aug 1649 [28/1/14B-26A].

<sup>167</sup> Hartlib, “Introductio”, p. A4.

<sup>168</sup> II Cor. 12:15-16.

the work instead of the surveyor-general and his staff.<sup>169</sup> Petty employed the empirical methods which involved the use of objective, quantitative observation in a systematically controlled, replicable situation, in order to measure the land of Ireland and which were being promoted by the Hartlibians in their campaign to permanently supplant the scholastic methods of their recent past.<sup>170</sup> His plan was as organizationally innovative as it was practically revolutionary; Worsley was ordered to terminate his “gross survey”, based as it was on traditional surveying practice, and Petty immediately wrote a programme for a new one.<sup>171</sup> Eventually this ‘civil’ survey came to be known as the ‘down’ survey when it was literally laid ‘down’ on paper and metal plates. Petty proposed including natural as well as man-made features in his survey and a six-fold grading of the contents of each forty-acre division based on rectangular boundaries. Worsley had used the traditional triangular slices, but these were less representative of the true situation of the acreage. A committee was established to supervise Petty’s work and Gen. John Reynolds who had built a distinguished career in the Civil Wars and the reconquest of Ireland was appointed chairman. Reynolds’ committee authorized Petty to employ two surveyors per county, each given adequate funding to ensure that all land in the three regions be completely measured, that ‘unprofitable’ land be included but properly categorized, and that land be divided into equally sized tracts irrespective of former baronial boundaries.<sup>172</sup> These measures, Petty argued, would correct the faults committed in Worsley’s first attempted survey.

Worsley suffered the humiliation of being supplanted by a former colleague, and he became a redundant surveyor-general watching Petty direct the survey independently of the government office. Instead of participating in the work or offering his assistance, Worsley occupied himself with attempts to sabotage the work and the continuation of other interests, as

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<sup>169</sup> Petty, *The History of the Survey*, pp. xiv-xv. See also Leng, *Benjamin Worsley*, pp. 80-90.

<sup>170</sup> McCormick, *William Petty*, p. 94.

<sup>171</sup> Robert Dunlop. *Ireland Under the Commonwealth* (Manchester, 1918), p. 452.

<sup>172</sup> Petty, *The History of the Survey*, p. 5.

evidenced by his published saltpetre paper in 1655.<sup>173</sup> He and Sir Charles Coot continued the campaign against a new survey, maintaining that Petty's proposal for a complete and comprehensive survey of all Irish land was expensive, impractical and subject to many kinds of errors. Coot was added to the Reynolds' committee and initially, Worsley was optimistic his work would yet stand.<sup>174</sup> In response, Petty worked hard to ensure a favourable defence of his proposal and offered another committee member, Sir Hardress Waller (who became Petty's father-in-law in 1667), a share of the profits if he would help with the survey of Munster. This action later exposed Petty to a charge of bribery but acting as a private contractor, he was not subject to the same rule which forbade the surveyor-general from making such agreements or purchasing debentures from soldiers who were willing to sell their distributions.<sup>175</sup> Waller would have cancelled Coot's vote by supporting Petty's proposal but this proved unnecessary when Coot switched support to Petty.<sup>176</sup> Col. John Hewson, Governor of the City of Dublin, member of the state council, and friend of Henry Cromwell supported Petty along with Reynolds.<sup>177</sup> In the end, there was a majority of five in favour of approval. All seven men on the committee were officers in the army, each concerned with their own land claims as well as those promises made to their troops.<sup>178</sup>

Six months after its creation, Reynolds' survey committee reported to the state council that a new survey was needed, and a formal contract was offered on 11 December 1654 to Petty, who had promised the committee that he could complete the survey in 13 months.<sup>179</sup> The agreement directed Petty to create small tracts, each of which was to be no less than 40 acres.

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<sup>173</sup> See Benjamin Worsley, "De Nitro Theses Quaedam", *HP* [39/1/16A-20B].

<sup>174</sup> Petty, *The History of the Survey*, p. 13.

<sup>175</sup> Leng, *Benjamin Worsley*, p. 86.

<sup>176</sup> *Ibid.*

<sup>177</sup> "Colonel John Hewson, the Cromwellian", *JRSAI*, Fifth Series, 36, no. 4 (1906): 429-32.

<sup>178</sup> McCormick, *William Petty*, p. 106.

<sup>179</sup> Petty, *The History of the Survey*, p. 9.

It called for him to produce maps, plots, and books of reference to be placed in the Surveyor General's office. Even though the council approved the survey, Worsley continued to object as Petty began to recruit, research, and plan. Surveying officially began on 1 February 1655, with the council still answering Worsley's objections. The puritan Samuel Winter, provost of Trinity College, a student of John Preston at Cambridge and a popular preacher, forbade students from participating in the survey as a means, Petty later alleged, to prevent the survey from benefiting from their mathematical knowledge and skills.<sup>180</sup> At about the same time, Worsley began to question the integrity of Petty's instruments, though Petty immediately responded that Worsley was not qualified to judge their quality. Worsley managed to slow the work, writing letters to individual surveyors after they had begun working, and discouraging them from continuing under Petty's authority.<sup>181</sup>

Petty divided the work into seven categories of employment from field work to map making and verification. He employed one thousand veteran soldiers for their abilities to manage in the countryside.<sup>182</sup> Petty himself directed the survey from Dublin Castle where his cousin John Petty and Thomas Taylor assisted him in working through several obstacles as they arose during the work. Eight of Petty's men were captured and killed near Wicklow, some surveyors sold their equipment and abandoned their posts, and all the while Worsley infiltrated the office with friends who kept an eye on the project for the surveyor general who remained protective of his traditional responsibility and jealous of the secretary's success. Petty later wrote to Hartlib that "[Worsley] had written many polemical sheets upon the subject, pleasing himself, as he usually does".<sup>183</sup>

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<sup>180</sup> Petty, *The History of the Survey*, pp. 21, 317.

<sup>181</sup> *Ibid*, p. 43.

<sup>182</sup> *Ibid*, p. 46. See also McCormick, *William Petty*, pp. 98-9.

<sup>183</sup> Petty, *The History of the Survey*, p. 44.

Petty gathered information from previous surveys, wrote a code of instructions for all persons involved, divided the work among hundreds of workers, and broke the task into manageable pieces. Using principles of geometry to underpin his surveys, and equipped with the best scientific instruments, Petty assumed as a good Baconian that new purposes would be discovered in the future for ‘unprofitable’ land, such as bogs, marshes, or rocky outcroppings and that these would ultimately prove to be profitable.<sup>184</sup> Having facilitated Boate’s natural history and published the same, Hartlib was enthusiastic for all manner of surveys and of various locations useful to the improvement project.<sup>185</sup> He was aware of Petty’s survey as soon as it began, noting how impressed he was that Petty had undertaken to complete it in one year.<sup>186</sup>

The Down Survey was completed in March 1656 as promised and was the first detailed land survey on a national scale of any place in the world. Over 2.2 million total acres were measured and mapped, most of it then prepared for distribution to the soldiers. The committee was pleased and Petty was paid £18,532, which he used to pay debts incurred from the project and to buy debentures.<sup>187</sup> In 1657, with about £9,000 profit, he bought 10,000 acres,<sup>188</sup> and by the end of the year he had acquired a total of 19,000 acres of land, a figure that rose to 50,000 acres by 1685.<sup>189</sup> Petty had a great financial stake in Ireland and grew wealthy because of his investments.<sup>190</sup> He was paid for his expenses on labour and equipment but Worsley, who was given an opportunity to assess the books of reports and maps, was predictably critical of the

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<sup>184</sup> Petty, *The History of the Survey*, p. 9.

<sup>185</sup> Ephemerides 1652, Part 2, 7 Oct – 31 Dec, [28/2/44A]; and 1654, Part 3, 4 Aug – 31 Dec, *HP* [29/4/30B].

<sup>186</sup> Ephemerides 1655, Part 3, 21 Apr – 13 Aug, *HP* [29/5/31B].

<sup>187</sup> Dale, *Sir W. P. of Romsey*, p. 27.

<sup>188</sup> McCormick, *William Petty*, p. 101.

<sup>189</sup> M. Poovey, *A History of the Modern Fact: Problems of Knowledge in the Science of Wealth and Society* (Chicago, 1998), p. 120.

<sup>190</sup> Irving, *Natural Science*, p. 96.

work. His objections were overruled by the committee, however, which assessed the collaborative, state-supported civilian scientific survey as successful.<sup>191</sup>

The survey can be seen as one of the greatest Hartlibian contributions to early English imperial improvement.<sup>192</sup> Nevertheless, although Petty struggled to maintain a positive relationship with Hartlib right up to the Restoration, the survey ended his good standing with the Hartlibians. His breach with Worsley resulted in most of the associates choosing to remain friends with the latter, and as I show below, by April 1657 Petty was trying to set up his own Office of Address.<sup>193</sup> Hartlib blamed Petty for the fracture in August 1658 though Petty attempted to repair his relationships with both Hartlib and Boyle. Nevertheless, the latter continued to speak of him with some suspicion thereafter.<sup>194</sup> Hartlib was offended by Petty's self-interested behaviour, however, more than his ideas, some of which Hartlib subsequently praised even if some associates were quick to dismiss them as a result of his breach with Worsley.<sup>195</sup>

Outside the Hartlibian network, however, Petty's standing rose significantly. He continued as clerk of the state council in Ireland and secretary to the Lord Deputy. The multiplicity of his offices and apparent conflict of interests in profiting from his own survey also made him a target for frequent complaints filed by his several enemies. As secretary to the council, he became the surveyor and distributor of land, and ended up as one of the wealthiest planters in Ireland.<sup>196</sup> The survey itself had been completed on time and was quickly recognised as a monumental achievement. Petty was praised for the quality and speed of his work.<sup>197</sup> High-

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<sup>191</sup> McCormick, *William Petty*, p. 101.

<sup>192</sup> Hunter, *Science and Society*, p. 25.

<sup>193</sup> McCormick, *William Petty*, p. 102.

<sup>194</sup> Hartlib to Boyle, 10 Aug 1658, in Boyle, *Correspondence*, 1:286-287.

<sup>195</sup> McCormick, *William Petty*, p. 103. See also Hartlib to Evelyn, [Feb?] 1660, *Diary and Correspondence of John Evelyn*, F. R. S., ed. William Bray (4 vols, London, 1862), iii:132-3.

<sup>196</sup> McCormick, *William Petty*, p. 114.

<sup>197</sup> Leng, *Benjamin Worsley*, p. 86.

quality maps provided for accurate legal descriptions of property and provided the title foundations of property in Ireland thereafter. The survey found, for example, that County Kerry had the most land available for distribution and Cork had the least, but the greatest value lay in the ability it gave the government to assign a legally defined plot to an individual person while avoiding subsequent conflict over boundaries.<sup>198</sup> The government began preparing for distribution. Copies of the survey were made, and Petty's original papers were stored in Worsley's office where a fire almost destroyed them in 1711.



Figure 1.5: A sample part of the map that was made by William Petty from the Down Survey.

<sup>198</sup> Petty, *The History of the Survey*, p. 144.

## 1.6. The Debenture Plan and The Office of Address

Dury announced the Office of Address to the public in 1647 and Hartlib published *A Further Discoverie of The Office of Publick Adresse for Accomodations* the following year.<sup>199</sup> Hartlib outlined plans he had presented to Parliament in 1640, addressing agricultural improvement, the economy, the expansion of the English empire, healthcare, housing, national security, patents, the postal service, religion, and unemployment. *A Further Discoverie* was a theoretical work, which described multiple registers of trade, property, and information about employment opportunities. Hartlib intended to increase efficiency in all manner of production and to increase the momentum of economy in England and its colonies, and he requested demographic and statistical information about all classes of people working in different sorts of professions. The Office of Address, as envisioned by Hartlib, would study the history of diseases, commodities, raw materials, medicines, and produce natural histories of all living creatures.<sup>200</sup>

The Down Survey provided for distribution of forfeited land in Ireland to soldiers and adventurers, but it also opened up an opportunity for investors to purchase allotments from those soldiers who chose to sell instead of settling their Irish lots. Petty thus purchased several parcels for himself. Although Worsley protested against Petty's personal financial gains, Petty's actions inspired him to craft a proposal in 1656 to fund the Office of Address which he proposed to Hartlib. By purchasing forfeited homes in various Irish towns, Worsley suggested, rents could be used to provide sustainable income to create and maintain the office. The office was discussed in the letters of at least ten of Hartlib's most intimate correspondents, some as

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<sup>199</sup> Dury, *Considerations tending to the Happy Accomplishment of Englands Reformation in Church and State*. (London, 1647).

<sup>200</sup> Charles Webster, *Great Instauration*, p. 422.

far flung as New England, and he mentioned it frequently in his journal during this period.<sup>201</sup> Worsley identified several specific houses that were available in Rosse, Wexford, Kilkenny, and Drogheda. Boyle, Culpeper, and others in the Circle agreed to support Worsley's opportunistic idea, anxious to fund the Office of Address.<sup>202</sup> They created a board of trustees to receive rents from the houses as a non-profit public corporation and use them to fund the office. Investors were recruited to advance the initial funds to make the purchases. Robert Wood, a mathematician and Hartlib associate working for the government in Dublin, promised Hartlib that he would do his part in Dublin by supporting Worsley, promoting the proposal before the state council, and keeping Hartlib informed of its progress until the plan was approved.<sup>203</sup>

To ensure the debenture funding plan's best chance for success before the Dublin council, the trustees sought a resolution of approval from the state council in London. The council received the petition favourably, its purpose being "for the preservation of Learning in this Nation".<sup>204</sup> On Christmas Day 1656, the council created a committee to review the proposal and return a recommendation as soon as possible. The committee included Henry Scobell, clerk of both Parliament and the State Council; William Jessop, clerk of the council; Gabriel Beck, counsel to Cromwell and one particularly concerned with Irish accounts; John Rushworth, inventor, historian, and politician; William Sydenham, soldier and member of the commission of the treasury, and Hartlib. The debentures identified by Worsley and which were being considered were estimated by the committee to be worth £10,000 per year. The Office of Address was authorised to erect a foreign correspondence of educated men and maintain

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<sup>201</sup> John Winthrop, *List of Contents of Box from Hartlib*, 25 Oct 1660, *HP* [32/1/12A].

<sup>202</sup> Jacob, *Robert Boyle*, p. 126.

<sup>203</sup> Robert Wood to Hartlib, 10 Jun [1656], *HP* [33/1/3A-4B].

<sup>204</sup> Copy Petition to Cromwell on Advancement of Learning, With Related Papers and Cromwell's Reply, In *Scribal Hand A*. 25 Dec 1656 – 19 Jan 1658, *HP* [47/4/1A-7B: 8A].

men of ability who were not otherwise provided for. The committee allowed the Office great latitude to fulfil the vision of Hartlib and it gave advance approval for “other Publicke Designes, as shall vpon the most solid grounde be judged the most proper & fit for advancement & promotion generally of Learning & Religion”.<sup>205</sup>

Hartlib had done his work in London by calling upon his relationship with Cromwell, and with the Lord Protector’s support, the committee’s report was approved by the Council of State in London in January 1658. The orders of the council, confirming what was described in the petition, further clarified the organisational structure of the Office of Address. The trustees were to supervise an agent who, with the help of a secretary, would direct the office. The organisational structure of the Office had thus changed little since it was first described by Hartlib in the 1640s.<sup>206</sup> Worsley was the only named trustee located in Dublin but neither Petty nor Wood were chosen. Hartlib confidently assured Boyle that “the thing intended is so real, that if the council [t]here do but please to give equal countenance to that, which they have done to others lately in their private concerns, the proposition will be made to (I judge at the least) ten thousand pounds”.<sup>207</sup>

With Cromwell’s endorsement, Hartlib was justifiably optimistic. The commitments of investors were secure, the plan had been approved by the highest levels of government, the houses were available and would be purchased as soon as the state council of Ireland gave their consent. Hartlib told Boyle, “I have in my hand already a considerable stock assigned by the donors, and a probability of securing near the whole sum within less than a month’s time, the council giving the donors encouragement to go on”.<sup>208</sup> Concerned that Petty would oppose the

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<sup>205</sup> Petition to Cromwell on Advancement of Learning. 25 Dec 1656, *HP* [47/4/1A-7B].

<sup>206</sup> See, for example, John Hall to Hartlib, 11 Mar 1646, *HP* [60/14/8A]; Sir Cheney Culpeper to Hartlib, 18 Jan 1647, *HP* [13/180A-181B]; and Cyprian Kinner to Hartlib, 19 Jun 1647, *HP* [1/33/7A-11B]. See also McCormick, *William Petty*, pp. 102-3, 126-7; *HDC*, pp. 77-87; and Charles Webster, *Great Instauration*.

<sup>207</sup> Hartlib to Robert Boyle, 7 Jan 1658. *The Works of Robert Boyle*, vi, pp. 98-9.

<sup>208</sup> Hartlib to Robert Boyle, 2 Feb 1658. *The Works of Robert Boyle*, vi, pp. 100-1.

proposal, however, and use his influence to lobby for a denial of the purchase, Hartlib added to Boyle, “Mr Secretary continuing ill, and not meddling with business, my lord Fleetwood had undertaken to get the letter to be signed by his highness of the council in Ireland, which was the only thing remaining to be done”.<sup>209</sup> It is much easier to understand Hartlib’s optimism than why Petty opposed the proposal. On the same day, Worsley warned Hartlib that Petty planned to visit London and might attempt to obstruct the plan; in a letter to Hartlib that the latter copied to Boyle, Worsley wrote, “The other friend [Dr Secretary], that is like to give you a visit, would think a man a fool, that would serve any man besides himself, or otherwise, than in order to himself, being a wisdom common to this world”.<sup>210</sup>

Within 20 days of Hartlib’s most optimistic letter to Boyle, Worsley wrote to Hartlib to say that he had given “all the Papers” to Col. Sankey who had taken them to the Lord Deputy Henry Cromwell the day before. By the afternoon of the same day, the council sent for the Lord Deputy and appointed a committee to consider the Office of Address Debenture Funding Plan. However, on 10 February 1658 Worsley wrote, “Our affaire here is yet doubtful”.<sup>211</sup> Petty had questioned the plan and placed enough doubt in the minds of the council members that they had decided to table the proposal. The Lord Deputy was the Protector’s son, but he was also Petty’s friend, and the Secretary implied that the proposal was an attempt to undermine the executive’s authority. Soon, Worsley complained to Hartlib that his mail was being intercepted, “kept back”, he claimed, “& never sent me”.<sup>212</sup> He told Hartlib that Petty was the culprit, keeping whatever he chose.

By 20 May 1658, Hartlibian correspondents were questioning why they had not heard of the plan’s approval. George Dalgarno, for example, wrote to Hartlib from Oxford to say, “I

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<sup>209</sup> Hartlib to Robert Boyle, 2 Feb 1658. *The Works of Robert Boyle*, vi, pp. 100-1.

<sup>210</sup> *Ibid.*

<sup>211</sup> Extracts of Letters Concerning Learning in Scribal Hand?, 10 Feb 1658, *HP* [47/3/1A].

<sup>212</sup> Extracts of Letters Concerning Learning in Scribal Hand?, 23 Feb 1658, *HP* [47/3/1B].

long to heare what becomes of the bussines in Irland”,<sup>213</sup> while Johann Morian offered his own encouragement, speaking of Petty and the proposal, “God the LORD governs all things according to the council of his will”.<sup>214</sup> By 26 May, Worsley had resigned himself to the complete defeat of the plan and lamented the ruin he would suffer for mortgaging his own estate to be one of the investors.<sup>215</sup> He was apologetic to Hartlib for the plan’s failure, but noted that Petty “hath taken upon him to dispose it or rule it at pleasure”, and “The money also is now wholly diverted”.<sup>216</sup> Worsley encouraged Hartlib to have Dury speak to “my Lord Protector (Cromwell), my Lord Fleetwood & others about it, as also with Dr Secretary himselfe”.<sup>217</sup> In the same letter, he told Hartlib, “My Estate must answeere for those Debentures. I am herein so much concerned that (though I dare scarce tell my owne wife so) yet my stay in this Country doth mainly depend upon it & upon the issue of it”.<sup>218</sup> To Dury, in a separate letter, Worsley had little other explanation for the failure of the scheme than that Petty had stopped the Debenture Funding Plan as a way to ruin him, concluding, “The Issues, times, & successes of all things I saw, were in Gods hands”.<sup>219</sup>

In the meantime, Petty met with Hartlib’s son, Samuel Jr, in London on 1 June 1658, and they discussed the failure of the Plan. Hartlib told Boyle it was a long meeting between the two and that “Sam” had found Petty to be full of “frivolous suspicions and allegations”; the latter had “notably pleaded for the justice of that affair, and doth not mean to give it over, till he be convinced into better resolutions”.<sup>220</sup> Hartlib reported to Boyle that his son had referred Petty to William Jessop (clerk of the state council) so that he might find a satisfactory resolution

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<sup>213</sup> George Dalgarno to Hartlib, 20 May 1658, *HP* [49/1/1A].

<sup>214</sup> Johann Moriaen to Hartlib, 14 Jun 1658, *HP* [31/18/29A-30B].

<sup>215</sup> Extracts of Letters Concerning Learning in Scribal Hand? 26 May 1658, *HP* [47/3/3A].

<sup>216</sup> *Ibid.*

<sup>217</sup> *Ibid* [47/3/2B].

<sup>218</sup> *Ibid* [47/3/3A].

<sup>219</sup> Copy Letter in Scribal Hand D?, Benjamin Worsley to Dury, 26 May 1658, *HP* [33/2/9A].

<sup>220</sup> Hartlib to Robert Boyle, 1 Jun 1658. *The Works of Boyle*, vi, p. 110.

to his “pretended scruples”.<sup>221</sup> Nevertheless, Hartlib told Boyle that the bases of Petty’s opposition to the plan were so thin “that my son can discern the weakness of them, to speak the best of them”. Hartlib added that Petty had gone to meet with Fleetwood while in London and he feared the former Lord Deputy would not be able to cope with Petty’s “cunning subtilities”. Petty would have known Fleetwood was a patron of his enemy Sankey, the latter having lived in Fleetwood’s Westminster home while serving in Parliament.<sup>222</sup>

On 10 August 1658, Petty appeared at Hartlib’s door. He left Charing Cross after a two-hour meeting in which the two men talked about the Office of Address and the debenture funding plan. Discouraged, yet still not abandoning his relationship with Petty, Hartlib wrote to Boyle on the same day, “Dr Petty hath taken away above two hours from me, which should have been devoted to your service”.<sup>223</sup> According to Hartlib, Petty was deceitful regarding his understanding of the plan and disguised his own purpose in order to protect his relationship with Hartlib.<sup>224</sup> In the meeting, Petty boldly described his plan to found an institution that sounded remarkably similar to the Office of Address. He told Hartlib that he had an idea of establishing a college or colony that would employ “twenty able leaned men” and “very good Latinists, of several nations, that should teach the Latin tongue merely by use and custom”.<sup>225</sup> “This with the history of trades, he looks upon as the great pillars of reformation of the world”, Hartlib relayed to Boyle,<sup>226</sup> and he added that Petty had cost him £250 lost annual salary but had acted as if he was completely unaware of the consequences of his actions. “I wish you

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<sup>221</sup> Hartlib to Robert Boyle, 1 Jun 1658. *The Works of Boyle*, vi, p. 110.

<sup>222</sup> W. R. Williams, *The parliamentary history of the county of Oxford including the city and university of Oxford, and the boroughs of Banbury, Burford, Chipping Norton, Dadington, Witney, and Woodstock, from the earliest times to the present day, 1213-1899, with biographical and genealogical notices of the members* (Brecknock, 1899), p. 207.

<sup>223</sup> Hartlib to Robert Boyle, 10 Aug 1658. Letter. *The Works of the Honorable Robert Boyle*, ed. T. Birch, 2<sup>nd</sup> edn (6 vols, London, 1772), vi, pp. 112-113.

<sup>224</sup> Eric Strauss, *Sir William Petty: Portrait of a Genius* (London, 1954).

<sup>225</sup> Hartlib to Robert Boyle, 10 Aug 1658. *The Works of Robert Boyle*, vi, pp. 112-3.

<sup>226</sup> *Ibid.*

could handsomely present unto him, how he hath defeated me”, Hartlib complained, “(for which I have to shew some of the donors own hands) by undermining the more universal design of learning, upon which I have been made to hope these two years”.<sup>227</sup> The impact of this episode was much more serious than a personal loss for Hartlib, since the defeat of Worsley’s plan meant the end of using property in Ireland to fund the Office of Address, and indeed, it represented the end of any realistic plans for the Office.

## 1.7. Conclusion

Several conclusions can be drawn regarding the role of Ireland in the Hartlibian-Baconianism programme and the place of that programme in early English imperialism. The Hartlibian plan for the plantation of Ireland fell far short of Hartlib’s goals for several reasons. In the first place, conflict in Ireland temporarily hindered the great work of the Hartlibians, causing planters and Hartlib’s associates to flee the island as refugees. As a result, it delayed their return, and destroyed a prime opportunity for Hartlibian development. Advances made before the rebellion were negated by the devastation of war, and his allies were forced to begin afresh once the war was over. The English civil wars also hindered the Hartlibians' work in Ireland by distracting the attention of Parliament and taxing resources that might have been used for improvement. Division among the associates also proved to be an insurmountable obstacle to the Hartlibian project in Ireland. None of these feuds were as bitter as that which occurred between Worsley and Petty; while both attempted to maintain their relationship with Hartlib, they continued to undermine each other and, in the end, they jointly diminished the effectiveness of the Hartlibian improvement project in Ireland. Petty may have defeated the

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<sup>227</sup> Hartlib to Robert Boyle, 10 Aug 1658. *The Works of Robert Boyle*, vi, pp. 112-3.

funding plan for the Office of Address but both of them ultimately obstructed the Hartlibian programme. Worsley may have more clearly understood Hartlib's philosophy of the common good, but both of them acted to protect their private interest and refused to settle their differences for the greater good.

On the other hand, two significant achievements were accomplished through associates working in Ireland. Petty's survey was a practical continuation of Boate's natural history and an extension of Hartlib's project in several ways.<sup>228</sup> Petty's survey was "the greatest example" of Hartlib's philosophical colonisation strategy.<sup>229</sup> Because of his failure to produce a lasting survey, and because both Petty's successful completion and publication of its history, Worsley has been treated poorly by historians who have uncritically accepted Petty's account of the period.<sup>230</sup> Worsley, however, did not have Petty's mathematical sense or organisational skills but Petty had the advantage of having observed Worsley's attempt before launching his criticism and alternative proposal. There were 19 different surveys of various types and purpose conducted through this period, most of them conducted while Worsley was surveyor-general, but Petty's Down Survey remains the best and most well-known.<sup>231</sup> The survey established Petty's reputation as both an expert on Irish land and population and as a beneficiary of Irish land transference.<sup>232</sup>

Boate's *Naturall History* and The Down Survey were evidently very different projects. Petty's survey involved one thousand men and was completed in thirteen months. The natural history was the work of Boate and a handful of contacts who were working under no deadline,

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<sup>228</sup> Charles Webster, *Great Instauration*, p. 434.

<sup>229</sup> Irving, *Natural Science*, p. 48.

<sup>230</sup> Leng, *Benjamin Worsley*, p. 85. See also Y. M. Goblet, *La Transformation de la Géographie Politique de L'Irlande au XVIIe siècle* (Paris, 1930), 215-16.

<sup>231</sup> Charles Webster, *Great Instauration*, p. 436.

<sup>232</sup> McCormick, *William Petty*, p. 3.

and he derived no financial benefit from it.<sup>233</sup> By contrast, Petty deposited more than £9,000 in his personal account from the payments he received for completing the survey but at the end of his life he owned estates worth £18,000 per year and amounting to 50,000 acres.<sup>234</sup> The survey was a private project executed with public support, while the history was an entirely private endeavour done with government favour but with no official sanction or funding. The history informed government bureaucrats and adventurers without dividing them along personal, scientific, or political lines, whereas the survey ruined several relationships and sparked a multitude of contentious debates.<sup>235</sup> The two projects were distinguished in terms of content but both constituted major research enterprises done by Hartlibians under the aegis of a general plan to establish and improve English colonies. Both projects remained to a large degree incomplete; Petty's later history of the survey, like Boate's planned multi-volume work, was never finished, even though the survey itself, like Boate's single volume, was. The two works were engineered by different Hartlibian associates, but the common denominator of both was Hartlib.<sup>236</sup>

The two endeavours were similar in many ways and equally facilitated the adventurers who executed the plantation that Hartlibians promoted; both were improvement projects employing Baconian empirical methods.<sup>237</sup> Some Hartlibians, especially those who spent a length of time serving in Ireland like Miles Symner, contributed to both the history and the survey. Neither undertaking was utopian in attitude or purpose, but both were empirical natural philosophical projects directed towards the practical amelioration both of the land and human welfare.<sup>238</sup> The history and the survey located bogs to be drained, ore to be mined, forests to

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<sup>233</sup> McCormick, *William Petty*, p. 114.

<sup>234</sup> *Ibid.*

<sup>235</sup> McCormick, *William Petty*, p. 105.

<sup>236</sup> See Ephemerides 1652, Part 2. 7 Oct – 31 Dec, *HP* [28/2/43A].

<sup>237</sup> Coughlan, "Natural History", p. 299.

<sup>238</sup> Mendyk, "Gerard Boate", p. 5.

be cleared, fields to be planted, and pastures to raise animals. Both prioritized natural features, opportunities for future improvement, and points of potential wealth for adventurers. Neither work devoted any serious time or space to Irish history, culture, society, or to the plight of the native Irish, but then none of those topics formed any part of the purpose of either the history or the survey.<sup>239</sup>

The history and the survey dated the history of Ireland from 1641, since plantation after the rebellion required a pristine natural landscape that was legally owned by no one and that was thus ripe for cultivation by adventurers.<sup>240</sup> The history and the survey equally illustrate the hopes of the Hartlibians for Ireland because both created a foundation for husbandry from which all other improvement projects could flow.<sup>241</sup> As Boate continually emphasised, an abundant food supply was necessary before the other ideas could proceed.<sup>242</sup> The immediate function of the survey was to satisfy the need to recompense the English army, and it aided in the distribution of 2.5 million acres to soldiers and adventurers by paying off almost £3 million of government debt. By helping to transplant thousands of new English landowners into Ireland, the Hartlibians indirectly facilitated transplantation of new crops, extraction of untapped resources, and trials of new inventions. As a direct result of these two projects, Irish land was enclosed, ‘improvements’ were made, infrastructure was constructed, agriculture was reoriented, and commercial networks were established.<sup>243</sup> Colonisation and commercialisation both resulted from the sum total of information supplied by the history and the survey. Each was a departure and a continuation for Hartlibians.<sup>244</sup>

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<sup>239</sup> See Coughlan, “Natural History”, p. 315.

<sup>240</sup> *Ibid.*, p. 316.

<sup>241</sup> McCormick, *William Petty*, p. 89.

<sup>242</sup> Boate, *Ireland’s Naturall History*, pp. 3-7.

<sup>243</sup> McCormick, *William Petty*, p. 117.

<sup>244</sup> McCormick, *William Petty*, p. 117-8.



## CHAPTER II: HARTLIB AND NEW ENGLAND

*But thou, O Daniel, shut up the words, and seal the book, even to the time of the end: many shall run to and fro, and knowledge shall be increased.*

Daniel 12:4, (KJV)

### 2.1. Introduction

#### 2.1.1. Background of the English Empire in America

As stated in the introduction, it was not until the reign of Elizabeth that a permanent English-speaking settlement was attempted on American soil, when Sir Walter Raleigh planted two English colonies in 1585 and 1587. The first was abandoned and the second one famously disappeared.<sup>245</sup> The first permanent English settlement in America was planted during the reign of James I in 1607 by the authority of a charter granted to the newly created Virginia Company of London. Adventurers sought this charter believing tremendous wealth lay waiting to be claimed in America.<sup>246</sup> Building upon experience gained from a century of planting in Ireland, Jamestown was founded by English adventurers within a year of the charter.<sup>247</sup> Several factors pushed individuals out of England and others pulled them to America during the seventeenth-century.<sup>248</sup> England was experiencing a significant population increase, while consecutive poor harvests prompted an economic recession in which prices for food increased. Coupled with the growing need of the textile industry for greater supplies of wool, landowners began enclosing the English countryside and drove many poor farmers away from their traditional homes.

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<sup>245</sup> See James Horn, *A Kingdom Strange: The Brief and Tragic History of the Lost Colony of Roanoke* (New York, 2010).

<sup>246</sup> See Colin G. Calloway, *New Worlds for All: Indians, Europeans, and the Remaking of Early America* (Baltimore, 1997); Arthur Quinn, *A New World: An Epic of Colonial America from the Founding of Jamestown to the Fall of Quebec* (Berkeley, 1994); and Alan Taylor, *American Colonies: The Settling of North America* (London, 2001).

<sup>247</sup> Printed Booklet, *The Moderate Intelligencer* No. 160. 6-13, Apr 1648, HP [39/2/74/1A-6B].

<sup>248</sup> Malcolm Gaskill, *Between Two Worlds: How the English Became Americans* (Oxford, 2014), p. ix, ff.

Finally, the law of primogeniture in a period of population increase left increasing numbers of second and third-born sons in need of alternative career paths. Ireland and America offered such paths and lured them with the promise of personal economic prosperity coupled with a tempting, however dangerous, sense of adventure.<sup>249</sup>

The first permanent English settlement in New England was planted 13 years after the founding of Jamestown.<sup>250</sup> Puritan separatists, who had first migrated from England to the Netherlands for 12 years, were granted permission by the Virginia Company to plant a colony at the mouth of the Hudson River, then claimed by the English as part of Virginia. If they had



Figure 2.1: Colonial New England, 1652

fulfilled their orders, the Plymouth settlers would have arrived at the southwestern tip of Long Island and the mouth of the Hudson River, which later became the colony of New Amsterdam (New York City) four years before the Dutch. For several reasons, however, including adverse weather and contrary ocean currents, Plymouth was founded instead, without a charter, in Cape Cod Bay, too far north to be considered Virginia even by the English. The colonists,

aware that they had chosen to abandon their original charter, autonomously wrote and signed their own Mayflower Compact and thus began the English colonial experiment in New England. A charter was later granted for a neighbouring New Hampshire colony, north of

<sup>249</sup> See Gaskill, *Between Two Worlds*; Quinn, *A New World*; and Taylor, *American Colonies*.

<sup>250</sup> William Bradford, *Of Plymouth Plantation* (London).

Massachusetts Bay, in 1623 and then Massachusetts Bay itself in 1630, but the Colony of Plymouth never gained a charter and functioned without one until it merged with the Massachusetts Bay Colony in 1691.<sup>251</sup> New Hampshire remained small and focused on fishing and fur rather than building permanent settlements. Massachusetts Bay was founded by non-conformist Anglicans and was much larger than Plymouth, although it was established ten years later in 1630.<sup>252</sup>

### ***2.1.2. Hartlibian Interest in America***

Hartlib was interested in America for several reasons. Initially, his correspondents wanted, in a very general sense, to prepare for a millennium. As I showed earlier, given the increasing number of scientific discoveries and inventions apparently prophesied in Daniel 12:4, most Hartlibians believed in an imminent millennium that would be preceded by a restoration of prelapsarian knowledge. With this foundational motivation, they were keen to explore new lands, discover new animals, minerals, plants, etc., and to develop new applications for the improvement of life in the colonies, at home, and throughout the world. It was to be an advancement of learning for universal common good.<sup>253</sup> Coupled with the Hartlibians' millennial commitments was the motivating theme of evangelism.<sup>254</sup> The idea that Native Americans might be the lost ten tribes of Israel encouraged some, like Boyle, to support introducing Indians to Christianity.<sup>255</sup> John Cotton preached to the original settlers of

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<sup>251</sup> See Perry Miller, *The New England Mind: From Colony to Province* (Harvard, 1953); Thomas Morton, *New English Canaan* (Amsterdam, 1637); and Thomas Prince, *A Chronological History of New England in the form of Annals* (Boston, 1736).

<sup>252</sup> See J. G. Holland, *The Bay-Path: A Tale of New England Colonial Life* (New York, 1857) and John Winthrop, *Winthrop's Journal: History of New England, 1630-1649, vol 1: Normal School*, ed. James Kendall Hosmer (Scribner, 1908).

<sup>253</sup> See Slack, *Invention of Improvement*.

<sup>254</sup> Dury To Hartlib, 30 May 1645, *HP* [30 May 1645].

<sup>255</sup> Jacob, *Robert Boyle*, pp. 148-50.

Massachusetts before they departed Southampton, telling them to “Offend not the poor natives” and he encouraged the colonists to “win” them to the love of Christ, suggesting that God had directed the English to expand their empire primarily in order to bring salvation to Native Americans.<sup>256</sup> This motivation to share what they believed to be the “truth” of God as a necessary component of improvement shows the deep interpenetration of religion and science within the Hartlib Circle.<sup>257</sup>

Some of Hartlib's correspondents understood America as a second Mt. Ararat.<sup>258</sup> Like the mountain in *Genesis* upon which Noah landed the Ark after the universal flood, from which a new global civilisation began, Hartlib and the others were convinced that America represented a new beginning for the Old World.<sup>259</sup> Like Noah and his family, the settlers of Jamestown and Plymouth were to be the ancestors of those who were to fill the east coast of North America. From these two starting points, the wilderness would be transformed into productive farmland, trails would be improved to roads, wetlands would be drained as factories, laboratories, mills, and mines appeared across the landscape. Old World animals such as chickens, cows, horses, pigs, and sheep would multiply and spread across new-found land for the benefit of generations to come. The colonies in America would be where the mistakes of Europe would be corrected, and where new knowledge would lead Europeans to a better place.<sup>260</sup>

Hartlib and his friends were also interested in America because they believed colonies would strengthen the security of the kingdom diplomatically, economically, and politically.

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<sup>256</sup> John Cotton. *God's Promise to his Plantation . . . As it was delivered in a Sermon* (London, 1630).

<sup>257</sup> For example, see Sir Cheney Culpeper to Hartlib, 21 Jan 1645, *HP* [13/65A]; John Hall to Benjamin Worsley, 5 Feb 1647 [36/6/1A]; Benjamin Worsley to Dury, 27 Jul 1649? [33/2/18A-19B]; John Beale to Hartlib? 9 Apr 1657 [52/11A]; and Dury to [Hartlib], Oct 1661 [4/4/36A].

<sup>258</sup> See, for example, Extract In Hand H?, Dr. Tong To Hartlib, undated, *HP* [15/8/23A-24B].

<sup>259</sup> Gen. 8:4.

<sup>260</sup> See Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, CT, 1972).

They saw it as a moral obligation to responsibly share information with other Protestant countries, thereby protecting these friendly nations and the Protestant faith. Hartlib believed in a growing union of English-speaking kingdoms as one centralising component within a greater alliance of Protestant nations. To England, Scotland, and Wales were added Ireland and America. Colonies in America and Ireland would allow England to achieve a level of economic self-sufficiency that would free the country from dependence on continental trade. Hartlib knew the advantages of trading from a position of strength. A wealth of resources within the empire would allow for the development of manufacturing and the creation of employment opportunities. It allowed England to be a seller on the world market rather than a buyer and would ensure -- from within the zero-sum perspective of mercantilism -- the maintenance of a sustainable positive trade surplus, thus allowing England to reduce poverty by eliminating unemployment. Several in the Hartlib Circle believed this would lead to a reduction in crime and in the prison population, and it would remove the risk of rebellions caused by economic discontent.<sup>261</sup> Descriptions of peace and prosperity by writers within the Hartlib Circle were serious attempts to visualise a Baconian New Jerusalem that would result from the success arising from the activities of adventurers in the colonies. Knowledge of nature was to be a servant of the English empire.<sup>262</sup>

Thirdly, America was significant to the Hartlib Circle because they believed it could be a grand laboratory in which they could not only discover new natural resources but conduct experiments for the benefit of the common good.<sup>263</sup> The discovery of new resources would make goods less expensive and the knowledge gleaned from experiments would introduce new applications of many Old-World products. America could thus change the English economy to

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<sup>261</sup> For example, see *Proposals Relating to Poor Relief*, undated, *HP* [15/2/47A-50B]; [John Dury] to? 1646? [17/9/1A-10B]; and Hartlib, *Londons Charity Enlarged*, 1650 [57/4/13/1A-12B].

<sup>262</sup> See Davis, *Utopia* and Eurich, *Science in Utopia*, pp. 147-55.

<sup>263</sup> *Ephemerides*, Jun 1656 – Sep 1656, *HP* [29/5/83A-94B].

the extent that the English transformed America.<sup>264</sup> Hartlib was always fascinated by discoveries in the New World. He was keen to promote the Columbian exchange of animals, minerals, and plants, and to discover how resources might grow, produce, and react in a new environment.<sup>265</sup> Partly because of encouragement from his correspondents, seeds, produce and livestock were shipped both directions across the Atlantic Ocean. Potatoes came to Ireland, but cattle, chickens, and pigs along with apples, carrots, and coffee went to America. Because of Old World demand, tobacco was cultivated to grow larger leaves in less time in order to increase profit for the plantations and enhance incentives for potential new colonial investors.<sup>266</sup>

Finally, members of the Hartlib Circle found America significant because they immediately recognised its potential as a safe space for friendly populations suffering persecution. Jews and French Protestants in particular, like the separatists of Plymouth, needed a colony of their own, free from the persecution by The Catholic Church and the Church of England. America was remote, and the great distance that allowed the Massachusetts Bay Colony to function in relative political and theological independence also insulated fragile populations from the wild seventeenth-century fluctuations in English politics.<sup>267</sup>

### ***2.1.3. Hartlib and New England***

The extensive literature on English efforts to colonise New England is largely silent on the Hartlibian project, although Hartlib worked diligently throughout the 1630s, 40s, and 50s

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<sup>264</sup> See Edwin J. Perkins, *The Economy of Colonial America* (Columbia, 1988).

<sup>265</sup> Culpeper To Hartlib, 1 Sep 1649, *HP* [13/268A-269B].

<sup>266</sup> Beale to Hartlib, 10 May 1660. BL ADD MSS 15948 Fol. 96A-97B.

<sup>267</sup> Printed Booklet, *The Moderate Intelligencer* No. 160. 6-13, Apr 1648, *HP* [39/2/74/3A].

to support English imperial expansion.<sup>268</sup> Conversely, the Hartlibian literature has underplayed and largely ignored the significance of New England to his programme.<sup>269</sup> Yet Hartlib corresponded regularly with major figures in New England including Robert Child, a New England adventurer, colonist, and entrepreneur; John Davenport, co-founder of the colony at New Haven; George Starkey, a chymist and native of Bermuda; William White, colonist and entrepreneur; John Winthrop Jr, governor of Connecticut; Henry Vane Jr, governor of the Massachusetts Bay Colony, and (probably) John Cotton, the pre-eminent colonist and Puritan minister of early New England. Cotton, who is mentioned extensively throughout the Hartlib Papers, was a friend to many in the circle, tutor of John Rulice, and, as I argue in this chapter, likely a correspondent of Hartlib himself. The Hartlibian correspondents in New England were pastors, teachers, and theologians but they were also adventurers, chemists and inventors who contributed to the English imperial project in America. Indeed, New England, like Ireland, was a vitally important laboratory for testing Hartlibian ideas that could provide the basis for implementing improvements in agriculture, mining, and manufacturing. In turn, natural samples and manufactured products in New England could be transplanted back to England.

In this chapter, I seek to restore New England to its pivotal place in the Hartlibian-Baconian project for “improving” the world.<sup>270</sup> Hartlibian associates such as Davenport, Child,

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<sup>268</sup> Brooks Adams, *The Emancipation of Massachusetts* (Boston, 1886); Calloway, *New Worlds for All*; Games, *The Web of Empire*; Holland, *The Bay Path*; Barry Levy, *Town Born: The Political Economy of New England from its Founding to the Revolution* (Philadelphia, 2009); Perry Miller, *The New England Mind: The Seventeenth Century* (Harvard, 1939) and *From Colony to Province*; Perkins, *The Economy of Colonial America*; Sarah Rivett, *The Science of the Soul in Colonial New England* (Chapel Hill, 2011); Taylor, *American Colonies*; Wendy Warren, *New England Bound: Slavery and Colonization in Early America* (Liveright Publishing Corporation, 2017); and Justin Winsor, *The Memorial History of Boston: Including Suffolk County, Massachusetts 1630-1888* (Harvard, 1886).

<sup>269</sup> Dale, *The Inhabitants of London*; Dircks, *Milton's Familiar Friend*; Jacob, *Robert Boyle*; Hunter, *Boyle and Robert Boyle Reconsidered*; Leng, *Benjamin Worsley*; Flora Masson, *Robert Boyle*; McCormick, *William Petty*; Turnbull, *Samuel Hartlib: A Sketch*; and Charles Webster, *Samuel Hartlib and The Great Instauration*.

<sup>270</sup> New England is used to designate all the land on the east coast of North America between the Dutch claims at New Amsterdam (New York) and the English claims at Newfoundland. The term is used in the Hartlib Papers in the same way it is understood today.

Vane, White, and Winthrop went to New England, while others remained in England but were no less interested or important in the progress of American improvement projects. The importance of New England to the vision of the circle is also demonstrated in the transfer of supplies and samples. This included equipment such as laboratory instruments sent to New England as well as pieces of ore, fruit, plants, and insects sent to England. By the time Hartlib arrived at Cambridge, a second English colony had been planted at New Hampshire.<sup>271</sup> The first industries of this colony were timber and fishing, but the settlements were small and struggled until the plantation was eventually merged with Massachusetts Bay Colony in 1641. Led by refugees from Massachusetts, the New Hampshire settlers grew beans, corn, and squash. Sir Ferdinando Gorges, who was a founder of the colony and is known, by some, as the father of English colonisation in North America, was a friend of several in the Hartlib Circle from 1645 through 1659 and later a recipient of books from Hartlib.<sup>272</sup> Hartlib participated in the imperial project through his correspondence with those more directly invested in planting. He assisted them as an activist for desirable imperial legislation in Parliament, as an advocate sending them helpful publications, and as a virtual clearing house collecting their discoveries and inventions for redistribution to other people and places. No single individual in England did more over time to encourage an ongoing plantation programme.

The most important colony, and the most significant for the Hartlib Circle in New England, was Massachusetts Bay, where Boston was the first and enduring principal town. When this plantation was chartered by Charles I in 1630, Hartlib was finished with his education at Cambridge, was married, and had moved to Chichester. By the time the king

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<sup>271</sup> Jere R Daniell. *Colonial New Hampshire: A History* (Lebanon, NH, 1981), p. 24.

<sup>272</sup> See James Phinney Baxter, *Sir Ferdinando Gorges and his Province of Maine* (Boston, 1890). See also, for example, five letters from Robert Child to Hartlib, *HP* [15/5/1A-2B, 39/2/1A-4B and 5A-6B, 40/5/1A-2B and 3A-6B] and eight letters from Robert Wood to Hartlib, *HP* [33/1/13A-14B and 20A-B, 15/4/3A-4B, 30A-32-B and 33A-35B, and 33/1/39A-40B, 43A-B, and 44A-B].

chartered the Massachusetts Bay Colony, William Laud had been Archbishop of Canterbury for two years and the great migration of Puritans had begun. Two pre-existing settlements were incorporated into the new charter, Salem (1626) and Charles Town (1629), already well-established north of the Plymouth Colony. Laud's policies pushed many into this new plantation, which immediately became the largest colony in New England. Hartlib himself briefly considered emigrating to America in 1630 when the Chichester school was struggling. He was almost certainly aware of John Cotton's sermon *God's Promise to his Plantation*, which was preached to the departing original Massachusetts settlers, since indirect references to the sermon appeared in his correspondence and journal immediately thereafter. Whether Cotton was influenced by Hartlibian ideas or developed them independently, Hartlib was evidently keen to know Cotton's argument for English subjects migrating to America. Cotton said, for example, that individuals should go to America to gain knowledge, to conduct trade, to plant a colony, to obtain liberty of conscience, and to take advantage of special providence.<sup>273</sup>

The Massachusetts Bay Colony was the primary focus of the Hartlib Circle in New England for three decades. By the late 1630s, additional colonies in Connecticut (founded in 1635 and distinct from Davenport's New Haven Colony) and Rhode Island (1636) had been established. Throughout the period 1630-1660, Hartlib and his associates sought to apply their ideas in the New England colonies. Hartlib's influence is seen most clearly in the petition of the two French Huguenot refugees briefly discussed in the previous chapter, Hugh L'Amy and Peter Le Pruvost, who approached Hartlib and Dury for assistance in establishing themselves as agents on the east coast of America in either New England or Virginia. This effort came to occupy much of the Hartlib's time and energy as the civil wars were ending and a parliamentary victory seemed assured.

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<sup>273</sup> Cotton, *Gods Promise*.

## 2.2. Hartlib and the Political Context of New England

### 2.2.1. *The Political and Religious Nature of the Colonies*

Although most of those who settled in New England can be classed as Puritans, each colony was politically and theologically different. Those Puritans who settled in Plymouth and Rhode Island were English separatists or Independents, who were slightly more tolerant of Protestant diversity in New England than the congregationalists (low church non-conformists) who settled in Massachusetts Bay, Connecticut, and the New Haven Plantation. The separatists attracted a diversity of ‘denominations’, whereas the less tolerant non-conformists, who had suffered most under Archbishop Laud in England, actually enforced a strict non-conformist unity that discouraged separatists from choosing to settle in those colonies.<sup>274</sup> This intolerance resulted in the religious persecution in the Massachusetts Bay Colony of residents such as Roger Williams and Anne Hutchinson, who were forced into separatism, and Robert Child, who was Presbyterian.<sup>275</sup> The leadership of the Colony was composed completely of strictly non-conformist, congregational, or ‘low church’ dissenters who sought to maintain a pretense of loyalty to the Church of England. They actively worked to maintain a political and theological unity, limiting the franchise, for example, to members of ‘the church’. The majority population of the colony, therefore, were not allowed to join the church for a variety of reasons.<sup>276</sup> The law limiting citizenship to church members, though conflicting with the rules of Parliament, was defended by the leadership as an authority based on the colony’s charter.<sup>277</sup>

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<sup>274</sup> Adams, *The Emancipation of Massachusetts* p. 131.

<sup>275</sup> Henry Melville King. *Sir Henry Vane, Jr, Governor of Massachusetts and Friend of Roger Williams and Rhode Island* (Providence, 1909), pp. 50-4, 70.

<sup>276</sup> Adams, *The Emancipation of Massachusetts*, p. 93.

<sup>277</sup> See Edmund S. Morgan, *The Puritan Dilemma: The Story of John Winthrop*, ed. Oscar Handlin (New York, 1958).

The leadership was, therefore, equally opposed to conforming Anglicans, Catholics, and separatists whether these were Anabaptists, Baptists, Presbyterians, or Quakers.<sup>278</sup>

If the splintering of mid-seventeenth-century English Protestantism were not enough, the non-conformists of the Massachusetts Bay Colony leadership became more intolerant over time and initiated a greater persecution of theological diversity than that from which they had flown. They attempted to regulate the outward behaviour of persons as well as the conscience of those living or visiting the colony.<sup>279</sup> This policy put Hartlib at odds with the Massachusetts Bay leadership, which included John Winthrop Sr. The colonial council maintained absolute power and, as will be detailed in this chapter, many Hartlibians, along with their plans for improvement, suffered accordingly as friends were jailed, fined, and banished from the colony. A few compromised their religious convictions to maintain their physical residency and continue their scientific work in Massachusetts Bay.

The New World Hartlibians' Baconian commitment to empirical exploration and experimentation tended to make them more tolerant of political and theological diversity because the programme welcomed knowledge from a diversity of sources regardless of religion, political ideology, or ethnicity. Over time, they demonstrated their ability to work progressively with royalists, Jews, and Catholics, without compromising their own personal Parliamentary or Protestant principles, whenever such people were able to supply useful, practical information. A certain degree of liberty to express oneself in speech and in print was critical for a successful improvement programme. Hartlib saw no conflict between the Bible and his pragmatic empiricism, and he embraced both with equal enthusiasm. On the other hand, he was reluctant to compromise the odds of Hartlibian success at the expense of becoming

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<sup>278</sup> Adams, *The Emancipation of Massachusetts*, pp. 102-130 and Canny, "The Origins of Empire", pp. 210-11, 215.

<sup>279</sup> Adams, *The Emancipation of Massachusetts*, pp. 64, 79.

entrenched in deep theological divisions over topics such as transubstantiation, infant baptism, or the proper balance between church and state.<sup>280</sup> Having worked for improvement under both Charles I and Oliver Cromwell, he demonstrated that he could function successfully under a monarchy or a republic. However, this attitude had its limits; he testified against Laud, and once revealed his bias against Presbyterians. He was careful, however, to not lose correspondents unnecessarily over doctrinal or political issues.<sup>281</sup>

### **2.2.2. Hartlib and John Cotton**

John Cotton is a remarkable example illustrating the fault lines among the leadership of the Massachusetts Bay Colony and the effect of Massachusetts Puritanism on the work of improvement in New England. Although no correspondence has yet been found to link Hartlib and Cotton directly, this famous Puritan minister was well known to Hartlib and his associates, and his writings were valued and circulated among them.<sup>282</sup> Cotton's name was first mentioned in Hartlib's journal in 1634, where Hartlib recorded that what Cotton had written up to that point was worth "all that ever was printed".<sup>283</sup> The anonymously-authored pamphlet *The Effect of Master Dury's Negotiation for the Uniting of Protestants*, found in the Hartlib Papers, lists Cotton among the "chief leading men" of the empire, living or deceased.<sup>284</sup> Hartlib occasionally quoted Cotton as if he were referencing lost correspondence or unrecorded

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<sup>280</sup> "Hartlib to John Worthington", 20 Jul 1659. Worthington, xiii, pp. 140-158. See also Adams, *The Emancipation of Massachusetts*, p. 103 and Perry Miller, *From Colony to Province*, p. 83 ff.

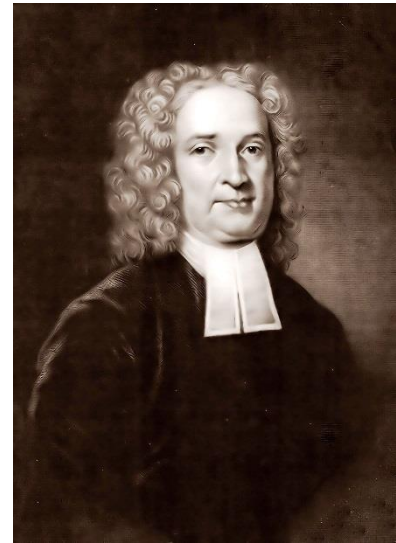
<sup>281</sup> "Hartlib to John Worthington", Oct 1661. Worthington, xxxvi, pp. 54-66.

<sup>282</sup> Hartlib, *Desiderata Theologica Etc*, undated, BL Sloane MSS 638 ff. 113A-128B.

<sup>283</sup> *Ephemerides 1634 Part 5, HP* [29/2/54A].

<sup>284</sup> *The Effect of Master Dury's Negotiations for the Uniting of Protestants*. 1657, *HP* [14/2/1/2B].

conversations conducted in person.<sup>285</sup> This, of course, is not conclusive evidence of a direct relationship between them but as much as Turnbull found it “strange” that there were no surviving letters between Hartlib and John Milton in the Hartlib Papers, it is equally difficult to believe there were none between Hartlib and Cotton.<sup>286</sup> Just as Hartlib and Milton shared pedagogical philosophies, so Cotton and Hartlib shared attitudes and beliefs about political, theological, and practical topics.



*Figure 2.2: John Cotton*

John Rulice (also known as Johannes Rulicius) was an important link between Hartlib and Cotton. Rulice had been a student of Cotton’s before the Puritan minister emigrated to America, and it may have been Cotton who introduced him to Hartlib.<sup>287</sup> References to Rulice appear in the Hartlib Papers 138 times over twenty-seven years, first in 1635, only two years after Cotton emigrated to New England and Rulice moved to Europe. Rulice was also a friend of Hartlib’s wife, Mary, by the mid-1630s, and the level of familiarity indicates that he may have been a guest, as so many were, in the Hartlibs’ home while in London. Indeed, Turnbull speculated that Hartlib knew both Cotton and Rulice at Cambridge in the mid-1620s.<sup>288</sup> Writing to Hartlib in 1635 from Amsterdam, Rulice wrote, “I hope to be with you again” proving that he had been with him at least once before.<sup>289</sup> Further, Casper Strosso sent messages to Hartlib through Rulice, demonstrating how close Strosso, a Hartlib correspondent in his own right,

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<sup>285</sup> Ephemerides, After Jan 1635, *HP* [29/3/13B].

<sup>286</sup> *HDC*, p. 44. See also Barbara K. Lewalski. *The Life of John Milton: A Critical Biography* (Oxford, 2000), pp. 172-5.

<sup>287</sup> John Nicolaus Rulice. *Rulice to Cotton*. 29 Nov 1628. ALS MS:MSA, CCXL, *Hutchinson Papers*, I, fols. 5, 5a, 6a.

<sup>288</sup> *HDC*, p. 14.

<sup>289</sup> Rulice to Hartlib, 29 Jan 1635, *HP* [11/1/39A].

considered Hartlib and Rulice to be.<sup>290</sup> Once in the Netherlands, Rulice met Dury. He was already acquainted with Johann Morian and Comenius, who later dedicated works to him. After Rulice returned to England in the early 1630s and was charged by Laud in the form of four “imputations”, Hartlib, a “credible witness”, testified to the incident at Laud’s trial in 1644 although, by then, Rulice had long returned to Holland.<sup>291</sup> Towards the end of his life Hartlib recorded that John Preston, Cotton’s teacher and close friend, took special care of Rulice,



Figure 2.3: John Rulice

and noted that he had been responsible for the student’s room and board while Rulice studied at Cambridge.<sup>292</sup> In a letter to Hartlib, Thomas Ball, who later edited Preston's works, asked Hartlib to secure certain papers by the former Emmanuel College master because Hartlib had known Preston personally.<sup>293</sup> William Speede, Hartlib’s former partner at the school in Chichester, wrote of Hartlib’s “opportunity at Boston” and referred to Cotton, then minister in Boston, Lincolnshire, as Hartlib prepared to leave Chichester in 1631.<sup>294</sup>

Several facts place Cotton in a Hartlibian context.<sup>295</sup> A graduate of Emmanuel College, Cambridge, he was known for his excellent preaching skills, scholarship, and millennial views. He became the vicar of St. Botolph’s Church in Boston, Lincolnshire, when he was only 27

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<sup>290</sup> Caspar Streso To John Rulice, In Latin And English. 6 Dec 1636, *HP* [11/1/116B].

<sup>291</sup> Rulice to Cotton, 29 Nov 1628, *The Correspondence of John Cotton*, ed. Sargent Bush Jr., “Provenance”, p. 2, n. 2; Milada Blekastad, *Comenius: Versuch eines Umrisses von Leben, Werk und Schicksal des Jan Amos Komenský* (Oslo and Prague, 1969), p. 290 n.; Casper Streso to John Rulice, 6 Dec 1636, *HP* [11/1/116A]; John Stoughton to Hartlib, 7 Sep 1636, *HP* [46/11/3A]; and Hartlib to Worthington, Oct 1661. Worthington, xxxvi, pp. 54-66.

<sup>292</sup> Hartlib to Worthington, Oct 1661. Worthington, xxxvi, pp. 54-66.

<sup>293</sup> Thomas Ball to Hartlib, 28 Nov 1638, *HP* [48/3/1A-2B].

<sup>294</sup> William Speede To Hartlib, [1631?] *HP* [46/6/14A-4B].

<sup>295</sup> See Emerson, *John Cotton*; Alexander Wilson M’Clure, *The Life of John Cotton* (Boston, 1846); H. G. Somerby, *The English Ancestry of Rev. John Cotton of Boston* (Boston, 1868); John Wingate Thornton, “Genealogies: The Cotton Family”, *New England Historical and Genealogical Register* 1:2 (April, 1847): 164-6; and Larzer Ziff, *The Career of John Cotton: Puritanism and the American Experience* (Princeton, 1962).

years old, in 1612, and as pastor at St. Botolph's he practised non-conformism. He introduced congregational government, altered the liturgy, abolished many aspects of Anglican ritual, and began to teach salvation by grace while remaining within the Church of England communion.<sup>296</sup> This eventually drew the unfavourable attention of his superiors, including Archbishop Laud, but it also made him a hero with Puritans at Cambridge, non-conformists throughout England, and colonists in New England. Once he chose to emigrate to New England in 1633, he was quickly made pastor of the most prestigious church in Massachusetts Bay. Cotton remained a critic of unreformed Anglicanism in New England but was no less critical of separatists and the intolerant attitudes and practices of strict non-conformists.<sup>297</sup>

Cotton's role in trials defending Robert Child, Samuel Gorton, Anne Hutchinson, Henry Vane Jr, Roger Williams and others caused him to be put on trial for his own words and actions.<sup>298</sup> As a result, he compromised his initial argument for toleration and retracted several of his most controversial opinions supporting those who were accused of heresy, thereby preserving his employment as pastor but compromising his credibility among those Hartlibians who sympathized with these defendants. After Cotton was interrogated for his teaching by his New England colleagues, Hartlib had both a hand-written and printed copy of the transcript from the meeting among his papers.<sup>299</sup> Most of these reformers, some of them correspondents of Hartlib, had been members of Cotton's church but the controversies eventually ended each of the relationships between Cotton and his former members.<sup>300</sup>

Cotton's evolution as a New England theologian damaged but did not end his relationship with members of the Hartlib Circle. Indeed, his skill as an orator and writer and

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<sup>296</sup> Adams, *The Emancipation of Massachusetts*, p. 75.

<sup>297</sup> See *The Correspondence of John Cotton*, ed. Sargent Bush, Jr (Chapel Hill, 2018).

<sup>298</sup> Adams, *The Emancipation of Massachusetts*, p. 75.

<sup>299</sup> Transcript of Interrogation of John Cotton. Dec 1636, *HP* [10/1/1A-20B: 8B, 19A]

<sup>300</sup> Canny, "The Origins of Empire", pp. 202-3.

his position as pastor of the largest church in New England, coupled with his support for educational improvements, made him a crucial ally in Massachusetts. Archbishop James Ussher suggested to Hartlib, in the midst of the Laudian persecution (1634), that “all the best books” should be sent to America for preservation.<sup>301</sup> He believed that Laud would not stop until he had rooted out all non-conformity and burned Puritan books.<sup>302</sup> Ussher must have included the works of Cotton since Hartlib had previously identified them as the best books. Once Hartlib had moved to London from Chichester, every letter from William Speede requested more books from Cotton: “I wish you could find how I might get Mr Cotton on *the Covenants of Workes & Grace*”, he wrote to Hartlib more than once.<sup>303</sup> On another occasion he asked Hartlib to get a copy of Cotton’s *the Highway and Stony Ground* so that he could transcribe it.<sup>304</sup> Hartlib sent Cotton’s *Meditations* to a printer he knew in Rotterdam so that Cotton and Hooker could answer fellow Massachusetts minister, Nathaniel Ward, who had written the polemical *Theologiae Practicae*.<sup>305</sup> Finally, he possessed both printed and hand-written copies of Cotton’s *Catechism on Church Doctrine*, a work that became a standard for elementary education in New England for decades.<sup>306</sup>

### ***2.2.3. Educational and Theological Projects in New England***

William Berkeley, John Davenport, Henry Vane Jr, Robert Child, William White, George Starkey, Richard Leader, and John Winthrop Jr are well documented correspondents of the most important Hartlibians. Most of them worked together at some point between 1630

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<sup>301</sup> Ephemerides, 1634, *HP* [29/2/44A-55A].

<sup>302</sup> *Ibid.*

<sup>303</sup> William Speede to Hartlib, 9 Jan 1631, *HP* [46/6/8B] and 16 Jul 1631, *HP* [46/6/30A].

<sup>304</sup> William Speede to Hartlib, 1631, *HP* [46/6/14A].

<sup>305</sup> Walter Welles to Hartlib, 15 Jul 1632, *HP* [33/3/9A].

<sup>306</sup> John Cotton, *Catechism on Church Doctrine*. 1643, *HP* [41/2/1/1A and 42/2/2]

and 1660, and all of them made personal visits at some point to Hartlib when they were in London. They discussed the impact of New England politics on the prospects for improvement, the meaning of America in Biblical prophecy, and the evangelisation of Native Americans. The Massachusetts Bay Colony may have been intolerant regarding outward conformity and liberty of conscience, but believing it was one of Satan's chief projects to keep men from the knowledge of the Scriptures, they founded schools in every town of the plantation that contained at least 50 households.<sup>307</sup> These schools taught young men and women to read and write, men to the age of 21 and girls to the age of 18,<sup>308</sup> and Hartlib was especially pleased to hear that girls were included.<sup>309</sup>

Another Massachusetts ordinance of 1642 made it illegal for a family to prevent a child from receiving an education, and a penalty of 20 shillings was imposed upon violating parents "that none of them shall suffer so much barbarism in any of their families".<sup>310</sup> Massachusetts Bay founded a college in 1636, the basis of what would become Harvard University, to train ministers for the congregational churches and educate Indian children in the English language and the Gospel.<sup>311</sup> By 1645, Robert Child informed Hartlib that he had been to Harvard and reported that the college was growing despite the restrictions placed on students. He told Hartlib, who had likely prompted the reluctant Child to make the visit, that the college library was "filld with Bookes", while the buildings included a "new faire house" for the president and a printing press. Child however, protested to Hartlib that he did not care "for meddling with them" because of various political and theological concerns.<sup>312</sup>

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<sup>307</sup> Adams, *The Emancipation of Massachusetts*, p. 79.

<sup>308</sup> John Cotton. *The Booke of Generall Lawes and Libertyes Concerning the Inhabitants of the Massachusetts* (Cambridge, 1648), p. 16.

<sup>309</sup> Hartlib, *London's Charity Inlarged*, p. 18. See also Charles Webster, *Great Instauration*, p. 242.

<sup>310</sup> Hartlib, *London's Charity Inlarged*, p. 16.

<sup>311</sup> See S. E. Morison. *The Founding of Harvard College* (Harvard, 1936), pp. 161-2, 415-16; and *HDC*, pp. 31, 48.

<sup>312</sup> Child to Hartlib, 24 Dec 1645, *HP* [15/5/1, 40/5/1A-2B, and 40/5/3].

These issues caused problems for Hartlibians, and in 1649, Benjamin Worsley, who was considering a move to America, outlined the benefits of Virginia over New England that existed because of the “condition” of Massachusetts.<sup>313</sup> Although primarily concerned with economic issues, Worsley cited the theological controversies in New England and gave examples of those who were moving from New England to Virginia in order to obtain personal liberty and freedom of worship. Thomas Thorowgood supported Worsley by arguing that settlers who chose Virginia were of a better sort than those who, he argued, merely pretended religion.<sup>314</sup> Worsley informed Dury that Virginia had two or three churches each of both Independents and Presbyterians, and he was impressed that more was being done for evangelising Native Americans in Virginia than in New England. Thorowgood grudgingly praised them for being “antimonarchicall”,<sup>315</sup> but he did praise the missionary John Eliot for dedicating himself to sharing the Gospel among the Natives of New England, whom Eliot considered ripe for conversion.<sup>316</sup> Worsley told Dury that he had recommended “our friend” Hartlib for the position of secretary for the parliamentary committee of plantations, but added that he himself wanted a commission from this committee.<sup>317</sup>

Many in the Hartlib Circle promoted the evangelisation of Native Americans in both Virginia and New England. There was a Commission for Propagating the Gospel in New England and this was backed by powerful Puritan interests in England, including the Earl of Warwick.<sup>318</sup> “Civilising” the indigenous people required an English education in language, history, and theology, and John Eliot and Daniel Gookin formalised three goals for the project

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<sup>313</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A].

<sup>314</sup> Thomas Thorowgood, *Ievves in America, Or, Probabilities That the Americans are of that Race* (Oxford, 1660), p. 78.

<sup>315</sup> *Ibid*, p. 81.

<sup>316</sup> Charles Webster, *Great Instauration*, p. 44.

<sup>317</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A].

<sup>318</sup> Charles Webster, *Great Instauration*, pp. 35, 208.

by arguing the Indians must first give up their “idle habits” for hard work, shed their “superstitious beliefs”, and learn to read and study the Bible.<sup>319</sup> John Beale acknowledged major cultural differences between Native Americans and Englishmen to Hartlib but did not believe this was a serious problem in terms of their conversion; he urged the equal application of the Gospel “for Jew, Turke, Indian, Negro, & for all mistaken & misinformed Mankind”.<sup>320</sup> Numerous pieces of evidence from letters and journals show an ongoing interest among many Hartlibians in Native American culture including their clothing, food, history, language, medicines, and religious beliefs.<sup>321</sup> Much of this reflected Hartlib’s interest in medicine; for example, John Winthrop Jr informed Hartlib that Native Americans did not develop kidney stones because they were eating “sampe”, an old form of grits made from corn.<sup>322</sup>

Because of their millennial commitments, combined with a biblically informed interest in the history of human habitation in the New World, correspondents within the Hartlib Circle were fascinated by the belief that Native Americans were the lost tribes of Israel. As a consequence, many Hartlibians lobbied for the readmittance of Jews into England.<sup>323</sup> Some corresponded with Jewish Rabbi Manasseh Ben Israel, who promoted this view, while Dury edited and wrote a preface for Thorowgood’s *Jews in America*, unequivocally affirming that the author had proven the lost tribes theory. Thorowgood based his argument on the testimonies of Spanish explorers, similarities in language and clothing, the presence of a flood story in Indian oral history, the common appreciation for dancing, and numerous other types of evidence. Like others, Thorowgood’s arguments tell us more about Europeans in the seventeenth-century than they do about Native American ancestry. Other contemporaries

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<sup>319</sup> Jacob, *Robert Boyle*, p. 150.

<sup>320</sup> John Beale, *Tract on Eleutheropolis*. 14 Dec 1658, *HP* [51/44A-51B].

<sup>321</sup> See for example, Ephemerides, 1650, *HP* [28/1/81B]; 1653 [28/2/80A]; 1654 [29/4/13A-23B]; 1658, [29/7/1A and 29/7/15B]; and 1660 [29/8/14A].

<sup>322</sup> John Winthrop to Hartlib, 10 May 1661, *HP* [32/1/10A].

<sup>323</sup> Dury to [Adam Boreel?], In Latin. 8 Aug 1649, *HP* [1/31/1A].

disagreed, and Thomas Morton thought the Indians dressed not like Jews but the Irish with “the Stockinges joyne to their breeches”.<sup>324</sup> Ben Israel informed the Parliament of London that “the eies of all are turned upon you”<sup>325</sup> in reference both to the readmission of Jews into England and to the charter for a Jewish Colony in America.<sup>326</sup> Dury thought the idea of Jews migrating to America was a waste of time because he believed the time was near for all of the Jews to migrate back to Palestine.<sup>327</sup> Thorowgood never lived in America and was not a millenarian<sup>328</sup> but he did offer demographic and topographical information about the New World, contributing to the equation of “evangelised” with “civilised” in Native American missionary projects.<sup>329</sup>

Several of Hartlib’s improvement projects were explicitly influenced by theology. For example, assuming that at least some of the Native Americans were Jews, Thorowgood speculated as to how they might have travelled to North America from the ancient land of Assyria and proposed that there was a land bridge in the extreme north-western corner of North America.<sup>330</sup> A conviction among Hartlibians that Native Americans were subject to the fall of man as recorded in *Genesis*, English settlement in New England necessarily raised the issue of the morality of displacement. Thorowgood declared that the Indians had forfeited their right to the land of North America because they had failed in their duty to “advance the good of mankind in general”. Since they had disqualified themselves by not advancing in technology comparable to that of Europeans, the English had a duty and were, in fact, “bound” to take their

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<sup>324</sup> Morton, *New English Canaan*, p. 30.

<sup>325</sup> Menasseh Ben Israel, *The Hope of Israel* (London, 1651).

<sup>326</sup> Ben Israel, *The Hope of Israel*, p. A2.

<sup>327</sup> Daniel Rhaetus [Dury] to ?. 26 Nov 1635, *HP* [3/4/33A-38B].

<sup>328</sup> See Thomas Thorowgood, *The Ancestry of the American Indians: Thomas Thorowgood’s Jewes in America* (London, 1650) and *Jews in America* (Oxford, 1660); and Richard W. Cogley, *John Eliot’s Mission to the Indians before King Philip’s War*, (Harvard, 1999).

<sup>329</sup> Cogley, *John Eliot’s Mission*, p. 319.

<sup>330</sup> Hartlib wrote, for example, that Frederick Clodius’ and Dr. Gurdain’s investigations into alchemy had led them to make new discoveries in perfume. Benjamin Worsley said as much about his own research. See *Ephemerides*, Jan-Feb 1650 [28/1/39A-49A]; *Ephemerides*, 1660, *HP* [29/8/10A-16B]; and *Benjamin Worsley to Hartlib*, 22 Jun 1649, *HP* [26/33/1A-3B].

place in fulfilling God's command to fill the earth.<sup>331</sup> According to Thorowgood, nothing could negate this truth of God and it was further proof that English settlement and displacement of Native Americans was justified according to the Scriptures. Others in the Hartlib Circle, including John Davenport and Robert Child, however, were more cautious and were concerned with maintaining trade with Native Americans. Both acquired land from the Indians by purchase and by treaties that were deemed fair to both parties, according to Child.<sup>332</sup>

## **2.3. Hartlibian Improvement Projects in New England**

### ***2.3.1. 1620s: Davenport and St. Stephens, Origin of the New Haven Colony***

Several New England correspondents shared a genuine Hartlibian commitment to the philosophy of improvement. These include William Berkeley, John Davenport, Henry Vane Jr, Robert Child, William White, George Starkey, Richard Leader, and John Winthrop Jr. Except for Starkey (1628-1665), this group were of the same generation, all born within 16 years of each other, and all Englishmen with an interest in improvement projects. Three governors, a minister, and four entrepreneurs exchanged biological, chemical, engineering, and medical knowledge with each other and with Hartlibians in the Old World. The first to establish contact with Hartlib was John Davenport. Davenport was a London preacher who was appointed vicar of St. Stephen's Church in 1624. This church was a Puritan stronghold by the seventeenth-century<sup>333</sup> but Davenport denied that he was a non-conformist when he took on his role, interpreting it to mean opposition to the government. However, by 1628 he was considering

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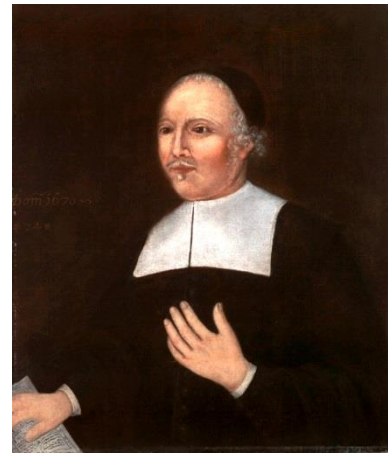
<sup>331</sup> Thorowgood, *The Ancestry of the American Indians*, p. 57.

<sup>332</sup> Robert Child to Hartlib? 24 Dec 1645, *HP* [40/5/1A-2B, 40/5/3, and 15/5/1]. See also Turnbull transcript in *Publications of the Colonial Society of Massachusetts* (1959), xxxviii, pp. 50-3.

<sup>333</sup> Sinclair B. Ferguson, *John Owen on the Christian Life* (Edinburgh, 1987), p. 16.

complete separation from the Church of England, and he encouraged his growing flock to vote unanimously to migrate as a congregation to America.<sup>334</sup>

Looking for a co-pastor to lead them, he asked Hartlib and John Bastwick for recommendations. Hartlib mentioned Dury, and Davenport then sent a letter to Dury in Elbląg. Citing recommendations from “our much-esteemed friend” and noting what he had heard of Dury’s work, Davenport obviously implicitly trusted Hartlib’s opinion.<sup>335</sup> He explained to Dury



*Figure 2.3: John Davenport, 1670, Yale University Art Gallery*

that he and the congregation intended to leave for America within six months to share the Gospel in the New World. Dury, however, rejected the call, citing his responsibilities in Elbląg. He encouraged Davenport to find a pastor more qualified and more willing to accept this unique opportunity.

Perhaps due to their failure in finding a qualified and willing minister to lead them, the congregation of St. Stephen’s postponed their decision. This may explain why Davenport resigned from the church in 1633 and migrated to Amsterdam. He became co-pastor of two churches there before returning to London in 1637, acquiring a patent for a new colony in Massachusetts, and collecting those in the St. Stephen’s Church still willing to fulfil their earlier plan of moving to America. They spent a few months in Boston with Cotton, but in 1638 fulfilled their patent and founded the colony of New Haven. As a co-founder of the colony and the most influential settler there, Davenport maintained a correspondence with both Hartlib and Dury and served as a link between Hartlib and John Winthrop Jr. prior to the latter’s

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<sup>334</sup> Davenport to John Dury and Reply. 27 Oct 1628, *HP* [4/5/1A].

<sup>335</sup> *Ibid.*

establishing a direct correspondence.<sup>336</sup> Davenport gave books from Hartlib to Winthrop on improvement subjects such as agriculture, banking, chemistry, medicine, and “more he tells me of”.<sup>337</sup> Besides founding a colony school in New Haven (further detailed below), Winthrop’s later letters to Hartlib indicate that Davenport had been keeping bees and experimenting with recipes to cure the stone.<sup>338</sup>

### ***2.3.2. 1630s: Winthrop in the Field and Vane in the Colonial Court***

Apart from Davenport, four of Hartlib’s correspondents in New England (Child, Leader, Starkey, and White) were more closely related to each other in the field and indeed collaborated on improvement projects. This group managed to avoid political and theological controversies and were able to make new discoveries and build several manufacturing facilities. The Puritan leadership in Massachusetts welcomed this work at first because it was considered an act of piety to explore God’s creation, while the discovery of nature’s secrets was an affirmation of faith.<sup>339</sup> For such men, Biblical revelation was complemented by investigation of the natural world, and was not challenged by it. It was helpful to this group that Winthrop Jr, son of the governor, was their leader. It has been claimed, with some reason, that Winthrop was the first significant natural philosopher in the English colonies, but it is less well known that he was part of a team of natural philosophers who led the transfer of empirical methods from England to the New World during the seventeenth-century.<sup>340</sup> Winthrop was the first of

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<sup>336</sup> See The Effect of Master Dury’s Negotiation for the Uniting of Protestants, 1657, *HP* [14/2/1/1A-6B]; and John Davenport to John Dury, 25 Jun 1660, *HP* [6/5/1A-2B].

<sup>337</sup> John Winthrop to Hartlib, 16 Dec 1659, *HP* [40/3/1B].

<sup>338</sup> John Winthrop to Hartlib, 25 Aug 1660, *HP* [32/1/6A-7B].

<sup>339</sup> Ronald Sterne Wilkinson, “John Winthrop, Jr. and the Origins of American Chemistry”, PhD diss., Michigan State University, 1969 (University Microfilms, Inc., 69-16, 193), p. 2.

<sup>340</sup> Wilkinson, “John Winthrop, Jr”, p. 8. See also Robert C. Black, *The Younger John Winthrop* (Columbia, 1966); Richard S. Dunn, *Puritans and Yankees* (Princeton, 1962); Lawrence Shaw Mayo, *The Winthrop Family*

Hartlib's contacts to be present in New England, following his father there in 1631, long before actually corresponding with Hartlib himself. Yet even though his direct correspondence with Hartlib began late, he was working from the beginning directly with others who were corresponding with Hartlib.

Winthrop was educated at Trinity College in Dublin where the curriculum in 1622 was still very scholastic.<sup>341</sup> In 1627 he served in the army under Buckingham, who was attempting to relieve the Huguenots in France, and there he met Cornelis Drebbel and Abram Kuffler.<sup>342</sup> From 1628-1629, Winthrop toured Italy and Istanbul where he saw several inventions and activities that inspired his engineering activities later in New England.<sup>343</sup> Once in New England, Winthrop built



*Figure 2.4: John Winthrop the Younger*

the first laboratory in the English colonies, and he became a physician who cared for Englishmen as well as Native Americans.<sup>344</sup> Winthrop's wife, Elizabeth, was also a chemist in the style of Catherine Boyle and worked alongside her husband as he began to implement discoveries in the field. The couple chose to experiment with products useful to settlers such as iron, glass, gunpowder, salt, and soap, and Winthrop blew the first glass in the colonies when he established a glass works in Salem.<sup>345</sup> Winthrop started building an ironworks at Agawan (now Ipswich) in 1633 but suspended construction to make a one year trip back to England;

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*in America* (Massachusetts Historical Society, 1948); Edmund S. Morgan, *The Puritan Dilemma*; and Thomas F. Waters, *A Sketch of the Life of John Winthrop the Younger* (Harvard, 1900).

<sup>341</sup> Constantia Maxwell. *A History of Trinity College* (Dublin, 1946).

<sup>342</sup> See L. E. Harris, *The Two Netherlanders: Humphrey Bradley and Cornelis Drebbel* (Cambridge, 1961); and James Riddick Partington, *A History of Chemistry* (Chicago, 1961).

<sup>343</sup> Wilkinson, "John Winthrop, Jr", p. 21.

<sup>344</sup> Cotton Mather. *The Angel of Bethesda* (Worcester, MA, 1972).

<sup>345</sup> Wilkinson, "John Winthrop, Jr", p. 25.

this was by way of Ireland where he met Charles Coote and the Kufflers, who gave him important advice in smelting metals.

Winthrop returned to New England with Hugh Peter, Thomas Shepard, Henry Vane Jr., and two hundred other settlers who set up the colony of Connecticut. They arrived in 1635 just as Roger Williams was being banished from Massachusetts, a punishment that led to his



*Figure 2.5: Winthrop's 1650 Grist Mill in New London as it appeared in 1910*

planting the colony of Rhode Island. Winthrop was not then part of the Connecticut colony but joined them later and became their governor. He went to Agawan where he built a saltworks; once it was operating, he moved to Salem and began exploring desalination techniques. Here he continued until he returned with Child to England, his second return trip, in 1641. By that time, Henry Vane Jr had arrived in New England, served as governor, and had also returned to London.<sup>346</sup>

Vane experienced a religious awakening as a teenager in Essex and openly adopted Puritan values in opposition to his father. Partly because of this conflict, he migrated to Massachusetts Bay in 1635 on the ship with Winthrop.



*Figure 2.6: Henry Vane the Younger*

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<sup>346</sup> See Adamson and Folland, pp. 59, 67, and 121-2 ; Henry Melville King, *Sir Henry Vane, Jr., Governor of Massachusetts and Friend of Roger Williams and Rhode Island* (Providence, 1909), pp. 25-6, 44, 54-5, and 75-6; and Violet A. Rowe, *Sir Henry Vane the Younger: A Study in Political and Administrative History* (London, 1970), pp. 4-7, 14, and 25.

Because of his wealth and noble birth, Vane was quickly made a freeman in New England. He was thus allowed to join the church, vote, and serve in public office. Due to an opportunistic split in the New England leadership, and with the support of John Cotton, Vane was elected governor of Massachusetts in 1637, and one of his priorities as governor and apostle of improvement was educational reform.<sup>347</sup>

Hartlib urged everyone in his network to encourage learning and popularise useful knowledge. One reason Hartlibians started schools was because schools were places where natural secrets could be revealed as part of the curriculum. Superstitious terrors, they argued, could be defeated by means of rational thought and empirical investigation. From the outset, Vane attempted to improve Massachusetts Bay by starting schools; a member of the colonial committee to construct a new legal code in 1636, he was opposed to monopolies and advocated that every child should be taught skills “either in husbandry or some other trade”.<sup>348</sup> According to Robert Child, these schools were funded by a tax on wine vendors amounting to £40 per year.<sup>349</sup> Vane, Winthrop Sr, Cotton, and five others drew up these laws “as near the law of God as they can”.<sup>350</sup> Hartlibian influence may be detected in the laws introduced and drafted by Vane and Cotton, not only in education and religious toleration but also in economics and trade. For example, it was ordered in 1641 that there were to be no monopolies in Massachusetts, unless one was required for some new invention that would be profitable for the colony, only feasible with the benefit of a monopoly, and, then, only for a short period.<sup>351</sup>

Vane, like other Hartlibian correspondents in New England, favoured religious toleration. He supported Anne Hutchinson during her trial in the Antinomian Crisis, and he

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<sup>347</sup> King, *Sir Henry Vane, Jr*, p. 30; and Adamson and Folland, *Sir Henry Vane*, pp. 31.32.

<sup>348</sup> Wilkinson, “John Winthrop, Jr”, p. 136.

<sup>349</sup> Robert Child to Hartlib? 24 Dec 1645, *HP* [15/5/1].

<sup>350</sup> Cotton, *The Booke of Generall Lawes*, pp. 68, 73.

<sup>351</sup> *Ibid*, p. 62.

continued to defend her even after Cotton withdrew his support. However, he lost credibility as governor due to his actions in the Pequot War, which resulted in the annihilation of the Pequot tribe. Vane followed the advice of some who wrongly accused the Pequot for murdering colonist John Oldham, and despite a warning from Roger Williams that Oldham was most likely killed by the Narragansett, Vane authorised war against the Pequot.<sup>352</sup> Vane's popularity with the Massachusetts leadership suffered further when he backed Hutchinson's associate, John Wheelwright, after Wheelwright delivered strong sermons against those, he said, who were preaching a works-based salvation. The election for governor in 1637 was moved to Cambridge by the general court to ensure Vane's defeat. The leadership knew Vane had less support in Cambridge and that his Boston base of supporters were unlikely to travel even the short distance just to vote.<sup>353</sup> John Winthrop Sr duly won the election and Vane's one-year term as governor came to an end.<sup>354</sup> Rather than continue in New England as a defeated former governor, or follow Williams and Hutchinson to Rhode Island, Vane returned to England in 1639.<sup>355</sup>

Opinions of Vane within the Hartlib Circle varied. Boyle informed Hartlib that the former governor was the author of the well-respected *A Briefe Discourse examining from Scripture Reason the Nature Rise and End of Civil Government*, and Ben Israel called him a "gallant gentleman" whose name would live in honour.<sup>356</sup> Dury, however, said Vane was not well suited to be a statesman,<sup>357</sup> and he left up to Hartlib's discretion how much of their conversation Hartlib should share with Vane.<sup>358</sup> This and other references indicate that Hartlib

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<sup>352</sup> King, *Sir Henry Vane, Jr*, p. 59; and Adamson and Folland, *Sir Henry Vane*, pp. 71-78.

<sup>353</sup> The distance from Boston to Cambridge, MA is approximately 4.2 miles.

<sup>354</sup> Adams, *The Emancipation of Massachusetts*, p. 72.

<sup>355</sup> *Ibid*, p. 78.

<sup>356</sup> See Ephemerides, 1648 [Jan-Jun], *HP* [31/22/3B]; and Moses Wall to Hartlib, 9 Jan 1659 [34/4/19A].

<sup>357</sup> Dury to Hartlib, 18 Aug 1646, *HP* [3/3/26B].

<sup>358</sup> Dury to Hartlib, 24 Apr 1652, *HP* [4/2/29A].

was in communication with Vane during and after his presence in New England.<sup>359</sup> Vane continued to be instrumental in building and improving colonies in London. He became Secretary of State and a Member of Parliament in 1640, and he was a member of the Westminster Assembly. Although he remained faithful to his Puritan convictions and maintained the spiritual security of his early conversion experience, Vane's experience with New England clergy made him distrustful of all clergy and suspicious of clerical power in England.<sup>360</sup>

George Starkey was the only correspondent of Hartlib who was born in the New World. The son of Scottish Presbyterian Minister, George Stirk, he was born in Bermuda in 1628. He began recording entomological observations of various insects on the island as a child and moved with his mother to New England in 1639, two years after his father's death. At the age of 15, he developed his natural history interests and began studies at Harvard College, graduating with his first degree in 1646 and a second in 1649. During this time, Starkey was tutored in chemistry by Winthrop.<sup>361</sup> Harvard was teaching the peripatetic philosophy but, most likely under the influence of Winthrop, Starkey rejected this, concentrating on practical and useful pursuits. These commitments were reinforced once he met Richard Leader and Robert Child:

Wherefore as many experiments as I could try I tried and took nothing upon any mans trust, so as to build any thing on it, nor to draw any conclusions from it. I invented many sorts of furnaces, procured what Glasses were possible, with all manner of Simples, mineral and metalline.<sup>362</sup>

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<sup>359</sup> See for example, Henry Oldenburg to Hartlib, 12 Jun 1658, *HP* [39/3/9A-10B]; and 26 Jul 1659 [39/3/29A-30B].

<sup>360</sup> Michael P. Winship, *Making Heretics: Militant Protestantism and Free Grace in Massachusetts, 1636-1641* (Princeton, 2009), p. 245.

<sup>361</sup> William R. Newman, *Gehennical Fire: The Lives of George Starkey, An American Alchemist in the Scientific Revolution* (Harvard, 1994), p. 132.

<sup>362</sup> George Starkey, *Natures, Explication and Helmont's Vindication* (London, 1657), pp. 35-6.

By the age of 17, he had studied chemistry, history, logic, mathematics, physics, and politics. In the same year, he began practising medicine in Boston and was married to Susanna Stoughton, daughter of Col. Israel Stoughton and sister of Massachusetts Bay Gov. William Stoughton.<sup>363</sup> Winthrop, Vane, and Starkey were each privileged by family connections, and were drawn into communication with the Hartlib Circle by common empirical interests and a shared desire for colonial improvements.

### ***2.3.3. 1640s: Winthrop and Child***

It was on his second trip back to England in 1641 that Winthrop first met Hartlib, and it may have been Robert Child who introduced them.<sup>364</sup> Winthrop, Child, and Hartlib were drawn together by a common interest in chemistry. They discussed various uses for iron and graphite, and Winthrop shared samples with Hartlib.<sup>365</sup> Winthrop also visited Hamburg where he met key Hartlibians such as Morian, Glauber, and Comenius, likely with written introductions from Hartlib. Cotton Mather wrote that Winthrop had been authorised to offer the presidency of Harvard College to Comenius, but the famous educator declined the invitation.<sup>366</sup> It was chymistry that drew the Kufflers, Morian, Petraeus, Comenius, and Winthrop together for a meeting in Amsterdam before the latter returned to New England in 1643. Child lingered in England until 1645 but when he made his second trip to New England, he took with him William White and Richard Leader among others. Winthrop was told that England's need for iron, and its lack of timber for fuel meant that demand for New England

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<sup>363</sup> William R. Newman, "Starkey [formerly Stirck], George [pseud. Eirenaeus Philalethes] (1628–1665), alchemist, medical practitioner, and writer", *ODNB* (23 Sep 2004).

<sup>364</sup> Wilkinson, "John Winthrop, Jr", p. 86.

<sup>365</sup> *Ibid*, pp. 60-75.

<sup>366</sup> Cotton Mather, *Magnalia Christi Americana: or, The ecclesiastical history of New-England, from its first planting in the year 1620. unto the year of Our Lord, 1698* (London, 1702), p. 14.

iron would be high if he could manage its production. Joshua Foote had successfully set up an ironworks in Ireland, and Child introduced him to Winthrop for that purpose. Leader in turn introduced Winthrop to White, “a man of some skill in science”, who had previously invented several devices and machines.<sup>367</sup>

On his return to New England, Child corresponded regularly with Hartlib. He complained that he had been unable to conduct experiments since arriving because he was not allowed freedom of conscience by the colonial authorities.<sup>368</sup> He reported to Hartlib that the merchants of Massachusetts Bay were losing money due to unreasonable regulations, and lamented that the political climate was poisonous: “Every day” he wrote, “wee have breach upon breach both in Church and commonwealth between Magistrates, Ministers, People Members Non-Members”. He predicted to Hartlib that the oppression would soon cause a rebellion, complaining that Presbyterians like himself, and many others, were not permitted to vote because they were not allowed to join the church. In this way, a minority ruled the disenfranchised majority by strictly regulating church membership but then requiring such membership as a prerequisite to citizenship. Non-members “think themselves enslaved”, Child wrote, telling Hartlib he was paying “great taxes” but was prohibited from having his children baptised and was not allowed to receive the sacrament.<sup>369</sup>

The General Court did, however, guarantee land and a 20-year license to operate to anyone who found minerals in the colony. Winthrop had located a deposit of graphite as early as 1638 and identified it as “black lead” in 1641. Once he returned to New England, he found an iron deposit near Braintree, which Foote told him was similar to the “limonite” he had seen in Ireland.<sup>370</sup> Winthrop began construction of the Braintree ironworks on land formerly owned

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<sup>367</sup> E. N. Hartley. *Ironworks on the Saugus* (Norman, 1957), p. 132.

<sup>368</sup> Robert Child to Hartlib, 24 Dec 1645, *HP* [15/5/1, 40/5/1A-2B, and 40/5/3].

<sup>369</sup> *Ibid.*

<sup>370</sup> C24/733/33; Rawlinson MSS (Bodleian Library), D 918/133.

by the Hutchinsons, and Child built the furnace with five tons of stone. The General Court granted them a temporary monopoly for ironworks, and soon Winthrop, Child, and others had constructed six furnaces in different locations. Winthrop's wide-ranging interest in a variety of projects led him to establish a pattern of building new works and then turning them over to others such as Child, who maintained them. In the case of the Braintree ironworks, however, his London investors chose to replace him with Leader against Winthrop's wishes. Winthrop and Leader remained friends, nonetheless; Winthrop established new copper, lead, and tin works, while Leader moved the Braintree ironworks to Saugus River, closer to Boston, without shutting down the Braintree site entirely. Child lived in Leader's house and continued to assist him, even while working with Winthrop on new projects.<sup>371</sup>

In the meantime, prospects for improvement in Davenport's New Haven Colony were poor and the colony was so isolated geographically from Plymouth and Massachusetts Bay that he was forced to search for new economic opportunities. Davenport was a Puritan minister but was also a merchant and trader. He and his partner Theophilus Eaton purchased land from the local Native Americans and created a plantation with 250 settlers. New Haven created its own colonial court and held elections involving all planters who were also members of the authorised church; by 1643, the colony had expanded to six settlements, including the villages of New Haven, Milford, Guilford, Stamford, Southold, and Branford. Eaton served as the first governor, but Davenport unofficially had equal authority in leading the plantation. He chose to commit his time and efforts to establishing a school and he began writing to Hartlib and others about setting up a college in New Haven. Davenport asked Dury to design a curriculum for use in New Haven schools and asked him to suggest books for classroom teaching.<sup>372</sup> Keen to

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<sup>371</sup> Hartley, *Ironworks on the Saugus*, p. 123.

<sup>372</sup> Dury to Davenport. 7 Aug 1642, *HP* [6/4/149A].

initiate trade, he led New Haven to construct one of the first ships built in New England and sent it on trading voyages to the West Indies.<sup>373</sup>

Dury's rejection of a role at St. Stephen's did not prevent Davenport from establishing a close relationship with him, a move that was obviously encouraged by his ongoing conversation with Hartlib. Dury's first letter to Davenport after the migration followed a now lost letter from Davenport to Hartlib in 1642. Hartlib had already raised the possibility of settling Jan Amos Comenius' congregation in New England and Davenport was keen to extend an invitation. Comenius was interested in the project and Dury was quick to commit his own goodwill and offer of service. More immediately, Davenport wanted curricular resources for the schools he had created, and he asked Hartlib for suitable recommendations. Dury outlined a spiritually focussed curriculum that included history, Latin, grammar, and rhetoric and he listed a number of texts, including Comenius' *Ianua*, which he particularly commended as a work to be translated by the New Haven students into Greek and Hebrew. In return, Davenport is listed among those who supported the fund to maintain "men to translate or compose such seasonable treatises as their present necessities require, & to print & convey unto them such meanes of their Spiritual good", both of which Hartlib and Dury were vigorously promoting.<sup>374</sup>

From Massachusetts, Child conducted a survey of all the colonies of New England and in 1645 he reported the results of his findings in the form of a three-page letter to Hartlib.<sup>375</sup> Child, who walked across much of the New England territory, noted that there were six distinct New England colonies with 80 plantations, with a total population of about 40,000.<sup>376</sup> He consistently used the terms "colony" and "plantation" not as synonyms, but to distinguish

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<sup>373</sup> See Charles M. Andrews, *The Colonial Period of American History: The Settlements II* (3 vols, New Haven, 1937); Isabel M. Calder, *The New Haven Colony* (New Haven, 1934); and George Larkin Clark, *A History of Connecticut: Its People and Institutions* (New York, 1914).

<sup>374</sup> Promises to Pay Donations, With List of Receipts, undated, *HP* [23/2/17A].

<sup>375</sup> Child to Hartlib? 24 Dec 1645, *HP* [15/5/1A-2B].

<sup>376</sup> Child to Hartlib? 24 Dec 1645, *HP* [15/5/1].

between the larger chartered regions and individual settlements. According to Child's detailed statistics, Massachusetts Bay was confirmed to be the largest colony by far, more than three times the population and plantations of any other colony, while Connecticut, Maine, New Haven, Plymouth, and Rhode Island were similar in size. Child's rough natural history detailed the chief agricultural products of each colony. Corn was the leading product of Connecticut, New Haven, and Rhode Island, while Massachusetts was producing beef, which settlers could purchase in the Boston market for only 50 pence per pound. Plymouth was barren and poor with no notable products but was, according to Child, populated by "moderate" Puritans like those of Rhode Island, which was then, according to Child, mired in a theological war with Massachusetts.<sup>377</sup> Edward Winslow, who would become an enemy of Child after the latter published his *Remonstrance and Humble Petition* in 1646 criticising the constraints placed on liberty of conscience in Massachusetts, wrote admiringly that Child

hath beene twice in the Countrey . . . upon a diligent survey of the whole Countrey, and painfully travels on foot from Plantation to Plantation; takes notice of the, situation, strength, Churches, Townes, number of Inhabitants, and when he had finished this toylesome taske, returnes againe for England, being able to give a better account then any of the Countrey in that respect.<sup>378</sup>

According to Winslow, Child donated books to Harvard College and was making the country profitable with his advancement of iron works.

Child and Winthrop located a graphite deposit that contained approximately 12 pounds of silver per ton; Child assayed the ore, deeming it to be worth £15 per ton. While Winthrop attempted to locate a market for the graphite, Child bought land in Saco (Maine Colony) indicating that the scope of their concentration was never limited to Massachusetts Bay. In the letter to Hartlib reporting their progress, Child wrote that New England was great for minerals

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<sup>377</sup> Child to Hartlib? 24 Dec 1645, *HP* [15/5/1B].

<sup>378</sup> Edward Winslow, *New-Englands Salamander Discovered* (London, 1647), pp. 7-8.

but bad for politics. Even as he and Winthrop made promising mineral finds, he complained to Hartlib of cold winters, religious intolerance, high taxes, and involuntary military service. His increasingly jaundiced view was noted by contemporaries and Winslow recorded that Child's demeanour "is now changed and is not onely ready to close with such as are discontented, but to be a *leader* [emphasis added] of such against the government".<sup>379</sup>

When he was not surveying or extracting mineral resources, Child was increasingly focussed on local politics. He was one of twenty-five "non-freemen" who prepared a petition for the Commissioners for Plantations in late 1646 in which they pleaded for liberty of conscience in Massachusetts and the appointment of a general governor.<sup>380</sup> Child later wrote that there were "many thousands in these Plantations" who were unhappy with the colonial government and its strict policies which tied citizenship to church membership.<sup>381</sup> He was also the leader of seven who signed the *Remonstrance and Humble Petition* which was submitted to the General Court in 1646.<sup>382</sup> These documents were composed in the village of Hingham, only thirteen miles southeast of Boston, where the local minister, Peter Hubbert, was known to have opened church ordinances to non-members in a "presbyterial spirit".<sup>383</sup> Thomas Burton, one of seven who signed the Remonstrance, lived at Hingham, and Child, a Presbyterian and constantly mobile in his improvement work, was frequently present. The five others who signed the *Remonstrance* were prominent but equally discontented men living in Boston. Later when colonial leaders called a synod to discuss issues such as those raised in Child's complaint, only Hingham refused to participate.<sup>384</sup>

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<sup>379</sup> Winslow, *New-England's Salamander*, pp. 7-8.

<sup>380</sup> Winthrop, ii. 357-8 (293). See also George Lyman Kittredge, *Doctor Robert Child, The Remonstrant*, (Cambridge, 1919), pp. 40-1.

<sup>381</sup> *New England's Jonas Cast Up at London* (London, 1647), p. 12.

<sup>382</sup> J. Child, *Jonas Cast Up*, p. 13; and Adams, *The Emancipation of Massachusetts*, p. 96. See also R. Child, *The Remonstrance* (Plymouth Colony, 1646) and Kittredge, *The Remonstrant*, pp. 17ff.

<sup>383</sup> Winthrop, ii. 235-6.

<sup>384</sup> *Jonas Cast Up*, p. xxvi.

These two petitions from Child and his friends chronologically coincided with, but were not related to the notorious contemporary trials of Samuel Gorton and others of Rhode Island, and Child and Gorton criticized the colonial government for different reasons.<sup>385</sup> Child's discontent was primarily political, and the religious affiliations of his friends were very diverse. There were only two Presbyterians who signed the *Remonstrance*, for example.<sup>386</sup> Gorton, a Baptist, questioned the Massachusetts Colony's legal and theological jurisdiction over the Providence Plantations and Rhode Island colonies, but his group, when arrested and tried in Boston, was questioned exclusively about their religious opinions, particularly regarding soteriology. Both Child and Gorton complained that Massachusetts was failing to govern in submission to the laws of England.<sup>387</sup> Child's *Remonstrance*, known to the General Court as "the petition of Dr. Childe and Mr. Fowle", was particularly threatening because it spread much more widely among the general populace. Copies spread to all of the New England colonies and the document was said to have been found in Virginia, the New Netherlands, and Bermuda.<sup>388</sup> In *Jonas Cast Up*, the *Remonstrance* was known as the "Petition of Dr. Child", and there can be little doubt that Robert Child was the primary author of the latter document.<sup>389</sup>

During these troubles, Child reported to Hartlib that he and Leader had managed to cast practical utensils such as mortars, skillets, and stoves. Child also attempted to start a glassworks with Winthrop and the brothers John and Ananias Conklin. In the same period Winthrop continued to tutor George Starkey in chemistry, and Starkey later confirmed that he began his studies in "Chemical Philosophie" in 1644. Winthrop, who loaned him books, chemicals and equipment, was the only person in New England from whom Starkey could have received an

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<sup>385</sup> Adams, *The Emancipation of Massachusetts*, p. 77.

<sup>386</sup> Kittredge, *The Remonstrant*, p. 28.

<sup>387</sup> Samuel Gorton, *Simplicities Defence Against Seven-Headed Policy or Innocency Vindicated*, (London, 1646); and Edward Winslow, *Hypocrisie Unmasked* (London, 1646).

<sup>388</sup> MA Col. Rec., ii, 162 and *Jonas Cast Up*, pp. xxvi-xxvii.

<sup>389</sup> *Jonas Cast Up*, p. 19.

education in chemistry during this time. Starkey became a friend of Child and Leader before migrating to England in 1649.<sup>390</sup> Child mixed political commentary with improvement reports and told Hartlib that the colony often threatened individual tribes with up to 500 soldiers and thus intimidated them into surrendering £500 worth of goods (corn, hides, etc.) and some of their “brightest” children to be educated in colonial schools, in exchange for a promise of peace. Child believed this intimidation strategy was unfair to the Native Americans and ultimately dangerous to the peace and economic prosperity of the English colonies.<sup>391</sup> He was conscious of the native tribes in New England as a political and military force, and expressed his concern with their potential to commit hostile actions against the English colonies or form alliances with other tribes or other European powers. He therefore promoted trade with the Indians to ensure peace and bolster the prosperity of the English colonies, complaining to Hartlib in 1648 that the plantations had been badly damaged by Dutch wars with the Indians. After a three or four-year war, peace had been concluded between the Native Americans and the Dutch, but the English colonies continued to suffer economically by a disruption in trade caused by the former conflict. He reported that trade with the Indians was the single largest economic activity contributing to the prosperity of the English plantations.<sup>392</sup>

Child sent cultural artefacts and samples of minerals to Hartlib, identifying “10 or 12 sorts” of iron stone though he added that “yet we have made no experiment of them”.<sup>393</sup> He expanded his interest into fur trading, wine production, and general agriculture.<sup>394</sup> He eventually described his intensive method of husbandry to Hartlib, drawing on his experience

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<sup>390</sup> Starkey, *Natures Explication*, pp. 35-6.

<sup>391</sup> Robert Child to Hartlib, 24 Dec 1648, *HP* [39/2/5A].

<sup>392</sup> *Ibid.*

<sup>393</sup> Robert Child to Hartlib? 24 Dec 1645, *HP* [15/5/1].

<sup>394</sup> *Envisioning America: English Plans for the Colonization of North America, 1580-1640*, ed. Peter C. Mancall (Bedford, 1995), pp. 23, 36.

in New England to publish *The Defects of English Husbandry*.<sup>395</sup> Hartlib incorporated the substance of this work in his *Samuel Hartlib and His Legacie*, even though the latter work was published first.<sup>396</sup>



Figure 2.8: Spanish Map of Bermuda, 1594

In 1647, William Berkeley, a wealthy merchant and later governor of Virginia, invited Winthrop and the others to migrate to Bermuda, keen to improve the island in a manner similar to what had been accomplished in New England. Winthrop chose to stay in New England, but William White, who had fallen out with Leader, decided to accept the invitation. Leader accused White of promising more than he delivered and the work was hindered by the resulting

<sup>395</sup> Robert Child, *The Defects of English Husbandry* (London, 1652).

<sup>396</sup> Samuel Hartlib, *Samuel Hartlib and His Legacie* (London, 1651).

strained relationships.<sup>397</sup> With funding from Starkey, White moved to Bermuda and urged Child to go with him, but Child chose to return to London. Leader continued running the ironworks in Massachusetts until 1650. Starkey was an enthusiastic empiricist once he arrived in London and White wrote in advance to introduce him to Hartlib. As a physician in Boston, Starkey had experimented with alchemical ovens; he had not only shared “phsicke” knowledge with White but employed him for five shillings per day for 12 weeks before White migrated to Bermuda.<sup>398</sup>

By 1649, John Winthrop Jr had the largest library in New England, perhaps the largest chemical library in the world.<sup>399</sup> With Child, Starkey, and Vane gone to London, White in Bermuda, and Leader in charge of the ironworks, Winthrop continued Starkey’s medical practice in Boston. He experimented with animal, chemical, and herbal remedies and readily treated Native Americans. Winthrop treated many poor patients, English and Indian alike, without charge. Before departing for England, Child had visited several native villages and observed their habits and practices. Once in London, he reported to Hartlib that the Indians were using fish oil in the way some Englishmen used goose grease to keep their hands warm in cold weather.<sup>400</sup> Hartlibians heard of the effectiveness of Native American engineering and medical skills from Child, whose reports led them to explore the medical applications of various New World plants. Working in cooperation with, and supported by Leader, White, Winthrop, and Starkey, Child also documented supply and demand for various New England commodities such as animal products, agricultural crops (beans, fruit, grains, etc.), and seafood, particularly herring and salmon. He conducted experiments with apples, apricots, cherries, pears and vines, and sent indigenous seeds back to England, promising Hartlib in 1645 that he

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<sup>397</sup> William White to [Child]. 8 May 1649, *HP* [15/8/6A].

<sup>398</sup> William White To ? 8 May 1649, *HP* [15/8/6A].

<sup>399</sup> Wilkinson, “John Winthrop, Jr”, p. 157.

<sup>400</sup> *Ephemerides* 1650 Part 4, *HP* [28/1/81B].

would send him seeds from New England on a yearly basis. He lamented the scarcity of clothing for sale in New England and explained this was due to the limited availability of materials traditionally used in making clothes, such as cotton, hemp, and wool. Child explained how the spinning of cotton had declined in direct relation to the decrease in fabric production; if clothing had not come from England, he wrote, “they had beene much streightned”.<sup>401</sup>

Optimistic about the potential for improvement in New England, Child complained to Hartlib about the remoteness of the location and the cold winters but promised to continue the work and provide Hartlib with long letters.<sup>402</sup> By 1649, Child chose to return to England as an extension of his religious protest, not because he was lonely, cold, or discouraged in the work of improvement. He concluded that the leadership of the Massachusetts Bay Colony was not interested in improvement if it was perceived to be a threat to its authority. Child wrote to Winthrop in 1650 after returning to England using the term “us” to refer to his membership of the Hartlib Circle.<sup>403</sup> He told Winthrop that he remained willing to return to New England if his fine were refunded, but when this request was unsurprisingly unmet, he migrated to Ireland in 1651. As I showed in the previous chapter, he spent the remainder of his life there working for Sir Charles Coote.<sup>404</sup>

William White also left New England because of political and theological oppression but wrote to Child from Bermuda in 1649 detailing his success in a range of industries. He said that he had experimented successfully in brickmaking, and had worked productively in husbandry and general agriculture, notably with chickens, corn, cows, figs, fishing, pigs, salt, saltpetre, sugar, tobacco, and turkeys. He noted that wetlands were being drained and various planters were producing bricks, furnaces, and saltpetre commercially; now, he was diving for

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<sup>401</sup> Robert Child to Hartlib? 24 Dec 1645, *HP* [15/5/1].

<sup>402</sup> *Ibid.*

<sup>403</sup> Child to John Winthrop Jr, 26 Aug 1650, *Winthrop Papers*, iii. 161-3.

<sup>404</sup> Child to John Winthrop Jr, 13 May 1648, *Winthrop Papers*, iii. 159; and 26 Aug 1650, iii, 161-3.

salvage off the coast of Bermuda where ships laden with treasure had gone down. White wrote that he was having trouble with other experiments, however, and asked Child to come over with chemical glasses.<sup>405</sup> White is most likely the bricklayer mentioned in a 1649 letter from Worsley to Dury who was “known well to Mr Hartlib” and who had gone to New England.<sup>406</sup> White, Child and Leader were some of many Englishmen who migrated to New England with affiliation to Hartlib but who, for religious and political reasons, left an otherwise successful improvement program.

#### ***2.3.4. Early 1650s: Starkey in London***

Once in London, Starkey’s name began to appear frequently in Hartlib’s journal, usually by the original spelling of his name, and there is evidence he was a regular visitor to Hartlib’s Charing Cross home. Starkey’s first letter to Robert Boyle dates from 1651.<sup>407</sup> He abandoned his medical practice and worked with Boyle on alchemical experiments and the invention of curative drugs.<sup>408</sup> Starkey tutored Boyle in alchemy and was paid for his service during 1651-1652.<sup>409</sup> Boyle, however, chose to never acknowledge Starkey as a tutor, a decision most likely made only after Starkey was “expelled” from the Hartlib Circle. Similarly, Starkey chose to never acknowledge Winthrop as a tutor but claimed that he had learned his secrets in his dreams.<sup>410</sup>

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<sup>405</sup> William White to [Child]. 8 May 1649, *HP* [15/8/6A-7B].

<sup>406</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A-19B].

<sup>407</sup> George Starkey, *Pyrotechny Asserted and Illustrated, To be the Surest and Safest Means for Art’s Triumph over Nature’s Infirmities* (London, 1658), p. i.

<sup>408</sup> Antonio Clericuzio, “From van Helmont to Boyle: A Study of the Transmission of Helmontian Chemical and Medical Theories in Seventeenth-Century England”, *The British Journal for the History of Science*, 26:3 (Sep 1993): 303-34.

<sup>409</sup> Newman, *Gehennical Fire*, p. 71.

<sup>410</sup> John J. O’Brien. “Samuel Hartlib’s influence on Robert Boyle’s Scientific Development”, *Annals of Science* 21:1 (1965): 1-14.

In 1651, Starkey was at the core of the Hartlib Circle and was acknowledged by Hartlib as a “master of secrets” with “divinely sanctioned revelations”. He was praised for new perfumes and sophic mercuries, and promised to write for Hartlib “the whole story” of the work in New England including the “fact” of an old woman who through his own devices, was given new teeth and hair.<sup>411</sup> This same technique, Starkey said, had given new life to a peach tree that he claimed had been dead for eight years. Early in their relationship, Starkey was making typically hyperbolic claims to Hartlib to the effect that he knew 60 different people who had discovered the philosophers’ stone and that he himself knew the secret of preserving the scent, colour, and shape of plants.<sup>412</sup> Starkey did have credible witnesses; Dury informed Hartlib that he had witnessed him extract silver from antimony that was “in weight equal to Gold” and “out of Iron Gold of a most high colour as your Rosenobles are”.<sup>413</sup> Dury estimated Starkey was able to make 300 pounds of gold annually by these processes, and affirmed that he could turn tin or copper into silver, and silver into gold.<sup>414</sup> He further informed Hartlib that goldsmiths had graded Starkey’s silver to be “unlike” other silver, leaving open the question of whether this was a good thing. Dury wrote that Starkey had finally found someone willing to pay the price he was asking for the metal, but added that Worsley had complained that it was “a dangerous sale” and that it should have been delivered to “Muntze”, evidently a silver appraiser known to Dury. Hartlib may have been sceptical of Starkey’s claims but he would never have doubted the testimony given by Dury.<sup>415</sup>

Hartlib was not naïve about the claims of alchemists and was usually quick to dismiss anyone who was an obvious fraud, or who made unverifiable claims, and there are multiple

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<sup>411</sup> Ephemerides 1651 Part 2, *HP* [28/2/12B].

<sup>412</sup> Ephemerides 1651 Part 2, *HP* [28/2/15B].

<sup>413</sup> Ephemerides 1651 Part 2, *HP* [28/2/18A].

<sup>414</sup> Ephemerides 1651 Part 2, *HP* [28/2/18B] and 1652, Part 1 [28/2/31B].

<sup>415</sup> Newman, *Gehennical Fire*, p. 78.

examples of his criticism of charlatans who could not deliver on their promises.<sup>416</sup> Starkey had legitimate discoveries and inventions to his credit, along with the endorsements of Dury and Frederick Clodius, Hartlib's son-in-law, but Hartlib complained that Starkey was "piddling and toiling for small quantities", noting that Worsley and Morian were attempting with difficulty to corroborate Starkey's claims. John Pell found Starkey's Adeptus, one who had obtained the secrets of alchemy, "somewhat obscure" but then Clodius assured Hartlib that this was a lack of understanding on the part of Pell: "If he should but open one passage unto him the rest should be so clear as nothing could be clearer".<sup>417</sup> Clodius was not totally enamoured with Starkey and he also told Hartlib that a friend had given him recipes from Rome for perfume that "far excels all that ever Stirke hath made".<sup>418</sup> Starkey's explanation was that he found the work of making gold to be tedious, "a round worke", because it was like a horse walking around a small circle in a mill, grinding grain continually.<sup>419</sup> Hartlib wondered privately why Starkey did not invent instruments to automate the process since an annual £300, from the sale of Starkey's manufactured gold, could have done much for Hartlibian projects by funding the Office of Address. Starkey promised Hartlib that if he did it, he would derive no private benefit from it but would give up his secret to the common good and for the advancement of universal learning. Although Starkey had the recommendation of Child, the latter criticised him for his "cavalier attitude" toward proper ventilation in the laboratory.<sup>420</sup>

Starkey impressed Hartlib with his knowledge and ability, providing him with manuscripts, recipes, and experiences from New England. He catalogued medicines and explained how to make them. Clodius verified these recipes were better than others.<sup>421</sup> He gave

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<sup>416</sup> Ephemerides 1651 Part 2, *HP* [28/2/31B].

<sup>417</sup> Ephemerides 1651 Part 2, *HP* [28/2/19A].

<sup>418</sup> Ephemerides 1651 Part 2, *HP* [28/2/20A-20B].

<sup>419</sup> Ephemerides 1651 Part 2, *HP* [28/2/18B].

<sup>420</sup> Newman, *Gehennical Fire*, p. 79.

<sup>421</sup> Ephemerides 1651 Part 2, *HP* [28/2/23A].

Hartlib the recipe for “Oile of Benjevin” (hemp oil) and he claimed that he could make ice in the “hottest roome” or in summer. Hartlib recorded how valuable he thought this secret would be in Italy “where the Cardinals use to bring to their Tables pieces of Ice to coole their drinks”.<sup>422</sup> Starkey informed Hartlib that the best sweet drink he had ever tasted was “chacotan” from Spain.<sup>423</sup> This was most likely chocolate from America but from too far south for Starkey to have encountered it in New England before 1650. Starkey also told Hartlib about a silk spider in Bermuda that he saw as a child, which was “hugely great”.<sup>424</sup> Interested in silk worms and promoting the transplanted of them to the colonies as he was, Hartlib would have been excited to hear Starkey’s reports of how much silk was made by these spiders, especially when he heard that a girl Starkey knew had made a pair of gloves with this spider silk, which were subsequently worn by two or three of her sisters. “These far exceed the silk-worms”, he told Hartlib. Later known as the Golden Orb Weaver (*Nephila Clavipes*), Starkey’s silk spider was, in fact, the largest spider on Bermuda. In the same journal entry, Hartlib wrote that Starkey had told him that the oranges and lemons of Bermuda were “far greater” than any from Spain, and Pell confirmed to him that the Spanish ambassador to England, dining with the Earl of Arundel, had said as much.<sup>425</sup>

In 1652, when Hartlib was interested in the alchemical theories of Glauber, it was Starkey he wanted to send to question the Dutch alchemist Morian. In the same year Starkey made new medicines, sweet drinks, and an “excellent” dye from the root and leaves of Bermudan pears that Hartlib said would have made him wealthy enough to retire.<sup>426</sup> On the other hand, he had not forgotten the Bermudan girl who had made the silk gloves. In the same

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<sup>422</sup> Ephemerides 1651 Part 2, *HP* [28/2/22A].

<sup>423</sup> Ephemerides 1652 Part 1, *HP* [28/2/34B].

<sup>424</sup> Ephemerides 1652 Part 1, *HP* [28/2/35B].

<sup>425</sup> Ephemerides 1652 Part 1, *HP* [28/2/36A].

<sup>426</sup> Ephemerides 1652 Part 2, *HP* [28/2/40B-41A].

journal entry, he reported that she had retired and moved to Virginia since Starkey had first informed him about this silk entrepreneur, known only as “Mrs Wilkinson’s daughter”.<sup>427</sup> Because Dr John Wilkinson, principal of Magdalen College, Oxford, who had died in 1650, was survived by his wife, was known to Hartlib, and was mentioned in the Hartlib Papers in 1649, it is logical to conclude this was the father of the emigrant silk farming daughter in Virginia, though this is impossible to prove.<sup>428</sup> Several unmarried female Wilkinsons appear in the colonial records during the 1650s, and there were three Henry Wilkinsons known to Hartlib, one affiliated with Magdalen College and two who were members of the Westminster Assembly. The latter were father and son and had five daughters between them.<sup>429</sup> All of these were committed Puritans but each of them was living in 1652 a fact that surely would have prevented Hartlib from referring to the woman as the daughter of her mother.<sup>430</sup>

Another of Hartlib’s favourite topics in which Starkey was closely involved was beekeeping. Hartlib was fascinated by the art of apiary, not least because he knew bees were critical agents in the pollination of many types of plants, including fruit trees. A beehive was something every home could manage, and bees produced a desirable product an individual could consume or sell. Starkey reported to Hartlib via Cheney Culpeper about the management of bees in New England, stating that bees could be fed year-round with molasses, preferably that which came from Barbados. His instructions reveal detailed knowledge based on personal experience; the molasses, according to Starkey, should be mixed with lime and then one pound of molasses mixed with two quarts of water, then further “thickened” with wheat, bean, or “any other corne”-flour. Based on this recipe, he claimed that bees would gather for 12 months each

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<sup>427</sup> Ephemerides 1652 Part 1, *HP* [28/2/35B].

<sup>428</sup> William Hamilton to Hartlib, 17 Dec 1649, *HP* [9/11/19A].

<sup>429</sup> George Cabell Greer, *Early Virginia Immigrants* (Richmond, 1912), p. 358.

<sup>430</sup> William Barker, *Puritan Profiles: Contemporaries of the Westminster Assembly* (Fearn, SCT, 1996), pp. 121, 137, 154, 165, and 254n.

year and produce two gallons of honey every six weeks.<sup>431</sup> While Starkey continued to consider Hartlib as a useful patron and authority, the latter remained impressed with the American and his impressively broad range of skills.

### ***2.3.5. Late 1650s: Winthrop and Hartlib Reunited***

Hartlib had plenty of other sources for information about New England, some very remote from the core-set of his associates. In 1653, he wrote of “One Wood a very Inventive Man” who went to New England. Wood had invented a plough for planting corn and another for cutting topsoil in peaty soil covered with heather, coarse grass, or moss. Several others in the correspondence network considered migrating to America, partly due to Hartlib’s encouragement and enthusiasm. As we have seen, the most significant Hartlibian political figure in the region was John Winthrop Jr, who in 1653 proposed new works in indigo, iron, potash, salt, and saltpetre, which he envisioned taking root in both Massachusetts and Connecticut. He had attempted to create an individual stock company in 1650 and had sent mineral samples to London that were eventually acquired by Hans Sloane many decades later. One sample was later found to be a new metal, which was named Columbite in 1801. In 1654, William White, ever “a man of some skill in science” returned from Bermuda to assist Winthrop in establishing new works in Connecticut.<sup>432</sup>

In the meantime, Richard Leader had constructed a 24-blade sawmill in Maine and ran it successfully until he migrated to Barbados in 1655 to found a saltworks.<sup>433</sup> Of Leader’s mill, Hartlib said, “all the world may be supplied from thence”,<sup>434</sup> and six months later he was

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<sup>431</sup> Copy Notes On Bees From Culpeper/Sirk, In Hartlib’s Hand. 14 Feb 1653, *HP* [55/3A].

<sup>432</sup> Winthrop, v, 239; and Benjamin Worsley to Dury, 27 Jul 1649?, *HP* [33/2/19B].

<sup>433</sup> *Ephemerides*, 2 Mar-May 1653, *HP* [28/2/54A].

<sup>434</sup> *Ibid.*

informed that this same mill was producing more than 30,000 board feet of cut timber daily and, that, with only 15 blades operating.<sup>435</sup> Otherwise, Leader promised to write a report about cranberries in New England. Known as “Bog-berries” to Hartlib and Leader because they were flooded with water during harvesting, Leader told Hartlib that the New England berries were bigger and better tasting than those in Ireland. Hartlib had questions about their preservation, conservation, and potential uses, knowing that they could be kept up to 12 months if properly dried and then reconstituted by soaking in warm water, especially when used in tarts or sauce. From White, Hartlib learned independently that cranberries were at that very moment being imported from sugar-producing Barbados to make sweet cranberry tarts.<sup>436</sup> Despite his difficult history with Child, White, and Winthrop, Leader had skills that Hartlib and his allies could not ignore, since he knew “invaluable” things that were needed in all the colonies.<sup>437</sup> Indeed, as I point out later in this thesis, it was due in no small part to the inspiration provided by Leader and Winthrop that Hartlib proposed the creation of ‘Antilia’, a new colony in North America dedicated to Hartlibian principles.<sup>438</sup>

Partly with encouragement from John Davenport, Winthrop relocated to New Haven in 1656. Perennially plagued with limited investment funds, scarcity of skilled labour, poor materials, the threat of Native Americans, and the fact that the most valuable mineral deposits were most often found in remote locations where workers quickly grew discontent, Winthrop was growing weary of his many practical projects by the late 1650s. Prompted by Davenport, however, he re-established contact with Hartlib and found a new source of vision and the energy to recommit himself to new improvement projects. Cranberries were the reason

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<sup>435</sup> Ephemerides 1653 Part 4, *HP* [28/2/72B-82B].

<sup>436</sup> Ephemerides, 2 Sep-31 Dec 1653, *HP* [28/2/72B-82B].

<sup>437</sup> Charles Webster, *Great Instauration*, p. 46.

<sup>438</sup> *Ibid.* See also Donald R. Dickson, *The Tessera of Antilia: Utopian Brotherhoods and Secret Societies in the Early Seventeenth Century* (Leiden, 1998).

Davenport encouraged Winthrop to write to Hartlib in 1659. Winthrop must not have been corresponding with Hartlib for a long period prior to his letter of 16 December, because he referred to a *resumption* of communications.<sup>439</sup> He said he had been in New England since their meeting in London but had not forgotten that Hartlib had given him a copy of Johann Agricola's works "out of your owne Library". Based on Winthrop's enthusiasm, there is no reason to believe that he had been intentionally avoiding Hartlib for these two decades. Indeed, as governor of the Connecticut Colony, he praised Hartlib magnanimously by saying that "The fame of your public spirit and worthy unwearied endeavours for the public good, urges me to add my part of that thanks which the whole world owes you".<sup>440</sup>

While Child, Leader, and White had apparently failed to relay messages between Hartlib and Winthrop, Davenport had been sharing Hartlib's writings with Winthrop along with news of inventions, and chemical recipes from London. In a series of letters written in 1660, Winthrop revealed the extent of Davenport's involvement in New England improvement projects, adding to what Hartlib already knew of based on his enduring correspondence with Davenport. Winthrop discussed a list of topics from his reading of Hartlibian books including "setting out of land", banking, and beekeeping. With only 40 miles between Winthrop and Davenport after 1656, and both beyond the borders of Massachusetts, each man was free to recommit himself to improvement projects, and to work collaboratively although at some distance from each other. By 1660 they were combining letters and samples to Hartlib in a common packet.<sup>441</sup>

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<sup>439</sup> John Winthrop to Hartlib, 16 Dec 1659, *HP* [40/3/1A-2A].

<sup>440</sup> John Winthrop to Hartlib, 16 Dec 1659, *HP* [40/3/1A-2A].

<sup>441</sup> Hartlib to Winthrop. 16 Mar 1660, *HP* [7/7/1A].

### 2.3.6. 1660s: *Hartlib and Winthrop*

As the English Republic was being gradually dismantled, Davenport continued to write to Dury. In 1660 he lamented his failure in attempting to start a college in New Haven and was disappointed that “a Colonie Schoole” was the most he had accomplished. He also longed for a press in New Haven, repeating to Dury the continuing need for the Hartlibian ideals of advancement of Christ’s kingdom, the universal common good, and the glory of God. Thirty years after Davenport’s death in 1670, Yale College recognised him as their principal founder for his lifetime of work dedicated towards establishing such an institution in New Haven. Back in 1660, Davenport voiced his frustration to Hartlib that Hartlibian projects in London had suffered for lack of investment. “In London are wealthy men enough to set all Engines a worke”, he wrote, “which have been presented by you”, but little that was tangible had yet come to pass.<sup>442</sup>

Davenport had given Winthrop samples of Hartlib’s writings and in these letters, Winthrop asked Hartlib for more, particularly on anything concerned with technical or natural philosophical issues, as well as alchemy, banking, beekeeping, and surveying. Winthrop had a list of other acquaintances he had made over the years but with whom he had lost contact. Of all those to whom he could have potentially written, the governor now looked to Hartlib for useful news, believing that Hartlib was the person who could best give him the latest information about scholars and academics, some of whom had died since Winthrop had last heard from him. Comenius, Digby, Glauber, and Morian were on Winthrop’s list. He asked Hartlib what had happened in the quest for an alkahest, the engine of perpetual motion, and the philosophers’ stone. He wanted to know about improvements in telescopes and what new

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<sup>442</sup> Davenport to Dury, 25 Jun 1660, *HP* [6/5/1A-2B].

heavenly bodies had been discovered. Winthrop told Hartlib that he had his own telescope that was ten feet long but that, sadly, he could barely make out Saturn, whose rings had recently been discovered and announced.<sup>443</sup>

Hartlib worked hard to promote research on the topics raised by Winthrop, and in his letters to others following the receipt of Winthrop's requests, he systematically consulted appropriate scholars who were most knowledgeable about each question. Every topic raised by Winthrop appears in Hartlib's journal and letters during the months immediately following receipt of Winthrop's letter of 25 October 1660. For example, in response to Hartlib's question on Winthrop's behalf, Robert Wood promised to send a Roger Bacon manuscript belonging to Henry Jones in Ireland about Rosicrucianism, which described the philosophers' stone although the movement arose in 1614-1617, after its publication.<sup>444</sup> Col. Thomas Scot promised to send Hartlib notes regarding Tobias König's theories of perpetual motion, a subject on which Hartlib was also collecting information from Edward Montagu, 2<sup>nd</sup> Baron Montagu, and Samuel Morland, who was proposing a perpetual motion engine that would run on air or water. On Monday, 2 April 1660, Johann Kuffler, a frequent visitor in Hartlib's home, brought William Berkeley, recently arrived from America to visit for "a second time". The one-time governor of Virginia had information he thought would help Hartlib with his kidney stones but while he was there Hartlib asked him about perpetual motion.<sup>445</sup> "He intimated to have indeavoured the Perpetuus Motus", Hartlib wrote in his journal, "and affirmed that the Motion must not be too rapid but manageable".<sup>446</sup> Berkeley took such an interest in Hartlib and his improvement projects that he rented a house in Westminster next to Hartlib's Axe Yard home.

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<sup>443</sup> John Winthrop to Hartlib, 25 Oct 1660, *HP* [32/1/8A-9B].

<sup>444</sup> Ephemerides 1660, *HP* [29/8/11A].

<sup>445</sup> Hartlib to John Evelyn. 7 Apr 1660. BL MSS 15948 ff. 98A-99B.

<sup>446</sup> Ephemerides 1660, *HP* [29/8/15A].

Winthrop also asked Hartlib about Cornelis Drebbel, the Dutch engineer and inventor, and about latest news in the development of telescopes, and for both of these Hartlib asked Kuffler, who was Drebbel's son-in-law.<sup>447</sup> He gathered banking information from Maj. Anthony Morgan, William Petty, Henry Slingsby, and Robert Wood for Winthrop because, as Hartlib noted, they had met several times to discuss it.<sup>448</sup> Over the course of their exchanges, Hartlib not only gave Winthrop current information about scholars he knew, but he initiated correspondence between Winthrop and other Hartlibians who were new to him, such as William Brereton Jr, who had been tutored by John Pell and who was soon to be an original fellow of the Royal Society.<sup>449</sup> Hartlib and Winthrop benefitted from an active correspondence that eventually lasted for over two years, and these contacts persisted after the chartering of the society in 1660 and Hartlib's death in 1662. Winthrop sent samples and information to Hartlib, while Hartlib sent information and books to New England. The governor commented on dozens of books that had been sent to Connecticut, for which he gave thanks to Hartlib; some were the result of Winthrop's requests and some came as Hartlib's own recommendations. All of them were gifts, and the books remained in Winthrop's library to the end of his life in 1676.<sup>450</sup>

In response to these requests Hartlib was happy to assure the governor that he had "a great remembrance" of his name, even though their "acquaintance was but very small".<sup>451</sup> He explained to Winthrop that he would answer all of the questions raised and added in a Baconian vein that "the time is coming on apace that the great natural truths will not be so obscure as they have been in former ages".<sup>452</sup> Hartlib took an unusual amount of care in writing his letter

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<sup>447</sup> Hartlib? To? 25 Feb & 6 Mar 1640, *HP* [7/45/1A-2B].

<sup>448</sup> *Ephemerides 1660*. 1660, *HP* [29/8/13A].

<sup>449</sup> Hartlib and Brereton, the 3<sup>rd</sup> Baron Brereton, were also related through Hartlib's Aunt Margaret Langton who married Edward Savage II (first cousin of John Brereton, born 1591, grandfather of the third baron).

<sup>450</sup> John Winthrop to Hartlib, 10 May 1661, *HP* [32/1/10A-11B].

<sup>451</sup> Hartlib to John Winthrop the Younger. 16 Mar 1660, *HP* [7/7/1A-8B].

<sup>452</sup> Hartlib to John Winthrop the Younger. 16 Mar 1660, *HP* [7/7/1B].

to Winthrop. Besides giving him updated information about his long list of scholars in question, Hartlib encouraged his recipient to continue conducting empirical investigations in New England and promised to assist him by making his “approximations” more perfect. In typical fashion, he further promised Winthrop that if he would continue their correspondence, “more shall be discovered”. Winthrop was thrilled at the prospects described by Hartlib as he wrote of bringing Old and New England “closer together for the perfecting and improving of so great a talent for the glory of the manifold goodness of God”.<sup>453</sup> Then, in the closing lines of this remarkable letter, Hartlib referred to a society that would possess and dispense knowledge, constituted by “stewards of information”. Hartlib was aware that the men who would form the Royal Society were ready to reveal themselves to the public once the new government was established, and asked Winthrop to keep this information quiet “till I have gotten leave to give you leave”. Eventually Winthrop became a member of the Society and contributed two papers to its *Philosophical Transactions*. “In the meantime”, Hartlib concluded, “what you approve or disapprove deal freely with me”.<sup>454</sup>

While Hartlib was principally asking for Winthrop’s partnership in encouraging a free communication of information, the exchange of goods and produce was also a significant part of the Hartlibian programme. Indeed, in the postscript to the letter Hartlib asked for a barrel of cranberries. Otherwise, Winthrop continued conducting experiments and sending results to Hartlib. In 1660, he had independently created artificial marble out of paper and reported his success to Hartlib who recorded that he had heard of “marble paper” in France via John Evelyn. Hartlib’s son-in-law Frederick Clodius, also told him about a book, *Monumenta Saxonica*, which was concerned with the art of making artificial marble among the Saxons.<sup>455</sup> In turn,

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<sup>453</sup> Hartlib to John Winthrop the Younger. 16 Mar 1660, *HP* [7/7/5B].

<sup>454</sup> *Ibid*, [7/7/6A].

<sup>455</sup> See Carl Gerhard Wilhelm Lodtmann, *Monumenta Osnabrugensia, Ex Historia Romana Francica Saxonica* (1753).

Winthrop shared with Hartlib from his investigations into paints used by the Native Americans and how they were used to dye cloth.<sup>456</sup> In August 1660, in response to Hartlib's request in March, Winthrop noted that he had “given special order at Boston” to send Hartlib a barrel of cranberries.<sup>457</sup>

## 2.4. The Huguenot Petition

An excellent example in which to see the Hartlibian vision and the circle's participation in the colonisation of New England, is Hartlib's petition to parliament on behalf of the two French Huguenots, Hugh L'Amy and Peter Le Pruvost, whose Irish plan was briefly discussed in the previous chapter.<sup>458</sup> At least 13 years before Louis XIV became king of France in 1643 and initiated a new period of persecution, L'Amy had emigrated to England. Like most Huguenots, L'Amy and Le Pruvost were strong Calvinists and opposed to Catholicism, and they sought a place of refuge for their displaced people. By the time L'Amy arrived in England, colonies of Huguenot settlers had already made two failed attempts to create a French Protestant plantation in America. Jean Ribault led a group to Carolina in 1562 and René Goulaine de Laudonnière led others to Florida in 1564. Barred by France from settling in New France, once these southern Huguenot settlements failed, some French Protestants went to the Dutch colony of New Amsterdam and were granted land on Long Island, where they became the first permanent European settlers of modern-day Brooklyn in 1624.<sup>459</sup>

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<sup>456</sup> Ephemerides, 1660, *HP* [29/8/14A].

<sup>457</sup> John Winthrop to Hartlib, 25 Aug 1660, *HP* [32/1/61A-7B].

<sup>458</sup> Thomas Leng, “‘A Potent Plantation well-armed and Policed’: Huguenots, the Hartlib Circle, and British Colonization in the 1640s”, *William and Mary Quarterly* 3<sup>rd</sup> Series, 66:1 (Jan 2009), p. 174.

<sup>459</sup> Paula Wheeler Carlo, *Huguenot Refugees in Colonial New York: Becoming American in the Hudson Valley* (Eastbourne, 2005).

As an employee of the English office of Receiver General, L’Amy was granted rents from America upon the nomination of Attorney General Sir Robert Heath and the confirmation of the Earl of Carlisle.<sup>460</sup> After Louis XIII forbade Huguenot religious services in France, he required all Protestant children to attend Catholic schools, and prohibited emigration, but L’Amy was followed by Le Pruvost and thousands of others, many of whom came to England. L’Amy had already been trying to secure a charter for a uniquely Huguenot English colony on the east coast of North America. He first considered another attempt to settle “Carolina”, the site of Sir Walter Raleigh’s failed Roanoke Colony. Articles of agreement were signed with L’Amy in 1630 for settlement there with “full power to people, plant, and dispose, appoint officers and establish laws” in the land designated in honour of the king.<sup>461</sup> Despite the agreement, however, the colony never embarked. Carolina was not chartered until 1653 and no Huguenot settled there until 1685.

Within this context, Le Pruvost, a partner of L’Amy and then still living in Holland, contacted Dury sometime before 1645 and discussed the possibility of setting up a Huguenot colony in English America. He had reason to be optimistic. Dury was immediately interested in helping him, and informed Hartlib that he had met someone who could partner with members of the Hartlib Circle in a mutually beneficial relationship. Hartlib encouraged L’Amy and Le Pruvost to also consider Ireland as was discussed in the previous chapter but here Hartlib could assist them in securing the favour of parliament and the Huguenot could found a virtuous Hartlibian plantation where a greater number of experiments could take place without the burdensome regulations of colonial governments. Hartlib was not immediately convinced by

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<sup>460</sup> “America and West Indies: Feb 1630”, in *CSPC, America and the West Indies: Volume I, 1574-1660*, ed. W. Noel Sainsbury (London, 1860), 107-108.

<sup>461</sup> *Ibid*, 114-117.

L’Amy and Le Pruvost’s grand claims and asked Dury to investigate, knowing their nationality would be an obstacle with xenophobic members of parliament.<sup>462</sup>

L’Amy and Le Pruvost claimed in a letter to Hartlib that their colony would soon produce £1.2 million per year.<sup>463</sup> Obviously aware of what Hartlib needed to hear, and being adherents of Baconian and empirical principles themselves, L’Amy and Le Pruvost highlighted the potential benefit from such a colony to the state. Profits from it could be used for public projects such as education and poverty relief, besides providing the funding for 48 ships; this was particularly pertinent since about eight percent of the colony’s male population were commonly used as merchant marines who patrolled the east coast of America. These ships would protect all English settlements, fishing boats, and guard trade routes to England. L’Amy and Le Pruvost argued that the Huguenot colony would produce £300,000 per year in taxes paid directly to the English treasury. Further revenue would be generated, they added, by the trade in products between the new settlement and Protestant countries on the continent.<sup>464</sup>

Towards the end of 1645, Hartlib asked Dury to provide an assessment of Le Pruvost’s character. His activity and letters indicate that either L’Amy was visiting Hartlib in person or that Le Pruvost was taking the lead in promoting the project. It is unclear whether Hartlib was personally acquainted with L’Amy since, as is so often the case with Hartlib’s experience, no transcripts were created of oral conversations in his home. It would be remarkable indeed to find that L’Amy did not visit Hartlib at least once during the period of drafting his petition. In the meantime, Dury assured Hartlib that he had met with Le Pruvost and found him to be:

a sound & honest Christian, well principled in pietie, in Faith, in charitie in knowledge and in the ways of Peace and moderation, a man free from partialitie and cautiously

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<sup>462</sup> See Leng, “A Potent Plantation”, p. 182, 187.

<sup>463</sup> A Copie of the Memoriall confided to Mr Hartlib from Peter le Pruvost in the name of Monsieur Hugh L’Amy both of them French Protestants, who tender their services to the Parliament of England, undated, *HP* [55/10/1A].

<sup>464</sup> *Ibid.*, [55/10/1A-1B].

wary and prudent in his owne affaires; quiet & free from the vanity of appearing; and of an universall insight and experience in matters of trade.<sup>465</sup>

Based on Hartlib's complete trust in Dury, the proposal was accepted and Hartlib was ready to initiate the drafting of a petition and lobbying necessary to ensure its passage. Dury also encouraged Hartlib to not allow the committee to be "jealous" of Le Pruvost or suspicious of him because he was a foreigner.<sup>466</sup>

Once Hartlib was convinced that L'Amy and Le Pruvost were sincere petitioners and worthy of trust, he risked his own reputation, called on all his contacts in parliament, and effectively wrote the petition in 1646, making a request for colonial charter on their behalf. He contacted Oliver St. John and the Earl of Warwick, two of his most supportive patrons.<sup>467</sup> Mindful of Dury's warning that the Frenchmen's status as "strangers" would be the first objection, he stated their ethnicity boldly in the first sentence of the petition, but diffused possible objection by directing attention to their status as "French Protestant Gentlemen Forrainers", expressing hope that their class and theological views would outweigh the problem of their nationality.<sup>468</sup> At nine pages, the petition went into substantial detail regarding the specifics of how and why this particular colony would be different from those already established. The purpose of the colony would be to facilitate husbandry, fishing, and trade with the West Indies. By selecting a useful location and employing more sophisticated methods, Hartlib, an acknowledged expert on proven agricultural techniques, assured parliament that

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<sup>465</sup> Dury to Hartlib, 30 Nov 1645, *HP* [55/10/6A-8B].

<sup>466</sup> *Ibid.* The fact that L'Amy and Le Pruvost chose Hartlib to write a petition which was likely to be denied if submitted by foreigners, must prove unequivocally that Hartlib was not perceived as a foreigner to the English of the seventeenth century, particularly members of Parliament. See Mark Greengrass, "Samuel Hartlib and the Commonwealth of Learning" in *The Cambridge History of the Book in Britain: Volume 4, 1557-1695*, eds. Lotte Hellinga, John Barnard, D. F. McKenzie, Joseph Burney Trapp, and David McKitterick (Cambridge, 2002), p. 309; and Trevor-Roper, "Three Foreigners: the Philosophers of the Puritan Revolution", in *Religion, the Reformation and Social Change*, 3<sup>rd</sup> edn. (London, 1984), pp. 237-93.

<sup>467</sup> Leng, *Benjamin Worsley*, p. 179.

<sup>468</sup> Petition of Samuel Hartlib, undated, *HP* [55/10/1B-6A].

unusual levels of production could be achieved and that Pruvost “will increase the meanes of dunging & fattning the ground farre beyond the ordinary”.<sup>469</sup>

Dury, later concerned about Le Pruvost’s flexibility if a compromise became necessary during the campaign, promised Hartlib that he would advise Le Pruvost to “bee more open” with the committee that would investigate the petition and not cause them to deny the petition because of his rigid insistence on the ordinances as requested. Two of the key members of the committee were Sir Gilbert Pickering and Sir William Waller, whom Le Pruvost later complained were “cold in this matter”.<sup>470</sup> Pickering was a strict Puritan, who eventually became an Anabaptist, but Waller was well known among the Hartlibians as one who was aware of and fascinated by many of their projects. More than 30 letters passed between Waller and Hartlib from 1639 until 1648 but in November 1647 he had warned Hartlib from Leiden, “As for that Transmarine buisness, I looke vpon itt, with the same eye you do, as vnseasonable att present; I feare *our* buisness will lye nearer home”.<sup>471</sup>

As part of the petition, Hartlib had included his own list of the purposes of plantations in general, revealing knowledge gathered from years of participation in colonial projects. Briefly, he wrote that plantations were beneficial to a country in order to achieve economic independence, reduce unemployment, ensure national security, protect a positive trade balance, eliminate poverty, and spread the Gospel. Most members of parliament in the late 1640s would have supported all these arguments, and Hartlib laboured to assure them that L’Amy and Le Pruvost were qualified to bring these plans to fruition for the benefit of England. Having established the request, Hartlib further defined what he was asking of parliament on behalf of the French Protestants. Firstly, he wanted an ordinance determining that all settlers to the new

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<sup>469</sup> Canny, “The Origins of Empire”, pp. 209, 216.

<sup>470</sup> Le Pruvost to Hartlib, 11 Aug 1648, *HP* [7/119/2A].

<sup>471</sup> William Waller to Hartlib, 20 Nov 1647, *HP* [32/2/32A].

colony would practise the agricultural methods to be directed by Le Pruvost. Settlers would have freedom of religion but not freedom to practise any sort of husbandry. Secondly, he asked for an additional ordinance to freeze the price of fish to protect fishermen from market fluctuations. Finally, he wanted a third ordinance fixing the dividend paid to investors of the colony to ensure that a maximum amount would be reinvested into the experimental colony. In this way, Hartlib wrote, “The Parliament will reap from thence exceeding great profit”. Beyond these three ordinances, Hartlib urged parliament to grant political and religious liberties to the colony and avoid additional regulations, knowing the motivating power of the potential for economic success: “For he that holds his horse by the bridle may get up and rid when he pleaseth”. Hartlib understood economics, politics, and personal motivation as well as he understood agriculture and the purpose of plantations.<sup>472</sup>

As the campaign went forward, other letters passed between those directly involved and other Hartlibian correspondents, who were drawn into the conversation. The episode reveals the nature of operations within the Hartlib Circle, the depth of information possessed, shared, and discussed among peers, and the elements necessary to create a trustworthy and plausible practical enterprise.<sup>473</sup> Early in the process, Dury wrote to Hartlib to discuss the prospects for L’Amy and Le Provost’s proposal. In his analysis, he compared typical English shipping with that of other countries such as Holland and Sweden and noted how the Dutch were able to carry more goods, both faster and more cheaply than the English. Nevertheless, Dury proposed a number of ways in which the English might improve and grow to be better in shipping than the Dutch, adding that no imperial power could ever be self-sufficient or completely profitable if their trade was reliant on foreign vessels. As evidence, he discussed the manufacture of more

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<sup>472</sup> Petition of Samuel Hartlib, undated, *HP* [55/10/1B-6A].

<sup>473</sup> See Jacob Soll, “How Think Tanks Became Engines of Royal Propaganda and what their French origins, and their waning and rising relevance to the power structures over the centuries, say about the new Washington”, *Tablet Magazine* (1 Feb 2017); [www.tabletmag.com/sections/history/articles](http://www.tabletmag.com/sections/history/articles).

efficient ships (larger and faster), the economics of a balance of trade, and the benefits of improved marketing. He concluded that he had “noe cause to think Le Pruvost’s Propositions any way impossible but rather very probable”.<sup>474</sup>

Dury understood his friends well enough to know best how to appeal to their personal experience and preferences. A skilled orator, he was also an excellent writer who knew how to construct an argument supported by examples and logic. Having written to Hartlib, he wrote to Sir Cheney Culpeper and requested his support to help get the Huguenot petition through parliament. Knowing Culpeper to be a deeply religious man, Dury cited a number of Scriptural passages that allegedly pointed to the future success of the colony. He raised anticipated objections to the proposal in his argument, and then dispelled them before Culpeper had a chance to raise them for himself. Dury explained the need for ordinances from parliament and addressed the issue of what would happen if it were not approved, noting that the Huguenots should not merely strike out independently in a private adventure similar to the way Plymouth was founded. He further explained to Culpeper that a patent would be wholly “unprofitable” to Le Pruvost, and nothing short of an ordinance would suffice. Dury, who knew Culpeper had a certain amount of influence in parliament, ended his appeal by discussing how colonialism carried out under the aegis of the English government would be a benign civilising process. The Native Americans were a population “without rule”, he noted, and “wilde under noe government”; they were idle and poor, but they could, according to Dury, be “reduced” to certain supervised and productive employments. Indians who needed to be taught would learn godliness, righteousness, and temperance. For his part, Culpeper was in favour of the petition

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<sup>474</sup> Petition & Letters From Dury On Le Pruvost & L’Amy In Scribal Hand B, undated, *HP* [55/10/11B].

but warned that projects such as this could eventually lower the value of English land and thus narrow the gap between rich and poor, a result he equated with the fall of Babylon.<sup>475</sup>

By November 1646, the petition had been submitted, assigned to the appropriate committee, and debate was underway. Dury wrote an open letter promoting the petition and attempted to answer objections that had been raised in the committee. The letter was most likely sent to Hartlib, who copied it for members of the committee and others involved in the legislative process. They could not have chosen a more difficult time, however, to submit a petition for colonial charter. The Parliamentarians had achieved a series of victories during the year and had practically secured the country, but the king remained in the hands of the Scots, even in November as the Huguenot petition was being debated. Just one month before, parliament had abolished episcopacy. Far more urgent questions were being debated, and greater issues remained to be settled before a significant concern for new colonies might return. Moreover, already in 1646, existing colonies were being neglected and emigration to the plantations was declining.<sup>476</sup>

Undeterred and energised by the challenge, Dury created a passionate but reasonable argument in favour of the petition for the committee. Referring not to members of the committee but to those who had raised objections from outside, he lamented that those whose support was needed most were also those who least understood the requirements of the colonial programme.<sup>477</sup> Dury repeated the reasons supporting the petition such as its potential for success and he argued against objections raised against it. He attached a letter he had written to Le Pruvost, in which he demonstrated the productive relationship between plantations and

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<sup>475</sup> Culpeper to Hartlib, 16 Feb 1647, *HP* [13/165-66]; 9 Apr 1647, [13/171-72]; 3 Nov 1647 [13/200-1]; 30 Aug 1648, [13/241B-42B]; 1 Sep 1649, [13/268B]; 14 Aug 1649 [13/260-1]; 15 Aug 1649, [13/262-3]; and undated, [13/294A].

<sup>476</sup> See Carla Gardina Pestana, *The English Atlantic in an Age of Revolution, 1640-1661* (Harvard, 2004).

<sup>477</sup> Extracts of Letters concerning Mr Pruvosts buisnes. 5 Nov 1646, *HP* [55/10/14B-20B].

trade, couching it within a millennial context. “The tymes and seasons are determined with God”, he wrote, “our duty is only to doe that which is most likly to advantage the scope”.<sup>478</sup> Dury was confident, as a Scot, that the Scots would soon make peace with England, but he was not sure that a sufficient number of parliamentarians could understand the urgency of Le Pruvost’s proposal to get the ordinances passed.

Perhaps to bolster the petition’s chances, Dury wrote a letter to an unnamed person who had arrived in London, uninformed of the Huguenot petition but who, the author assumed, could help lobby for the petition. Dury addressed the possibility that the petition might not be passed, going on to speculate as to the reasons why, and what could happen if the adventurers decided to offer their idea to a rival nation. In the process he told the unidentified recipient how another projector, Louis de Geer, had attempted something similar “a while ago” in Holland. De Geer was a Dutch entrepreneur and industrialist known for manufacturing weapons and building a fortune during the Thirty Years War. A Dutch merchant and Protestant, he was also a director of the Dutch East India Company. Dury wrote that even though De Geer had been a public-spirited man and offered to improve husbandry throughout the Netherlands for very little cost or obligation of the parliament, he had been rejected and had now gone to enrich the economy of Sweden instead.<sup>479</sup>

## 2.5. Conclusion

Like so many other plans, the Huguenot petition for a new Hartlibian colony in America, which linked religious commitments to a drive for technological and agricultural

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<sup>478</sup> Petition & Letters From Dury On Le Pruvost & L'Amy In Scribal Hand B, undated, *HP* [55/10/18B].

<sup>479</sup> Dury to Le Pruvost. 1646, *HP* [55/10/20A-22B].

‘improvement’, petered out with a whimper. As such, it joined the list of projects that Thomas Leng has described as “stillborn”, and which “littered this early stage of empire like shipwrecks on the Atlantic Ocean floor”.<sup>480</sup> The umbrella over the Hartlib Circle was always the subject of ‘improvement’ as much as the ground beneath them was Calvinist Christianity. Hartlib worked to practically implement the theories of Francis Bacon in New England and was fascinated with the parallels he found between Comenius’s writings on educational theory and Dury’s vision of Protestant unity on the continent. He sought to improve Protestant economies by deploying practical, technical solutions to problems in England as well as in its colonies. For three decades, Hartlib functioned as the unofficial secretary of universal reformation promoting plantations and their improvement; operating within the parameters of established English government, his vision was to formalise all of this within a more permanent institution, which would have been the Office of Address. The Huguenot Petition for America, like the Worsley Debenture Plan for Ireland a decade later, was designed, among many other causes, to fund this office.<sup>481</sup>

Debates arising from these issues were occasioned firstly by the oppression of personal liberty in the Massachusetts Bay Colony and by the barriers that the Colony’s government presented to Hartlibian improvements, and secondly by the challenge encountered by the Huguenot petition. Even in failure, Hartlib had emphatically demonstrated the value of such archival and communicative practices. Furthermore, new colonies continued to be influenced by Hartlibian ideals as the colonies continued to grow – and in many cases thrive -- throughout the remainder of the seventeenth-century. If only from a distance, Hartlib participated in the

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<sup>480</sup> Leng, *Benjamin Worsley*, p. 175.

<sup>481</sup> Frank E. Manuel and Fritzie P. Manuel, *Utopian Thought in the Western World* (Harvard, 1979), p. 209, 321.

expansion of trade, the building of early modern “factories”, the spread of an ecumenical Protestant Christianity, and the dissemination of knowledge in the New World.

## CHAPTER III: HARTLIB AND VIRGINIA

*Improvement makes straight roads, but the crooked roads without improvement  
are roads of genius.*

-William Blake

### 3.1. Introduction

#### 3.1.1. *The English Empire and Virginia*

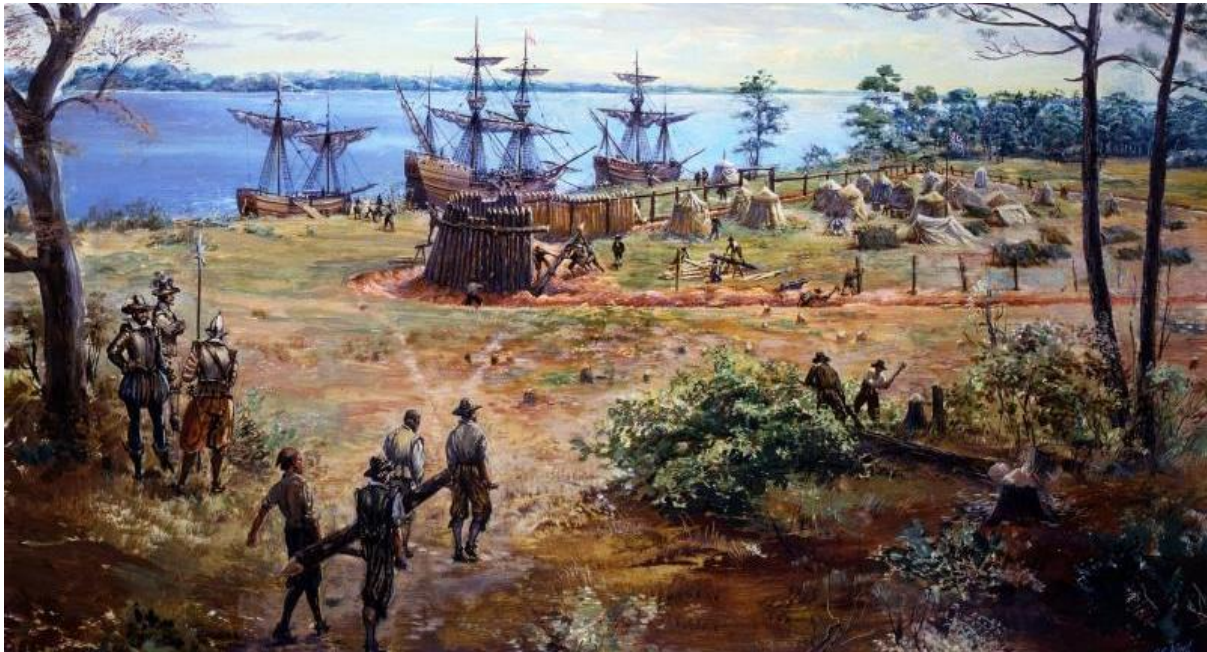
As I outlined earlier in this thesis, in 1606 English adventurers applied for and were granted a charter by James I to create a joint-stock company and send settlers to Virginia. The Virginia Company of London, also known as The London Company, was given a monopoly right to establish colonial settlements in North America.<sup>1</sup> James' charter gave the Company's original council of 13 legal access to territory on the eastern coast of North America from the 34<sup>th</sup> parallel to the 41<sup>st</sup> parallel (roughly modern North Carolina to New York) and permission to establish a 100 square mile settlement with authority to explore, settle, and trade. The charter described the designated land as "not now actually possessed by any Christian Prince or People".<sup>2</sup> The Company's primary goal was to build wealth for shareholders by extracting natural resources from the New World. The first head of the company was the former governor of the East India Company, Sir Thomas Smythe. Smythe sold shares in the Virginia Company to almost 1,700 Englishmen of various occupations and classes; wealthy women and able institutions, trade guilds, towns, and cities, bought shares of £12.10s. each (six months' wage for an average working man in 1609). The largest single investor was Sir Thomas West, Lord de la Warre, who became the first governor of the colony in 1610. Others included men such

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<sup>1</sup> The name 'Virginia' was commonly used by the Hartlib Circle to describe all of English North America.

<sup>2</sup> The First Charter of Virginia, 10 Apr 1606 in William Stith, *The History of the First Discovery and Settlement of Virginia* (Williamsburg, 1747).

as Sir Francis Bacon, who also invested in the Newfoundland Company.<sup>3</sup> Smythe used the money collected to purchase ships and supplies and to recruit and equip male labourers.



*Figure 3.1: The Jamestown fort provided protection against Native American assaults, but its design ensured most cannon faced the river to protect against attack by European ships. Source: National Park Service, Jamestown - Sidney King Paintings, “Colonists Landing at Jamestowne”.*

The first Virginia settlers departed from Blackwall, London in December 1606, with three ships and 144 “men and boys”. The original group included carpenters, a blacksmith, bricklayers, a mason, 13 labourers, and preacher Master Robert Hunt among others, but no women.<sup>4</sup> The composition of this initial party reflects Smythe’s fear of Native Americans and the company’s desire to generate a quick return on investments, but he did not oppose sending families once the first plantation was established. The first voyage took over four months, arriving on the south side of Chesapeake Bay where the settlers were immediately attacked by native warriors. As a result, they moved further south and on 13 May 1607 established the first

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<sup>3</sup> Irving, *Natural Science*, p. 23.

<sup>4</sup> John Smith, *A Map of Virginia with a Description of the Country, The Commodities, People, Government and Religion* (Oxford, 1612).

permanent English-speaking colony in the New World. Jamestown was positioned on a peninsula formed by a bend in the James River, which strengthened defence against native attacks and was sufficiently far enough upstream to conceal the fragile community from Spanish and Dutch ships passing by the outer coastline. To further secure the settlement, a three-sided wooden enclosure was constructed, a triangle with platforms for cannon at each angle. Jamestown was initially governed by President Edward Wingfield with a seven-member council, which had been selected by James I. This council included Capt. John Smith who became president of the colony in 1608. Rivalries quickly developed among the settlers and protests erupted from within the settlement as sickness, attacks by Native Americans, shortages of provisions, and friction between classes of men strained relations to breaking point.<sup>5</sup>

In 1609, the Virginia Company charter was amended to expand the original claim to a territory stretching from “sea to sea”, while another amendment in 1612 incorporated the Somers Isles (Bermuda), which had recently been discovered.<sup>6</sup> The new charter also sought to calm political tensions in the company, extending certain privileges and immunities and giving the right for the company to select its own governor from among the shareholders.<sup>7</sup> The company launched a new recruitment drive for additional investments, and sales of shares increased. New funds poured in, and 600 additional colonists, men, women, and children, migrated across the Atlantic. The company continued to struggle, however, and failed to generate a profit, primarily due to chronic shortages of labour. Returns did not improve until

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<sup>5</sup> “List of the Colonial Secretaries” and “Sketches of the Secretaries of the Colony of Virginia”, *The William & Mary Quarterly*, 10:3 (Jan 1902): 167-75.

<sup>6</sup> See Ivor Noël Hume, *The Virginia Adventure: Roanoke to James Towne, An Archaeological and Historical Odyssey* (Charlottesville, 1994), p. 129, 240-4, 297, 351, 372, 378.

<sup>7</sup> Patents and Charters Granted to Virginia, undated, *HP* [61/4/1A].

planters discovered the profitability of a particular strain of tobacco, which materialised after many years of experimentation on the crop.<sup>8</sup>



*Figure 3.2: Tobacco is a flowering plant brought from South America to Virginia first by Native Americans, before John Rolfe obtained seeds of a different species (Nicotiana tabacum) that was sweeter when smoked.*

Tobacco simultaneously became a saviour and curse of Virginia.<sup>9</sup> While production of this easily grown and exportable crop ensured the settlement's profitability and survival, it also led to an economic specialisation that chronically threatened the colonists with starvation and restricted diversification, while it discouraged experimentation with other commodities. Tobacco grew so well in Virginia and demand expanded so quickly -- along with the value of the import tax -- that by 1619, James I decreed both that all tobacco had to enter England

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<sup>8</sup> Nuala Zahedieh, "Economy" in *The British Atlantic World: 1500-1800*, eds. David Armitage and Michael J. Braddick (New York, 2002), p. 54.

<sup>9</sup> G. Melvin Herndon, *Tobacco in Colonial Virginia: The Sovereign Remedy* (Williamsburg, 1957).

through London and that all tobacco pipes be manufactured only in Westminster. In due course, indentured servitude was encouraged to alleviate the labour shortage in the colony. The Virginia Company offered passage to Virginia, food, protection, and a promise of land ownership upon completion of service, in exchange for seven years' labour to any adventurer willing to volunteer. By the time Hartlib began to participate in the improvement of Virginia, the enslavement of Africans had been adopted to further ensure the profitable growth of export crops and raw materials by supplementing the labour of indentured servants. Irish captives were transplanted to all of the American colonies but were primarily sent to the West Indies: Barbados, Jamaica, and the Leeward Islands.<sup>10</sup> So many, up to 10,000, were sent to Barbados that "Barbadosed" became the common verb to describe what happened to an Irish captive sent to any colony against their will, including Virginia.<sup>11</sup>

In 1609, William Crashaw, pastor of the White Chapel Church of London, preached a defining sermon to the fleet of reinforcing settlers who left for Virginia with Sir Thomas Gates later that year.<sup>12</sup> Crashaw was a friend of a number of men who later became correspondents of Hartlib, and they were drawn together by a common interest in the universal reformation, millennialism, and support for colonisation. His brother, Raleigh (1584-1624), migrated to Virginia in 1608 to be an "Indian fighter" with Capt. Smith. Crashaw addressed his four-hour message to Governor West, and to Gates, the first to serve under West as deputy. He argued that Englishmen were bound by duty to God to go to Virginia and that the purpose of the colony was "the destruction of the devil's kingdom, and propagation of the Gospel".<sup>13</sup> He added that those leaving for the New World were the best people of England and that they were embarking

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<sup>10</sup> Sean O'Callaghan, *To Hell or Barbados: The Ethnic Cleansing of Ireland* (Brandon, 2000), pp. 77-88.

<sup>11</sup> Kristen Block and Jenny Shaw, "Subjects Without an Empire: The Irish in the Early Modern Caribbean". *Past and Present* 210:1 (2011):33-60.

<sup>12</sup> Sheehan, *Savagism & Civility*, p. 124.

<sup>13</sup> William Crashaw, *A Sermon Preached in London* (London, 1610).

upon the best possible purpose. A person was “profane”, he charged, for not going to Virginia unless they were either unaware of the opportunity or honestly unable to secure passage. Although he described the difficulties commonly faced in planting colonies, Crashaw stated that the new situation was “as though God himself had built a bridge for men to pass from England to Virginia”. The distance, climate, and other features of the land were only minor obstacles, he claimed, and would be as easily surmounted as when the Jews conquered Canaan 3,000 years earlier. Harsh conditions, he argued, were what England needed to toughen a kingdom that, in the opinion of many Puritans, had gone soft. With a millennial theme, he promised the nation that England’s best days were arriving soon and noted that the successful despatch of colonists was proof: “The ancient valour of English blood is not yet extinguished”, he declared, and launched the reinforcing fleet toward the ailing colony.<sup>14</sup> The themes of this sermon endured among English imperialists through the next several decades and echoes of them are seen in the writing of Hartlibian correspondents.

Jamestown continued to struggle, however, even when tobacco produced the first profits for the Virginia Company from 1620. This encouraged planters to forego planting all other crops, including edible crops that were crucial for the colonial food supply.<sup>15</sup> As for the importation of tobacco into England, The Company complained of corruption in the tax collection process and violation of its rights as given in the charter. Officials of the company charged the Lord Treasurer with embezzlement of funds and with intent to maliciously undermine the colony.<sup>16</sup> As a legal battle was waged in the courts, the company arranged to sell Virginia tobacco in the Netherlands to circumvent English taxation and the alleged prejudice of Lionel Cranfield, 1<sup>st</sup> Earl of Middlesex and Lord High Treasurer. The Privy

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<sup>14</sup> Crashaw, *A Sermon Preached in London*, p. 10.

<sup>15</sup> Zahedieh, “Economy”, p. 54.

<sup>16</sup> Speech to General Committee of Virginia Company on Fraudulent Dealings in Tobacco, undated, *HP* [61/2/2A].

Council, however, prohibited the export of any product from Virginia to any foreign country unless the commodities first landed in England, English duties being paid. This restriction and these circumstances destroyed the profits of the company and dividends on shares went unpaid. Soon the company, as a result of these regulations, was over £9,000 in debt and colonial leaders in Virginia were told to expect no further supplies from London.<sup>17</sup>

The situation was therefore already in dire straits when Native Americans rose in retaliation against the settlements in 1622, killing 25 percent (300 English) of the European population of Virginia.<sup>18</sup> Several communities, including Henricus and Wolstenholme Towne, were completely destroyed.<sup>19</sup> Comparable in some ways, if not in scale, to the 1641 Irish rebellion, this attack convinced many English of the savagery of the Indians, that they could not be trusted, and that the settlers were under no moral obligation to treat them humanely. As a result of these economic and security issues, the Company lost its charter in 1624, and control of the colony was seized by the Crown. Investors who were turned out by the revocation reorganised themselves as The London Company of The Somers Isles and focused on the development of Bermuda. James I appointed Sir Francis Wyatt governor of Virginia but allowed the colonists to elect their own local assembly. The executive, along with this legislative assembly, were collectively given the right to establish judicial commissions and to declare war against Native Americans.<sup>20</sup>

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<sup>17</sup> Wesley Frank Craven, *The Virginia Company of London, 1606-1624* (Charlottesville, 1957), p. 37. See also Wesley Frank Craven, *Dissolution of the Virginia Company* (Oxford, 1932); *The Records of the Virginia Company of London 1607-1622*, ed. Susan M. Kingsbury (4 vols, Washington, DC, 1906); Edward D. Neill, *History of the Virginia Company of London* (Albany, NY, 1869); and Benjamin Wooley, *Savage Kingdom: The True Story of Jamestown, 1607, and the Settlement of America* (New York, 2007).

<sup>18</sup> Sheehan, *Savagism and Civility*, p. 169.

<sup>19</sup> J. Frederick Fausz, "The 'Barbarous Massacre' Reconsidered: The Powhatan Uprising of 1622 and the Historians", *Explorations in Ethnic Studies* 1 (1978): 16-36.

<sup>20</sup> Patents and Charters Granted to Virginia, undated, *HP* [61/4/1A].

### 3.1.2. *The Hartlibian Interest in Virginia*

Hartlib participated in a wide variety of projects to improve Virginia from 1629 until his death in 1662.<sup>21</sup> Based on the collection of copied colonial records among his papers, Hartlib was aware of the history of Virginia and The Virginia Company prior to his first correspondence regarding the colony. Documents detailing the foundation and development of Virginia were in his possession, including a complete list of patents and charters granted between 1607 and 1625 as well as a defining speech given in 1620 to the Virginia Company by Nicholas Ferrar about the tobacco trade.<sup>22</sup> Hartlib was interested in Virginia for five reasons. Firstly, as mentioned earlier, he was preparing for a Baconian-informed millennium that required the promotion of improvement projects.<sup>23</sup> Secondly, as we have seen in the previous chapter, there was always the complementary theme of evangelism.<sup>24</sup> Robert Boyle served on a council for the propagation of the Gospel in America and worked to support the introduction of Indians to Christianity.<sup>25</sup> As previously mentioned, this motivation to share the truth of God, not only as a personal and eternal benefit to the new believer but as a necessary component of civilisation (i.e. improvement), is evidence of the deep belief in the interpenetration of religion and natural philosophy held by members of the Hartlib Circle.<sup>26</sup>

A third explanation for interest in Virginia, as mentioned earlier, is seen in the interpretation of some correspondents, who identified Jamestown as a second Mt. Ararat,<sup>27</sup> the

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<sup>21</sup> Johann Fridwald To Hartlib, 18 Jun 1629, *HP* [27/34/3A].

<sup>22</sup> See Patents and Charters Granted to Virginia, undated, *HP* [61/4/1A-2B] and Copy Speech to General Committee of Virginia Company on Fraudulent Dealings in Tobacco, undated, *HP* [6/1/1A-14B].

<sup>23</sup> See Harrison, *The Fall of Man*; Hotson, *Paradise Postponed*; and Jue, *Heaven Upon Earth*.

<sup>24</sup> Dury To Hartlib, 30 May 1645, *HP* [30 May 1645].

<sup>25</sup> Jacob, *Robert Boyle*, pp. 148-50.

<sup>26</sup> For example, see Culpeper to Hartlib, 21 Jan 1645, *HP* [13/65A]; John Hall to Worsley, 5 Feb 1647 [36/6/1A]; Worsley to Dury, 27 Jul 1649? [33/2/18A-19B]; Beale to Hartlib? 9 Apr 1657 [52/11A]; and Dury to [Hartlib], Oct 1661 [4/4/36A].

<sup>27</sup> Extract In Hand H?, Dr. Tong To Hartlib, undated, *HP* [15/8/23A-24B].

mountain on which Noah landed the Ark after the near global destruction of humanity.<sup>28</sup> Like Noah and his family, the original settlers of Jamestown were to be the ancestors of those who would fill North America. From Jamestown, the wilderness would be transformed into productive farmland, trails would be improved to roads, and wetlands would be drained to become productive agricultural fields. In due course, farms, mills, and mines appeared across the landscape creating jobs and improving economies. Old World animals such as chickens, cows, horses, pigs, and sheep multiplied across apparently virgin land for the benefit of generations to come. In turn, some products such as avocado, cassava, corn, squash, and turkeys were imported for a more immediate and tangible benefit to seventeenth-century England, but more importantly to the Hartlibians, Virginia was where the mistakes of Europe could be corrected, and new knowledge would lead humanity to a better physical and spiritual place.<sup>29</sup>

Fourthly, Hartlib was interested in Virginia because he thought that colonies would strengthen the national security of England. He further believed that it was a moral responsibility to share information learned with other Protestant nations, thereby protecting these friendly populations and the Protestant faith. It would also raise the standards of living, which included lower infant mortality, advancement and expansion of education, eradication of disease, elimination of famine, and the raising of life expectancy. Colonies in America and Ireland would allow England to achieve a level of economic self-sufficiency that would free the country from economic dependence on continental trade and enable the nation to assist others from a position of strength.<sup>30</sup> Finally, the Hartlib Circle found Virginia attractive for its potential to be a safe space for friendly populations suffering persecution. America was suitably

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<sup>28</sup> Gen. 8:4.

<sup>29</sup> See Crosby, *The Columbian Exchange* and Perry Miller, *From Colony to Province*.

<sup>30</sup> For example, see *Proposals Relating to Poor Relief*, undated, HP [15/2/47A-50B]; [John Dury] to? 1646? [17/9/1A-10B]; and *Londons Charity Enlarged*, 1650 [57/4/13/1A-12B].

remote, and the great distance that allowed Jamestown to function in relative political independence also insulated fragile refugee populations from wild fluctuations in English and continental politics.<sup>31</sup>

### ***3.1.3. Hartlib and Virginia***

As with the history of New England, the literature on English efforts to colonise Virginia is largely silent on the Hartlibian project, although Hartlib worked diligently throughout the 1630s, 40s, and 50s to support English imperial expansion in the region.<sup>32</sup> Conversely, the Hartlibian literature, and that on alleged members of his circle, has almost completely ignored the significance of Virginia to his programme.<sup>33</sup> However, Hartlib regularly corresponded with at least two dozen associates about Virginia, including some who were members of Parliament and others who worked within the government.<sup>34</sup> He established a relationship with a number of colonists in Virginia and with others who had been leaders or investors in The Virginia Company.<sup>35</sup> Hartlib discussed theories of improvement as well as practical plantation strategies for Virginia with academics such as Thomas Browne, the English

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<sup>31</sup> Printed Booklet, *The Moderate Intelligencer* No. 160. 6-13, Apr 1648, HP [39/2/74/3A].

<sup>32</sup> See amongst others Philip L. Barbour, *The Three Worlds of Captain John Smith: Adventurer Colonist Promoter* (London, 1964); Robert Beverley, *The History of Virginia in Four Parts* (London, 1705); James Horn, *A Land As God Made It: James town and the Birth of America* (New York, 2005); William Keith, *The History of the British Plantations in America* (London, 1735); William M. Kelso, *Jamestown: The Buried Truth* (Charlottesville, 2006); Edmund S. Morgan, *American Slavery, American Freedom: The Ordeal of Colonial Virginia* (New York, 1975); James Otis, *Richard of Jamestown: A Story of the Virginia Colony* (New York, 2018); David A. Price, *Love & Hate in Jamestown: John Smith, Pocahontas, and the Start of a New Nation* (New York, 2005); *The Journals of Captain John Smith*, ed. John M. Thompson (Washington, 2007); Camilla Townsend, *Pocahontas and the Powhatan Dilemma* (New York, 2004); Tony Williams, *The Jamestown Experiment: The Remarkable Story of the Enterprising Colony and the Unexpected Results that Shaped America* (Naperville, IL, 2011); and Woolley, *Savage Kingdom*.

<sup>33</sup> Dale, *Sir W. P. of Romsey*; Dircks, *Milton's Familiar Friend*; Jacob, *Robert Boyle*; SHUR; Hunter, *Boyle and Boyle Reconsidered*; Leng, *Benjamin Worsley*; Flora Masson, *Robert Boyle*; McCormick, *William Petty*; HDC; and Charles Webster, *Samuel Hartlib and The Great Instauration*.

<sup>34</sup> Charles Webster, *Great Instauration*, p. 462.

<sup>35</sup> Ransome, "John Ferrar". See also Maycock, *Chronicles of Little Gidding; Conversations at Little Gidding*; and Sharland, "Introduction".

polymath and author of varied works; William Hamilton, fellow of All Soul's College, Oxford, and regent for the college of Glasgow; Cyprian Kinner, a Silesian educator and linguist; and John Worthington, Master of Jesus College, Cambridge from 1650 to 1660, and Vice-Chancellor in 1657. He also formulated plans for new colonies in Virginia with strategists such as Hugh L'Amy, Joachim Hübner, and Johann Fridwald, the last two both advocates for a dedicated scientific colonial project. Finally, Virginia was a common and enduring topic in the Hartlib correspondence among those who offered sources of information regarding a wide range of topics directly related to the work in Virginia.<sup>36</sup>

In addition to his collection of surviving correspondence, Hartlib made more than 40 direct and indirect surviving journal entries between 1630 and 1660 relating to Virginia. Although half of these refer to tobacco, the others reflect the usual spectrum of Hartlibian interests, including advocacy for education, food production, manufacturing, minerals, silkworms, sugar, trade, and notes regarding colonial planning.<sup>37</sup> The preponderance of conversation regarding tobacco in the Hartlibian written correspondence was a reflection of the great problem that monoculture had become, but more broadly, Hartlib's journal entries reflect the otherwise unpreserved conversations he was having with informants concerning the general improvement of Virginia.

In this chapter, the absence in the historical literature of any account relating Hartlib's programme to contemporary English imperial projects is rectified by restoring Virginia to its pivotal place in the Hartlibian-Baconian project for improving the world.<sup>38</sup> Unlike New England, where associates migrated to the colony and became informing correspondents about

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<sup>36</sup> *HDC*, pp. 9, 69, 99, 102.

<sup>37</sup> Culpeper To Hartlib, 1 Sep 1649, *HP* [13/268A-269B]. See also Braddick, p. 105.

<sup>38</sup> 'New England' was commonly used by the Hartlib Circle to designate all the land on the east coast of North America between the Dutch claims at New Amsterdam (New York) and the English claims at Newfoundland. Only prior to 1620 was 'New England' used to refer to all of English America. For this early meaning, see George Percy, *A Trewe Relacyon: Virginia From 1609 To 1612* (London 1625), p. 282.

those colonies, information regarding Virginia came to Hartlib primarily from those who had been there, returned to England, and delivered information to him in person. There are no surviving Hartlib letters that passed directly between Duke's Place or Charing Cross and Jamestown, but that does not mean his influence did not make an impact on the colony. In conversation with the government and among his influential correspondents, he was a committed advocate of a bountiful spiritual and economic future for Virginia, a view he based on the experience of those who had been resident there as well as on intelligence he gathered from others in Ireland and New England.<sup>39</sup> Adventurers, merchants and persecuted populations approached the members of Hartlib's wider network for assistance with colonial projects, issues of trade, or chartering new colonies because they needed representation, financial support, and diplomatic protection.

In this chapter I discuss various proposals for a colony that would be dedicated to producing practical and useful knowledge, but which would also be a haven for refugees of the Thirty Years War and those persecuted for their religious faith. The most significant of these colonies planned by Hartlibians and to have been located in Virginia was called Antilia, a name that inaccurately raises negative connotations linking Hartlib to a former group of Rosicrucians on the continent of the same name. Hartlib explained late in life that he had earlier simply borrowed the name because he liked it, and that the purpose for which he intended the colony was not connected to the older schemes. Secondly, I show that Benjamin Worsley's plan to reform the government and economy of Virginia was an example of Hartlib's practical and political impact on colonial administration within the government. As several members of the Hartlib Circle assisted Worsley, this project highlights the cooperative nature of Hartlib's work.

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<sup>39</sup> Elizabeth Mancke, "Empire and State" in *The British Atlantic World: 1500-1800*, eds. David Armitage and Michael J. Braddick (New York, 2002), p. 189.

Worsley led a campaign to replace the royalist governor and he was the principal author of the navigation act adopted in 1650. Finally, a third section details Hartlib's ongoing work of personally lobbying both Parliament and planters in Virginia toward economic diversification; an example of practical improvement within the colony. Without condemning tobacco outright, Hartlib promoted alternative commodities like silk to strengthen the economy of the colony for the benefit of colonists and the sponsoring nation.

### **3.2. Scientific Improvement: Colonisation, Classification, and Evangelism**

#### ***3.2.1. A Dedicated Hartlibian Colony***

The Antilians were one of several fraternal groups that sprang from the Rosicrucian Enlightenment, a movement inspired by the earlier Hermetical movement thoroughly analysed elsewhere.<sup>40</sup> While it does not appear that Hartlib or any of his associates were members of any Antilian or Rosicrucian group, they were aware of this movement and Hartlib was fascinated with their activities and practices. Names appear in the Hartlib Papers such as "Christian Society", "Invisible College" or "Antilia" to indicate a link between these groups and Hartlib's proposal for an ideal colony, and he corresponded with a number of individuals closely identified with the Rosicrucian tradition. Based on Hartlib's own writings, however, he simply adopted the name "Antilia" for his envisioned colony in Virginia or the West Indies, and he clearly did not intend for his proposal either to be, or be perceived as, an extension of the older

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<sup>40</sup> See Donald R. Dickson, "Johann Valentin Andreae's Utopian Brotherhoods", *Renaissance Quarterly* (22 Dec. 1996) and *The Tessera of Antilia*; Stephanie Frow, *Freemasonry, Rosicrucianism, and the RS* (Unpublished master's thesis) University of Cambridge, Cambridge, UK; *Rosicrucian Trilogy: Modern Translations of the Three Founding Documents: Fama Fraternitatis, 1644, Confessio Fraternitatis, 1615, The Chemical Wedding of Christian Rosenkreutz, 1616*, ed. Joscelyn Godwin (Newburyport, MA, 2016); and Frances A. Yates, *The Rosicrucian Enlightenment* (London, 1972).

fraternity.<sup>41</sup> Furthermore, being aware of the offence some scholars took at the name “Antilia”, he occasionally used “Macaria” as a synonym though he did not abandon the name “Antilia” completely. As will be detailed below, “Antilia” was more common in Hartlib’s journal and in his correspondence with correspondents such as Johann Fridwald, but “Macaria” was preferred by the English Hartlibians such as Boyle and Beale. Both terms were prominent in Hartlib’s correspondence with John Worthington, as a result of the latter’s having asked for Hartlib’s explanation of his use of ‘Antilia’.<sup>42</sup>

As we have seen, Hartlib was one of many who found affirmation in Scripture for his expectation that knowledge would increase as the millennium drew near. Like many other Puritans, he was driven not only toward a physical and spiritual reformation of Mankind, but towards the inauguration of a unique colony in America dedicated to the practical improvement of the world. These views were indirectly shaped by various individuals and textual sources including Cambridge Neoplatonists, the writings of Bernard Palissy and Francis Bacon, and the modified Hermeticism of Johann Valentin Andreae.<sup>43</sup> All of these streams converged perfectly for Hartlib, who envisaged Antilia to be a real world synthesis of Bacon’s Bensalem, More’s Utopia, Andreae’s Christianopolos and Plato’s Republic, all of which Gabriel Plattes explained in *Macaria*. At various points in his career, Hartlib was determined to establish a colony in Virginia where philosophers would live comfortably and be free to experiment in a manner not dissimilar to the activities described in *New Atlantis*.<sup>44</sup> Discoveries would be objectively reviewed in trials and openly shared with other researchers;<sup>45</sup> knowledge would be

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<sup>41</sup> See Turnbull, *Samuel Hartlib: A Sketch*, p. 37.

<sup>42</sup> See 10 Letters exchanged between Hartlib and Worthington, 30 Jan 1659-17 Dec 1660, Worthington, i, pp. 192-199; Hartlib to Robert Boyle, 15 Nov 1659-29 Nov 1659, “The Works of the Honourable Robert Boyle”, ed. T. Birch, 2<sup>nd</sup> edn (6 vols, London, 1772), vi, pp. 131-3; Ephemerides, 1650 Parts 3 and 4, and 1660, *HP* [29/8/10A, 30/4/56B and 61A]; and Johann Fridwald to Hartlib, 28 Nov 1629 and Jun 1630, *HP* [37/34/5A and 6A].

<sup>43</sup> Frow, *Freemasonry*, p. 8.

<sup>44</sup> Francis Bacon. *The New Atlantis* (London, 1627).

<sup>45</sup> Charles Webster, *Great Instauration*, p. 47.

collected and preserved with government funding of archival libraries, and research would be protected from external political interference.<sup>46</sup>

As a genuinely original Hartlibian project, each of the larger English areas of colonisation were considered for Antilia's plantation by Hartlib and various correspondents in the early 1630s.<sup>47</sup> Unlike Ireland, America seemed to be a land of endless territory to seventeenth-century adventurers, and Virginia was favoured over New England as a home for the new colony. Based on climate, geography, geology, vegetation, and wildlife, each location promised its own set of wonders and potential for a suitable colonial settlement. To transform the natural world into a productive resource, Hartlib proposed the creation of an educated artisanal class and a fully employed working class in the new colony, which would be dedicated to mechanics and mathematics.<sup>48</sup> Antilians were also to be busy with innovative trials in anatomy, alchemy, and natural history as well as with millennial ideas and a spiritual reformation. It would be an exemplary community of Christians uncovering the secrets of God in nature for the benefit of the common good, regardless of their ecclesiastical affiliation. Hartlib exalted two books as his highest authority: Scripture and the figurative Book of Nature, both of which he considered to have been infallibly inspired by God.

Hartlib proposed the idea of Antilia to one of his correspondents, Johann Fridwald, as early as 1629.<sup>49</sup> Hartlib had come to London from Cambridge only one or two years earlier, still in his early twenties, and began to promote the idea almost as soon as he began to establish an epistolary network. In June of that year he informed Fridwald that he had considered other

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<sup>46</sup> See Keith Pluymers, "Taming the Wilderness in Sixteenth- and Seventeenth-Century Ireland and Virginia", *Environmental History* 16 (Oct 2011): 610-32.

<sup>47</sup> *HDC*, pp. 69-76, 128.

<sup>48</sup> Frow, *Freemasonry*, p. 14.

<sup>49</sup> Johann Fridwald to Hartlib, 18 Jun 1629, *HP* [27/34/3A] and Hartlib to John Worthington, 15 Oct 1660. Worthington, xiii, pp. 210-5. See also *HDC*, p. 70.

locations for instantiating his ideal community, but none were as suitable as Virginia.<sup>50</sup> Five months later, he noted in his journal that he had plans to scout Virginia personally and verify its suitability for his empirical colony. Although it is unclear whether someone travelled on his behalf for this purpose, Georg Heinrich Pomer, in correspondence with Fridwald and Hartlib, asked for advice on the prospects for his own proposed migration to Virginia.<sup>51</sup> He was interested because of the attractiveness of America as described by Hartlib, as well as the deteriorating political conditions of the Baltic area where he was based.<sup>52</sup> In June 1630, Fridwald cautioned Hartlib that Virginia was “inadvisable” as a place for emigration, yet five months later Virginia and New England were both promoted as viable possibilities for Antilia by a number of Hartlib’s English correspondents. Although Fridwald had withdrawn any support for the project, the English Hartlibians remained enthusiastic.<sup>53</sup>

Hartlib may have been drawn to promote Virginia as a location for Antilia because of connections he had established before migrating to England, or because of talking to London-based colonial investors such as Thomas Roe, who was also a patron of Hartlib.<sup>54</sup> Roe was a shareholder in the Virginia Company and was keen to earn profits on his investment, but he also wanted to see the planting and expansion of English colonies in the New World for nationalistic reasons. Many years later, in September 1649, Cheney Culpeper wrote positively to Hartlib regarding the potential American plantation.<sup>55</sup> Without naming the colony, he pleaded for a plantation dedicated to economic improvement that he believed would contribute to the improvement of life across Europe, a happy “levelling”, he said. This colony, for

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<sup>50</sup> Johann Fridwald to Hartlib, 18 Jun 1629, *HP* [27/34/3A].

<sup>51</sup> *HDC*, p. 70-1.

<sup>52</sup> Dickson, *The Tessera of Antilia*, p. 125.

<sup>53</sup> Johann Fridwald to Hartlib, 22 Nov 1630, *HP* [27/34/7A-B].

<sup>54</sup> Charles Webster, *Great Instauration*, p. 42.

<sup>55</sup> Sir Cheney Culpeper to Hartlib, 1 Sep 1649, *HP* [13/268B]. See also Charles Webster, p. 462 and *HDC*, p. 262.

Culpeper, would have been the fulfilment of the bounties promised to the faithful in Psalm 67, being dedicated to education, religious unity, good government, empirical improvement, and the conversion of Native Americans.<sup>56</sup>

Although Hartlib never abandoned the idea entirely, Antilia never materialised. As late as 1660, he was lamenting reflectively to John Worthington that the “thing is as good as vanished”, though the broader dream had not died. In the next few lines of the same letter, he suggested that the entire island of Bermuda could be purchased for the same purpose, for as little as £2,000.<sup>57</sup> The two men began an intense correspondence on the subject in the same month that the Royal Society was being founded at Gresham College. Somewhat confusingly, Hartlib told Worthington that the Antilians, meaning a group of scholars he knew to be meeting regularly in London, had been abused but continued to hold regular meetings. Worthington responded with a substantial analysis of this group as he understood it, implying that the new Society was a serious group but the “Antilians” were not.<sup>58</sup> Hartlib in turn objected to Worthington’s distinction and explained that a misunderstanding had arisen from his choice of the name and its association with the obscure Rosicrucian movement, explaining that the two groups in the present discussion were the same people.<sup>59</sup>

Hartlib admitted that his idea may have been a “tessera” of the nascent Society, and apologised for using the name, but continued to defend the identification of Antilia with the group meeting at Gresham.<sup>60</sup> Nevertheless, Worthington wrote that Macaria was “too good a word for this late pretending company”, apparently still confusing the term with an opaque Rosicrucian group.<sup>61</sup> Hartlib patiently wrote again on 17 December to offer Worthington his

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<sup>56</sup> *HDC*, p. 31.

<sup>57</sup> Hartlib to John Worthington, 15 Oct 1660. Worthington, xiii, pp. 210-5.

<sup>58</sup> John Worthington to Hartlib, 29 Nov 1660. Worthington, xiii, pp. 233-9.

<sup>59</sup> Hartlib to John Worthington, 10 Dec 1660. Worthington, xiii, pp. 239-41.

<sup>60</sup> See Charles Webster, *Samuel Hartlib*, p. 30.

<sup>61</sup> John Worthington to Hartlib, Dec 1660. Worthington, xiii, pp. 241-5.

most complete clarification of the name. He admitted it was a “mystical” term but by describing the Antilians as a group meeting at Gresham College or “Mr Ball’s chambers in the Temple” and including men such as Boyle, John Wilkins, Paul Neale, William Brouncker, and Christopher Wren, he said that he was obviously writing about the early Royal Society.<sup>62</sup>

Several other versions of Antilia were proposed during the Hartlibian period, each with varying degrees of support from Hartlib or those among his associates. One such colony was called New Albion, proposed for northern Virginia in the early 1630s.<sup>63</sup> A parallel proposal to Antilia was that of Franciscus van den Enden, a Dutch sponsor of colonisation in America, who promoted a plantation in which there would be equal opportunity education, joint ownership of property, and a democratically elected government.<sup>64</sup> Another example of a colony promoted by members of the Hartlib Circle is the colony planned for French Protestants in America.<sup>65</sup> Although the petition of Hugh L’Amy was discussed fully in the previous chapter in relation to New England, it is necessary to list it here among the many proposals for Virginia since the southern colony was also considered. Virginia seems to have been the first choice of L’Amy in the earlier formulations of this plan before he considered a location even further south, but he was careful not to give Spain cause to take offense.<sup>66</sup> Although New England was more seriously considered during the later Hartlibian period, a Huguenot colony was eventually planted in South Carolina during the 1680s.

In 1649 Hartlib noted that William Bullock was designing a new colony in Virginia and had already met with several London aldermen to provide security for the adventurers who had

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<sup>62</sup> Hartlib to John Worthington, 17 Dec 1660. Worthington, xiii, pp. 245-52. See Jacob, *Robert Boyle*, p. 146.

<sup>63</sup> *A Direction for Adventurers with Small Stock to get Two for One, and Good Land Freely* (London, 1641).

<sup>64</sup> Bart Plantenga, “The Mystery of the Plockhoy Settlement in the Valley of Swans”, *Mennonite Historical Bulletin* (Apr 2001).

<sup>65</sup> Charles Webster, *Great Instauration*, p. 371.

<sup>66</sup> Petition, Hugh L’Amy To Parliament, undated, *HP* [12/161A].

committed to invest in his proposal.<sup>67</sup> Hartlib compared this plan to that of L’Amy and Le Provost and was soon sharing Bullock’s proposal with his associates. Worsley responded positively, claiming “I shall bee glad to see Designe for Virginia”, and emphasizing that he was particularly interested in what Bullock had learned regarding corn.<sup>68</sup> In the same letter, Worsley promised to provide L’Amy with “the highest and most luciferous secrets in nature” to assist in the success of the Huguenot colony.<sup>69</sup> John Ferrar, one of Virginia’s strongest advocates, also promoted his own idea for an entirely new colony to Hartlib.<sup>70</sup> His careful study of Bullock’s work and the growth and development of his proposal is evidenced by the marginal notes Ferrar made in his surviving copy of *Virginia Impartially Examined*.<sup>71</sup> His interests in the improvement plans being promoted by Hartlib, such as mining, silk worms, and corn, drew him to a sympathetic Hartlib once again and may have been an offer to actualize Hartlib’s idea for a colony dedicated to empirical research. Ferrar never founded a new colony but his communication with Hartlib during the period is further evidence of Hartlib’s work and his association with the colonies, and it is more fully discussed in the following sections.<sup>72</sup>

### ***3.2.2. Colonization and the Natural History of Virginia***

Hartlib never attempted to create or procure a natural history of Virginia in the way he did for Ireland and New England, largely because several accounts had already been published

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<sup>67</sup> William Bullock, *Virginia Impartially Examined* (London, 1649).

<sup>68</sup> Ephemerides, 1649, *HP* [28/1/21A].

<sup>69</sup> Extract in Hartlib’s Hand. 11 Jun 1649, *HP* [1A]. See also the RS MSS *Boyle Letters* 7.2 1A-2B.

<sup>70</sup> Peter Thompson, “William Bullock’s ‘Strange Adventure’: A Plan to Transform Seventeenth-Century Virginia”, *The William and Mary Quarterly*, 3rd series 31:1 (Jan 2004): p. 124.

<sup>71</sup> John Ferrar’s Marginalia in the Bodleian Library’s Copy of William Bullock’s *Virginia Impartially Examined* (London, 1649). Located at St. John’s College Library (Oxford), HB4/3. a.2.19(1), bound with other titles; available; confined.

<sup>72</sup> See Lois Green Carr, Russell R. Menard, and Lorena S. Walsh, *Robert Cole’s World: Agriculture and Society in Early Maryland* (Chapel Hill, 1991), and James Horn, *Adapting to a New World: English Society in the Seventeenth-Century Chesapeake* (Chapel Hill, 1994), esp. 141-200, 251-92.

by others that were excellent for understanding its climate, geography, population, vegetation, and wildlife. For example, John Smith's exhaustive account of his memories of Virginia in 1612 was so popular that it was republished several times before the Restoration. It was familiar to Hartlib, who used Smith as a Virginian reference similar to the way he used Gerard Boate's *Ireland's Naturall History* and Robert Child's brief accounts of New England.<sup>73</sup> Smith included a remarkably detailed small-scale map of Chesapeake Bay and its tributary rivers that was to be exceptionally useful to promoters of improvement located in London. Furthermore, he was invaluable to Hartlib for the wealth of information he included regarding animals and plants. In the process of describing the division of labour among Native Americans, for example, Smith listed a multitude of edible plants consumed by the natives as well as identifying the optimal diet for the English in the New World.<sup>74</sup>

Hartlib also owned a copy of John Rolfe's *Relation of the State of Virginia*, written in 1617, which detailed all of the commodities produced in the colony to that point.<sup>75</sup> A second example of a natural history for Virginia, Rolfe discussed barley, cabbage, peas, pumpkins, turnips, wheat, and other commonly grown crops, and identified silkworms and tobacco as commodities being successfully cultivated in the New World. Rolfe also described the government of Virginia, its practical function in regulating life in the colony, and the social structure of the community. From Rolfe's account, Jamestown was still the largest plantation on the mainland of Virginia in 1616 but the settlement was then accounted only 19 percent of the total population of the colony, which consisted of six plantations including Bermuda. Finally, Rolfe, who discounted natives as an obstacle to possession of the land and who also

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<sup>73</sup> John Smith, *A Map of Virginia*. See also Hume, *The Virginia Adventure*, pp. 308-9.

<sup>74</sup> Smith, *A Map of Virginia*, pp. 10-18.

<sup>75</sup> John Rolfe, *A True Relation of the State of Virginia Lefte By Sir Thomas Dale Knight In May Last 1616* (London, 1617). See also "Virginia in 1616" in *The Virginia Historical Register and Literary Advertiser* 1:3 (Jul 1848): 101-10 for commentary on Rolfe's *Relation*.

compared the English in America to the Israelites in Canaan, put forward a point that would be taken up by Hartlib thereafter, namely that no man should be allowed to possess any more land in Virginia than he was able to manure and bring into full production.<sup>76</sup>

The anonymous document among the Hartlib Papers entitled *Proffits humbly presented to this kingdome* developed several proposals promoted by Hartlib and Worsley for Virginia.<sup>77</sup> Virginia was not named explicitly in the document but no location fit the description of *Proffits humbly presented* as well as Virginia in its larger sense, and there is no one more likely to have been the author than Worsley, working with Hartlib as editor.<sup>78</sup> The manuscript version of the text contains Hartlib's correcting marks and he wrote "Mr Worsley" in the margin. The topics and style of writing parallel those of Worsley's letters, especially those produced in 1649 such as his letter to Dury and the subsequent *Memo on Virginian Plantation*. *Proffits humbly presented* opened a window into core ideological principles that were dear to the associates of the Hartlib Circle, asserting a close connection between ideas to relieve poverty, colonial policies and international trade. Evangelical proposals included the conversion of the Jews, Protestant unity, educational reform, and the general advancement of learning, all of which were cited among the benefits of systematically improving colonies as opposed to allowing plantations to grow haphazardly on their own.<sup>79</sup>

*Proffits* lobbied for a mercantilist economy in which England would become a creditor nation, no longer buying commodities from other European nations, but by extracting resources from improved English colonies the nation would sell finished goods and profit economically from this positive trade balance. According to Worsley, cash was being laid out from England

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<sup>76</sup> John Rolfe, *A True Relation*.

<sup>77</sup> Copy "Profits Humbly Presented To This Kingdom" In Hand B, [Benjamin Worsley?], undated, *HP* [15/2/61A-64B].

<sup>78</sup> Charles Webster, *Great Instauration*, p. 539 and "Benjamin Worsley", p. 221.

<sup>79</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A-19B] and *Memo On Virginian Plantation In Dury's Hand, Adapted From Worsley's Letter To Dury*, undated, *HP* [33/2/22A-B].

to other countries, none more than Holland, for raw materials and finished goods but that this harmful economic activity could end with colonial expansion and improvement. A positive cash flow would create jobs and increase revenue for the government from increased duties on exports which Worsley argued, buyers would be happy to pay since an economy of scale meant lower prices. This process, he wrote, started with enlarged English dominions and he mentioned both the North Sea and the New World as he envisioned new colonies in the East, South, “or Polar partes” as Australia, China, or Japan to be reached by the “Streights of Anian” or the Northwest Passage.<sup>80</sup>

Worsley identified five particular topics as examples ripe for improvement and projects easily implemented in “The Plantation land”. While Saltpetre was mentioned, greater attention was given to improvements in husbandry, fishing, and trade. Again, he meant for these strategies to be implemented in England as well as in the colonies, since both areas stood to benefit from “better manuring” and “other kind of nets”. “All which things”, he wrote, “wee have all ready experimented”. Superior methods were able to create and increase production of cloth, fruit, glass, medicine, ore, paper, silk, sugar, and wine in England and its colonies. With new resources flowing into London and other ports from the colonies, especially those in the “Southern and Westerne partes”, a diversification of agricultural and mining economies in Virginia would add credibility to Worsley’s argument. “Wee may sitt as judge and Umpire of al Christian difference”, he wrote of the power England would exercise once the empire was established, and he added that the benefits would be both economic and moral since “drunkenness rageth least in those Countries where wine is easiest to bee had”. In general,

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<sup>80</sup> Memo In Scribal Hand B, *Profits Presented To The Kingdom*, Undated, HP [53/32/5B].

Worsley confidently expected an increase in national health and cheerfulness as a result of availability of goods and a reduction in the cost of living.<sup>81</sup>

As much as land lay idle in Virginia due to the chronic shortage of labour, surprisingly little was said of African slaves or slavery in Worsley, Smith, Rolfe, or the Hartlib papers. This is so despite the fact that shortage of labour was frequently mentioned in the papers, and that African slaves were known to be present in Virginia after 1619. A word of caution is appropriate here. When the word “slave” or “slavery” is used in Hartlib, it most often refers to a religious application such as persons being slaves to sin. When the words refer to involuntary servitude, they more often refer to Native Americans rather than Africans.<sup>82</sup> Hartlib possessed a copy of Sir Nicholas Crispe’s *Remonstrance to Parliament*, made about 1651, in which the slave trade is discussed more fully, but his connection to Crispe, if indeed there was one, is unclear.<sup>83</sup> Crispe’s major business partners in his trading enterprise were Humfry Slaney and William Clowbery, names that do not appear in the Hartlib Papers. Kenelm Digby, who corresponded with Hartlib, was a minority partner of Crispe’s trading company but, despite having been a privateer in the Mediterranean, had no apparent interests in slavery other than his limited relationship with Crispe. The lengthy document discussed trade between England and Africa and has more to say about Africans than any other document found among the Hartlib Papers. Crispe was no more dismissive of the “heathen” in Africa than other writers were of all other non-English native populations, including the Irish or Native Americans.<sup>84</sup>

As already noted, in 1649 Hartlib obtained a copy of William Bullock’s *Virginia Impartially Examined*, which he compared to a similar account written by Le Pruvost, although

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<sup>81</sup> Copy Profits Humbly Presented To This Kingdom In Hand B, [Benjamin Worsley?], undated, *HP* [15/2/61B].

<sup>82</sup> Sheehan, *Savagism and Civility*, p. 181.

<sup>83</sup> Sir Nicholas Crisp’s *Remonstrance to Parliament*, undated [c. 1651], *HP* [60/8/1A-10B]. See also R. Porter “The Crispe family and the African trade in the Seventeenth century”, *The Journal of African History*, 9 (1968): 57-77.

<sup>84</sup> Sir Nicholas Crisp’s *Remonstrance to Parliament*, undated [c. 1651], *HP* [60/8/1A-10B].

he noted that the two men were unknown to one another.<sup>85</sup> Bullock, who had previously spent over a decade (c. 1626-1639) in Virginia, was preparing to return there and wrote to argue for economic diversification and the reform of the colonial government. From the book, Hartlib copied information relating to shorter growing cycles in Virginia for crops such as corn and tobacco. Some planters, according to Bullock, were producing up to three harvests of corn per year from the same acreage due to a longer growing season. On this basis, Hartlib envisioned that all of Europe could soon be provided with an abundance of lower priced corn from America due to the productivity levels that were being achieved in Virginia. Hartlib informed several correspondents of the book's publication and sent copies to the most relevant associates. Since he was in correspondence with John Ferrar at the time, it may be that Ferrar received his copy of *Virginia Impartially Examined* from Hartlib, since he knew of Ferrar's enduring interest in the improvement of Virginia.<sup>86</sup> The possibility is strengthened by the fact that when Ferrar's copy was obtained by the Bodleian Library from Magdalene College, Cambridge, in 1914, it was bound in two pages of an edition of Hartlib's *A Rare and New Discovery*.<sup>87</sup> Despite these publications, which may be considered natural histories of Virginia, John Beale lamented to Hartlib in 1658 that no comprehensive history of the American colonies had been written.<sup>88</sup>

### ***3.2.3. Evangelism of Native Americans in Virginia: 1608-1640s***

As early as 1608, Sir Thomas Gates (in 1610 the second (joint) governor of Jamestown) was instructed by the Virginia Company to seek the conversion of the Native Americans to Anglicanism. The following year, as Gates and his company left London, William Crashaw

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<sup>85</sup> Epherides, 1649, *HP* [28/1/18A] and Thompson, "William Bullock's 'Strange Adventure'", pp. 107-28.

<sup>86</sup> Peter Thompson, "William Bullock's 'Strange Adventure'", pp. 107-128.

<sup>87</sup> *Ibid*, p. 111.

<sup>88</sup> John Beale to Hartlib, 7 Dec 1658, *HP* [51/39A].

preached that the indigenous Americans were the “Brethren” of the English; he argued that the natives were waiting for knowledge of Christ and that sharing the Gospel with Indians was among the most noble purposes of the colony: “We will take nothing from the Savages by power nor pillage”, he said. “We will offer them no wrong”.<sup>89</sup> The sermon is important for understanding the mindset of the Virginia Company in 1609, as well as that of the settlers who were sent to Virginia and who would soon confront these same Native Americans. The sermon illustrates how expectations changed after arrival in Jamestown when the newcomers were told by the earlier settlers that the Indians had cut the brains out of the heads of a scouting party with “mussel shelles”; so, according to eyewitness George Percy, “we Beate the Salvages out of the Island burned their howses Ransaked their Temples Tooke downe the Corpes of their deade kings from of their Toambes And caryed away their pearles Cop and bracelets, wherewith they doe decore their kings funeralles”.<sup>90</sup> Only one decade earlier, Sir Walter Raleigh had argued that the Indians were no threat to colonists because they possessed no dangerous weapons. Not only did the Native Americans acquire more advanced weapons during the following years, but their attitude toward the English settlers had changed dramatically. Now, rather than settling grievances peacefully, violence typically erupted in response to increasingly greater violations of native sovereignty.<sup>91</sup>

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<sup>89</sup> Crashaw, *A Sermon Preached in London*, p. 30.

<sup>90</sup> Percy, *A Trewe Relacyon*, p. 263.

<sup>91</sup> Brereton, *Travels in Holland*, p. 20.

The diversity of opinion in England and even among Hartlib's associates regarding the treatment of Native Americans and the feasibility of their conversion, is illustrated in the debate between Bullock and John Ferrar over the author's comments in *Virginia Impartially Examined*. Ferrar was a London merchant who had been deputy governor and treasurer of the Virginia Company and he was corresponding with Hartlib as early as 1640 when his name begins to appear in the Papers.<sup>92</sup> Ferrar authored a treatise of education, Hartlib co-authored a



Figure 3.3: This 1616 engraved portrait of the Virginia Indian Pocahontas is the only known image of her from life. Simon van de Passe, who made the engraving, was a Dutch artist working in London when Pocahontas arrived in England with her husband, John Rolfe. The inscription around the image includes the names Matoaka, the secret personal name given to Pocahontas in infancy, and Rebecca, the Christian name she later adopted. This engraving was published in *Bazilioologia: A Booke of Kings* (1618), a collection of portraits of British monarchs and notables, attesting to the prestige accorded Pocahontas.

<sup>92</sup> See *Ephemerides* 1640, Part 3. c. Aug, *HP* [30/4/53A-60B].

book about silkworms with Ferrar's daughter, as explained below, and by 1643 Ferrar was sending Hartlib information about prescriptions he had discovered in Westminster.<sup>93</sup> Bullock, a royalist lawyer also well known to Hartlib, stated that the Indians were no longer a threat to the colony in Virginia and were thus open to evangelism and education. Ferrar strongly disagreed, recording his opinion in the margins of his copy of Bullock's book: "Why doth not this Gent. tell us of the latter [massacre] 1642 [actually 1644] twenty yeare after [the 1622 massacre] as with in a man slane as many and the very same way and Manner of the Indian frindshipp: it's a Riddell to me", he wrote, arguing that Native Americans were obviously averse to evangelism or education based on their history of violence against English settlers. Both men were familiar with Native American relations in Virginia but held very different opinions regarding which policy was needed. Bullock had lived in the colony from c. 1626-1639, between the two great wars, and Ferrar had been the deputy governor and treasurer of the Virginia Company during the 1622 massacre. Ferrar wrote that Bullock "seems never to have been to Virginia",<sup>94</sup> an attitude that is explained in part by the fact that his father, Nicholas Ferrar the elder, had given £300 to establish a school for Indians in Virginia only for his brother's home to be destroyed in the 1622 attack.<sup>95</sup>

Hartlib's friend John Hammond also disagreed with Bullock and made his argument for a more forceful approach in *Leah and Rachel, or, the Two Fruitful Sisters Virginia and Maryland: Their Present Condition, Impartially stated and related* in 1655. Hammond, who spent 1634-1655 in Virginia, appealed to his personal experience and "not hear say as Bullock and other lying Writers have done".<sup>96</sup> John Sadler, who supported Ferrar's approach, was cautious in his comments to Hartlib regarding Hammond, warning that this "curious artist" was

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<sup>93</sup> Remedies Against the Stone. Part dated Oct 1642 & Feb 1643, *HP* [60/4/1A-2B].

<sup>94</sup> John Ferrar's Marginalia in the Bodleian Library's Copy of Bullock's *Virginia Impartially Examined*.

<sup>95</sup> Thompson, "William Bullock's 'Strange Adventure'", p. 115 and Sheehan, *Savagism and Civility*, pp. 169-72.

<sup>96</sup> John Hammond, *Leah and Rachel* (London, 1655), p. 2.

no friend of improvement projects.<sup>97</sup> In a letter to Katherine Ranelagh, John Beale was more positive about Hammond regarding agriculture and baptism alike.<sup>98</sup> Hammond agreed that there were multiple problems in the establishment of Virginia and the evangelism of Indians, but cited the quality of the settlers who had been sent to America as the best reason to remain hopeful for the colony's success and the conversion of the Indians.<sup>99</sup> Virginia, he said, had made great progress and things in the colony were far better in the 1650s than before. Moreover, many of the colonists' problems were of their own creation, since they should have foraged more aggressively for resources, and they had planted insufficient amounts of edible crops. He wrote that there were not many ministers in Virginia at first and admitted that those who had gone before 1630 were poorly skilled, but better preachers had migrated since, and by the 1650s the general situation in the settlements had greatly improved. Hammond reserved his harshest criticism for those poor, imprisoned, unemployed persons in England who would not consider migrating "their carkessies" to the New World.<sup>100</sup>

### **3.3. Political Improvement: Worsley's Plan of Reform**

#### ***3.3.1. The Context of Poor Colonial Government in Virginia***

Having been approached by desperate London merchants, in 1649 Benjamin Worsley formulated a plan to reform the Virginian government. The plan was necessary after the regicide, since Governor William Berkeley was actively resisting the oversight of Parliament while declaring his loyalty to the Stuarts. The problems in Virginia were more serious than the behaviour of the governor, however, and Worsley expertly went beyond superficial changes to

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<sup>97</sup> John Sadler to Hartlib, undated, *HP* [46/9/29A].

<sup>98</sup> John Beale to Hartlib, 15 Oct 1658, *HP* [51/29A] and John Beale to Lady Ranelagh, undated, *HP* [27/16/4A].

<sup>99</sup> Hammond, *Leah and Rachel*, p. 3.

<sup>100</sup> Hammond, *Leah and Rachel*, pp. 15-16.

address specific economic concerns that had been chronic problems since the early days of the colony. The issue of governing Virginia had always been aggravated by distance and complicated by its reliance on tobacco.<sup>101</sup> Before the dissolution of The Virginia Company, two opposing factions with mutually exclusive visions for the colony had developed among the leading shareholders. James I dissolved the company, and indeed took control of the colony, but factions continued to prevent the plantation from being as successful as it should have been.<sup>102</sup> In an undated packet from John Beale, Hartlib received a copied letter which gave him an excellent history of Virginia politics including a survey of the political situation as it was in the 1620s, along with an informative geography of the New World. According to the missive, most men adventured because of understandable desire for wealth but those whose “Wings [were] too large for their Neste” were obstructing the function of the colonial government.<sup>103</sup>

Virginia was a very different type of colony from Ireland or New England. It was unique in ways that complicated the regulation of trade, protection of the population, collection of taxes, and general maintenance of the social order. With different climates, and being settled by colonists with vastly different goals, the Virginian leaders were more interested in trade than colonists in New England, who were struggling over religious differences. New England was settled by families from the beginning, whereas Virginia was populated by adventurers seeking wealth, usually younger sons of nobility, retired army officers, the unemployed, and former prisoners who focused on wealth and control of the geographical space. They had little regard for theological matters, and were far more individualistic, self-sufficient, competitive and materialistic. Colonists in New England lived in tightly built villages similar to traditional

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<sup>101</sup> See Simon Schaffer, “The Earth’s Fertility as a Social Fact in Early Modern Britain” in *Nature and Society in Historical Context*, eds. Mikuláš Teich, Roy Porter, and Bo Gustafsson (Cambridge, 1997), pp. 127-30.

<sup>102</sup> Emily Rose, “Short Sweet Life of The Virginia Company 1612-1624”, *The Daily Republican Newspaper* (16 Apr 2001).

<sup>103</sup> Letter Justifying The Action of Virginia In John Beale’s Hand, undated, *HP* [33/2/23A].

towns in England and came to be more corporately minded and interdependent, and far more likely to subsist on fewer supplies per capita as a matter of spiritual discipline. In Virginia, the planters were driven by economic necessity to incorporate large tracts of land, and they built their homes far from the nearest neighbours.<sup>104</sup>

The Virginian society created by these patterns has been described as “commercially sophisticated but socially primitive” on the grounds that colonists communicated with other settlers far less often, spent much more time isolated with family and servants and were far more intimate with nature.<sup>105</sup> The description does, however, clarify significant differences between the two early American colonies, which persisted and arguably later led to catastrophic commercial and social divisions. Led by a ruling elite of wealthy planters, and reliant on a labour supply made up of indentured servants and involuntary slaves, Virginia’s founding society had no middle class. As early as 1610, the indentured servants in Virginia were said by Rolfe to be “full of mutenie and treasonable intendment”, and “prone to acts of insubordination and to desertion”.<sup>106</sup> This, in the context of constant fear of native attacks and the high mortality caused by war, famine, and disease, caused sharp divisions between classes. White servants were increasingly affiliated by class more than by race, but by the time their resistance came to a head, there was a middle class in Virginia to thwart their rebellion and the Hartlibian period had ended.<sup>107</sup>

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<sup>104</sup> See Frederic W. Gleach, *Powhatan’s World and Colonial Virginia: A Conflict of Cultures* (Lincoln, NE, 2000); April Lee Hatfield, *Atlantic Virginia: Intercolonial Relations in the Seventeenth Century* (Philadelphia, 2007); Christopher E. Hendricks, *The Backcountry Towns of Colonial Virginia* (Knoxville, 2006); and A. J. R. Russell-Wood, *Settlement Patterns in Early Modern Colonization, 16<sup>th</sup>-18<sup>th</sup> Centuries* (Farnham, 1998).

<sup>105</sup> Keith Wrightson, “Class” in *The British Atlantic World, 1500-1800*, eds. David Armitage and Michael J. Braddick (Palgrave Macmillan, 2002), p. 139. See also Nathaniel Wolloch, “The Civilizing Process, Nature, and Stadial Theory”, *Eighteenth-Century Studies* 44:2 (Winter 2011): 245-59; and Norbert Elias, *The Civilizing Process* (Basel, 1939).

<sup>106</sup> John Rolfe letter to Sir Thomas Dale, 1614 in *Narratives of Early Virginia, 1606-1625*, ed. Lyon Gardiner Tyler (New York, 1907), p. 237-44.

<sup>107</sup> Christopher L. Brown, “The Politics of Slavery” in *The British Atlantic World: 1500-1800*, eds. David Armitage and Michael J. Braddick (Palgrave MacMillan, 2002), p. 224.

The great shortage of labour in Virginia grew worse through the mid-seventeenth-century. Parliament took several measures, with the enthusiastic encouragement of Hartlib and his correspondents, to encourage more potential labourers to migrate but the increasing numbers were never sufficient to quench demand.<sup>108</sup> Many poor subjects were taken to Virginia against their will, despite parliamentary precautions against involuntary transportation, even including children without the consent of their parents, or anyone whose name was not recorded in the customs house. Penalties were written into the act regarding ship captains who deposited passengers at ports other than the intended destination, especially foreign ports. Otherwise, Parliament was so desirous to promote the economy of Virginia that the law also granted free importation of supplies to the colony if they were transported in English ships. There is little indication of any serious political concerns with the leadership of Governor Berkeley before 1649, or evidence of any other persons calling for political reform before Worsley and other Hartlibians began to advocate for reform at the end of the 1640s. This was true despite, or because of the fact that Berkeley had been empowering the smaller planters in Virginia for years, undermining merchants, and persecuting non-conformists.<sup>109</sup>

According to Worsley's remarks in the earliest stages of formulating his plan, the problem was one of sovereignty. The presence and authority of Parliament in the colonies had been eroded for lack of contact and communication during the civil wars, and it needed to be re-established, nowhere more than in the authority to regulate colonial trade.<sup>110</sup> To build a convincing argument for the priority of parliamentary authority, Worsley cited a letter of James I from 1622 in which the king had declared his sovereignty over the colony even during the

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<sup>108</sup> "Jan 1647: An Ordinance for encouragement of Adventurers to the several Plantations of Virginia, Bermudas, Barbados, and other places of America.", in *A&Os of the Interregnum, 1642-1660*, ed. C H Firth and R S Rait (London, 1911), 912-913.

<sup>109</sup> Leng, *Benjamin Worsley*, p. 57.

<sup>110</sup> Worsley to John Dury, 27 Jul 1653, *HP* [32/2/18A-19B] and *A Complete Text and Image Database of the Papers of Samuel Hartlib*, ed. Judith Crawford et. al. (Ann Arbor, 1995).

administration of The Virginia Company.<sup>111</sup> The issue of authority was aggravated by a growing population that was rapidly expanding the territorial scope of the colony's claim. By that time, the number of English settlers in Virginia and the number of settlements had grown rapidly, and pressure had magnified against the Native Americans who were pushed further west and away from "the fruitfulest places of the land".<sup>112</sup> The c.400 settlers killed by Indians in 1622 amounted to one-third of the entire English population of Virginia, but the same number killed in 1644 was only ten percent, of the total, even though Smith claimed there were "many Hundreds now yearely returning" to England.<sup>113</sup>

The population grew as investors recruited men and women to go as voluntary indentured servants. Regular commercial networks (trade routes) brought others, including slaves, while commercial, informal, and religious networks served to encourage friends, relatives and neighbours to follow others who had gone. Increasing migration offset a falling life expectancy due to disease, starvation, and war, and despite the brevity of life, the average age of persons who married in Virginia rose steadily during the early to mid-seventeenth-century. The population began to stabilise in the 1650s after two decades during which potential settlers on each side of the civil wars in England waited to discover which direction the nation would proceed before deciding to migrate. Puritan immigrants of the 1630s and 1640s were increasingly replaced by those with royalist and/or Catholic loyalties in the 1650s, as the Cromwellian regime consolidated its power.<sup>114</sup>

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<sup>111</sup> Title Page in Scribal Hand B. 1622, *HP* [39/2/153A].

<sup>112</sup> Copy Treatise On Virginia In Scribal Hand ?, Anon, undated, *HP* [61/3/5B].

<sup>113</sup> John Smith, *The Generall Historie of Virginia, New England, and the Summers Isles with the names of the Adventurers, Planters, and Governors from their first beginning An 1584 to this present 1624* (London, 1626), pp. B, 90 and Copy Treatise On Virginia In Scribal Hand ?, Anon, undated, *HP* [61/3/5B].

<sup>114</sup> Alison Games, "Migration" in *The British Atlantic World: 1500-1800*, eds. David Armitage and Michael J. Braddick (New York, 2002), p. 40.

### 3.3.2. *Desperate Measures and Conflicting Loyalties*

The situation in Virginia was complicated for the Hartlibians, not least because Hartlib was personally on good terms with Governor Berkeley, who was part of his extended network. That relationship had become strained in 1644 when an anonymous letter arrived from Amsterdam, warning Hartlib of Hugh Peters' mission to secure funding for Parliament during the civil war and also revealing to him a plot to regain power by former Virginia Governor Francis Wyatt. This coloured the relationship between Hartlib and Berkeley at a critical moment, since Wyatt was a committed Puritan who resolved to remove Berkeley from office.<sup>115</sup> Wyatt was not identified explicitly by name in the letter but "W" was used to refer to the leader of the proposed coup. "W" was described as one "who hath lived many years in Virginia", was one of the council, had the means to purchase arms and recruit soldiers, and was set in opposition to Berkeley as "the other Governour". "W" was thus undoubtedly Wyatt, who served as governor prior to Berkeley from 1624-1626, his second term. His opposition to Berkeley is further clarified by an episode from 1641 in which Wyatt was responsible for attempting to prevent Berkeley's passage to Virginia and in which he was ordered to yield the office.<sup>116</sup> Berkeley was appointed by Charles I precisely to counter growing Puritanism in Virginia<sup>117</sup> and only secured his appointment by personally appearing in the House of Lords in 1641, supported by letters patent with the Great Seal of England affixed by the crown.<sup>118</sup>

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<sup>115</sup> Extracts Of Letters From Paris & Amsterdam. 8 Feb 1644, *HP* [43/19B]. See also Charles Webster, *Great Instauration*, pp. 459-60.

<sup>116</sup> "House of Lords Journal Volume 4: 30 Oct 1641", in *Journal of the House of Lords: Volume 4, 1629-42*, (London, 1767-1830), 411-412.

<sup>117</sup> Leng, *Benjamin Worsley*, p. 57.

<sup>118</sup> "House of Lords Journal Volume 4: 3 Nov 1641", in *Journal of the House of Lords: Volume 4, 1629-42*, (London, 1767-1830), 419-421.

Berkeley was released by Parliament to depart for the colony and succeed Wyatt who by then was said to be “but *durante beneplacito*”, or serving at the pleasure of the king.<sup>119</sup>

Wyatt yielded, but three years later with the power of the Independents increasing, he was plotting his return from Amsterdam with a force that assumed support from a new majority in Parliament and the planters of Virginia. The anonymous source of the sensitive information that Hartlib received from Amsterdam had learned about the plot from a third-party and knew Hartlib well enough to know that as a friend of Berkeley, he would most likely seek to protect the governor in spite of the religious and political affiliations that otherwise complicated a response to this intelligence. Wyatt had successfully secured two ships with ammunition and planned to sail directly to Virginia where he intended to forcibly remove Berkeley and seize his former authority. Hartlib was told that the information was given “that you might make use of it”; Berkeley may have been a royalist, but he was also the legitimate governor of the colony and a friend of Hartlib’s due to his historical interest in agricultural improvement projects. He experimented with various plants in his personal Virginia garden and shared results of trials with Hartlib.<sup>120</sup>

Hartlib was not without experience in handling diplomatic intelligence, yet the informant cautioned that Hartlib make use of the information “without great noise” and with “all Circumspection in it”, while clearly recommending assistance to Berkeley and defending opposition to Wyatt. It was no coincidence that Berkeley was in London four months later buying weapons and ammunition, which he said were to fight Native Americans. Although there were engagements with the Indians in 1644, they would not have necessitated a personal

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<sup>119</sup> “House of Lords Journal Volume 4: 3 Nov 1641”, in *Journal of the House of Lords: Volume 4, 1629-42*, (London, 1767-1830), 423-424.

<sup>120</sup> Worsley to Dury, 27 Jul 1649?, *HP* [33/2/18A]; Worsley to Hartlib, 13 Aug 1649, *HP* [33/2/1A]; Worsley to Dury, 27 Aug 1649, *HP* [33/2/3A]; Dury to Worsley, 31 Aug 1649, *HP* [1/2/14A]; Worsley to Walter Stickland, undated [Aug/Sep 1649], *HP* [61/8/1A]; and Strickland to Henry Vane, 2 Sep [1649], *HP* [61/9A].

weapons-buying voyage by the governor, since other similar conflicts did not and, for the largest native conflict of that year, Berkeley had no advance warning. Berkeley was almost certainly in London preparing to defend himself from Wyatt's planned attack, but apparently concealed the fact that he had been warned by Hartlib or that he had any knowledge of the plans being laid in Amsterdam. This may explain the endurance of Berkeley's relationship with Hartlib after Hartlibians had actively worked to remove him from office. In between terms as governor in Virginia, Hartlib reported to Evelyn that a "Dr Berkeley" had become friends with his son and so enjoyed discussing medicine and chemistry with him that he had taken lodgings near Sam's house in the Axe-yard.<sup>121</sup>

### 3.3.3. *Crafting and Shepherding a Reforming Initiative*

Virginia was a growing economic problem during the 1640s as tobacco continued to restrict the colony's overall prosperity, even as the planters' commitment to the monocrop made several individuals wealthy. Meanwhile, Berkeley assumed greater autonomy even as the power and influence of Parliament increased in England. Soon, Hartlibian correspondents were expressing their growing political concerns about the governor. Some began to



*Figure 3.4: Sir William Berkeley was an English royal governor of the colony of Virginia.*

define the issue of colonial autonomy and formulate a sustainable plan of correction. One early letter from this period detailed why the independence of a royalist governor mattered and why

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<sup>121</sup> Hartlib To John Evelyn, 7 Apr 1660, *HP* [98B].

the loyalty of colonists was significant to England in general and to the Hartlibian project specifically.

In his 1649 letter to Dury, Worsley identified the central issues and the specific procedures necessary to successfully reform Virginia.<sup>122</sup> Frustrated by years of neglect and the consequent deterioration in the colony, Worsley described Virginia as “little or no benefit to the nation”. His letter prompted him to write the *Memo on Virginian Plantation*, and both the letter and the memo drew on solutions discussed in the 1647 *Proffits humbly presented to this kingdome*.<sup>123</sup> Illustrative of the typical way such information circulated within the Hartlib Circle, Dury copied the letter to Hartlib for comment before submitting Worsley’s *Memo* to the State Council.<sup>124</sup> Worsley renewed a waning enthusiasm for Virginia and reminded his readers that all the resources that fuelled earlier Hartlibian projects remained waiting to be extracted.<sup>125</sup> Worsley’s proposal was well received by members of the council and other influential politicians with the support of other Hartlibian correspondents, merchants, and planters.<sup>126</sup>

The primary obstruction, Worsley argued, and the reason for Virginia’s economic stagnation, was “the present Governour”, who had ignored the resolutions of Parliament and was governing Virginia as an autonomous state. Berkeley had, according to Worsley, “persecuted those that have appeared affected to the Parliament & zealous for Religion”.<sup>127</sup> He had allegedly banished certain non-conformists who had come to Virginia from Bermuda and England, even though Virginia had, until the late 1640s, been known for religious toleration.

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<sup>122</sup> Memo On Virginian Plantation In Dury’s Hand, Adapted From Worsley’s Letter To Dury, undated, *HP* [33/2/22A-B]. See also Charles Webster, *Great Instauration*, pp. 459-60.

<sup>123</sup> Charles Webster, *Great Instauration*, pp. 539-46.

<sup>124</sup> Charles Webster, “Benjamin Worsley: Engineering for Universal Reform” in *SHUR*, pp. 221-223.

<sup>125</sup> Ephemeredes, 1651, *HP* [28/2/1A and 28/2/8A]. See Webster, “Benjamin Worsley”, p. 228.

<sup>126</sup> Charles Webster, *Great Instauration*, pp. 459-60 and “Benjamin Worsley”, p. 229.

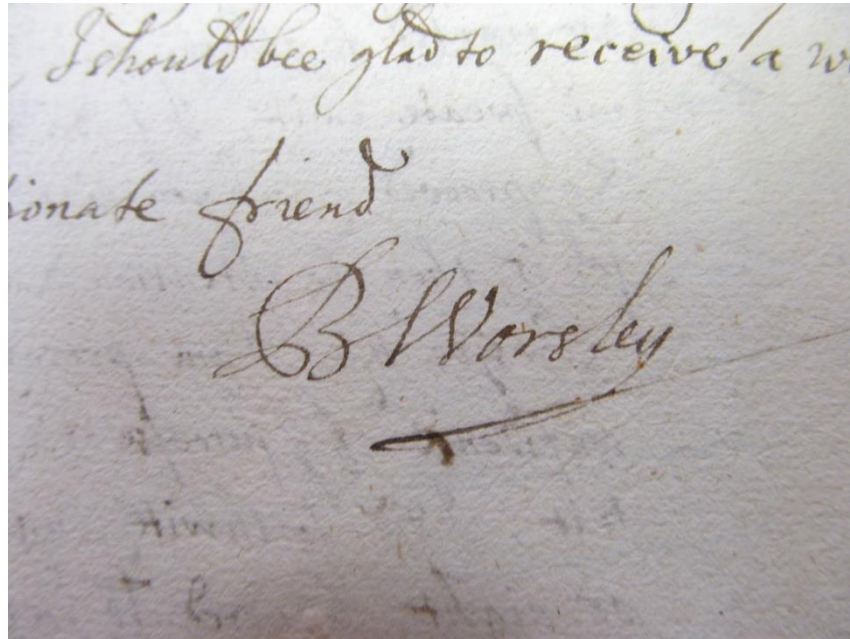
<sup>127</sup> Memo On Virginian Plantation In Dury’s Hand, Adapted From Worsley’s Letter To Dury, undated, *HP* [33/2/22B].

By July 1649, Worsley had heard that Berkeley had closed some independent and Presbyterian churches in Virginia, so he wrote to Dury, now certain that any significant reform of Virginia's government must include removing the governor. By this time Dury was receiving letters from Worsley every two weeks regarding their mutual concern for the colony, and Worsley also shared his ideas with Sadler, who was then town clerk of London and who supported the call for reform. Worsley claimed, more generally, that the colonists in Virginia were being pressured to support the governor in opposition to Parliament and prohibited from attending non-conformist churches. As a final gambit he charged that representatives of Berkeley were at that very moment in France petitioning the government of Louis XIV for a new charter for Virginia. As a solution to these ills, Worsley urged the English Parliament to act quickly and decisively in order to preserve the colony as an English settlement. He called for a new commission to be composed of members of Parliament and merchants, and supported by a commission secretary, which Worsley said ought to be Hartlib. He expected Sadler would introduce this plan to the State Council and shepherd it through Parliament to completion. As for himself, Worsley made no apologies for wanting to become the secretary of Virginia in the colony. He repeated his qualifications to Dury and argued that no one else was qualified for this difficult task; "I shall be able to leave this place", he concluded optimistically.<sup>128</sup>

As Parliament debated the issue, Worsley continued to assail Berkeley by arguing that the governor intended to divert colonial trade away from London and tax London merchants who traded with Virginia. He noted that Berkeley was acting in his personal interest with complete disregard for the interests of the colony or the Parliament, and urged Parliament to take direct control of the colony for "the good of the Plantation", merchants, adventurers, Trade, industry, goodness, civility, and the Indians. According to Worsley, no one except

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<sup>128</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A] and Charles Webster, "Benjamin Worsley", p. 230.



*Figure 3.5: The signature of Benjamin Worsley from a letter to Hartlib*

Berkeley stood to benefit from a lack of Parliamentary action, and he charged that the governor was profiting at the rate of £5,000 annually from his refusal to submit to the English government. Correction was simple, and any military risks would be minimal because Virginia had no forts. He nevertheless sought the opinions of his friends in the Hartlib Circle throughout, however, and especially Hartlib himself, to whom he had written with the most detailed description of his proposal. “Wee shall most willingly & cheerfully heare from you”, he wrote, professing to be indifferent for his own personal interest.<sup>129</sup>

By the time Dury responded on 8 August 1649, the work had become “the Virginia business” and Dury, who recorded some reservations in correspondence, told Worsley that he had written to John Bradshaw, president of the State Council, to advocate for Worsley’s reforms.<sup>130</sup> Dury assured Worsley that Bradshaw had endorsed all of the provisions previously

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<sup>129</sup> Benjamin Worsley To Hartlib, 13 Aug 1649, *HP* [33/2/1A].

<sup>130</sup> Letter in Hartlib’s Hand, John Dury to Worsley, 8 Aug 1649, *HP* [1/2/12A].

suggested, including a commission for Worsley, and urged the council to do so with “all convenient speed”. After receiving Dury’s letter, Worsley wrote to Hartlib on 13 August regarding “that busynesse or proposal about Virginia”.<sup>131</sup> The flurry of correspondence indicates the level of communication typical among the associates when the work was perceived to be urgent, their involvement in the leadership of the colony, and concern for the future of the plantations. Dury wrote to Worsley again on 17 August, stating confidently that Parliament “will bee moved” regarding what was now termed “*your* Virginia busines”.<sup>132</sup> The campaign continued and drew in other Hartlibians including Walter Strickland -- an English diplomat to The Hague -- Cheney Culpeper, and Henry Vane. The correspondence is full of first-person plural pronouns that indicate the collective nature of the activity; “We have represented the business”, Dury wrote to Worsley, that “you have offered to us”.<sup>133</sup> More commonly, the plan was described as “*our* busines”.<sup>134</sup>

Worsley was one of the most influential activists for colonial reform in 1649 and his relationship with the Hartlib Circle amplified his voice. Hartlib recorded that although he had been recommended to the Privy Council of Ireland for the position of secretary, what he wanted most was to be the surveyor general “over all our forraigne Plantations”.<sup>135</sup> Worsley’s letters and papers illustrate his great and enduring commitment to improvement and to the success of the English imperial economy through trade. In one letter to Strickland, Worsley gave a more detailed history of how he had come to sponsor the plans to reform the government of Virginia. “Some honest privatt men; came to me, intreating me, to assist them with what friends, & Interests, I could”, he explained without identifying any of the men individually.<sup>136</sup> Frustrated

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<sup>131</sup> Benjamin Worsley To Hartlib, 13 Aug 1649, *HP* [33/2/1A-2B].

<sup>132</sup> John Dury to Worsley, 17 Aug 1649, *HP* [1/2/11A].

<sup>133</sup> John Dury to Worsley, 17 Aug 1649, *HP* [1/2/11B].

<sup>134</sup> Benjamin Worsley to Dury, 27 Aug 1649, *HP* [33/2/3A].

<sup>135</sup> Extract in Hartlib’s Hand, 11 Jun 1649, RS MSS, *Boyle Letters* 7.2 1A-2B.

<sup>136</sup> Benjamin Worsley to Walter Strickland, undated *HP* [Aug/Sep 1649] and *HP* [61/8/1A-3A].

merchants had come to Worsley as someone who could help and their action reveals they were aware of his political connections and his potential to lobby for meaningful reform. Berkeley was not only in rebellion against Parliament but was thereby discouraging potential settlers and disrupting trade. However, Worsley acknowledged to Strickland that Virginia's problems could not be solved merely by replacing the royalist governor.

Documents among the Hartlib Papers indicate that he was well aware of the broader political contexts surrounding trade with Virginia. Many commodities desired by the colony such as linen, iron goods, and alcohol could be purchased inexpensively from the Dutch who were less strict about conditions and were, unlike the English merchants, more likely, with their faster ships, to actually arrive to their destination ports successfully.<sup>137</sup> English ships, according to Berkeley, were charging higher customs and were too often attacked by pirates. None of this, however, justified Berkeley's actions in the eyes of the Hartlibians or of Parliament, or negated the need for substantial change. Accordingly, Worsley petitioned Parliament for a declaration of sovereignty, the replacement of Berkeley, the creation of a colonial committee, and an elected local assembly.<sup>138</sup> Adventurers thereafter migrating to the colonies would be required to swear an oath of loyalty to Parliament before being allowed departure.<sup>139</sup> This, he told Hartlib, was a very present precaution since many royalists were seeking to escape "the present Government", by fleeing as political refugees to royalist Virginia.<sup>140</sup>

Worsley was largely responsible for generating the enthusiasm within the Hartlib Circle for reform in Virginia and he designed the details for colonial change from Amsterdam. However, Dury, in consultation with Hartlib, Culpeper, and others in the Circle, was the main

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<sup>137</sup> Memorandum Concerning Trade & Coinage, Anon. undated, *HP* [18/14/3A-6B].

<sup>138</sup> John Dury to Worsley, 8 Aug 1649, *HP* [1/2/12A-13B]; 17 Aug 1649, *HP* [1/2/11A-B]; and 31 Aug 1649, *HP* [1/2/14A-15B].

<sup>139</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18A-19B] and 27 Aug 1649, *HP* [33/2/3A-4B].

<sup>140</sup> Benjamin Worsley to Hartlib, 13 Aug 1649, *HP* [33/2/1A-2B].

lobbyist in London who was working with Sadler, Vane, Strickland, and John Trenchard in government to push the plan to completion.<sup>141</sup> On 17 August, Dury pleaded with Worsley that, as author of the proposal, he needed to personally appear before the council to make his argument and provide the members with a formal proposition capable of being referred to Parliament. According to Dury, no one could sell it like Worsley himself, because of his comprehensive understanding of the situation in Virginia.<sup>142</sup> Indeed, Worsley was a man of substantial means who possessed ability, intellect, creative thought, and a sense of urgency. He framed his concerns by making comparisons with other colonies such as Ireland, New England, and the West Indies. He discussed Virginia thoughtfully within a geographical and historical context, and he argued that any colony was “but a Branch of our own nation”.<sup>143</sup> He assessed the value of popular democracy in colonies and liberties that may or may not be safely allowed by the parent nation. His well-thought-out and tightly written argument concluded that colonies were not autonomous communities but, however distant, permanent extensions of the sponsoring country. In this he was supported by Cressy Dymock, who argued that the best analogy was to think of England and the colonies as a mother and her daughters.<sup>144</sup>

Worsley did not immediately return from Amsterdam, in part because the plan was already advancing through the channels of government. Dury had met once more with Bradshaw, who had asked for a formally written proposal that he could present to the council for approval and referral to Parliament. As a result, Dury expressed his confidence that it would be approved with amendments offered by Worsley.<sup>145</sup> Dury decided that four credible men were needed to testify before the council on behalf of the legislation so he listed as witnesses

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<sup>141</sup> Charles Webster, *Great Instauration*, p. 462.

<sup>142</sup> John Dury to Worsley, 17 Aug 1649, *HP* [1/2/11A-B].

<sup>143</sup> Benjamin Worsley, *Further Animadversions About Virginia*, undated *HP* [c. 1650] and *HP* [61/6/1A]. See also Charles Webster, *Great Instauration*, p. 463.

<sup>144</sup> Memorandum About Engines, Dymock, undated, *HP* [62/8A-B].

<sup>145</sup> John Dury to Worsley, 31 Aug 1649, *HP* [1/2/14A].

two inside Parliament, Vane and Trenchard, and one outside Parliament, Bishop John Williams, all of whom were committed to speak favourably to the proposition. He urged Worsley to find another person who could represent the general population, concluding, “if the State will not owne their owne Interest, it cannot bee expected that Privat men should engage for them without some assurance to bee able to proceed with countenance and protection”. Strickland also promoted Worsley for the position of secretary for the forthcoming colonial committee, telling Vane how royalists in the colonies were persisting in their resistance to Parliament and why a correction was necessary for general ‘improvement’, manufacturing, and trade -- all of the usual Hartlibian concerns.<sup>146</sup> Only four months after Strickland sent this letter, in early 1650, Worsley was attending hearings about Virginia at Vane’s Committee of the Admiralty where his proposal for the reduction of Virginia was endorsed.<sup>147</sup>

It is clear that these Hartlibians were the leading advocates for reform of the colonies at that time. Without a Virginia Company, an independent correspondence network of informed imperial advocates was necessary to formulate and lobby for improving reforms. However, the disruptive political events in England during the late 1640s gave Berkeley and others significant cover to maintain their loyalty to the traditional church and state. Without protection from Parliament, few Virginia planters were openly opposing Berkeley, despite their political and religious affiliations, for fear of the governor who, having been appointed by the king, had the power of absolute veto over any law passed by the colonial assembly; could summon, prorogue, or dissolve the assembly; and could make grants of land.<sup>148</sup> Until he was removed, Berkeley also appointed the Governor’s Council which, acted as the upper house balancing the

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<sup>146</sup> Walter Strickland to Sir Henry Vane, 2 Sep [1649], *HP* [61/9A] and Charles Webster, “Benjamin Worsley”, p. 224.

<sup>147</sup> Leng, *Benjamin Worsley*, p. 56.

<sup>148</sup> Warren M. Billings, “Growth of Political Institutions in Virginia, 1634 to 1676”, *William and Mary Quarterly*, 3<sup>rd</sup> series, 31 (1974): 225-42. See also Jon Kukla, *Political Institutions in Virginia, 1619-1660* (New York, 1989).

assembly and as the highest colonial court, settling civil disputes and prosecuting criminal cases.<sup>149</sup> Berkeley, like most governors, usually chose the wealthiest and most prominent men of the colony but he could also take political allegiance into consideration when making selections.<sup>150</sup> Membership on the council was much desired, not least because council members were exempt from taxation. The governor also could reward his supporters by appointing them to various offices which were valuable positions for their prestige and income. Openly opposing the governor had consequences.<sup>151</sup>

However, as Parliamentarians took full control of the English government, Hartlibians wasted no time advocating their desire to see the new English government take control of the colonies. If Berkeley had been well-armed and able to resist Parliament militarily, or if he had successfully negotiated for French assistance, reform might have been long delayed as the government reorganised itself. Virginia was weak, however, and vulnerable to any disciplinary measures from London, and the Hartlibians knew it. They also knew actions taken quickly saved greater conflict which would have resulted from action delayed. According to Worsley, there were enough ships in New England, as few as there were, to easily bring Virginia under Parliamentary rule, and he rightly pointed out that because the colony was economically depressed, Berkeley was unable to supply himself with basic goods, though he had excellent military fortifications.<sup>152</sup>

The significant pieces of legislation that were passed in the first years of the Cromwellian regime implemented reform in four intermediate steps. In 1649, within months of Worsley's initial proposal, Parliament assumed direct control of the colony by passing a

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<sup>149</sup> See Warren M. Billings, *A Little Parliament: The Virginia General Assembly in the Seventeenth Century* (Richmond, 2004).

<sup>150</sup> Taylor, *American Colonies*, pp. 286-8.

<sup>151</sup> Jack P. Greene, "The Role of the Lower Houses of Assembly in Eighteenth-Century Politics", *The Journal of Southern History* 27:4 (Southern Historical Assn.): 451-74.

<sup>152</sup> Worsley, *Further Animadversions About Virginia*, undated, *HP* [61/6/1A].

sovereignty resolution, and it declared its intention to take further steps of enforcement. As a test, Parliament ordered Berkeley to restore the non-conformist Rev. Thomas Harrison to his church, reminding him that to require use of the Book of Common Prayer was illegal.<sup>153</sup> Secondly, Parliament prohibited trade between English colonies and any foreign port in 1650 with language identical to Worsley's letters.<sup>154</sup> The act cited several reasons why Virginia was and would remain subject to the authority of Parliament, charging Berkeley -- who had been first in the colonies to formally proclaim Prince Charles to be king -- with various acts of rebellion. Indeed, it was Berkeley's proclamation which provided cover for Antigua, Barbados, Bermuda, and Maryland to do the same. On 3 October, 1650, Parliament authorised a fleet to sail to Virginia with the purpose of enforcing these acts, by force if necessary.<sup>155</sup> They cited Worsley's reasons for the authorisation of violence and accused the governor of treason.<sup>156</sup> Thirdly, Parliament passed Worsley's Navigation Act of 1650, directly assuming control of colonial trade.<sup>157</sup> The act banned foreign ships from transporting goods to or from English colonies and other country without first docking in England. The penalty for violation of this act was no less than forfeiture of the ship and cargo.

Finally, a new trade commission was established by Parliament for which Worsley was appointed secretary and Hartlib's son was made clerk. Culpeper, Honywood, Maurice

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<sup>153</sup> *CSPC: Colonial Series, 1574-1660*, p. 330. See also Edward L. Bond, *Damned Souls in a Tobacco Colony: Religion in Seventeenth-Century Virginia* (Macon, GA, 2000), pp. 146-67.

<sup>154</sup> "Oct 1650: An Act for prohibiting Trade with the Barbadoes, Virginia, Bermuda and Antego.", in *A&Os of the Interregnum, 1642-1660*, ed. C H Firth and R S Rait (London, 1911), 425-429.

<sup>155</sup> "House of Commons Journal Volume 6: 3 Oct 1650", in *CJ: Volume 6, 1648-1651*, (London, 1802), 478-479. See *SHUR*, p. 22.

<sup>156</sup> "Oct 1650: An Act for prohibiting Trade with the Barbadoes, Virginia, Bermuda and Antego", in *A&Os of the Interregnum, 1642-1660*, ed. C. H. Firth and R. S. Rait (London, 1911), 425-429.

<sup>157</sup> Worsley to John Dury, 27 Jul 1653, *HP* [32/2/18A-19B]. For Worsley's claim to have inspired the Navigation Act of 1651, see Leng, *Benjamin Worsley*, pp. 2, 8, 36, 54, 59-60, 65, 70, 74-7, 79, 192; J. E. Farnell, "The Navigation Act of 1651, the First Dutch War, and the London Merchant Community", *Economic History Review*, 2<sup>nd</sup> series 16 (1964): 439-54; Lawrence A. Harper, *The English Navigation Laws: A Seventeenth-Century Experiment in Social Engineering* (New York, 1939), pp. 39-46; Charles Webster, *Great Instauration*, p. 463 and *idem.*, "Benjamin Worsley", pp. 230-3.

Thomson, and Vane were Hartlibians among fifteen members of the committee appointed to “take into their consideration the English Plantations in America or elsewhere”.<sup>158</sup> Their twelve comprehensive instructions were a direct and specific communication of Worsley’s petition. Within one year, this committee produced fifteen reports and exercised its delegated authority over trade by restricting the colonies’ ability to legally trade with other countries and by ending trade with English royalists in rebellion against the sovereignty of Parliament. While the more powerful politicians and influential merchants exercised their authority, associates of the Hartlib Circle including Dury, Hartlib, and Worsley continued to contribute to the improvement of plantation as essential technical experts supporting the imperial policies through the committee and otherwise.<sup>159</sup>

While Parliament’s expeditionary naval force was *en route* to Virginia, Berkeley spoke to the colony’s assembly and the speech was quickly printed in London to publicise his defence and call for support.<sup>160</sup> He was defiant to the end, choosing to resist instead of offering a compromise or apology; “We shall eat the bread for which our owne Oxen plow”, he told the burgesses. According to the governor, Virginia was boldly resisting a Parliament that only had “these paper bulletts”, and holding up the letters, acts, and resolutions sent from London, he expressed his confidence that most of the English people would yet support monarchy rather than an insubordinate Parliament. The governor assured the burgesses that they were innocent of the king’s blood but that they could yet “staine your garments” if they chose to submit to “those murtherers”. Berkeley left the burgesses with his central argument: Parliament could not fight Virginia as long as the members of Parliament were fighting each other. Despite his

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<sup>158</sup> "August 1650: An Act for the Advancing and Regulating of the Trade of this Commonwealth.," in *Acts and Ordinances of the Interregnum, 1642-1660*, ed. C H Firth and R S Rait (London, 1911), 403-6.

<sup>159</sup> Charles Webster, “Benjamin Worsley”, pp. 232-3.

<sup>160</sup> *The speech of the Honourable Sr. William Berkeley Gouvernour and Capt: Generall of Virginea, to the Burgesses in the Grand Assembly at James Towne on the 17 March 1651* (London, 1651).

confidence, as soon as the English fleet arrived in Virginia, Berkeley was forced to resign and was replaced by Richard Bennett, the first of three Commonwealth governors who ruled until the Restoration. A report was read in Parliament on 31 August 1652 that an agreement had been concluded at Jamestown settling the plantation “under the Obedience and Government of the Commonwealth of England”.<sup>161</sup>

Worsley’s plan had been implemented and some in Hartlib’s network were satisfied that a former friend was allowed to retire to his Virginia plantation and live as a private person able to focus on his neglected agricultural experiments. If Worsley had been appointed secretary of the colony, he might have been able to cultivate a better relationship with the former governor and taken both the colony and the Hartlibian programme in a different direction. Parliament chose, however, to appoint a former secretary, Col. William Claiborne, an older man who had already served from 1625 until 1634, the first secretary appointed by Charles I after dissolution of the Virginia Company. Claiborne had experience fighting Indians, trading furs, and establishing trading posts in Chesapeake Bay.<sup>162</sup> Having failed to secure the appointment for himself, Worsley accepted the comparable post in Ireland as detailed above.

There is some evidence that at this point, Hartlib and others actively planned to move to Virginia. In December, William Hamilton, a Scottish chemist and fellow of All Soul’s College, Oxford, told Hartlib that he had heard that Hartlib, Dury, and Worsley were all planning to migrate to Virginia and he asked whether this was true. Hamilton must have been well acquainted with the Circle since at least four letters, before and after 1649, passed among them; he also appears frequently in Hartlib’s journal. More significantly, Hamilton, who was by all accounts a well-connected academic, wrote to Hartlib for advice, since he too was

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<sup>161</sup> “House of Commons Journal Volume 7: 31 Aug 1652”, in *CJ: Volume 7, 1651-1660*, (London, 1802), 172-173.

<sup>162</sup> “Sketches of the Secretaries of the Colony of Virginia”, *The William and Mary Quarterly*, 10:3 (Jan 1902): 167-75.

prepared to seek new employment in the colony with either the church or colonial government. However, nothing came of any plans for Hartlib or any other key members of the Circle to settle in the New World, and he continued to act as a spider in a web, directing his improvement programme from London.<sup>163</sup>

### **3.4. Economic Improvement: Agricultural Diversification in Virginia**

#### ***3.4.1. Hartlib and the History of Silk***

The development of a silk industry in England began in 1599, inspired in part by Thomas Moffett's poem about silk worms, which was a nationalist call to Englishmen to raise silkworms and wear silk clothing.<sup>164</sup> As demand for silk and other luxury goods grew, silk fabrics accounted for more than three percent of all English imports. Twenty years later, raw silk importation had increased to more than seven percent of imports, even though domestic silk production remained non-existent. By the time Hartlib began to promote silk production in the more favourable climate of Virginia, the value of silk being imported annually to London had reached £175,000, most of it coming from the Far East. As a straightforward effort to implement import substitution, Hartlib encouraged landowners throughout England and its colonies to plant mulberry trees, necessary for raising silkworms. As for the prospects of cultivating mulberry trees in Virginia, silk was an obvious alternative to the monoculture of tobacco, and he promoted it throughout his career.<sup>165</sup>

As Hartlib approached the need for economic diversification in Virginia, adventurers discussed the potential for exporting a variety of commodities including beer, glass, pitch, tar,

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<sup>163</sup> William Hamilton to Hartlib, 17 Dec 1649, *HP* [9/11/18A-20B]. See also *HDC*, p. 427.

<sup>164</sup> Linda Levy Peck, "Creating a Silk Industry in Seventeenth-Century England" in *Shakespeare Studies* 28 (1 Jan 2000): 225.

<sup>165</sup> Charles Webster, *Great Instauration*, pp. 456, 467.

and wine.<sup>166</sup> Hartlib was interested in all of these commodities but expressed his strongest support for the mining and development of items such as antimony, flax, lumber, potatoes, and sugar,<sup>167</sup> not neglecting gold, silver, copper, and other useful minerals if they could be found.<sup>168</sup> Virginia also seemed to have a vast abundance of beasts, birds, fish, fruits and trees, and descriptions of these had stimulated Hartlib's imagination from his earliest correspondence regarding America.<sup>169</sup> Nevertheless, it was the financial benefits to be procured that would attract adventurers and planters. Sir Walter Raleigh's men claimed that the roots of Sassafras trees found in America were sold for £336 per ton in the sixteenth century. Because of the

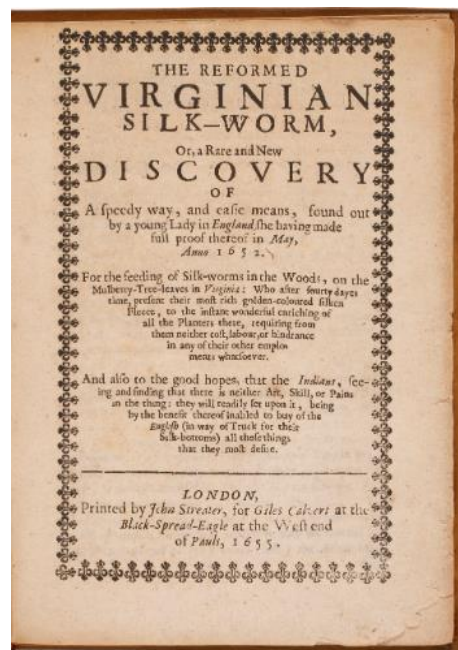


Figure 3.6: *The Reformed Virginian Silk-Worm, or, A Rare and New Discovery of a Speedy Way, and Easie Means, Found Out by a Young Lady in England, She Having Made Full Proof Thereof in May, anno 1652. London: Printed By John Streater, for Giles Calvert, 1655. Written by Samuel Hartlib with Virginia Ferrar.*

<sup>166</sup> Benjamin Worsley to Dury, undated, *HP* [26/33/7A].

<sup>167</sup> *Ephemerides*, 1651, *HP* [28/2/1A and 28/2/8A]. See also, *Memorandum About Engines*, Dymock, undated, *HP* [62/8A-B].

<sup>168</sup> *Ephemerides*, 1652, *HP* [28/2/27A-36B].

<sup>169</sup> Breerton, *Travels in Holland*, pp. 12-3. See also, *Patents And Charters Granted To Virginia*, undated, *HP* [61/4/1A-2B].

obvious benefits of a diversified colonial agriculture, the Virginia Company had warned early settlers to reduce the acreage dedicated to the production of tobacco and incorporate promising alternatives.<sup>170</sup> The company highlighted the potential of silk, but although many settlers indicated that they were prepared to develop the product, there would be no significant export of silk from Virginia throughout the seventeenth-century.<sup>171</sup>

At some point in the mid-1650s, Hartlib cited a 1622 letter of James I to argue for agricultural diversification and lobby for support of silk and other crops.<sup>172</sup> In the letter, which is found in Hartlib's copy of John Bonoel's tract on sericulture for Virginia, the king had commanded the Virginia Company to set up silk production in Virginia and to plant vines for the production of wine and raisins. Besides these, James encouraged planting fig, olive, orange, lemon, pomegranate, and almond trees. Hartlib affirmed the king's directives and amplified them with his own letters and publications directed to planters in the colony. Hartlib also owned a copy of John Smith's *General History of Virginia*, which argued that products from Virginia could potentially eliminate all imports to England of European goods.<sup>173</sup> Smith specifically cited wine and fruits from France and Spain and silk from Persia or Italy, with the expectation that superior Virginia products might remove the need to import them. Other evidence in Hartlib's possession pointed to similar possibilities, and he owned a copy of an anonymous work entitled a *Treatise on Virginia* in which the author cited earlier French interest in Virginia olives, rice, silk, and vines, all of which said to be better than those produced in France.<sup>174</sup>

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<sup>170</sup> Pluymers, "Taming the Wilderness", p. 628.

<sup>171</sup> *The Records of the Virginia Company of London 1607-1622*, ed. Susan M. Kingsbury (4 vols, Washington, DC, 1906).

<sup>172</sup> Title Page In Scribal Hand B. 1622, *HP* [39/2/153A].

<sup>173</sup> See Smith, *The General History of Virginia*.

<sup>174</sup> *Treatise On Virginia* In Scribal Hand ?, Anon, undated, *HP* [61/3/10B].

Hartlib also cited John Smith's description in his *General History* of active copper, iron, glass, and salt works in Virginia, which had from an early stage in the existence of the colony operated alongside vineyards and orchards of mulberry, fig, and pomegranate trees.<sup>175</sup> Indeed, some colonists were planting potatoes and cotton alongside corn and tobacco twice yearly by 1619, but this diversity increasingly yielded to a sustained increase in acreage committed to tobacco, as planters weighed costs, including labour, against potential profits. High returns for tobacco convinced large and small planters alike to commit as much land as possible to a single dominating crop, and no one volunteered to risk the losses that might arise from planting less profitable commodities.

#### ***3.4.2. The Monoculture of Tobacco***

Worsley and Hartlib argued on many occasions that over-concentration on a single crop was harmful to a colony and its overall profitability. The Virginia Colony had, however, failed to produce any profit for the Company and its shareholders until new varieties of tobacco were introduced to the planters in 1612. Rolfe, who arrived in the colony with Gates in 1610, is said to have been the first colonist to successfully cultivate tobacco by acquiring the original seeds from Spanish Trinidad. The new plants, growing in the rich soil of Virginia with its humid subtropical climate, produced a type of tobacco leaf far more appealing to English tastes, and tobacco quickly became the dominant crop in Virginia fields and chief export from the colony

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<sup>175</sup> Treatise On Virginia In Scribal Hand ?, Anon, undated, *HP* [61/3/8A-B].

to England.<sup>176</sup> In fact, after the Navigation Act of 1651, in exchange for restrictions imposed, English tobacco was grown exclusively in the Colony of Virginia.<sup>177</sup>

At first, planters were encouraged to grow as much as possible, and little thought was given to the food supply. When a resulting food shortage led to starvation in the colony, tobacco farmers were faced with a new shortage of labour. Planters were then encouraged by the company to diversify their crops but, driven by the economic potential of tobacco, most planters looked to others for edible crops and continued to maximise tobacco production. Maintaining the food supply would be a chronic problem in Virginia during the early seventeenth-century. Percy described settlers feeding upon horses “and other beastes as long as they Lasted”, while most at some point were forced to eat cats, dogs, mice, and rats. Some even devoured their shoes, while others searched the forests for snakes. These scavengers ran the risk of being killed by natives, having ventured beyond the protection of the settlement.<sup>178</sup> While some saw tobacco as a saviour, others, such as Hartlib, warned that it was only a temporary solution, good only for generating personal profit. For Sir Nicholas Crispe, tobacco was a curse and entirely unprofitable for both Virginia and England. While other nations were building with stone, the English were, according to Crispe, burning their “increase” in a tobacco pipe.<sup>179</sup> Dymock supported this opinion with a Biblical analogy; the excesses of Virginia, he said, had left England a naked aged mother, laid shamefully bare and open to the view of all other nations.<sup>180</sup> Settlers could not survive on a diet of tobacco and coins any more than they could subsist on snakes and shoe leather. Planters, however, were not easily persuaded and

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<sup>176</sup> Barbara Hahn, *Making Tobacco Bright: Creating an American Commodity, 1617-1937* (Baltimore, 2011), pp. 32-3; Hume, *The Virginia Adventure*, p. 367; and Arthur Pierce Middleton, *Tobacco Coast: A Maritime History of Chesapeake Bay in the Colonial Era* (Newport News, 1953), p. 113.

<sup>177</sup> Hahn, *Making Tobacco Bright*, p. 38.

<sup>178</sup> Percy, *A Trewe Relacyon*, p. 267.

<sup>179</sup> Sir Nicholas Crispe’s Remonstrance to Parliament. undated [c. 1651], *HP* [60/8/8A].

<sup>180</sup> Memorandum About Engines, Dymock, undated, *HP* [62/8A-B].

each maintained an attitude which insisted that other planters should diversify but each continued to plant their own land with the most profitable cash crop.

Dependence on tobacco continued to be a problem for the economy, first, because it continued to yield the highest return per acre over any available alternative for individual planters, and, second, because it was one of the worst soil depleting crops. Hartlib understood these problems and their impact on agriculture, and he lamented the destructive nature of American husbandry, both to the land and to the religious fibre of the planters. Not only did the plants deplete the soil, but because growing tobacco involved a long maintenance-free growth period, it encouraged laziness among the planters. Moreover, while it increased the demand for intensive labour during brief periods of planting and harvesting, it caused a surplus supply during 'lay by'.<sup>181</sup> Hartlibians protested against government policy toward Virginia, the limitations of the irregular demand for labour, the scarcity of livestock, and the cycle of indebtedness that "enslaved" small planters.<sup>182</sup> The farmers themselves called for an improved plough that was better suited for the local terrain, and argued that corn, the obvious edible alternative to tobacco, also depleted the soil. In his correspondence and personal journal, Hartlib sought to find answers to these challenges and discussed deeper ploughing, improved crop rotation, manuring, and the use of nitrogen-producing crops such as clover.<sup>183</sup> In one note, for example, he described a migration of "Pigeons" so large in Virginia that they broke the limbs of the trees upon which they attempted to alight, but added that in the process the ground underneath was "most wonderfully" fertilised.<sup>184</sup>

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<sup>181</sup> Braddick, "Civility and Authority", p. 101.

<sup>182</sup> Pluymers, "Taming the Wilderness", p. 612.

<sup>183</sup> See Avery Odelle Craven, *Soil Exhaustion as a Factor in the Agricultural History of Virginia and Maryland, 1606-1860* (Urbana: University of Illinois, 1926).

<sup>184</sup> Ephemerides, 1652, *HP* [28/2/36B].

The lack of crop rotation in Virginia fuelled rapid westward expansion as planters chose new ground rather than renewal of old fields or crop rotation. Instead of preserving the productivity of the soil, planters simply abandoned exhausted fields after only three or four years of tobacco. This left old smallholdings liable to reforestation, but created new, larger farms that were located further from port cities, a factor that that put increased pressure upon Native American populations.<sup>185</sup> Demand for Virginia tobacco in England continued to grow, yet the price fell due to a greater corresponding increase of supply. Planters, nevertheless, continued to intensify crop production, most planting only tobacco, even as the colony suffered for lack of a reliable and affordable food supply. Planters benefitted from improvements in production and distribution of tobacco, reduced costs of shipping, improved packing methods, better ship design, and improved transport links. While some planters may have experimented successfully in small plots with alternatives such as flax, hemp, or indigo, it was not until well after the Restoration that any of these crops made any significant diversifying impact on the agricultural export economy of Virginia.<sup>186</sup> Hartlib believed that impoverished soil could be renewed and a diversified colonial crop was more profitable for the macro-economy. As he promoted a variety of other improvements, however, many of these techniques – such as better preservation of harvested and dried tobacco leaves, and more efficient land and sea transportation -- were also making it more difficult to convince planters to commit land to alternatives. Indeed, Hartlibians were to some extent making it easier for tobacco planters to live further from town centres and navigable waterways.

Tobacco was widely praised for its benefits, and Hartlib recognised both the new series of experiments it had stimulated in England among his correspondents as well as its positive

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<sup>185</sup> Hahn, *Making Tobacco Bright*, pp. 19, 124.

<sup>186</sup> Ephemeres, 1651, *HP* [28/2/1A and 28/2/8A] and Sheehan, *Savagism and Civility*, p. 105.

effects on the English economy. For example, he recorded that the importation and consumption of tobacco from Virginia had created a new domestic industry of tobacco pipe-making.<sup>187</sup> The invention could also be adapted to a variety of alternative applications, and Petty informed Hartlib that a tobacco pipe was being used in an air pressure experiment at Oxford and it was involved in the testing of other substances such as the resins “Bethony and Amber [which could] bee taken in a pipe of Tobacco”.<sup>188</sup> Tobacco had apparent medicinal uses and the celebrated Clare physician, William Butler, once prescribed it to cure Nicholas Ferrar’s insomnia, while Hartlib noted that another physician had used tobacco to treat colic.<sup>189</sup> Tobacco was also taken by patients to cure “a most grievous swelling in [the] throat”, and Hartlib praised a certain Dr Turner who prescribed “a little Tobacco with the Pipe”, which had allegedly caused the patient to completely recover after only three hours.<sup>190</sup>

Tobacco was believed to have a wide variety of other benefits. For example, Hartlib noted that by observing tobacco smoke in a room, he could understand how air flowed.<sup>191</sup> Tobacco mixed with Cortex India, which took away “the stinck of it”, and according to Hartlib it was successfully used to perfume a room.<sup>192</sup> The oil of tobacco was found to be the best remedy against diarrhoea and Gabriel Plattes informed Hartlib that it could be lit with useless “mercuries”.<sup>193</sup> Tobacco was not effective, as Hartlib found out by his own experiments, in smoking fleas out of a bed despite it being burned within “a new kinde of bellows”.<sup>194</sup> The bellows and tobacco, as mentioned above, proved useful for collateral improvements, even if

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<sup>187</sup> Ephemerides, 1650, *HP* [28/1/82A].

<sup>188</sup> William Petty to Hartlib, 16 Dec 1650, *HP* [8/23/1A] and Ephemerides, 1653, *HP* [28/2/60A].

<sup>189</sup> Nicholas W. S. Cranfield "Ferrar, Nicholas (1593–1637), religious writer and administrator", *ODNB* (23 Sep 2004) and Ephemerides, 1656, *HP* [29/5/79A].

<sup>190</sup> Cranfield, “Ferrar, Nicholas” and Ephemerides 1653 Part 4, *HP* [28/2/77A]. See also Ephemerides 1655 Part 4, *HP* [29/5/50A and 51A]

<sup>191</sup> Ephemerides, c. Nov 1635-c. Feb 1636, *HP* [29/3/56A].

<sup>192</sup> Ephemerides, 1655, *HP* [29/5/21A].

<sup>193</sup> Gabriel Plattes. Printed Pamphlet, ‘The Profitable Intelligencer’. 1644, *HP*. [A1-4].

<sup>194</sup> Ephemerides, 1643, *HP* [30/4/89A-B].

they did not work well together in pest control. After this experiment Hartlib wrote that oil of lavender proved best in driving fleas from beds.<sup>195</sup> In *The Reformed Commonwealth of Bees*, he recorded that the smoke of tobacco had been used successfully to sedate bees when extracting honey from the hive.<sup>196</sup> Hartlib observed that the tobacco shops remained free of plague even in the greatest outbreaks of that disease, and many had concluded that breathing the smoke of tobacco was “very healthy”.<sup>197</sup>

Finally, tobacco was often a sort of “gold” paid in return for secrets. Child told Hartlib about a Royalist named Gore, who had discovered a dyeing technique that remained a highly protected secret. His colours, according to Child, remained stable during trials even though his dyed cloth was left in containers of urine and lemon juice overnight.<sup>198</sup> “He can fixe infallibly the Colour”, Child wrote, adding that a certain Lord Gorge had already attempted to discover Gore’s secrets without success even though he had “wooded” and “feasted” him. Gore had turned down “Ten thousand [Dutch] guilders” for his privileged information. Hartlib, knowing that the man struggled financially and had a weakness for certain consumables, suggested that Child offer him wine and tobacco for his secret.<sup>199</sup> The physical limitations of tobacco were also discussed among Hartlibians. Robert Boyle informed Hartlib of an Italian physician with 40 years’ experience in Padua who found that having his patients smoke tobacco blighted his treatment of their blindness, otherwise successful, even when he allowed his patients to drink wine.<sup>200</sup> In a *Treatise on Silk Worms to the Colonists of Virginia*, Hartlib and Virginia Ferrar had learned that tobacco was poisonous to silkworms, which were also harmed by the smoke as well as its residue. As a result of this discovery, Virginia colonists were exhorted to wash

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<sup>195</sup> Ephemerides, 1655, *HP* [29/5/21A].

<sup>196</sup> *The Reformed Commonwealth of Bees*, ed. Samuel Hartlib (London, 1655), pp. 20, 61.

<sup>197</sup> Ephemerides 1656 Part 3, Hartlib, 1656, *HP* [29/5/89A].

<sup>198</sup> Ephemerides, 1653 Part 4, *HP* [28/2/74A].

<sup>199</sup> Ephemerides, Part 3, *HP* [28/2/66A-B].

<sup>200</sup> Ephemerides, 1655 Part 4, *HP* [29/5/51A].

their silkworm tables carefully before placing worms on them, especially after anyone had been smoking in the same room.<sup>201</sup>

In 1649, Cressy Dymock wrote a paper supporting Worsley's comprehensive plan of colonial reform and improvement, regarding a technique for the improvement of tobacco. Hartlib responded that Dymock's ideas were sufficient, if followed by planters, to make Virginia tobacco "as good as the good Spanish and the best Spanish to make it yet better".<sup>202</sup> He was sufficiently impressed to tell Dymock that his paper "must bee kept mighty secret" in case "malitious mouthes" should scare customers from buying or using it. The paper's secret was that curing the tobacco in Virginia before shipping helped preserve the leaves and cloak other changes made in production. Hartlib later noted that Dymock continued to experiment with his tobacco leaves and had promised to bring an assortment of samples to Hartlib for testing; as a result, he was hopeful that Dymock's tobacco business would soon be as successful as Worsley's sugar business in Barbados. Later, Dymock was experimenting with making fresh water from salt water even as his tobacco curing trials continued, both projects undertaken with the express purpose to benefit the colony in Virginia. Dymock and William Petty both experimented with preserving scents from evaporation and reported their results to Hartlib.<sup>203</sup>

Dymock also wrote responses to a number of queries that Hartlib sent him concerning "How a Friend of yours might dispose of 150<sup>lb</sup>. (or any other Summe) to the best advantage". Dymock listed 12 ways to invest money, one of which was "To goe or adventure vpon Plantations in Virginia".<sup>204</sup> He predicted a five percent return by investing in the East India Company, ten percent from buying housing in London, or a twenty percent return from buying land in England. Yet he compared these unfavourably with a 100 percent anticipated annual

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<sup>201</sup> Treatise on Silkworms to the Colonists of Virginia, undated, *HP* [61/1/10B].

<sup>202</sup> *Ephemerides*, 1649, *HP* [28/1/7A].

<sup>203</sup> *Ephemerides*, 1649, *HP* [28/1/14B]; and 1652 Part 2, *HP* [28/2/39A].

<sup>204</sup> Cressy Dymock. Note On Increasing Money, 10 Jul 1649, *HP* [66/30/1A-2B].

return for planting a diversified combination of corn, flax, and rape or by breeding cattle as an adventurer in Virginia.<sup>205</sup> Dymock did not list the risks of planting in the colony, but in reality piracy and war made the high profits of shipping highly precarious. Ignoring the risks of drought, pests, disease, and the attacks of Native Americans, Dymock assured Hartlib of “extraordinary blessing” that would arise from venturing to Virginia, “a way most pleasing to God, & approved of good men”.<sup>206</sup>

### ***3.4.3. A Variety of Agricultural Alternatives to Tobacco***

The great expansion of tobacco monoculture was driven by the fact that smoking had become pervasive in England, a practice that stretched from the highest to the lowest orders. In *London's Charity Inlarged* for example, Hartlib noted of beggars that “if a Farmer give not them an alms to their own mind, or a crosse word, they care no more to set his Barn and Ricks of corn on fire, then to light a pipe of Tobacco”.<sup>207</sup> Once a luxury reserved for the upper class, by the 1650s, tobacco was abundant, inexpensive, and the lighting of a pipe had become a common sight among the middle class. Nevertheless, Hartlib continued to call for “Tobacco to be thrown down” by Virginia planters and he promoted alternatives, none more so than sericulture.<sup>208</sup> Recognizing tobacco's tremendous economic benefits, he never suggested a ban on its cultivation, but rather called for a voluntary but significant reduction in the planters' collective commitment to a single crop. By 1650, Hartlib had collected at least 15 books about silkworms.<sup>209</sup> These included several titles written by some of his dearest correspondents in

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<sup>205</sup> Ephemerides, 1651, *HP* [28/2/1A and 28/2/8A].

<sup>206</sup> Cressy Dymock, Note On Increasing Money, 10 Jul 1649, *HP* [66/30/1A-2B].

<sup>207</sup> Hartlib, Printed Pamphlet, “Londons Charity”, 1650, *HP* [57/4/13/3B].

<sup>208</sup> Samuel Hartlib, Printed Pamphlet, “Londons Charity Inlarged”, 1659, *HP* [57/4/13/12B].

<sup>209</sup> Title Pages of Works On Silk Worms, Hartlib, undated, *HP* [61/7/1A-8B].

both English and German, including Ralph Austen, Sir Thomas Browne, John Pell, William Petty, and George Starkey.<sup>210</sup> Other sources included the poem by Moffett mentioned earlier, and another by a certain Mr Collier, which Hartlib received in a bundle of Joachim Hübner's Papers sent to him by Worsley.<sup>211</sup> The emphasis of the works in the collection range from the care of silkworms to the production of silk, and included a number of pieces of evidence relating to the manufacture of silk garments and the history of Starkey's silk spiders in Bermuda.<sup>212</sup>

Because red mulberry trees had been found growing naturally in Virginia by early explorers, Hartlib was convinced silk production was the best alternative, to be grown alongside tobacco. Although the white mulberry was better for silkworms, Hartlib believed the presence of the red variety meant the whites could be imported and grown successfully, and he linked this proposal to the fate of Huguenot refugees in London. Simultaneously promoting silk in Virginia and assisting in organising a Huguenot colony in America, he envisaged that silk-weaving could become a major industry with the help of skilled Huguenot weavers. At this time, Huguenots were beginning to settle in London, creating a vibrant English silk trade and industry in Spitalfields. Limited silk-weaving had been performed in this section of the capital for decades, and the neighbourhood was only four hundred metres from where Hartlib lived near Aldgate until 1650. However, few of these French Protestants would migrate to America, as he initially planned, and instead silk-weaving in England would instead grow significantly after the Restoration.<sup>213</sup>

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<sup>210</sup> Ephemerides, 1652, *HP* [28/2/39A]. See also Extracts Of Letters On Silk In Hartlib's Hand. 1652, *HP* [61/7/9B].

<sup>211</sup> Extracts of Letters On Silk In Hartlib's Hand. 1652, *HP* [61/7/9A].

<sup>212</sup> Ephemerides, 1652, *HP* [28/2/39A].

<sup>213</sup> "Industries: Silk-weaving," in *A History of the County of Middlesex: Volume 2, General; Ashford, East Bedfont With Hatton, Feltham, Hampton With Hampton Wick, Hanworth, Laleham, Littleton*, ed. William Page (London, 1911), pp. 132-7 and Lien Bich Luu, *Immigrants and the Industries of London 1500-1700* (Farnham, 2005), pp. 193-8.

Some writers disagreed with Hartlib about silk's prospects. William Bullock relied upon Capt. Samuel Matthews, an experienced Virginia planter, to supplement his information about the colony for his *Virginia Impartially Examined*, and he questioned whether silk was a viable commodity.<sup>214</sup> In response, John Ferrar relied upon his own experience and additional advice from Hartlib for his *A Perfect Description of Virginia*, in which a multitude of alternatives to tobacco were explored and silk was highlighted as a leading commercially profitable and viable commodity.<sup>215</sup> Ferrar wrote that Virginia's tobacco "is much vented and esteemed in all places" but the price was low because of excess supply.<sup>216</sup> Hartlib, he claimed, had ideas for "effecting [alternative crops] to perfection" but planters dependent on tobacco were reluctant to gamble on something new.<sup>217</sup> To Ferrar they were "inferior inhabitants" and "ordinary sort of men" who would have to see a crop succeed in order to believe that it could do so.<sup>218</sup> Bullock, who also wanted diversification, believed that a viable silk industry could not be established in Virginia, and promoted other crops as better candidates.<sup>219</sup> Despite Bullock's pessimism, Hartlib and Virginia Ferrar continued to argue that silkworms could feed on Virginian mulberry trees, and thereby ensure the viability of silk cultivation in Virginia.<sup>220</sup>

At least three women were drawn into the Hartlib Circle because of Virginia Ferrar's interest in silk, joining Boyle's sister Katherine Ranelagh, Frances Vane, and Elizabeth Reade Winthrop as active female correspondents within the Hartlibian network.<sup>221</sup> Virginia Ferrar

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<sup>214</sup> Bullock, *Virginia Impartially Examined*, p. 37.

<sup>215</sup> John Ferrar, *A Perfect Description of Virginia* (London, 1649). This pamphlet was traditionally considered to be anonymous, but David Ransome has proven it to be the work of John Ferrar because it resembles Ferrar's comments on *Virginia Impartially Examined*. I contend Hartlib is the "friend in England" mentioned on p. 1 and is therefore a co-author with Ferrar who likewise is not mentioned in the document. See Peter Thompson, "William Bullock's 'Strange Adventure'", f. 12, p. 112 and David Ransome, *The Ferrar Papers: 1590-1790* (Cambridge, 2004).

<sup>216</sup> John Ferrar, *A Perfect Description*, p. 3.

<sup>217</sup> *Ibid.*, p. 5.

<sup>218</sup> *Ibid.*

<sup>219</sup> Peter Thompson, "William Bullock's 'Strange Adventure'", p. 116.

<sup>220</sup> Peter Thompson, "William Bullock's 'Strange Adventure'", p. 127.

<sup>221</sup> See Ephemerides, 1652, *HP* [28/2/27A-36B]. See also Charles Webster, *Great Instauration*, pp. 62-3.

was already engaged in correspondence with several colonists living in America, including the governor's wife, Frances Berkeley, and Michael Upchurch, an indentured servant who had been the first to encourage her to raise silkworms in England.<sup>222</sup> Ferrar had extensive epistolary contact with Hartlib in the 1650s, as well as with members of her own network;<sup>223</sup> in one typical example of the information she passed on to him, she noted that an associate in Ireland had convinced a neighbour there to raise silkworms, feeding them with lettuce only for 25 days and then only with mulberry leaves as part of a trial. Hartlib must have been prompted to write to the same unnamed silk-farming woman, as he recorded having received letters directly from her. As a result of these trials, the fact that lettuce is highly poisonous to silkworms was discovered for the first time by members of the Hartlib's extended network.<sup>224</sup>

Virginia Ferrar became an ideal colonial Hartlibian, conducting experiments and being both a lover of "rarities" and a frequent correspondent, who often sent local seeds to Hartlib.<sup>225</sup> She also sent silkgrass from the colony, which she believed, if properly cultivated there, could potentially create a thousand jobs for the poor.<sup>226</sup> She is credited for making the Ferrar Map of Virginia and collaborated with Hartlib to write *The Reformed Virginian Silk-Worm* in 1655.<sup>227</sup> Earlier, she had composed *The Wonderful & Admirable Vertue of the Sassafrass-Tree in Virginia* (1650) and she collaborated with Hartlib to produce *A Rare and New Discovery* in 1651, being described as the "young Lady in England".<sup>228</sup> She and Hartlib together argued that the Native Americans could be civilised and converted to Christianity by being introduced to the wonders of silk and taught to care for the fragile worms. Portions of the text regarding the

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<sup>222</sup> The Ferrar Papers, 1590-1790. Magdalene College, Cambridge.

<sup>223</sup> John Ferrar to Hartlib, 28 Nov 1653, *HP* [39/2/12A].

<sup>224</sup> Charles Webster, *Great Instauration*, pp. 456-7.

<sup>225</sup> John Ferrar to Hartlib, 28 Nov 1653, *HP* [39/2/12A].

<sup>226</sup> Braddick, "Civility and Authority", p. 101.

<sup>227</sup> *Ibid.*

<sup>228</sup> *A Rare and New Discovery* (London, 1651). See *HDC*, pp. 99-100.

mechanics of raising silkworms are obviously Ferrar's contribution, while a section comparing the profitability of silk to tobacco must have been written by Hartlib, who also wrote the introduction. As expected, Hartlib demonstrated how silk was potentially more profitable for a planter than tobacco, but he cautiously concluded that an industrious planter could easily produce silk and still raise tobacco simultaneously.<sup>229</sup>

#### ***3.4.4. Alternatives to Tobacco***

Tobacco was by no means the sole product that was imported from Virginia to England, and Hartlib continued to promote the development of an increasing variety of crops useful to settlers such as “sowing Hemp, and Flax, and Roots, and planting of trees for fruit and fuel”.<sup>230</sup> As an illustration both of the level of diversity achieved by 1650 in Virginia and of the permeation of American products within England, Hartlib noted in his journal that a druggist in Cheapside had a “good store” of snakeroot from Virginia, a pound of which only cost two shillings. This was significantly cheaper than it used to be, Hartlib wrote. He identified it as a pleasant tasting medicine when ground into powder and drank against infections. The cordial produced from this species of perennial flowering plant was good, he added, and to be taken after meals, citing Worsley as his source.<sup>231</sup>

Products imported from Virginia were often developed and used as medicine in England. Hartlib referenced several men in London, “Lovers of our English Plantations”, who wanted further improvements in colonial agriculture in order to produce more useful medications. These men were merchants with a commercial interest in medicine and Hartlib

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<sup>229</sup> Braddick, “Civility and Authority”, p. 101.

<sup>230</sup> Ephemerides, 1651, *HP* [28/2/1A and 28/2/8A].

<sup>231</sup> Ephemerides, 1650, *HP* [28/1/70A].

noted they were particularly interested in liquorice, a plant native to the Mediterranean that was often taken for various digestive complaints such as colic, inflammation, heartburn, and ulcers. They approached Hartlib in order to secure liquorice from Virginia to supply a shop located “at the Signe of the Tobacco Role” in Gracious Street (also known as Grace Church Street), although Hartlib added that various English “Licoras” were already sold there for between two and twelve pence per pound. While Hartlib showed an interest in supporting this venture, he also sought to facilitate the transfer of liquorice in the opposite direction, recording that he was anxious to make liquorice plants available to “any desirous to become Planters”. As with other crops, he was keen to promote the westward transfer of seeds and produce to America for experimentation and ultimately, production.<sup>232</sup>

Hartlib’s interest in the diversification of New World cultivation included the proto-industrial development of natural resources. In 1650, Edward Williams who had previously written *Virginia Virgo Triumphans*, promised Hartlib, through Robert Child, a treatise on sawmills in Virginia.<sup>233</sup> Hartlib was sent an early copy of Williams’s *Virginia’s Discovery of Silke-Wormes*, which relied heavily upon information given to the author by John Ferrar. However, in spite of the title, Williams’s work was primarily concerned with promoting the benefits of American timber as the best potential alternative to the monoculture of tobacco. He remarked on the deforestation of Europe and connected it to the value of timber in America, describing a sawmill as “an Engine, wherewith force of a wheele in the water, to cut Timber with great speed”.<sup>234</sup> Williams listed in great detail all of the products that could be produced with lumber from Virginia, including walnut tables and cypress chests. It may be “easily transported to England”, he wrote, and “sold at a considerable value”. Wood from Virginia

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<sup>232</sup> Extract From "Proceedings No.126", Hartlib, 10 Feb 1653, *HP* [31/12/2A].

<sup>233</sup> *Ephemerides* 1650 Part 2, Feb-May 1650, *HP* [28/1/57B].

<sup>234</sup> Edward Williams, *Virginia’s Discovery of Silke-Wormes, with their benefit* (London, 1650), p. 77.

could fuel iron mills in Virginia and England, build many houses, and provide employment for thousands.<sup>235</sup> Based on the numerous references comparing the colonies, Williams's desire to realise solid improvement, and his concern for the diversification of Virginia's economy, Hartlib may have contributed to *Virginia's Discovery* indirectly through Ferrar.<sup>236</sup>

Timber continued to be a concern for the Hartlib Circle until the Restoration when Beale further pleaded for increased imports of forest products from Virginia. He argued that the strength of England was its timber, which was used for building accommodations, ships, walls, utensils, and implements.<sup>237</sup> He lamented the lost potential represented by "bald-hills", which might otherwise be used to plant renewable trees in England and although planters were reluctant to develop long-term programmes for plants crops, he exhorted them to plant oak trees to ensure the national security into the next century. Most of the species he mentioned were American trees such as pine, hemlock, and cypress. In a separate letter, he further explained that importing iron from America would preserve English trees, which would not then be used for fuel in English iron mills.<sup>238</sup> He compared the iron ore of Virginia with New England and judged the former to be the best in the world. In pushing for the proper management of arboriculture in America in relation to the iron industry, he was following previous authors such as William Strachey, whose *Historie of Travaile into Virginia Britannia* (1649) had also analysed the shortage of timber and its effects on ironmaking in England.<sup>239</sup>

In *Virginia's Discovery of Silkworms and their Benefits*, Williams also addressed the entire spectrum of silk production with illustrations. The work detailed the planting and grafting of mulberry trees, analysing types of soil, breeding, housing and feeding silkworms,

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<sup>235</sup> Ephemerides, 1650, *HP* [28/1/57B]; and Edward Williams, *Virginia Virgin Triumphant* (London, 1650).

<sup>236</sup> Memorandum About Engines, Dymock, undated, *HP* [62/8A-B].

<sup>237</sup> John Beale to Hartlib, 19 Mar 1659, *HP* [51/84A].

<sup>238</sup> John Beale to Hartlib, 22 Mar 1659, *HP* [51/99B].

<sup>239</sup> William Strachey, *Historie of Travaile into Virginia Britania* (London, 1649).

and the diseases common to silkworms. Williams included similar details valuable to any planter interested in vineyards and wine making, and he included sections regarding a variety of other possible industries including almonds, figs, nutmeg, peaches, apricots, etc., any of which stood to become excellent alternatives to tobacco. Williams is an excellent example of somebody who was encouraged by Hartlib to produce books such as these for distribution to interested correspondents, and who was led, at least partially by Hartlib, to a lifelong and generational interest in the colonies. Indeed, his daughter, Elizabeth (1650-1710), married Edward Hill III and migrated to Virginia.<sup>240</sup>

After Berkeley was removed as governor in 1652, Hartlib returned to other natural American resource improvement projects, and his interest in developing the colony increased once again. William Freeman came to Hartlib in the same year about his brother, Thomas, who was “going over next spring into Virginia”.<sup>241</sup> Thomas was reported, by Hartlib, to be “a most Ingenious Man especially for finding out of mines” which he said were supposed to be in Virginia and rich with gold. Thomas was lodging with his brother William until his migration the following year. These men, originally of Oxfordshire, were apparently nephews of Lt Col Bridges Freeman, who had been in Virginia since 1625. Bridges Freeman had two brothers William and Thomas, but William had died, and Thomas had remained in England. Bridges owned 1,550 acres known as the Tomahunn Plantation near the mouth of the Chickahominy River and was a member of both the Virginia House of Burgesses and the governor’s council. William gave Hartlib Bridges’ contact information while Hartlib may have told William what Richard Leader had related to him regarding the alleged abundance of antimony found in Virginia.<sup>242</sup> Occasionally misidentified by adventurers as lead, antimony or *stibium* was

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<sup>240</sup> *Church of England Baptisms, Marriages and Burials, 1538-1812*, London Metropolitan Archives; Church of England Parish Registers, 1538-1812; Ref.: P93/GEO/005.

<sup>241</sup> *Ephemerides Part 1*, 1 Jan-7 Oct 1652, *HP* [28/2/36A].

<sup>242</sup> *Ephemerides*, 1653, *HP* [28/2/74B].

valuable to Hartlib as the base ingredient for several medicines and cosmetics when reduced to a powder, and it was frequently mentioned in his writings.<sup>243</sup> Although it is unclear how much Bridges and Thomas accomplished in communication with Hartlib, William, who lived in Westminster, remained an important contact between these Virginia planters and Hartlib.

Successes in industrial or agricultural improvement were often followed by reverses. The passage of the Navigation Act in 1650, for example, sparked the two-year First Anglo-Dutch War, which immediately disrupted the work of improvement as much as the Irish Rebellion had done ten years earlier.<sup>244</sup> Cromwell had been building ships even as the Dutch were reducing the size of their navy, but the latter had access to more merchant ships, and the conflict was about trade. Restrictions limiting the ability of the Dutch to legally carry English cargo caused the Dutch to threaten English shipments, which in turn forced the Commonwealth to declare war and blockade the Dutch coast. Because most of the war was fought in the English Channel and the Mediterranean, the conflict was not a direct threat to work in Virginia, but the threat of Dutch ships in the Atlantic reduced the number of crossings, which necessarily limited correspondence between Virginia and London. Although most prayed for a sudden end to the conflict, at least one anonymous source among Hartlib's correspondents felt it was more expedient for the war to continue "otherwise a War of Religion much greater and more bloody would ensue upon a Designe". The war ended 5 April 1654 with the *Treaty of Westminster* but the central conflict of trade remained unresolved. England was determined to boycott Dutch shipping but lacked the capacity to replace Dutch ships, match their speed, or compete with their base prices.<sup>245</sup>

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<sup>243</sup> Ephemerides, 1653, *HP* [28/2/74B].

<sup>244</sup> Charles Webster, "Benjamin Worsley", p. 233.

<sup>245</sup> Memo On The Dissolution Of Parliament In Hartlib's Hand [20 Apr 1653] *The James Marshal and Marie-Louise Osborn Collection*, Beinecke Rare Book and Manuscript Library, Yale University, Document 10.

Hartlibian interest in Virginia continued in through the late 1650s although the number of surviving Virginia-related texts in the Hartlib Papers falls off considerably towards the end of the decade. This may be a reflection of greater attention focused on Ireland, New England, and the West Indies from 1655-1660, but Hartlib did not ignore the colony completely.<sup>246</sup> He continued to experiment with tobacco and its possible alternative applications, both leaves and smoke.<sup>247</sup> He did not record from whom he received tobacco samples, but it was most likely from Virginia Ferrar. He conducted several experiments in the mid-1650s testing tobacco's benefits as a perfume, and its medicinal potency for curing a variety of ailments including colic, plague, the piles, and bee-stings.<sup>248</sup> Hartlib published two works in 1655 encouraging agricultural diversification in Virginia, the first being *The Reformed Commonwealth of Bees* and *A Rare and new-discovered speedy way, and easie meanes of keeping of Silk-worms* which he co-authored with Virginia Ferrar, and the second, John Hammond's *Leah and Rachel*, both of which are discussed above. Hammond had spent two decades in Virginia and demonstrated knowledge of a number of topics ranging from agricultural improvements to theological issues such as the conversion of the Jews and their readmission to England.<sup>249</sup> Otherwise, in the last few years of the 1650s, Hartlib engaged in a lengthy correspondence with Robert Wood regarding coinage and monetary policy, and the letters often considered the impact of imported precious metals from America on the prices of gold and silver in England.<sup>250</sup>

Hartlib and his associates continued to yearn for a good natural history of improvable parts of America. In 1658, John Beale pressed Hartlib to ask John Davenport in the New Haven

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<sup>246</sup> "State Papers, 1655: Jan (1 of 4)", in *A Collection of the State Papers of John Thurloe, vol. 3, Dec 1654-Aug 1655*, ed. Thomas Birch (London, 1742): 64-83.

<sup>247</sup> *Ephemerides* Part 2, Feb-21 Apr 1655, *HP* [29/5/21A].

<sup>248</sup> *Ephemerides* Part 4, 13 Aug-31 Dec 1655, *HP* [29/5/50A and 29/5/51A]; Part 3, Jun 1656-Sep 1656 [29/5/89A and 29/5/90B]; and *The Reformed Commonwealth of Bees*, ed. Samuel Hartlib (London, 1655), p. 62.

<sup>249</sup> Hammond, *Leah and Rachel*.

<sup>250</sup> Robert Wood, *Objections To Potters Decimal Coinage*, 1 Dec 1658, *HP* [33/1/37A-38B].

Colony to recruit someone to “give us the history of Virginia, Newe England, & other neyboring plantations, as is Civilly exemplified in Mr Ligons Barbados”.<sup>251</sup> In the same year, Beale composed his analysis of American colonies, noting that although New England was the charge of Puritans, Virginia managed by Parliament, and the West Indies run by Comwell, “wee”, that is the Hartlibians, were concerned with improving and advancing the interests of all three. The self-referential remark is undoubtedly aimed at Beale himself, Hartlib, and Worsley, the last two of whom he named in his *Tract On Eleutheropolis* on the same day.<sup>252</sup> In this unfinished essay, Beale, a minister and orchardist, made one of the few references to African slavery found in the Hartlib papers. Most of the work consisted of a list of Scriptural references to the slavery of sin but near the end of the text he noted that “More holy truth is written in the hearte of an attentive Negro than is to us Legible in some severe professours of christianity”.<sup>253</sup> Beale added that he was advocating “doeing good” for Jews, Turks, Indians, Negroes, and “all mistaken & misinformed Mankind”.<sup>254</sup> This was only a fleeting allusion to African slavery, however, and his remaining letters to Hartlib regarding Virginia addressed the topics of ironworks, timber, and conflict with the Dutch.<sup>255</sup> Lady Ranelagh did touch on the topic of “Barbary Slaves” in a letter to Hartlib in that year,<sup>256</sup> noting that they had been encountered by an Irish informant in Paris, but like almost all of Hartlib’s allies, she said little or nothing of slaves in the Americas.

There is no indication that members of the Hartlib Circle diminished their commitment to improvement plans in the colonies even as, by start of the 1660s, some correspondents were

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<sup>251</sup> John Beale to Hartlib, 7 Dec 1658, *HP* [51/39A].

<sup>252</sup> John Beale to Hartlib, 14 Dec 1658, *HP* [51/43B] and John Beale, *Tract On Eleutheropolis*, 14 Dec 1658, *HP* [51/44A-51B].

<sup>253</sup> Beale, *Eleutheropolis* [51/51A].

<sup>254</sup> *Ibid* [51/51B].

<sup>255</sup> John Beale to Hartlib, 19 Mar 1659, *HP* [51/82A-92B] and 22 Mar 1659, *HP* [51/99A-101B].

<sup>256</sup> Lady Ranelagh to Hartlib, 5 Apr 1659, *The James Marshal and Marie-Louise Osborn Collection*, Beinecke Rare Book and Manuscript Library, Yale, doc. 38.

already busy repositioning themselves as supporters of Charles II. Some, including John Pell, considered migrating to America to support the work of improvement without appearing to be fleeing the Restoration. Pell, who had spent very little time in England, visited Hartlib in London soon after Charles' return from exile. The last letter between them dates from November 1658 but their personal contact continued indirectly, while the evidence of the topics they discussed in 1660 appears in Hartlib's journal and in letters to others such as Worthington. Pell concluded that he would go to Virginia unless something better emerged to encourage him to stay. Such an opportunity did arise; he took orders in the church within a year and became a rector in Essex.

### **3.5. Conclusion**

Hartlib and his associates participated in the improvement of the English colony in Virginia by promoting new plantations, encouraging adventurers to migrate to America or invest in improvement projects. Represented by Benjamin Worsley, a core member of Hartlib's Circle, the correspondents were activists both within and outside the English government for agricultural, religious, and political reform. Their commitment to Baconian principles of empiricism were so strong, even Hartlib's friendship with Virginia Governor William Berkeley did not cause any hesitation of their calling for his removal when he resisted the authority of Parliament and introduced a colonial policy hostile to Hartlibian improvements. Hartlib and his friends consistently promoted public policies that were most favourable to their fundamental improvement programme of agricultural diversity and ongoing experimentation of resource development in Virginia.<sup>257</sup> Hartlib consistently argued that the planting and

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<sup>257</sup> Charles Webster, "Benjamin Worsley", p. 228.

improvement of colonies was good for national security and economy. Plantations provided opportunities in England and America for the unemployed, and particularly the poor, who could begin accumulating wealth through working rather than depending upon the voluntary charity of others.<sup>258</sup>

Committed to a Baconian-focused natural philosophy, Hartlibians were not distracted by issues of religious division, extreme nationalism, class, race, or gender. As other chapters have demonstrated, the epistolary network included conformists as well as non-conformists, Presbyterians, Independents, Jews, and Catholics. Other than royalists such as Berkeley, most planters and other contacts working in Virginia were economically focused Protestants less concerned with religious divisions.<sup>259</sup> Whereas Ireland was immersed in political, cultural, and theological war throughout the 1640s and New England became a difficult place for Hartlibians to work in as the colonial leadership enforced strict religious conformity, Virginia seemed to offer a unique opportunity for agricultural and economic improvement. The colony was distracted from maximizing its profitable development only by occasional conflict with Native Americans and political divisions in the late 1640s, as the monarchy was replaced by the Commonwealth and the colonial leadership swore loyalty to Charles Stuart. This situation provided opportunities in the Hartlib Circle and Worsley led several correspondents to petition Parliament, suggesting suitable reforms. Having seen those reforms adopted, he served in a number of meaningful posts designed to support colonial expansion through agricultural, industrial and spiritual improvement.<sup>260</sup>

Recognizing this type of participation in the early English empire is critical to understanding both the successes and failures of the Hartlibians.<sup>261</sup> Worsley was central to this

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<sup>258</sup> See Hartlib, *Londons Charity Inlarged*, p. 3.

<sup>259</sup> Charles Webster, "Benjamin Worsley", p. 228.

<sup>260</sup> *HDC*, p. 262 and Charles Webster, "Benjamin Worsley", p. 229-33.

<sup>261</sup> Mark Greengrass, Michael Leslie, and Timothy Raylor, "Introduction" in *SHUR*, p. 22.

process, lobbying actively for colonial reform in Virginia and being the centre of his own intelligence circle, while remaining in close communication with Hartlib.<sup>262</sup> With the help of such influential parliamentarian allies, Hartlib's challenge was to establish and maintain loyal contacts in Virginia such as he had in other colonies, who would correspond regularly, and send and receive samples of plants and minerals for experimentation and reporting. However, no associates worked as part of the government of Virginia, nor was there an active participant like Child or Winthrop as there was in New England. Virginia proved to be a difficult place for other Hartlibians projects such as the "Virginia business" of evangelism and education among the Indians, and despite Hartlib's recruitment efforts, no one was found to migrate to Virginia for these purposes.<sup>263</sup> Those who did venture there, such as Thomas Freeman, were more interested in the personal financial benefits to be derived from various agricultural and mining schemes. And yet, at least on paper, Virginia remained an ideal location for Hartlibian exploration and development, as it had been from the start of Hartlib's interest in America.<sup>264</sup>

More specifically, the reliance on the increasingly profitable crop of tobacco placed serious limitations on what any improvement programme could achieve. Unlike some Puritans, Hartlib allowed for the use of limited recreational products for pleasure, including tobacco, but he was deeply critical of an over-dependence on one crop in any single colony. Despite ongoing calls for agricultural diversity in Virginia and a multitude of alternatives introduced through Hartlib's participation, tobacco would remain the dominant export throughout the colonial period. This was inevitable, in part because it could not easily be grown in Europe and in part because demand remained strong, continually outpacing supply. In Virginia, tobacco was simultaneously a blessing and a curse. It required a small investment, was easy to grow, and

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<sup>262</sup> Charles Webster, "Benjamin Worsley", p. 224, 227.

<sup>263</sup> Benjamin Worsley to Dury, 27 Jul 1649, *HP* [33/2/18B] and *HDC*, p. 31.

<sup>264</sup> Johann Fridwald to Hartlib, in German, 18 Jun 1629, *HP* [27/34/3A] and 22 Nov 1630, *HP* [27/34/7A]; and *HDC*, p. 70-1.

earned healthy returns. Hartlib was not opposed to tobacco production but was committed to agricultural diversity and the cultivation of products that would strengthen the long-term economic health and positive trade balance of the empire.

More generally, diversification formed a key part of The Hartlibians' strategy of decreasing England's dependence upon imports from competing nations: "I should rather wish our supply from our owne plantations, than from Turkye", Beale wrote in 1658.<sup>265</sup> Hartlib continued to promote silk, beekeeping, corn, fruit trees, vines, etc. because this would allow the country to produce bread, cider, wine, and for both home and foreign consumption. Not only did he support the cultivation and importation of New World foods, but he was equally excited about experiments that might improve the quality and number of Old-World foods in Virginia. Hartlib was thus a pioneering and enthusiastic promoter of the Columbian Exchange, especially from the agriculturally moderate climate of Virginia with its numerous rivers and variety of soil types. While he perhaps accomplished the least in Virginia of all of the western colonies in which he was interested, he continued to see the greatest long-term potential for improvement in its plantations.<sup>266</sup>

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<sup>265</sup> John Beale to Hartlib [With Edmund Pytt to Beale?]. 14 Dec 1658, *HP* [51/43B].

<sup>266</sup> *HDC*, p. 427.



## CHAPTER IV: HARTLIB AND THE WEST INDIES

*But they finding their errors by their daily practice, began a little to mend; and, by new directions from Brasil, sometimes by strangers, and now and then by their own people, (who being covetous of the knowledge of a thing, which so much concerned them in their particulars, and for the generall good of the whole Iland) were content sometimes to make a voyage thither, to improve their knowledge in a thing they so much desired.*

-Richard Ligon, *History of Barbados*

### 4.1. Introduction

The English were slow to recognise the potential of Caribbean colonies. The Spanish Empire was well established in the West Indies by 1585, when Sir Francis Drake arrived in the Caribbean and raided *Santo Domingo*, *Cartagena de Indias*, and *St. Augustine* in the waters off the coast of Florida. A decade later, Sir Walter Raleigh explored the north-west coast of South America; even as he returned to London, Drake was setting off for his second voyage to the West Indies, where he died in 1596.<sup>1</sup> Raleigh returned to the Caribbean in 1617, when his crew attacked a Spanish outpost in violation of an English treaty with Spain. This incident led to Raleigh's execution one year later, and it was not until 1623 that English explorers once more entered the Caribbean and attempted to institute a permanent English-speaking settlement in the West Indies. St. Christopher's (St. Kitt's) was the first Anglophone colony in the Caribbean, but the community struggled to build a solid settlement with secure defences, and the project required several restarts after multiple conquests.<sup>2</sup> Capt. John Powell landed at Barbados in 1625, returning two years later to establish the first permanent English-speaking settlement in the Caribbean. This was 18 years after the founding of Jamestown, Virginia and five years after

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<sup>1</sup> Sir Walter Raleigh, *The Discovery of Guiana* (London, 1596).

<sup>2</sup> See Carrie Gibson, *Empire's Crossroads: A History of the Caribbean from Columbus to the Present Day* (London, 2014); O'Callaghan, *To Hell or Barbados*; and Vincent Hubbard, *A History of St. Kitts* (London, 2002).

the original establishment of the New England colony at Plymouth.<sup>3</sup> The establishment of Barbados would be highly successful, in part because the island was found to be uninhabited, and in part because Barbados was the easternmost of the Windward Islands, well away from the most active Spanish shipping lanes.

At least fifteen additional English colonies were established in the West Indies during the Hartlibian period, though all except Barbados were captured at least once by the Spanish, French, or Dutch military forces. In terms of its capacity to generate wealth, Barbados would be far more successful than any other West Indian English colony, with the exception of Jamaica, which was not conquered by the English until 1655. Barbados was claimed, founded, and developed by private individuals, and until the “Reduction of Barbados” in 1653, when the colony became a principality directly subordinate to the English Commonwealth, official government investment in Barbados was minimal.<sup>4</sup> Governors were elected by planters who functioned independently of government in London and who governed the colony alongside a local council and assembly. The central goal of the Barbadian planters was to build wealth, and profits were commonly reinvested in the colony to purchase additional land and labour. Most planters, however long on the island, rarely brought over their families and they always intended to return to England once a fortune was secure. Some attempted to manage plantations from London without travelling to the West Indies. Powell served as Barbados’ governor for one year and was followed by two other planters within as many years, each seeking to protect the business of Barbados and shield the island from outside political interference.<sup>5</sup>

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<sup>3</sup> Amussen, *Caribbean Exchanges*, pp. 24-25.

<sup>4</sup> For use of the term ‘Reduction’ in *The Hartlib Papers* as applied to Ireland and Virginia in parallel action, see Translated Letter In Dury's Hand, Peter Le Pruvost To Hartlib, 11 Aug 1648 [7/119/2A]; Copy Memo On Ireland In Hand B, Hugh L'Amy & Peter Le Pruvost, undated [12/146B]; and “Further Animadversions About Virginia, Benjamin Worsley” undated [61/6/2A]. For an example of the term applied to Barbados in 1653 see also Pestana, *The English Atlantic*, p. 282, n. 78.

<sup>5</sup> See Hilary Beckles, *A History of Barbados: From Amerindian Settlement to Caribbean Single Market* (Cambridge, 2007), and Larry Dale Gragg, *Englishmen Transplanted: The English Colonization of Barbados, 1627-1660* (Oxford, 2003).

Before Hartlibians turned their attention to the Caribbean, there was, unsurprisingly, little concern shown by colonists in exploration, discovery, and experimentation directed towards a Baconian improvement of the West Indies.<sup>6</sup> Planters did cooperate with practical ideas for improvement when they were presented to them, but only when it promised to increase the profitability of plantations by enhancing the production of cash crops, mechanising milling processes, or offering more efficient preservation of commodities for transport. On the other hand, despite the pervasive Hartlibian interest in evangelistic programmes to improve the well-being of native and slave populations, there was little appetite among planters for religious activity. For 14 years, until 1641, there was one church on the entire island of Barbados, and it was not intended for Indians or slaves.<sup>7</sup>

#### **4.2. The Hartlibian Interest in the West Indies**

Despite the lack of interest among West Indian planters in propagating the Gospel, Hartlib and his extensive network of correspondents participated actively in efforts to improve the West Indies from 1635 until his death in 1662 by offering practical ideas for the enhancement of resource extraction. Hartlib was aware of the West Indies prior to his first correspondence regarding the colony, and he knew of the 1629 dispute that had taken place over conflicting patents, after which Lord Carlisle had prevailed in securing legal title to the island. As early as 1634, he also received information regarding pirates in the Caribbean. It should be noted that commonly, a reference to the West Indies in the writings of Hartlib and his correspondents was meant to describe the English colonies of the entire region. Frequently,

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<sup>6</sup> Slack, *Invention of Improvement*, pp. 174-5, 263.

<sup>7</sup> See Gibson, *Empire's Crossroads*; and *Caribbeana: Miscellaneous Papers Relating to the History, Genealogy, Topography, and Antiquities of the British West Indies*, ed. Vere Langford Oliver (6 vols, London, 1909-1919).

the use of the term “Barbados” was a synonym for “West Indies” much like “Virginia” was often used to describe the entire North American coast from Florida to New Amsterdam during the same period. Correspondents used specific names when disambiguation was necessary.<sup>8</sup>

A number of manuscripts in Hartlib’s possession detailed the foundation and development of the West Indian colonies. These included Thomas Cates’ 1589 summary of Sir Frances Drake’s voyages in the West Indies and the anonymous *Treatise on Virginia* (1622), which made copious references to the West Indies. He had no less than eight different West Indian natural histories among his papers and many of these, as evidenced by his textual underlining, reveal their influence upon his understanding of the region. Citations in letters written by his associates indicate that these correspondents had their own copies of these same documents. Some of the histories were anonymous, some were authored by foreigners, but all of them supplied members of Hartlib’s network with valuable information about the area. As elsewhere, Hartlib’s goal was to create a technically proficient Christian empire by converting natural world discoveries into publicly beneficial improvements. This could best be achieved by combining empirical scientific methods with government funding. The Hartlibians’ commitment to making useful knowledge and imperial interests work in concert was particularly obvious in their plans for, and activities in the West Indies. As the Thirty Years War raged, and the English civil wars cast a shadow over other English colonies, Hartlibians looked hopefully to the Caribbean as a feasible site for the institution of a New Atlantis.<sup>9</sup>

The literature on English efforts to colonise the West Indies is largely silent on the Hartlibian project, although Hartlib worked diligently throughout the 1630s, 40s, and 50s to support English imperial expansion in the region.<sup>10</sup> Similarly, the Hartlibian literature, and that

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<sup>8</sup> Daniel Defoe, *A General History of the Pyrates* (London, 1724).

<sup>9</sup> Charles Webster, *Great Instauration*, p. xvi.

<sup>10</sup> See Rhett Akamatsu, *The Irish Slaves: Slavery, Indenture, and Contract Labor Among Irish Immigrants* (Scotts Valley, CA, 2010); Andrews, *Trade, Plunder and Settlement*; Axtell, *The Invasion Within*; Canny, “The

on alleged members of his “Circle”, has almost completely ignored the significance of the West Indies to his programme.<sup>11</sup> Nevertheless, Hartlib regularly corresponded about locations in the Caribbean with associates, and he established relationships with a number of colonists in the West Indies.<sup>12</sup> He wrote to and personally visited academics, activists, investors, merchants, ministers, and politicians who knew of or invested in the Caribbean colonies, and many of them visited his home for his knowledge or connections concerning the region.<sup>13</sup> He discussed general plans for improvement as well as practical plantation strategies and as a result, the most common topics in the West Indian correspondence reflect the challenges of situating colonies in a tropical climate such as food preservation and fresh water supply.<sup>14</sup> The preponderance of discussion regarding sugar may not have been Hartlib’s personal preference but it reflected the economic dominance of the product in parts of the Caribbean. Nevertheless, the range of other topics mentioned in these letters are indicative of the breadth of ideas concerning improvement and the constant search for profitable ventures to diversify and thereby strengthen the national economic strategy.

In this chapter, I restore the West Indies to its pivotal place in the Hartlibian-Baconian project for improving the world. Three sections serve as examples of Hartlibian participation in the West Indies. Firstly, I deal with English colonisation of the West Indies during the period,

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Origins of Empire”; Michael Craton, *Testing the Chains: Resistance to Slavery in the British West Indies* (Ithaca, 1982); Games, *The Web of Empire*; O’Callaghan, *To Hell or Barbados*; Matthew Parker, *The Sugar Barons: Family, Corruption, Empire and War* (London, 2011); Raymond Phineas Stearns, *Science in the British Colonies of America* (Urbana, 1970); and Thomas, *The Slave Trade*.

<sup>11</sup> Dale, *Sir W. P. of Romsey*; Dircks, *Milton’s Familiar Friend*; Jacob, *Robert Boyle*; *SHUR*; Hunter, *Boyle and Boyle Reconsidered*; Leng, *Benjamin Worsley*; Flora Masson, *Robert Boyle*; McCormick, *William Petty*; *HDC*; and Charles Webster, *Samuel Hartlib and The Great Instauration*.

<sup>12</sup> Charles Webster, *The Great Instauration*, p. 462.

<sup>13</sup> Ransome, “John Ferrar”. See also Maycock, *Chronicles of Little Gidding*; *Conversations at Little Gidding*; and Sharland, “Introduction”.

<sup>14</sup> *HDC*, pp. 9, 69, 99, 102.

1620-1641, which provides evidence of Hartlibian participation in the colonial project before the introduction of sugar. In the second section I focus on economics and trade in the West Indies, and examine correspondence regarding labour supply, production, and trade, in order to highlight the cooperative nature of Hartlib's work after the introduction of sugar in Barbados until the conquest of Jamaica. In the final section I detail Hartlib's ongoing work of lobbying both Parliament in London and planters in the West Indies to design, implement, and support economic diversification, agricultural experimentation, and Christian evangelism. These were all examples of Hartlibian strategies for practical improvement within the colonies during the period after the conquest of Jamaica, 1655-1662.



*Figure 4.1: Modern map of the West Indies for identification of English colonial locations. Used by permission.*

### 4.3. Early Barbados Before Sugar: 1625-1641

As discussed in the earlier chapter on Ireland, in 1625, James I sold 30,000 Irish prisoners to be sent to the New World as “slaves”, meaning indentured servants.<sup>15</sup> The majority of these individuals went to the islands of Antigua and Montserrat, where transplanted Irish prisoners comprised up to 70 percent of the total population.<sup>16</sup> As I have pointed out in previous



Figure 4.2: The island of Barbados

<sup>15</sup> Sheena Jolley. “The Irish in Barbados”, *Irish America* 30:6 (Oct/Nov 2015): 80-85.

<sup>16</sup> *Ibid.*

chapters, the term “slave” did not always refer to someone of African descent.<sup>17</sup> The issue was further complicated over time as the rise of mulattos blurred the colour line, making problematic simplistic assumptions of a necessary link between race and servitude.<sup>18</sup>

Barbados is a 166 square mile volcanic island, 14 miles east to west and 22 miles north to south. It was larger than St. Christopher’s, had the advantage of being flat, and was located on the eastern edge of the Caribbean, all qualities that served to protect Barbados from foreign powers. Given these exceptional natural benefits, Powell’s return to the island in 1627 was sponsored by other London merchants to “settle and plant” the land.<sup>19</sup> Powell initially established a settlement at Holetown on the Western coast of the island but soon, due to their superior port locations, the two main towns were Bridgetown, the seat of government, and Speightstown. Powell found the landscape covered with dense forest, but when additional settlers arrived with Sir William Courteen, vast swathes of trees were cleared, and tobacco was planted. In the earliest years, the island was occupied by Courteen’s company, and the settlers were his paid employees, although he held no charter.<sup>20</sup>

In 1627, Powell imported samples of both staple and cash crops from Guinea along with Arawak Indians to teach the English settlers how to plant and cultivate them. Alongside cassava and sweet potato, the settlers experimented with cotton, ginger, indigo, tobacco, and wheat. After the first tobacco harvests demonstrated the inferior quality of Barbadian tobacco, Barbados experienced its own “starving time” and planters searched for an alternative cash

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<sup>17</sup> See John Rushworth, “Historical Collections: 1625 (Charles I)”, in *Historical Collections of Private Passages of State: Volume I, 1618-29*, (London, 1721), 165-219; and Matthew Parker, *The Sugar Barons*, p. 15.

<sup>18</sup> For the topic of slavery in the British West Indies specifically, see Craton, *Testing the Chains*; O’Callaghan, *To Hell or Barbados*; Matthew Parker *The Sugar Barons*; and Andrea Stuart, *Sugar in the Blood: A Family’s Story of Slavery and Empire* (London, 2012). For the topic of slavery in the New World generally, see Robin Blackburn, *The Making of New World Slavery: From the Baroque to the Modern 1492-1800* (London, 1997); Basil Davidson, *The African Slave Trade* (New York, 1961); Peter Kolchin, *American Slavery 1619-1877* (New York, 1993); Thomas, *The Slave Trade*; and James Walvin, *A Short History of Slavery* (London, 2007) and *Britain’s Slave Empire* (Cheltenham, 2000).

<sup>19</sup> Amussen, *Caribbean Exchanges*, p. 24.

<sup>20</sup> Gibson, *Empire’s Crossroads*, p. 60.

crop throughout the 1630s. Because tobacco had been the saviour of Virginia and because it was being grown successfully by Spanish colonists in Cuba and Hispaniola, the English Caribbean planters had automatically started with it. Where it was successful, tobacco was easy to grow and was profitable. Some was grown successfully on a few of the volcanic English colonies, but the coral islands were not suited for tobacco production, and crucially for its economic future, volcanic islands like Barbados produced a tobacco of poor quality.<sup>21</sup> It was said that even the planters of Barbados were smoking Virginia tobacco, and William White wrote to a Hartlibian correspondent in 1649 to say that his own colony, Bermuda, had better tobacco than Barbados.<sup>22</sup> Indeed, the best tobacco grown in the West Indies came exclusively from the Spanish colonies.<sup>23</sup> It should be noted that the term “Barbados tobacco” commonly referred to “roll tobacco” of a particular thickness, and it does not necessarily identify tobacco that was grown in Barbados.<sup>24</sup>

Due to the general failure of English tobacco in the West Indies, planters experimented with a variety of other cash crops. As we have seen, a number of Hartlib’s correspondents had mixed feelings about the morality of the plant and Beale lamented the fact that it had been the salvation of the Plantations in America.<sup>25</sup> English agricultural production in the West Indies was a labour-intensive process and the demand for labour was met by both imported English-speaking indentured servants and African slaves.<sup>26</sup> Throughout the Hartlibian period, servants outnumbered slaves in English West Indian colonies, yet slaves were more valuable to planters

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<sup>21</sup> See Margaret Willes, *The Curious World of Samuel Pepys and John Evelyn* (New Haven, 2017), p. 196 and “America and West Indies: Aug 1655”, in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W Noel Sainsbury (London, 1860), 427-8.

<sup>22</sup> William White to ? 8 May 1649, *HP* [15/8/6A-7B].

<sup>23</sup> Ephemerides, 1648 [Jun/Jul-Dec], *HP* [31/22/27A-28B].

<sup>24</sup> Nancy Cox and Karin Dannehl, “Bar skin – Barronet”, in *Dictionary of Traded Goods and Commodities 1550-1820* (Wolverhampton, 2007).

<sup>25</sup> Beale to Hartlib [With Edmund Pytt To Beale?], 14 Dec 1658, *HP* [51/43A-B].

<sup>26</sup> See Copy Treatise on Virginia in Scribal Hand?, Anon, undated, *HP* [61/3/1A-25B].

due to the length of their servitude.<sup>27</sup> Some of the indentured servants were volunteers but most were either prisoners of war, convicted criminals, or so-called “vagrants”, most of whom were transplanted Irish captives.<sup>28</sup> Through his New England cousin, John Winthrop Jr., the Anglo-Irish soldier and diplomat Sir George Downing described the West Indies as a “flourishing land” and advised adventurers to migrate there with indentures from England.<sup>29</sup> These, he explained, even if the individual only served six-month contracts, would allow a planter to earn enough to purchase African slaves. Others confirmed that the profits from slave labour would quickly allow the purchase of more slaves and as a result, generate increasing and sustainable profit. Hartlib was aware from correspondence if nothing else, that managing the labour force in the West Indies was dangerous work. Revolts were possible and passive resistance was an ongoing fixed cost, but none of his extended network ever displayed any reservations regarding the institution of involuntary servitude.<sup>30</sup>

The focus on indentured servants in the Hartlib Papers reflects the reality of numbers in the West Indies during the mid-seventeenth-century. Hartlibian sources referencing slaves anywhere are rare before the mid-1640s and there is no mention in his papers of “blacks” in Barbados, although there is broad assumption in the secondary literature that at least a few Africans were among the earliest settlers there in 1627.<sup>31</sup> A number of Hartlib contacts, such as the royalist Sir Nicholas Crispe, the tax farmer Martin Noell, and the puritan, William Pennoyer, all of them merchants, were participating in and profiting heavily from the slave trade during the 1640s and 1650s. Winthrop described a New England-based ship that carried

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<sup>27</sup> Amussen, *Caribbean Exchanges*, p. 29.

<sup>28</sup> “America and West Indies: Dec 1653”, in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W Noel Sainsbury (London, 1860), 412.

<sup>29</sup> Sir George Downing to John Winthrop, Jr. 26 Aug 1645. *Winthrop Papers*, v, pp. 42-5.

<sup>30</sup> *CJ*, Sent to Hartlib, 1641 [Nov and Dec]. BL Sloane MSS 3317 ff. 41A-48B.

<sup>31</sup> Larry Gragg, “‘To Procure Negroes’: The English Slave Trade to Barbados, 1627-60”, *Slavery and Abolition* 16:1 (Apr 1995): 65-84.

pipe staves to the Canaries and “Africoes” from Cape Verde to Barbados from which it brought wine, sugar, salt, and tobacco back to New England. Another vessel, captained by a close friend, traded directly between New London, Connecticut Colony and Barbados.<sup>32</sup>

The political structure of Barbados reflected the power of the plantation owners. In 1630, landowners elected Henry Hawley governor, and he formed a council of leading planters. Hawley referred to them as “burgesses” and the council a “parliament”. Voting rights were given to 1,500 planters who owned at least ten acres; approximately one-quarter of the population owned at least one acre. Hawley followed the example set by Courteen and encouraged planters to plant tobacco in spite of its inauspicious beginnings. From Barbados and St. Christopher’s, the English took possession of several additional islands during the 1620s and 1630s including St. Vincent (1625), Tortuga (1625), Providence (now the Columbian Department of Isla de Providencia) (1630), Montserrat (1632), Antigua and Barbuda (1632), and Tobago (1637). English-speaking lumberjacks also partnered with pirates to establish unofficial settlements in Belize.<sup>33</sup>

Trade was valuable to the survival of these colonies but vulnerable to piracy in the West Indies regardless of the contents in a ship’s hold. Pirates were a much-debated topic within the government and within the Hartlib Circle. It was commonly known that the government unofficially tolerated, and sometimes openly contracted with them, employing them for covert operations against hostile foreign neighbours. As early as 1634, however, the debate among Hartlib’s correspondents concerned how to procure a full freedom of the sea, because they and the merchants held piracy to be the most serious detriment to their various interests.<sup>34</sup>

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<sup>32</sup> See *Winthrop’s Journal: ‘History of New England’, 1630-1649*, ed. James K. Hosmer (New York, 1908), ii, p. 227; and *John Winthrop to Hartlib*, 10 May 1661, *HP* [32/1/10A-11B].

<sup>33</sup> See Nigel Bolland, “Belize: Historical Setting” in *A Country Study: Belize*, ed. Tim Merrill (Washington, 1992) and Matthew Restall, “Creating Belize: The Mapping and Naming History of a Liminal Locale”, *Terrae Incognitae* 51:1 (21 Feb 2019): 5-35.

<sup>34</sup> News from the Continent, In German and English, 7 Dec, 10 Dec, 11 Dec 1634, *HP* [11/1/19A-B].

Sometimes the government allowed privateers space on English colonial soil to establish safe harbours for pirates but this policy was never supported by Hartlib or his associates.<sup>35</sup> These makeshift villages had little income other than that procured by raids against foreign ships, and they showed no evidence of interest in agricultural improvements or trade. Although pirates were forbidden from flying the English flag, and responsibility for pirate activities was officially denied, government-endorsed piracy in the West Indies prospered in the seventeenth-century, often at the expense of English trade and colonial security.<sup>36</sup>

Piracy, according to Hartlib, was a Pandora's Box that was not easily contained. Competing European powers used the practice against English ships and by 1651 unarmed English merchant ships were being attacked by Irish pirates off the coasts of the Scilly Isles and Jersey as they departed England for the West Indies. One anonymous first-hand account described leaving Dartmouth and being, "for want of a guard upon the Western Coast", attacked daily by pirates "in Shallops and small Vessels, that rove abroad at Catch, for an advantage".<sup>37</sup> It was the common practice of pirates in the British Isles to make a fast theft and then to quickly disappear into small rivers for shelter where no larger ship could follow. Moreover, this source reported, they were protected by larger ships "of they own Confederacy", which were positioned near Land's End. As was a common pirate practice in the West Indies, the Irish pirates divided their take equally between each man on the robbing ships, keeping only a small reserve for maintaining their vessels. This was a massive problem for English trade, and eliminating the Irish, or "Sicillian", pirates quickly became a national priority. The pirates were not easily defeated, however, and in 1652 Child reported to Hartlib that "the seas haue bin somewhat troubled with pyrates" but were being cleared by four or five frigates

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<sup>35</sup> Amussen, *Caribbean Exchanges*, p. 37.

<sup>36</sup> *Ibid*, pp. 37-9.

<sup>37</sup> Printed Pages of News Used as Wrapper for Notes on Fruit Trees. Mar 1651, *HP* [55/14/1A].

authorised by Parliament.<sup>38</sup> Although the West Indian pirates were arguably a bigger threat to English trade, no such action against pirates was forthcoming and some piracy was secretly encouraged.

Despite taking advantage of free trade with foreign ships, the population of Providence had grown to only 300 by 1635, including more than 100 slaves. Hartlib was aware of Providence's struggle and wrote that the colony had lost the Providence Island Company more than £100,000.<sup>39</sup> Once the company grew weary of financial losses, they authorised piracy, which further aggravated the Spanish. The level of their concern, according to Hartlib, was known when the Venetian ambassador's packets were opened in London.<sup>40</sup> Providence was one of several colonies where soap was made, but after the Spanish captured the island in May 1641, all production ended and the survivors fled to Barbados.<sup>41</sup> As one of the first to hear of the attack, Hartlib scribbled onto his copy of a *Journal of Proceedings of the House of Commons* (even before the full details of the incident were publicly known in London) that "The Isle of Providence is certainly in the Enemy's hand either of Negro's or the Spaniards" and understood this to be the reason the Lord Mayor of London "did ride up and downe the streetes in London till 3. a Clocke apprehending a number of Papists and other suspitious Persons". By then, Philip Bell and the other survivors had emigrated from Providence Island to Barbados -- despite his recent arrival, Bell was elected governor of Barbados by the local council in the same year.<sup>42</sup>

Tobago, as opposed to Providence, was constantly attacked by every Caribbean power and changed hands at least 33 times during the period, despite the English claim and settlement

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<sup>38</sup> Child to Hartlib, 23 Jun 1652, *HP* [15/5/12A].

<sup>39</sup> *CJ, Sent to Hartlib*, 1641 [Nov and Dec]. BL Sloane MSS 3317 ff. 41A-48B.

<sup>40</sup> *Ibid.*

<sup>41</sup> "The Voyages of Captain William Jackson, 1642-1645" in *Camden Miscellany*, ed. Vincent Harlow (London, 1924), xiii, p. 15.

<sup>42</sup> *CJ, Sent to Hartlib*, 1641 [Nov and Dec]. BL Sloane MSS 3317 ff. 41A-48B.

of 1637. The island was also claimed by the Baltic Courlanders and Hartlib discussed Polish pistols made for Tobago that were “shorter by far then the ordinary long ones ... yet will doe as great execution and will shoote as far as any of the ordinary ones”.<sup>43</sup> The guns may have been produced to defend Latvian Curland against the Polonians, but since Hartlib mentioned them in the context of a focus on West Indian trade and pirates in 1661, they may have also been among the several goods being sent into the Caribbean by the Courlander leader Jacob Kettler.<sup>44</sup> As Duke of Courland and Semigallia, Kettler traded with The Netherlands, Portugal, England, and France and implemented improvements in Tobago to facilitate agriculture, manufacturing, and shipbuilding. He achieved political autonomy from Poland and built a fortress on the Gambia River in West Africa in order to establish his own supply of African labour in 1651.<sup>45</sup> Tobago prospered as *Neu Kurland*, until Kettler was captured by the Swedes and imprisoned from 1658-1660, during which time his colonies were attacked, and his fleet was destroyed. Nicholas Mercator reported to Hartlib from the continent that both principalities (the colony and the homeland) were “saddened” in their poverty.<sup>46</sup>

As Barbados continued to struggle economically, and suffered for lack of an alternative to replace tobacco as the dominant cash crop, the planter James Drax travelled to Brazil, where he learned how to plant, cultivate, and harvest sugar.<sup>47</sup> He returned to begin a trial of planting sugar in Barbados in 1640, when the population of Barbados had grown to more than 10,000 compared to only 8,000 in Virginia at the same time.<sup>48</sup> Of this number, 8% in Barbados were

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<sup>43</sup> Ephemerides, 1658, *HP* [29/7/1A-16B].

<sup>44</sup> See Dury to [Hartlib], 1 Apr 1661 [4/4/8A-B]; and John Winthrop to Hartlib, 10 May 1661, *HP* [32/1/10A-11B]; and *Copy Extracts, ? to Hartlib?* May 1661, BL Add. MSS 4159 ff. 26A-28B; and Aug 1661, ff. 56A-57B.

<sup>45</sup> See Ephemerides, 1654 Part 1 [1 Jan-24 Apr], [29/4/1A-12B]; and Extracts from Poleman in Scribal Hands A, ? & Mercator, German & Latin, 25 Jul 1659 – 19 Sep 1659, *HP* [60/4/30A-37B].

<sup>46</sup> Extracts from Poleman in Scribal Hands A, ?& Mercator, German & Latin. 25 Jul 1659 – 19 Sep 1659, *HP* [60/4/30A-37B].

<sup>47</sup> Gibson, *Empire's Crossroads*, p. 61.

<sup>48</sup> Amussen, *Caribbean Exchanges*, p. 27.

African slaves, reflecting the colony's increasing participation in the so-called triangular trade. At this point, over 90% of the island's population was European, while 94% was male. As with every English colony before the Restoration, most of these people were indentured servants, and Hartlib noted in 1653 that Drax used such men roughly in the development of sugar production on Barbados.<sup>49</sup> Conditions were harsh and unforgiving, and the colonist Richard Ligon argued they were worse than those endured by slaves due to the temporary nature of indenture.<sup>50</sup>

#### **4.4. Barbados After Sugar: 1641-1655**

West Indian English planters attempted to produce tobacco exclusively in the 1620s and 1630s and then, during the 1640s, they shifted to sugar wherever the quality of tobacco was poor. During the transition, however, a variety of crops were planted, some more successfully than others, and many were encouraged by Hartlibians, who promoted diversification even while experimenting to improve the quality of tobacco and sugar.<sup>51</sup> One anonymous "faithful servant" described for Hartlib how some plants were "great Travellers" and some were not.<sup>52</sup> Coffee production was mentioned, even though consumption of coffee was new in 1641, but more was said about crops that were becoming increasingly familiar to seventeenth-century settlers such as pineapples, cotton, ginger, indigo and pears.<sup>53</sup> Hartlib and his correspondents experimented on various uses of these plants and, by the end of the 1650s,

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<sup>49</sup> Gibson, *Empire's Crossroads*, p. 61.

<sup>50</sup> Richard Ligon, *A True and Exact History of the Island of Barbados* (London, 1657), p. 43.

<sup>51</sup> Ephemerides, 1653 Part 2 [2 Mar-May], *HP* [28/2/54A-52A].

<sup>52</sup> Copy Letter in Hand H, ? to Hartlib, undated, *HP* [8/22/1A-4B].

<sup>53</sup> Brian William Cowan, *The Social Life of Coffee: The Emergence of the British Coffee House* (New Haven, 2005).

had found profitable applications for many of them as food, dyes, and medications.<sup>54</sup> Cultivation of roses in the English Caribbean also appears in Hartlib's papers, mentioned by those who had been to the West Indies and discussed by those in England who saw the potential for fresh flowers if issues of preservation during transit could be resolved. Although roses themselves were not a typical Hartlibian staple, the trade was lucrative. The experiments made to preserve them in transit were evidently relevant to the preservation of other perishable crops, and the ability to import them from the West Indies might prevent England from relying excessively on The Netherlands to satisfy its new taste for exotic garden flowers. Natural resources such as clay, diamonds, sulphur, pearls, salt, saltpetre, silver, and tar, which were less perishable in transit, were already being extracted and exported to England. Finally, soap was the single manufactured good mentioned by Hartlib that was exported in a finished form from the West Indies.<sup>55</sup>

No sugar was exported from Barbados until 1643 but within a year, the staple proved such a successful export that it had become the largest crop; Drax was thereafter the wealthiest planter in the West Indies. Numerous experiments were devised to improve the production process and, despite Hartlib's concerns over dependence on a single dominant crop, profits from sugar enticed planters throughout the West Indies and pushed out potential alternatives, as landowners committed as many acres as possible for the purpose of planting sugar cane. One important by-product of sugar, molasses, was made into rum. Hartlib had little to say about West Indian rum, preferring to call it treacle, but George Starkey told him that Barbados

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<sup>54</sup> Regarding medications, see, for example, Copy Letter In Hand H, ? To Hartlib, undated [8/22/1A]; Notes And Recipes, In German, Latin & English, part Dated 31 Jul 1659 [30/1/6B]; and Printed Pamphlet, 'General Accommodations', Adolphus Speede, undated, *HP* [57/3/8/5A].

<sup>55</sup> *Ephemerides*, 1653 Part 2 [2 Mar-May], *HP* [28/2/54A-52A]. See also Copy Letter in Hand H, ? to Hartlib, undated, *HP* [8/22/1A-4B] and John Rushworth, "Historical Collection: Dec 1641" in *Historical Collections of Private Passages of State: Vol. 4, 1640-42* (London, 1721), pp. 5, 9.

molasses was better than English molasses because the former was mixed with lime.<sup>56</sup> Other sources indicate it was first produced on West Indian plantations by Africans in the seventeenth-century; one tradition holds that the first English rum came from Nevis. Before 1660, the rum produced in the Caribbean was low in alcoholic content by volume but often contained life-threatening impurities. Nonetheless, it was traded early with New England, Virginia, English ships, and pirates.<sup>57</sup>

In the wake of the Irish Rebellion of 1641, the number of Irish captives being sent involuntarily to the West Indies rose dramatically, and these forced transplantations did not decline until long after the reconquest of Ireland by Cromwell. Having heard about the Irish Rebellion and the English civil wars, many Irish servants already working in the West Indies seized the opportunity to escape their plantations and flee from their islands. Some used fishing boats, while others bribed their way onto trade ships. English sources documenting these escapees are rare, but Spanish records indicate the arrival of English-speaking Irish labourers into their colonies, presenting themselves to the Spanish garrisons for asylum, asking to be allowed to “live among Christians as Catholics”.<sup>58</sup>

The preservation of labour and the development of trade were crucial for implementing Hartlibian goals. Worsley was instrumental in promoting these efforts through his crafting of the Navigation Acts - even though the provisions of the legislation, meant to benefit the mother country, were often harmful to individual colonies.<sup>59</sup> Indeed, a class action complaint was introduced to Parliament in 1641, a full decade before the Act passed from several English colonies, and the plea called for relief for a “Decay of Trades”, complaining of heavy import

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<sup>56</sup> Copy Notes on Bees from Culpeper/Sirk, In Hartlib’s Hand. 14 Feb 1653, *HP* [55/3A].

<sup>57</sup> See Anthony Dias Blue, *The Complete Book of Spirits: A Guide to Their History, Production, and Enjoyment* (HarperCollins, 2004), p. 70.

<sup>58</sup> Block and Shaw, “Subjects Without an Empire”, pp. 33-60.

<sup>59</sup> Charles Webster, *Great Instauration*, p.463.

and export duties between English ports, unfair pricing by merchants, and corruption in government.<sup>60</sup> When the complaint went unanswered, the colonies continued to struggle. As represented by Worsley, those in Hartlib's network favoured the state in resolving issues of trade with merchants or planters. They understood colonies to be extensions of the homeland and believed that they had been principally established to benefit the national economy. Worsley himself was adamant that English colonies should only trade with England on English ships, despite planter claims that goods could be purchased at lower prices from foreign competitors.<sup>61</sup>

In order to more properly manage trade, many Hartlibians advocated the creation of an English West India Company, comparable to both the English East India Company and the Dutch West Indian Company, to oversee and organise life and work in the colonies of the Caribbean. Cressy Dymock, for example, argued that a poor return on an investment in the English East India Company was no less valuable for all the beneficial works that were accomplished by that company for the common good. It was not, therefore, advisable, according to Dymock, for an Englishman to invest in any foreign company even though many did so with success. On this topic, Robert Child complained bitterly that while the Dutch West Indian Company was building ships in New Amsterdam, New England was subsisting on a "bever-trade with the Indians".<sup>62</sup>

Hartlib observed in 1641 that both houses of Parliament had openly authorised piracy against the Spaniards, the members of Parliament reasoning "it the only way to Restore the Prince Ellector to his owne Country or to a better".<sup>63</sup> The Elector Charles Louis's country was the Palatine which his father had lost in 1621 for participating in the Bohemian Revolt. He and

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<sup>60</sup> Rushworth. "Historical Collections", pp. 214-22.

<sup>61</sup> Charles Webster, *Great Instauration*, pp. 363-5.

<sup>62</sup> Copy Letter in Scribal Hand B, Robert Child to Hartlib? 24 Dec 1645, *HP* [40/5/1A].

<sup>63</sup> *CJ*, Sent to Hartlib, 1641. BL Sloane MSS 3317 ff. 24A-28B.

his wife, Elizabeth Stuart, were monarchs in Bohemia for less than one year, but became favourites of Hartlibians and Parliamentarians more generally as Protestant leaders on the continent. While Hartlib's relationship with Charles Louis is not the focus of this study, he is mentioned in the Hartlib Papers over 200 times and Hartlib was addressed as "servant to his Highnesse The Prince Ellector Pallatine in Dukes Place" two years after the authorisation of piracy in Parliament.<sup>64</sup> Hartlib supported the Prince's restoration but was firmly against the logic behind the legislation authorizing privateers. Piracy amounted to an undeclared war against Spain, according to Hartlib, and was a losing proposition as a weapon to protect or promote English trade. Regarding the 1641 legislation, he wrote for comparison that just as the English could send 4,000 Irish to invade Spain, the Spanish could just as easily send 4,000 Castilians to attack English colonies like Barbados or St. Christopher's in the West Indies. Fearing an arms race, one anonymous author in 1645, who may be Worsley, informed Hartlib that the Dutch had armed their merchant ships, likely because of pirates. He added that this armament also made potential conflict with unarmed English ships more likely.<sup>65</sup> To Hartlib, any advantage piracy might have given to England against the Spanish or to the Prince Elector was outweighed by the damage it would cause to improvement projects in the West Indies.

Many other nations showed substantial interest in colonising the Caribbean. One proposal came from the Dutch geographer Johannes de Laet, an acquaintance of Dury and one of the founding directors of the Dutch West India Company, who published several editions of his *History of the New World* following its initial publication (*as Nieuwe Wereldt ofte beschrijvinghe van West-Indien*) in 1625. In 1642 he informed Dury personally of proposals he had made to the company for the further expansion of the Dutch into the Americas, in part

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<sup>64</sup> Johann Morian to Hartlib, 22 Jan 1643, *HP* [37/100B].

<sup>65</sup> News from the Continent, Anon. 5 Oct [No Year], *HP* [11/1/127A].

to thwart Spanish tyranny He added that he had been invited to speak to the next meeting of the company about a specific plan for colonial expansion.<sup>66</sup> A few years later, William Waller, an acquaintance of Hartlib who had had a “very good correspondence” with de Laet for at least two years, told Hartlib that he had also discussed designs for the western world with him.<sup>67</sup> Waller told Hartlib that he longed to see plans made for the English colonies of the West Indies similar to the Dutch designs for Brazil that were described by de Laet. He noted that De Laet had complained about the participation of men motivated by private interests, an opinion that was, of course, received favourably by Dury and others in the Hartlib Circle. Worsley added that he thought de Laet’s history was “much more pleasant and acceptable” than that of the Jesuit Eusebius of Nuremberg’s *De la diferencia entre lo temporal y lo eterno*, in a manner that suggested that the latter’s contents were common knowledge, though no record of Eusebius’ work is found in the Hartlib Papers. On the other hand, De Laet’s book was well known to Hartlib’s associates and was mentioned by Comenius in his *Linguarum Methodus Novissima* of 1648, in conjunction with Comenius’ discussion of America.<sup>68</sup>

No assessment of the Hartlibians’ participation in the colonisation of the West Indies would be complete without considering Hartlib and his correspondents’ role in promoting Protestant Christianity among the Native Americans and African slaves. The propagation of the Gospel overlapped with Hartlib’s educational programme and was, in every way, as important to Hartlib as experimentation and trade. No Hartlibian curriculum was conceivable without a solid theological component - this was particularly true for Hartlib’s conception of education in the colonies and it was central to Hartlib’s conception of West Indian

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<sup>66</sup> Dury to Hartlib, 23 Oct 1642, *HP* [2/9/39B]. See also Arthur Weststeijn, “Republican empire: colonialism, commerce and corruption in the Dutch Golden Age”, *Renaissance Studies* 26:4 (2012), 496-7

<sup>67</sup> William Waller To Hartlib, 26 Sep 1647, *HP* [32/2/28A] and 14/24 Jan 1648 [32/2/21A-22B].

<sup>68</sup> *Ibid.*

improvement. Hartlib understood the value of an educated workforce, but his correspondence indicates a genuine concern for the souls of the non-Christian populations.<sup>69</sup>

Hartlibians had long promoted the evangelism and conversion of Jews, and were in favour of baptising Indians and Africans, whether slave or free. Focused on profit, planters remained anxious about the social effects of promoting Christianity among the labour force. The representative assembly of Barbados guaranteed freedom of religion in 1644, declaring “all faiths” equally respected, whether Anglican, Catholic, Jew, or Quaker. Although this policy lasted until the regicide, it did not imply any endorsement of the evangelism of the involuntary slave population. The restriction against baptising slaves set a precedent but had limited application during the period since the number of non-indentured labourers remained low in the English colonies before the Restoration. Winthrop’s cousin reported to him in New England that there were only 800 African slaves in Barbados in 1644, a much larger number of indentured servants, while both groups were predominantly male.<sup>70</sup> After the English civil wars involuntary servitude included royalists known to some as “malignants”. The state papers provide evidence of the “enslavement” of captured royalists, and Hartlib linked the word to the status of English prisoners sent to the West Indies as servants. A royalist document produced in Oxford during the king’s occupation, reported in 1644 that “Lords and Gentlemen who were Prisoners” were accounted to have been “sold as Slaves” and were to be sent to the West Indies.<sup>71</sup>

A useful work that supplemented De Laet's *History*, was the anonymous *Certain Inducements to Well-Minded People*, published in 1644.<sup>72</sup> Although Hartlib seems to have known who the author was, no clues are given of this person’s identity in the work, although

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<sup>69</sup> Dury to Hartlib, 18 Sep 1642, *HP*. [2/9/24B].

<sup>70</sup> George Downing to John Winthrop. 26 Aug 1645. *Winthrop Papers*, v, 43.

<sup>71</sup> Rushworth, “Historical Collections”, pp. 559-603.

<sup>72</sup> *Certain Inducements to Well-Minded People* (London, 1644).

the ten “inducements” concerned the West Indies and Barbados in particular. St. Kitt’s, Providence, Antigua, Barbuda, and Belize, however, were also mentioned in this short, 24-page history of the West Indies. The work links two projects uniquely important to the Hartlib Circle in the 1640s: trade and evangelism. *Inducements* investigated why the natives of the West Indies spoke Spanish, even though the Spanish had treated them so poorly and concluded that, because these same natives already possessed some knowledge of God before contact with Europeans, evangelising among the natives should be an easy mission. The author included a customary survey of vegetation, animals, sea life, and birds, arguing that the West Indian islands had greater potential for success as English colonies than either New England or Virginia. The document included information about how colonies could solve poverty and unemployment, cultivate silkworms, and cure kidney stones, and it repeated information from sources such as de Laet. This history reads like a motivational speech, and its author concluded that any person with the means and ability who was unwilling to migrate to the West Indies, could not possibly claim to be a Christian with integrity. Whoever wrote *Inducements* confirmed much of what had been previously written in Antonio de Herrera y Tordesillas’s *Descripción de las Indias Occidentales* and de Laet about advantages to be gained from Caribbean colonisation, but he or she drew their own Anglocentric conclusions.<sup>73</sup>

While evangelism was being debated, both English and colonial trade with the West Indies was growing apace. In 1645, for example, Robert Child gave evidence of regular shipments of cotton emanating from the West Indies for finishing in New England.<sup>74</sup> Child did not say whether the cotton was carried by Dutch or English ships, but cotton was the major staple grown in Barbados, prior to the introduction of sugar, and was the leading substitute for

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<sup>73</sup> See, for example, *Certain Inducements*, pp. 9, 10, 14.

<sup>74</sup> Copy Letter in Scribal Hand B, Robert Child to Hartlib? 24 Dec 1645, *HP* [40/5/1A-2B].

tobacco across the West Indian colonies. Beale was aware of West Indian cotton, the traditional variety and, for him, the more interesting Cottonwood Tree.<sup>75</sup> He had acquired Cottonwood seeds from the West Indies and had found that the trees initially grew well in England, until they died due to cooler winter temperatures. However, he suggested to Hartlib that English soil would not sustain the trees, even if the frost did not kill them. According to one anonymous correspondent who identified himself to Hartlib as only “your affectionate servant”, cotton, pepper, and indigo were identified among the “great Travellers” but they were plants that needed to be grown in their native climate since they “will hardly appeare or shew themselves at all in a colder Countrey”. Others were known to not only travel well but were able to grow in a variety of climates, even in England. The former group, including cotton, were categorised “strict” plants, some “very strict”.<sup>76</sup> This same cotton was soon being grown in limited acreage alongside tobacco in Virginia.

Hartlib’s correspondence inevitably contained vigorous discussions of West Indian ailments and the thriving trade in remedies. While Hartlib himself was perennially concerned with understanding disease and developing medications for prescriptions, the wider network was keen to know what specific diseases were encountered in the West Indies. It was well known that tropical diseases were vastly different from the various illnesses experienced in Virginia and New England, where the climate was cooler. The greater Caribbean was assumed to be teeming with new dangers, saddled with a great variety of reptiles, poisonous spiders, parasites, and infections. Hartlib owned a copy of a letter written from an Englishman in Guinea to his friend in Spain, in which the writer related his having suffered from Guinea worm disease, which he called “Bichos” meaning bug, vermin, or beast.<sup>77</sup> Hartlib included examples

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<sup>75</sup> Beale to Hartlib [With Edmund Pytt To Beale?], 14 Dec 1658, *HP* [51/43A-B].

<sup>76</sup> Copy Letter in Hand H, ? to Hartlib, undated, *HP* [8/22/1A-4B].

<sup>77</sup> Extracts on Water Purification in Scribal Hand B, Worsley & ? 14 May 1645 – 28 May 1648, *HP* [71/15/2A].

such as this from across the known world in an encyclopaedia of all diseases with their remedies, as part of his proposal for the Office of Address.<sup>78</sup>

As a preventative for Guinea worm, and in order to support a growing trade by ships, Hartlib recognised the need to guarantee a fresh water supply on ships and in the colonies. Ship captains making shorter voyages before the seventeenth-century were aware of this requirement, but on trans-Atlantic journeys there were no refilling points in the 2,500 miles between Cape Verde and Barbados. Although faster ships and more experienced captains had reduced the travel time to the Caribbean to as little as six weeks, open water remained potable on these ships for no longer than a fortnight. Sailors depended on rainwater, but the weather did not always cooperate and the water from rain was not enough on most voyages. “The waters stink & are unhealthful”, Dury told Hartlib, who naturally claimed to have a friend able to make fresh water from sea water.<sup>79</sup> Desalination was a hot topic among the Hartlib group, and Dury inquired of Hartlib how much he thought the Dutch Indian companies would have been willing to pay for such a secret. Worsley informed Hartlib in 1645 that there was a man in Middelburg (Zeeland) who knew the secret of desalination, which he called *alexipharmacum*, and he wrote that he had seen the process performed several times.<sup>80</sup>

Significantly, Hartlib was in possession of a draft version of the royalist Richard Ligon's influential *A True and Exact History of the Island of Barbadoes* in 1657. Although there is no direct evidence that Hartlib assisted Ligon in its publication, Ligon most likely wrote the book in London, and references to it proliferated quickly in Hartlib's correspondence before its publication.<sup>81</sup> Within two years, it was the most popular source for information about the West Indies in general and Barbados specifically. No one seems to have appreciated Ligon's work

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<sup>78</sup> Printed Pamphlet, ‘General Accommodations’, Adolphus Speede, undated, *HP* [57/3/8/4B].

<sup>79</sup> Dury to Hartlib, 4 May 1645, *HP* [3/2/117B].

<sup>80</sup> Extracts on Water Purification in Scribal Hand B, Worsley & ? 14 May 1645 – 28 May 1648, *HP* [71/15/2A].

<sup>81</sup> Amussen, *Caribbean Exchanges*, p. 46.

more than Beale, who often cited Ligon's authority in his letters to Hartlib, and who noted that “Our American travayler & particularly Ligon hath taught us how to feast Adame without breach of the Lawe of his Botanicall diet”, a possible reference to Adolphus Speede’s *Adam Out of Eden*.<sup>82</sup> Beale’s correspondence suggests that Hartlib later had a printed copy of Ligon's work, and he was meticulous in citing the page number for each of his comments, which Hartlib could easily reference. For example, in 1659, in the process of discussing telescopes with Hartlib, Beale wrote, “wee may devise to fit glasses to the Palmette royal of the Barbados which are described by Ligon”, and cited page 78 of the work.<sup>83</sup>

As a political refugee Ligon had departed for Barbados 14 June 1647 and spent three years in the colony making detailed notes of everything he observed, from plants and animals to the work and leisure of the labourers. Ligon’s was the type of natural history Gerard Boate had produced for Ireland and was the kind of Baconian database that Hartlib deemed essential for every colony. Ligon gave specific information regarding the planting, growth, harvesting, and processing of sugar, made drawings of plants, and created maps. He provided numerical tables of plantation costs and expenses, and his published work even included an index. Ligon’s migration to Barbados was made possible by the patronage of the prominent Barbados Planter, Sir Thomas Modyford, whose defection from the royalist cause in Barbados, during the Reduction of 1653, was instrumental in the success of Parliament against the royalist governor Willoughby.<sup>84</sup>

In Barbados, Ligon tasted various foods and drinks and gave descriptions of each along with comparisons to staples in England with which his readers would have been familiar. His portrait of life in Barbados allowed readers to see how Europeans, particularly the English,

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<sup>82</sup> See Beale to Hartlib, 18 Jan 1658, *HP* [51/55B]; and Hartlib to Boyle, 15 Nov 1659, *The Works of the Honourable Robert Boyle*, ed. T. Birch, 2<sup>nd</sup> edn. (6 vols, London, 1772), vi, pp. 131-3.

<sup>83</sup> Extract, ?Beale to? 6 Mar 1659. RS MSS, *Boyle Letters* 7.13, 1A-3B.

<sup>84</sup> Matthew Parker, *Willoughbyland: England’s Lost Colony* (London, 2015), p. 87.

perceived slaves and their importance to the success of sugar trade. Ligon observed that slaves were more humanely treated than indentured servants and explained that this was because a servant's service was limited to few years by their indenture, while slaves were life servants whose potential production was increased by their longevity, which could be extended by better nutrition. He also argued that slaves were reluctant to rebel against their masters on the basis that they had no weapons, were fearful of their masters, and spoke a variety of languages among themselves. He observed that planters bought slaves "stark naked" and, "as they do Horses in a market", traded in "the strongest, youthfullest, and most beautiful".<sup>85</sup>

In 1648, seven years after the loss of Providence Island in the Western Caribbean, indefatigable Puritans, still anxious to plant a godly colony "in the south", established a new settlement, also named Providence, within the Bahama Islands. This colony, often confused with Bermuda in the Hartlib Papers, was referenced by a multitude of names, including the Bermudas, New Providence, Lucayan Islands and Eleutheria, each with its own variety of spellings. In 1649, for example, Hartlib referred to the colony as the "Eleutheria-Plantation amongst the Bahama Islands".<sup>86</sup> When Johann Morian wrote to Hartlib to learn more about sea turtles, he asked about the "Luckyicke Islands".<sup>87</sup> Hartlib, responding to Morian, wrote of "the Charibby & Lucayicke Islands". The name "Lucayan" was sometimes used as a reference to the Lucayan Indians who once inhabited The Bahamas -- "Lucayan" was an Anglicisation of the Spanish "Lucayos", which originally meant "people of the islands".<sup>88</sup>

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<sup>85</sup> Ligon, *A True & Exact History*, p. 97.

<sup>86</sup> *Ephemerides*, 1649 Part 3, Jul/Aug-Dec, *HP* [28/1/26B].

<sup>87</sup> Johann Morian to Hartlib, In German. 22 Jun 1657, *HP* [42/2/10A-11B].

<sup>88</sup> Copy Stone Recipe from Richard Ligon's *History of Barbados*, In Hand D. [1657], *HP* [55/4/1A].

As explained in the previous chapter, the Bahamas were one of the many New World locations Hartlib proposed for a possible Antilian Colony.<sup>89</sup> After other potential sites were

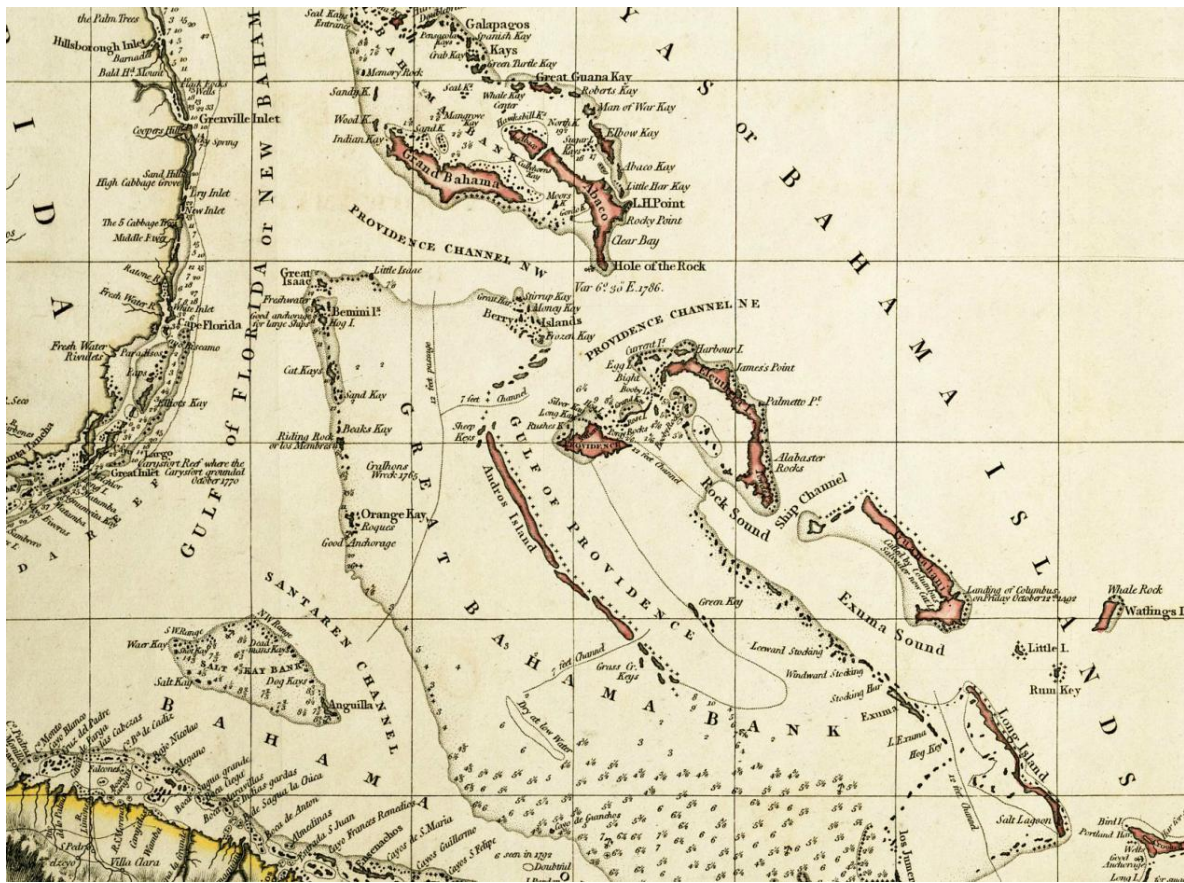


Figure 4.3: The Bahama Islands featuring several uses of the name “Providence”

rejected, the West Indies were briefly considered because they were navigationally closer to Europe but no less hazardous for vulnerable refugees and were completely exposed to Spanish attacks. The climate of the Bahamas was more favourable than Virginia, however, and Hartlib promoted the Bahamas as a possible location for this dedicated scientific community to Fridwald and others like him who were searching for safe spaces for dislocated populations.<sup>90</sup>

<sup>89</sup> Copy Memo in Scribal Hand B, Profits Presented to the Kingdom, undated, *HP* [53/32/1A-7B].

<sup>90</sup> *Ibid.*

#### 4.5. Self-Pivoting Propellers, Colored Colts, and Mechanical Carts

All of the colonies continued to suffer for need of adequate labour and as late as 1648, the Royalist Parliament in Oxford was recording that “common soldiers” were to be sent to the West Indies by the London Parliament “to serve the *English*”.<sup>91</sup> These particular captives were those 3,000 taken at the Battle of Pembroke who had served under Royalist Maj. Gen. Rowland Laugharne and who were subsequently sent to the Caribbean. Few Hartlibians had any sympathy for these “malignants” and they were quick to record their negative opinions of captured royalist soldiers. For example, Culpeper, who was assisting in development of an engine to improve the refining of sugar in the West Indies, wrote to Hartlib arguing that the war would soon be over because all the agricultural areas of England were firmly on the side of the Parliamentarians. The royalist counties were “malignant”, he said, as were those men who had fought “on the other side”.<sup>92</sup>

In response to the chronic shortage of labour, one of Hartlib’s favourite ideas for the improvement of the West Indies was the invention and development of labour-saving machines such as Dymock’s perpetual motion engine. This plan is significant in a discussion of labour in the West Indies because of the resistance to labour-saving devices that arose among some planters. Within the context of contemplating sugar mills in Barbados, Hartlib complained in 1648 about “the stupidity of custome” according to which some planters were content to have labourers toil like horses and have ropes upon their bodies, rather than to free themselves and improve efficiency with new technology. The rationale underlying their resistance was further complicated by these same planters’ ongoing complaints regarding the shortage of labour. The

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<sup>91</sup> John Rushworth, “Proceedings in Parliament: 1<sup>st</sup> May–1<sup>st</sup> Jun 1648”, in *Historical Collections of Private Passages of State: Volume 7, 1647-48*, (London, 1721), pp. 1097-134.

<sup>92</sup> Culpeper To Hartlib, [autumn 1643?], *HP* [13/319A-320B].

demand for labour was so strong in the period, Hartlib knew that there would be no shortage of tasks for those labourers who may have been displaced by the use of labour-saving technology.<sup>93</sup>

Dymock's perpetual motion engine was an ongoing project that involved many philosophers and mechanics, but as early as 1648 he shared his idea with Hartlib of using it to make the refining of sugar more efficient.<sup>94</sup> Once cut, sugar cane had to be processed within three days of the harvest in sugar mills, or the sugar was spoiled. In the beginning, the cane was crushed by wooden or metal rollers, which were powered by cattle and horses walking in an unending circle and turning a drive shaft. Sugar refining in the seventeenth-century was a dangerous, labour intensive process; human labourers fed the cane into the rollers, which only turned as fast as the livestock walked. The hands of the labourer were sometimes caught by the rollers and crushed as they were pulled inside the machinery; others occasionally fell into the boiling pots of sugar and were burned. Thus, Dymock promised Hartlib an engine to replace the animals in the mills and "an invention to ease the horse-like labors of bargemen haling their vessels against the streame". Hartlib added that Dymock's engine was "especially" applicable to the sugar mills of Barbados.<sup>95</sup>

Dymock's engine is often been criticised by commentators simply because the Hartlib correspondents referred to it as a perpetual motion machine. The notion that it could be powered continuously without external force or fuel, has caused some to classify the engine alongside alchemical transmutation, the philosophers' stone, fairies, and witches. However, no one in the Hartlib Circle suggested any self-powered magical marvel but rather intended a mechanical device powered by external sources. Dymock was experimenting with weights, water, and wind

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<sup>93</sup> Ephemerides, 1648 Part 1 [Jan-Jun], *HP* [31/22/1A-13B].

<sup>94</sup> Ephemerides, 1648 Part 1 [Jan-Jun], *HP* [31/22/7A].

<sup>95</sup> Ephemerides, 1648 [Jan-Jun], *HP* [31/22/7A]. See also Proposal For Work By Dymock And Worsley, Hartlib, undated [62/37/1A, 1B]; and Memorandum About Engines, Dymock, undated, *HP* [62/8A-B].

to power his engine, which was a type of water or windmill. It was as perpetual as the energy source that powered it and was thus a very primitive prototype of what became a steam engine.<sup>96</sup> At the same time, Petty was developing a similar machine powered by fire.<sup>97</sup>

Adolphus Speede claimed that Dymock had successfully pumped water vertically 20 yards with his engine and expressed confidence that it would drive a mill.<sup>98</sup> Dymock spoke for himself in a memorandum about engines in c. 1651:

If my engine bee made vse of in the Barbados for the grinding of sugar there will nessesarily follow (besids all private benifitts) this publike advantage that whereas they are now forced to let many acres ly for fother for those draught cattle winter & somer the profit thence arising being farre short of what the same land would yield if planted with sugar canes, cotton, Indico, or the lyke, by this meanes all that land may bee converted to those more beneficiall vses, to the great increase & trade of those more staple comodities.<sup>99</sup>

The historical literature records that Charles Pinney installed the first steam engine in a West Indian sugar mill when he imported one to his Nevis plantation in 1825. The Hartlib Papers, however, suggest that Dymock's engine was at least tested in the seventeenth-century West Indies, and this claim is reinforced by the fact that, by 1663, plantations were using windmills to replace horses in the sugar mills. Furthermore, Dymock was the leading developer of any such engine at that time in England, and, although James Drax was said to have built a mill in Barbados according to the Dutch design, the classic Barbadian windmill is an English design and there is no indication these mills were imported from any other country before or immediately after 1663.<sup>100</sup>

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<sup>96</sup> Ephemerides, 1649 Part 2 [Apr-August], *HP* [28/1/15B].

<sup>97</sup> Ephemerides, 1649 Part 1 [Jan-Apr], *HP* [28/1/10B].

<sup>98</sup> Printed Pamphlet, 'General Accommodations', Adolphus Speede, undated, *HP* [57/3/8/2B].

<sup>99</sup> Memorandum About Engines, Dymock, undated, *HP* [62/8A-B].

<sup>100</sup> Mark Berry, "The Windmills of Barbados", *The Newsletter of the Mills Section of the Society for the Protection of Ancient Buildings* 82 (2000): 7-11; J. Sydney Dash, "The Windmills and Copper Walls of Barbados", *Journal of the Barbados Museum and Historical Society* 21 (1965): 43-60; and Rex Wailes, "Windmills and Steam Power in Barbadoes", *Transactions of the Newcomen Society* 42 (1969-70): 127-48.

Hartlib was never content to focus on one improvement alone but was always experimenting, researching, and promoting a variety of colonial development projects. As we have seen, he sent and received plant samples for trials in England and in the New World. He maintained his own physic garden, classified native English plants, and was interested in the classification of Caribbean flora.<sup>101</sup> He was of course primarily concerned with the use of plants, and one anonymous author to whom Hartlib had sent “treasure” from his garden, included medicine within a discussion of the many uses of Caribbean plants discovered as a result of conducting of trials in “a small Conservatory”. The author referred to a method he and others had employed and thanked Hartlib “for the helping us”, referring to an account “I once saw in your hand”.<sup>102</sup>

In addition to exchanging ideas and samples with the colonists in the West Indies, Hartlib received information regarding the various “wonders” found there and shared it with others in his network. For example, there are several references in the Hartlib Papers regarding the existence of “Peintados” or painted horses in the West Indies.<sup>103</sup> “The Art of painting Horses”, he wrote in 1648, may perhaps give hints to find out the Art of dying” and Petty informed him that Lord Arundel had offered a fortune to acquire one of these *Peintados*. In other cases, information about inventions sent to the West Indies to facilitate production processes sometimes stimulated the minds of ingenious Hartlibians in England. Having described Dymock’s engine to Walter (or Gualter) Frost, Hartlib recorded that Frost had listed some of the applications to be added to those set down for the machine.<sup>104</sup> Frost, who had been Manciple of Emmanuel College and who was a skilled mathematician, was at this time the

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<sup>101</sup> Copy Letter In Hand H, ? To Hartlib, undated, *HP* [8/22/1A-4B].

<sup>102</sup> *Ibid*, [8/22/4A].

<sup>103</sup> *Ephemerides*, 1648 Part 1. [Jan-Jun], *HP* [31/22/1A-13B].

<sup>104</sup> *Ephemerides*, 1652, Part 2. [7 Oct-31 Dec], *HP* [28/2/38B].

assistant secretary to the Council of State, a post he had held since 1649.<sup>105</sup> He prophetically described musical instruments that might be made to play by Dymock's engine, and fans driven to cool rooms, but he also spoke of men flying through the air by means of it, or children riding in "goe-carts" powered by it. The engine would drive coaches for recreation or sport, and elderly people would be provided with extra mobility. Ships would be driven on the ocean, he said, forts would roll across battlefields, and "some thousands of swords" would be wielded by Dymock's machine.<sup>106</sup>

In the meantime, different associates in Hartlib's network were experimenting with a variety of improvement projects in the area of desalination. In 1648, Worsley told Hartlib that he had removed the "sacrament of secrecy" from the subject and had learned a process for desalinisation from a certain Mr Borrells, but he had determined that the final product was worse than drinking urine. He wrote that Borrells' secret was "noe distillation but only an infusion upon a hurtfull or unwholesome minerall". After he shared these discoveries with Johann Morian, they became equally angry with Borrells, who had been paid five pounds for a fraudulent "secret". Worsley and others envisaged many applications for desalinisation, and the trials continued in spite of this disappointment. The other solution they imagined was to take fresh water from the air. This was not rainwater but a process of condensation on a clear day as described to Hartlib in 1656. Two Swiss brothers came to Hartlib in person towards the end of the year and demonstrated this means of making water in his London home. Hartlib said they did it in "great quantities" and recorded that it would soon be beneficial to navies, armies, and "our people in Domingo".<sup>107</sup>

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<sup>105</sup> G. E. Aylmer, *The State's Servants: The Civil Service of the English Republic, 1649-1660* (Milton Park, 1973), p. 256.

<sup>106</sup> Ephemerides, 1652, Part 2. [7 Oct-31 Dec], *HP* [28/2/38B].

<sup>107</sup> Ephemerides, 1656 Part 4. Sep-Dec, *HP* [29/5/98A].

#### 4.6. The Relief of Poverty

Sometime between 1649-1653, Hartlib, who also produced *London's Charity Enlarged* on the same topic during the same period, collaborated with John Lloyd to produce a *Petition Concerning Provision for the Poor*.<sup>108</sup> Although Martin Noell's name is not mentioned in the Petition, because the petition proposed to send the poor to work on plantations in the West Indies, Hartlib likely consulted with Noell who was active in London at the time, was known to Hartlib, and had an interest in sending the poor to the West Indies. The petition listed eight reasons why sending "the poore of every parrish as they doe increase" would constitute a useful improvement in English expansion. These justifications echoed common Hartlibian themes such as increasing industry, enlarging the dominions of the nation, advancing trade, and planting the Gospel, and the petition is an explicit example of how Hartlib brought private and public interests together in the service of improvement. He also knew a certain Mr Barker, who lobbied for increased transplantation of condemned "Theeves or Felons" to Barbados.<sup>109</sup> There should be a Court of Judicature in every English county for this purpose, according to the petition. A committee was formed in Parliament to investigate "how the island may be most improved for the benefit of the planters, and the public service of the Commonwealth" in response to another petition about Virginia and Hartlib knew members of Parliament such as Walter Strickland, Anthony Ashley Cooper, and Edward Montagu who had been appointed to increase the labour supply to the West Indies by transporting vagrants.<sup>110</sup>

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<sup>108</sup> Petition Concerning Provision for the Poor, John Lloyd. Undate, *HP* [15/2/66A-67B].

<sup>109</sup> *Ephemerides*, 1653 Part 2 [2 Mar-May], *HP* [28/2/54A-62A].

<sup>110</sup> *Interregnum, Entry Book*, c, p. 189 and ciii, pp. 21-2; and "America and West Indies: Dec 1653", in *Calendar of State Papers Colonial, America and West Indies: Volume I, 1574-1660*, ed. Noel Sainsbury (London, 1860), i, 412.

In spite of the emphasis on involuntary migrant labourers, Thomas Brown wrote to Hartlib from Barbados to emphasise the need for a “virtuous & laborious people” because “the field of the sluggard, never was well cultivated”. He also described the growing problem of passive resistance, which reduced plantation productivity and compromised the potential of the English Caribbean. This was an issue for most planters and merchants who, despite low overall labour costs, nevertheless paid for labour indirectly and waged a constant battle to maintain the profitability of their individual farms. Although food was adequate on most island colonies in the West Indies, all other supplies had to be imported and, whether they were purchased from English or Dutch ships, they were expensive even before tariffs were added. Neither trade or labour, therefore, was free.<sup>111</sup>

To increase profits as much as possible and to create streams of income around the sugar harvest, planters were anxious for alternative avenues of production that would supplement but not compromise their commitment to sugar. In 1649, William White mentioned the potential of clay production in Barbados to Child within the context of describing his own experiments in Bermudan brick-making, disputing the claim of some settlers in Barbados to “haue found noe bricke earth” on the island.<sup>112</sup> White told Child “I haue found bricke [earth?] in euery trybe that I haue beene in”, and indeed the soil of Barbados was found to be rich with clay, a fact that was well known to the native population.<sup>113</sup> Indeed, the earliest English settlers did not know that the Carib name for Barbados was *Ichirouganaim*, which was translated “red land with white teeth”. By the end of the Hartlibian period, Barbados was producing bricks, tiles, and jars, with clay found on the island. African men used the clay to make *Muscavado*

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<sup>111</sup> Notes & Extracts on Bees, Hartlib, 13 Apr 1654, *HP* [26/29/58A].

<sup>112</sup> William White to [Child?]. 8 May 1649, *HP* [15/8/6A-7B].

<sup>113</sup> “Barbados Clay”, (St. Michael, BRB, 2013).

jars, sugar molds, used to drain molasses from the sugar product, and Monkey Jars, which kept drinking water cool in warm temperatures; both designs imported from Africa.<sup>114</sup>

Once sugar was introduced to Barbados, Hartlib's associates worked diligently to understand and improve the production process. Hartlib was apparently confident that he and these correspondents had a better understanding of sugar production than others, particularly those who were attempting to plant sugar crops in Madagascar.<sup>115</sup> That island, he noted in his journal in 1649, abounded in sugar cane but "*they* know not the way how to make it so delicate as *wee* doe".<sup>116</sup> As a result, *those* planters did not expect a profit in less than four years. Some in the Hartlib Circle had financial investments in the West Indies, but this did not necessarily compromise their commitment to the general good. Worsley had a sugar business in the West Indies and before the two fell out, Petty told Hartlib that he was considering a visit to Barbados in order to be present when his "Invention for brewing to bee applied to the sugar-boyling in Barbados" was tested.<sup>117</sup> Indeed, it is conceivable that Dymock's wind-powered engine and Petty's vessels were tested together in Worsley's sugar business. Although Worsley's interest in Barbados is not fully revealed by the surviving sources, Hartlib, while discussing the emerging success of tobacco in Virginia, remarked in his journal that the crop "may prove as good as Mr Worsley's sugar-business of Barbados".<sup>118</sup> While some historians have commented that Worsley only *intended* to establish a "sugar business" in Barbados, Hartlib clearly implied that some type of enterprise had not only been established but was actually successful.<sup>119</sup> It was

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<sup>114</sup> See J. S. Handler, "Pottery Making in Rural Barbados" in *Southwestern Journal of Anthropology* 19 (1963): 314-334 and "A Historical Sketch of Pottery Manufacture in Barbados" in *Journal of the Barbados Museum and Historical Society* 30 (1963): 129-153.

<sup>115</sup> *Ephemerides*, 1649 Part 1 [Jan-Apr], *HP* [28/1/9B].

<sup>116</sup> *Ibid.*, [28/1/12B].

<sup>117</sup> *Ibid.*, [28/1/9B].

<sup>118</sup> *Ibid.*, [28/1/1A-13B].

<sup>119</sup> See Leng, *Benjamin Worsley*, p. 49.

a viable crop *in Virginia* that was a future prospect in 1649, not Worsley's sugar business in Barbados.<sup>120</sup>

The trials in Barbados were evidently going well at this point because in July 1649, Worsley told Dury that Barbados had started to develop new commodities and was prospering. He told Dury that within ten years, the planters and labourers of Barbados had raised the value of the colony "from almost nothing; to be as deare full out or dearer then in England".<sup>121</sup> While this was an exaggeration, Barbados had indeed become England's most valuable colony in the New World and its wealth continued to climb as sugar production increased in response to the tremendous demand coming from Europe. Production was aided by expansion of acreage committed to sugar but also by the introduction of new technology. The Barbadian mills benefitted further when Brazilian mills were destroyed in war by the Dutch,<sup>122</sup> and in August 1649, Hartlib received letters from Amsterdam, which documented a dismissive Dutch attitude toward English success while regretting that their actions against the Portuguese had contributed to the same.<sup>123</sup> The anonymous author of one of these letters sought to convince Hartlib to favour the organisation of an English West Indies company, which, the author argued, would attract private Dutch investors who were prepared to abandon the Dutch West India Company. These Dutch adventurers were apparently even willing to invest in the West Indian Spanish fleet when given the chance.<sup>124</sup>

Despite the breadth of coverage in Ligon's *History* and the attention it continued to receive in his correspondence, Hartlib continued to add both new and older works to his library. In some cases he consulted works on the American arenas contested between the Spanish and

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<sup>120</sup> Ephemerides, 1649 Part 1 [Jan-Apr], *HP* [28/1/7B, 28/1/9B, and 28/1/10B].

<sup>121</sup> Worsley to Dury, 27 Jul 1649? *HP* [33/2/19A].

<sup>122</sup> Ephemerides, 1649 Part 3 [Jul/Aug-Dec], *HP* [28/1/27A].

<sup>123</sup> Extract in Hartlib's Hand, ? to Hartlib, 20 Aug 1649, *HP* [43/35A].

<sup>124</sup> *Copy Extracts, ? to Hartlib, Aug 1661*. BL Add. MSS 4159 ff. 56A-57B.

Dutch, though these lands were obviously unfeasible locations for his ideal colonies. In 1649 he was told by his friend Thomas Coxe that the dutch polymath Caspar Barlaeus was writing a complete History of the West Indies, “with cuts and maps more accurately than ever done by any body before”. Coxe, who had received this information from Jan Artus Hannius in Leiden, was making a significant claim about the importance of the work, since Thomas Cates’ 1589 summary of Sir Frances Drake’s voyages in the West Indies, already in Hartlib’s library, had pertinent information about the Caribbean and contained several finely drawn maps. Barlaeus was a keen supporter of the expansion of Dutch commercial interests into areas then controlled by the Spanish, and in his *Novus orbis, sive descriptio Indiae occidentalis* of 1622, another work that was already known to Hartlib, he had borrowed cuts and maps from Spanish works such as Antonio de Herrera y Tordesillas’s *Descripción de las Indias Occidentales*.<sup>125</sup>

Hartlib had presumably assumed that Barlaeus was completing a comprehensive work on American flora and fauna of a sort that had already been produced by de Laet. However, in 1649 his Danzig correspondent Johannes Rave told him that Barlaeus had only written about the reign of “Count Maurice”, that is, Johan Maurits of Nassau who had been governor of Dutch Brazil from 1636 until 1644.<sup>126</sup> Rave told Hartlib that because Barlaeus had died in 1648, Maurits had got hold of the draft of his *Rerum per octennium in Brasilia et alibi nuper gestarum sub praefectura* and was having it printed in 1649. This was also incorrect, since Barlaeus’s monumental tribute to Maurits’s rule in Brazil had actually been printed in 1647. The episode shows how precarious the flow of accurate information was from the Netherlands at the end of

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<sup>125</sup> Ephemerides, 1649 Part 2 [Apr-Aug], *HP* [28/1/15A]. For the identification of Thomas Coxe, see numerous MS in the *HP* including, for example, William Waller to Hartlib, 26 Sep 1647, *HP* [32/2/28A] and Dury to Hartlib, 29 May 1652, *HP* [4/2/22A-23B]; as well as *HDC*, pp. 40, 54 and Charles Webster, *Great Instauration*, pp. 72-3, 82.

<sup>126</sup> Ephemerides, 1649 Part 2 [Apr-Aug], *HP* [28/1/15B]. In the same sentence, Hartlib noted that “one Marshal Silesius hee hath exactly described the West-Indies Astronomically Physically etc”. The identity of this person is unclear; he is presumably not Angelus Silesius, the seventeenth-century mystic who was born Johann Scheffler of Silesia; see Frederic Palmer, “Angelus Silecius: A Seventeenth-Century Mystic”, *Harvard Theological Review* 11:2 (April 1918): 175.

the Thirty Years War, notwithstanding Hartlib's excellent connections on the Continent. As it was, the text was produced in collaboration with de Laet and remained the definitive source of information regarding Brazil in Europe until the middle of the eighteenth century.<sup>127</sup> Maurits's accomplishments in Brazil also inspired the last six volumes of the twelve-volume Virgilian poem *Mauritias* composed by his personal chaplain Franciscus Plante, who included in it a number of maps from his friend Barlaeus's *Rerum per octennium*.<sup>128</sup>

In 1650, Hartlib became involved in the efforts to re-establish political stability in Barbados, following a royalist rear-guard action against attempts by parliamentarians to assert control from Westminster. When news reached Barbados that Charles I had been executed, the delicate political balance among the colonial leadership collapsed and settlers with royalist sympathies took control of the island. Hartlib's acquaintances Martin Noell and Robert Wilding were given a right to trade with St. Christopher's and Nevis by Parliament but were required to give security of £4,000 against their trading with any ports in defection to the Commonwealth (i.e. Barbados).<sup>129</sup> Once Barbados came under full control of the Cromwellian regime, however, the restriction was lifted and both island colonies were listed among those whose profits would be great "by extending the power of England".<sup>130</sup> Noell, an advisor to Cromwell, purchased sugar plantations in both Barbados and Jamaica, and transported captured royalist soldiers, convicted English criminals, and Africans to Barbados as labour.<sup>131</sup>

Worsley, who campaigned for the political reformation of both colonies, compared the relative merits of Virginia and Barbados and argued that the former could learn from the

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<sup>127</sup> Arthur Weststeijn, "Republican empire: colonialism, commerce and corruption in the Dutch Golden Age", *Renaissance Studies* 26:4 (2012): 501.

<sup>128</sup> Weststeijn, 'Republican empire', pp 498-99.

<sup>129</sup> See Ephemerides, 1655 Part 4 [13 Aug-31 Dec], *HP* [29/5/43A-58A]; and "America and West Indies: Dec 1650", in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W. Noel Sainsbury (London, 1860), i, 347-8.

<sup>130</sup> "America and West Indies: Feb 1652", in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W. Noel Sainsbury (London, 1860), i, 373-5.

<sup>131</sup> Willes, *The Curious World*, p. 196.

success of Barbados, once a more cooperative government had been installed.<sup>132</sup> However, in the short-term, royalists remained in the ascendant. Parliamentarians in the Council and Assembly of Barbados were expelled in 1650 and royalists elected as Governor Francis, Lord Willoughby, previously a lessee of Carlisle who had been appointed by the king. Willoughby had been a Parliamentarian in the civil wars and had won battles in support of Cromwell, but then became a leader of the Presbyterians in Parliament and was elected speaker of the House of Lords in 1647. After being imprisoned by the Parliamentarian army for royalist sympathies, Willoughby fled to the Netherlands and became an avowed defender of the monarchy. When Willoughby declared independence from Parliament in Barbados, he was no stranger or enemy to the Hartlib Circle.

Apart from his unfortunate political sympathies, many Hartlibians were prepared to accept Willoughby as a fellow Baconian. According to *Observations of Inventions*, a signed statement in Hartlib's possession, Willoughby's brother William and six others had witnessed trials demonstrating a more efficient method of heating "liquors". The statement affirms that a process was demonstrated successfully using thirty-three percent less fuel and requiring sixty-seven percent less expense to boil a given amount of sugar.<sup>133</sup> Worsley sought the nomination of Willoughby as a commissioner on his committee for Virginia,<sup>134</sup> while Hartlib knew that Willoughby owned a "very curious" Indian basket, which he kept in his home, as well as a stone hatchet. Clodius reported that this implement was able to cut as well as any other hatchet made of iron or steel.<sup>135</sup> Hartlib remained on good terms with Willoughby and his family, and

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<sup>132</sup> See A Memorandum of the Virginia Plantation, Worsley? undated, [61/5/1A-2B]; and Worsley to Dury, 27 Jul 1649? *HP* [33/2/18A-19B].

<sup>133</sup> Copy Notes In Hand ?, *Observations of Inventions*, 16 Mar 1648, *HP* [8/11/1A].

<sup>134</sup> Benjamin Worsley to ?, Undated [Autumn 1649?], *HP* [33/2/20A].

<sup>135</sup> See Copy Notes In Hand ?, *Observations Of Inventions*, 16 Mar 1648 and undated, [8/11/1A]; and Extract In Hartlib's Hand, Benjamin Worsley? To ?, undated [Autumn 1649?], *HP* [33/2/20A].

was informed when Willoughby's wife fell ill on 26 March 1661, telling John Worthington when she died a week later.<sup>136</sup>

Most of the expelled Parliamentarians of Barbados fled from Willoughby to London in 1650 and, joined by Edward Winslow, who had recently arrived from New England, began to petition Parliament for relief. Winslow had been instrumental in driving Robert Child out of New England but was now supporting the Reduction of Barbados in order to bring the English fleet around to New England by way of Barbados and Virginia.<sup>137</sup> The refugees found sympathetic supporters in the Hartlib Circle as Worsley drafted a proposal for the reduction of Virginia, including the removal of Berkeley. Parliament speedily created a Barbados Committee, took state control of private colonies, and dispatched an expeditionary navy to the island in October 1651.<sup>138</sup> Hartlib was likely being kept informed as to the work of Parliamentary Committee through his friend, Secretary Gualter Frost. Evidence of Frost's relations with members of the Hartlib Circle appear frequently in Hartlib's journal and in a number of letters from 1639 until 1656. His name also appears in Hartlib's personal accounts lists and in records of payments.<sup>139</sup>

Some individuals who operated outside Hartlib's regular network but who had knowledge and skills relevant to his American interests, were less cooperative. The instrument-maker Henry Bond visited Hartlib in 1657 and told him that he had an idea for determining longitude at sea that he intended to sell to the Dutch East and West India companies. Apparently motivated by a desire for personal enrichment, a feature that was always deeply offensive to Hartlib, Bond would not reveal his technique and was even unwilling to first offer it to the

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<sup>136</sup> Hartlib to John Worthington, 2 Apr 1661, Worthington, i, pp. 290-6.

<sup>137</sup> "America and West Indies: May 1651", in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W Noel Sainsbury (London, 1860), i, 355-6; and ff. "Feb 1652", i, 373-5; and "May 1652", i, 378-9.

<sup>138</sup> "America and West Indies: Jun 1651", in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. Noel Sainsbury (London, 1860), i, pp. 356-8.

<sup>139</sup> Aylmer, *The State's Servants*, pp. 23, 75, 121, 254, 398.

English.<sup>140</sup> The Dutch already had their own secrets, according to Hartlib who wrote, “The East-India Company of Amsterdam hath kept mighty close for 7. years their discovery of a New World as big as Europe between the West-and East-Indies”.<sup>141</sup> He added that “a west India Company, such a one as was and is in Holland would bee very advantageous for increase of ships and trade” and he affirmed that the proposal to create such a company was well received by the plantation committee.<sup>142</sup> Although this would be managed by private individuals, Hartlib firmly believed that long-term improvement could only be accomplished with the backing of public authority.

The work *Certain Inducements to Well-Minded People* discussed earlier in this chapter was a precursor to a much more ambitious project on husbandry composed in 1651 by Adolphus Speede.<sup>143</sup> Speede's *Adam Out of Eden* was a completion of *Inducements* though it acknowledged that “if men did but industriously and skilfully improve and manure [England], we need not go to Jamaica for new plantations”. The reference to “Jamaica” is interesting in this context since the work was published four years before the conquest of the island and it reveals the

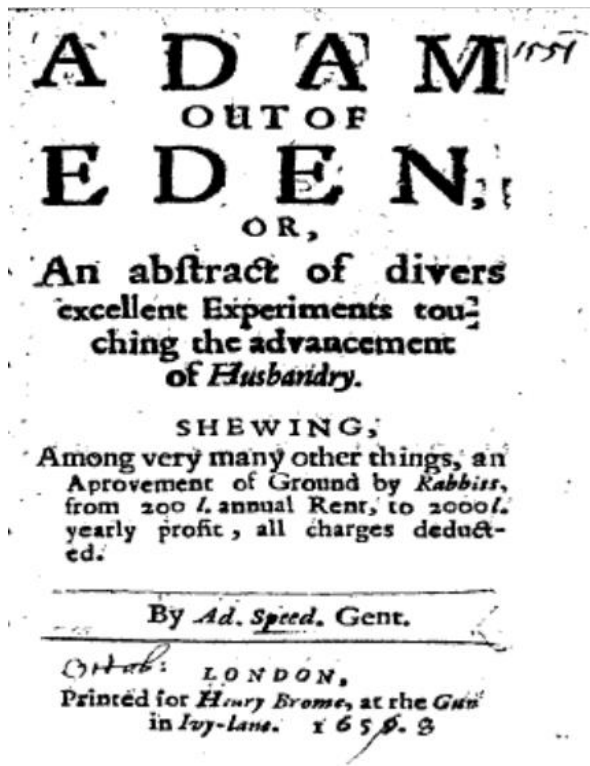


Figure 4.4: Frontispiece of the second edition, *Adam out of Eden*, by Adolphus Speede. Image of the first edition is unavailable.

<sup>140</sup> Ephemerides, 1649 Part 1 [Jan-Apr], *HP* [28/1/8B].

<sup>141</sup> Ephemerides, 1657 Part 2. May– Dec, *HP* [29/6/23A].

<sup>142</sup> *CJ*, Sent to Hartlib, 1641. BL Sloane MSS 3317 ff. 24A-28B.

<sup>143</sup> Adolphus Speede, *Adam Out of Eden, or, An Abstract of Divers Excellent Experiments Touching the Advancement of Husbandry* (London, 1647).

general use of this term in Hartlib's writings to designate the West Indies before the island itself became an English possession. This is more remarkable inasmuch as the Spanish name for Jamaica prior to 1655 was written and spoken as "Santiago", Spanish for "James", by everyone except the English. "Jamaica" evolved from the native Yamaye who knew the island as *Xaymaca* or "land of wood and water". Speede's work clearly predates the Western Design as evidenced by letters in the Hartlib Papers which explain how *Adam Out of Eden* was financed by Cheney Culpeper and published by Hartlib. Hartlib had employed Speede to write the book by 1647 and had Culpeper's commitment to support the project financially by the same time.

Several topics from letters between Hartlib and Culpeper appear in Speede's work, which covered almost all aspects of husbandry over his 166 pages. For example, Culpeper relayed a question to Hartlib about how to preserve trees planted in pastures from the "brute rubbing of cattle" and Speede included advice about how it could be done.<sup>144</sup> When Thomas Browne wrote to Hartlib from Barbados for helpful sources in 1654, among his questions were specific queries regarding birds and the "breeding and fattening" of rabbits which, he reported to Hartlib, were as common in Barbados as pigeons were in London.<sup>145</sup> *Adam Out of Eden* had extensive details about both types of bird, and the link between Speede's work and the West Indies is made clearer by information in the other work he produced during the same period, *General Accommodations*. This pamphlet was an outline of Hartlib's Office of Address but included accommodations to be made for colonists, and he specifically cited Barbados on a number of occasions.<sup>146</sup>

From 1652, Barbados was the jewel in the English parliamentary empire for its loyalty, as well as its remarkable economic value to the state. The aristocrat natural philosopher and

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<sup>144</sup> Culpeper to Hartlib, 10 Nov 1657, *HP* [13/203A].

<sup>145</sup> Thomas Brown To ? & Note On French Vintner, In Hartlib'S Hand. 13 Apr 1654, *HP* [26/44A].

<sup>146</sup> Printed Pamphlet, 'General Accommodations', Adolphus Speede, undated, *HP* [57/3/8/2B].

Roman Catholic Sir Kenelm Digby told Hartlib that by this time, £3,000,000 of sugar per year was being imported from Barbados, already the wealthiest English colony.<sup>147</sup> News in England of the conditions of labourers in Barbados, however, was grim, and men were increasingly unwilling to volunteer for migration. In the following year, Hartlib cited the case of a certain thief named Coole, who chose execution above being sent to Barbados when he was sentenced to be hanged for robbing the post.<sup>148</sup> The downturn in the supply of English and Irish servants to the Caribbean would lead inexorably to higher demand for the involuntary importation of Africans.<sup>149</sup>

In spite of the struggle to maintain sufficient labour in the colony, many different sorts of produce continued to be cultivated and exported from Barbados. Information gleaned from Barbados regarding ginger in 1652 reveals Hartlib's ability to assimilate knowledge from multiple sources for transfer to those correspondents working on improvement projects elsewhere.<sup>150</sup> Hartlib received information from a certain Capt. Floyd, who came to him in person from Barbados (having been recommended by his friend, Thomas Browne) about a design to relieve poverty in England. During the visit, Hartlib learned more about Barbados and was put in touch with the parliamentarian soldier Major Thomas Juxon, who told him that brewers in Barbados were using ginger instead of hops to brew beer. Juxon noted that ginger beer was easily preserved – a fact, Hartlib inferred, that meant it could be transported either as ginger or as ginger beer to England, or alternatively that beer could be made from raw ginger by brewers in Cornwall.<sup>151</sup> This presumably was connected to Culpeper's observation, previously relayed to Hartlib, that brewers in Cornwall had experimented unsuccessfully with

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<sup>147</sup> Willes, *The Curious World*, p. 196.

<sup>148</sup> Ephemerides, 1653 Part 2 [2 Mar-May], *HP* [28/2/54A-62A].

<sup>149</sup> O'Callaghan, *To Hell or Barbados*, p. 65 ff.

<sup>150</sup> Ephemerides, 1652, Part 1 [1 Jan-7 Oct], *HP* [28/2/27A-36B].

<sup>151</sup> John Moore to Hartlib, 25 Jan [no year], *HP* [21/8/3A]. See also *The Journal of Thomas Juxon, 1644-1647*, ed. K. Lindley and D. Scott (London, 1999).

the brewing of beer without hops in order to save the multiplicity of “hoppe-poles”.<sup>152</sup> There were many uses for ginger both in and outside the West Indies, and the plant, native to the islands of Southeast Asia, became the second most successful export of Barbados and St. Christopher’s by the end of the Hartlibian period.<sup>153</sup> These islands proved ideal for the production of ginger, and its development relieved the English of having to obtain one valuable spice from the Dutch. In addition to being used in cooking and brewing, ginger was tested for use as medicine, and dried West Indian ginger, both black and white, could be purchased in a number of London shops by the 1650s.<sup>154</sup>

Other West Indian colonies continued to produce a variety of valuable commodities. Hartlib noted in 1653 that “the best and purest of Sulphur” had been found in the “St. Christophers Ilands in such plenty as may bee had for mere carrying it away by whole shipfuls”.<sup>155</sup> In a second undated note, likely of the same period, he remarked that an entire island of “brimstone” (burning sulphur) had been found among the volcanic islands of St. Christopher’s, which was, according to Hartlib, “enough to furnish the World, and so pure that it scarce needs any refining”.<sup>156</sup> In England, brimstone was used to make sulphuric acid and fertiliser. The alchemists in the Hartlib Circle used it to make skin crème for “scabies”, ringworm, psoriasis, eczema, and acne because it oxidised to sulphuric acid and became, although unknown to seventeenth-century alchemists, an antibacterial agent.<sup>157</sup> Thus, whereas St. Christopher’s and Nevis later produced ginger and attempted to grow tobacco, according to Hartlib, the initial value of these colonies lay in their production of sulphur. He maintained an

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<sup>152</sup> John Moore to Hartlib, 25 Jan [no year], *HP* [21/8/3A].

<sup>153</sup> See Cox and Dannehl, *Dictionary of Traded Goods*.

<sup>154</sup> See “America and West Indies: Aug 1655”, in *CSPC, America and West Indies: Volume 1, 1574-1660*, ed. W Noel Sainsbury (London, 1860), i, 427-8.

<sup>155</sup> *Ephemerides*, 1653 Part 2 [2 Mar-May], *HP* [28/2/56A].

<sup>156</sup> Note on Brimstone in St. Christophers, Hartlib, undated, *HP* [65/5A-B].

<sup>157</sup> See for example, Copy In Scribal Hand H, *Utrum Urim Et Thumim In Monte Data*, undated [55/13/1A-6B]; Johannes Morian To Worsley, In Latin, 2 Jul 1651, [9/16/10A-B]; *Ephemerides*, 1653 Part 4 [2 Sep-31 Dec], [28/2/72B-82B]; and *Ephemerides*, 1654 Part 2 [25 Apr-4 Aug] *HP* [29/4/13A-23B].

interest in the substance to the end, and in 1659, he recorded in his journal that there was a mountain of the stuff in the West Indies, which he understood to have been purified by exposure to the tropical sun.<sup>158</sup>

In 1653, Hartlib learned that roses, not native to the West Indies, were transplanted there by a Capt. Floyd, who found they grew well in the tropical climate.<sup>159</sup> He was told by Floyd that “the fragrancie of their odor was above measure transcendent that the like was never smelt”.<sup>160</sup> Only five months later, Hartlib shared with Robert Boyle what he had learned, along with significant additional information regarding the respective fates of roses in the West Indies and in England. He commented on Boyle’s knowledge of the secret of getting roses to bloom twice each year and quoted Digby as having said, “A rose in autumn is as sweet as a rose in June”. Although roses were “a late attempt”, Hartlib wrote to Boyle, they had prospered in the West Indies and were better for “sight and smell” than the roses of England. As a result, Hartlib said he was to meet Alexander Marshall, the well-known entomologist and gardener, who had recently planted more than 30 varieties of roses and had turned down an offer of £300 for his experimental garden.<sup>161</sup>

Although tar received less attention than most natural resources in the Hartlib Papers, it was arguably the third most important commodity to be extracted from the West Indies during the mid-seventeenth-century. This was because of its military importance to ship building and its wider use in preservation of perishable materials, especially items likely to be corroded or otherwise damaged by salt water. What Hartlibians knew as pitch, or “Barbados tar”, was a green petroleum that was also used medicinally.<sup>162</sup> Hartlib made notes about how to remove it

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<sup>158</sup> Ephemerides, 1659, *HP* [29/8/1A-9B].

<sup>159</sup> Ephemerides, 1653 Part 4 [2 Sep-31 Dec], *HP* [28/2/72B-82B].

<sup>160</sup> *Ibid.*, [28/2/78A].

<sup>161</sup> Hartlib to Boyle, 8 May 1654. *Boyle Works*. Vol. VI, pp. 85.

<sup>162</sup> See Cox and Dannehl, *Dictionary of Traded Goods*.

from carpets with heat<sup>163</sup> and commented on the fact that old tar barrels could be used for bee-keeping.<sup>164</sup> Although tar was the first choice of preserving wood from worms and rot, Hartlib wrote that a certain Mr Ramsey had testified that the “Oile of Sulphur” from St. Christopher’s was a better alternative to pitch.<sup>165</sup> In another entry, he wrote that he accounted linseed oil a better preservative of wood than either tar or sulphur oil.<sup>166</sup>

The beneficial aspects of tar also gave rise to its most obvious drawback, as evidenced by Hartlib’s carpet, since -- despite his earlier enthusiasm about the use of heat to dissipate it - the substance proved to be impossible to remove from whatever it touched. It was so “defiling”, according to Dury, that he compared it to the taint of sin to a person’s soul.<sup>167</sup> Nevertheless, a multitude of references and descriptions in Hartlib’s correspondence to its various uses indicate that Barbados tar was being imported in substantial quantity, and it was apparently available, for all of its applications, in a London shop near Billingsgate.<sup>168</sup> Hartlib’s vinegar recipe, for example, first required blackening the bottom of the kettle with “black pitch”.<sup>169</sup> Worsley argued in his *Treatise on Virginia* that “Pitch & Tarr” from the New World would relieve England’s dependence for the stuff on Norway, Denmark, Poland, and Germany, which had previously satisfied demand.<sup>170</sup> According to Hartlib the Dutch had, at least once, threatened to disrupt the importation of these strategic resources.<sup>171</sup>

The West Indies contained a remarkable variety of food, flowers, and other samples whose capacity to survive the trans-Atlantic voyage was not yet known. The preservation of

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<sup>163</sup> Notes On Removal Of Stains, Hartlib, undated, *HP* [66/7/1A-2B].

<sup>164</sup> *The Reformed Commonwealth of Bees*, ed. Samuel Hartlib (London, 1655).

<sup>165</sup> Ephemerides, 1653 Part 2 [2 Mar-May], *HP* [28/2/54A-62A].

<sup>166</sup> Ephemerides, 1652, Part 2 [7 Oct-31 Dec], *HP* [28/2/37A-44B].

<sup>167</sup> Beale To Lady Ranelagh, undated, *HP* [27/16/1A-14B].

<sup>168</sup> See Ephemerides, 1650 Part 3 [May-Oct], [28/1/60B-71A]; and Alchemical Extracts In Scribal Hand ?, undated, *HP* [55/16/1A-14B].

<sup>169</sup> Part Of Copy Memorandum In Hand ?, On Making Vinegar, undated, *HP* [8/24/3A-14B].

<sup>170</sup> Copy Treatise On Virginia In Scribal Hand ?, Anon, undated, *HP* [61/3/1A-25B].

<sup>171</sup> Memo On "The Interest Of The English In The Sound", Anon. 17 May 1660, *HP* [19/1/10A-11B].

these staples and commodities over weeks of transport was a major problem. This applied to the outbound voyages from England, and sailors going west to the Caribbean suffered terribly from the inability of ships to preserve a fresh food and water supply. Hartlibians experimented keenly with various means to preserve corn, figs, molasses, and fish for ships at sea. Hartlib recorded that Dymock had developed a way “for winnowing of Corne, wherby much graine may bee saved”, while he also described a process in 1653 for dehydrating cranberries for shipment from New England he had learned from Richard Leader.<sup>172</sup> Fruit was sent to the West Indies in a concentrated state from which they were rehydrated on board ships or in Barbados, where they were used for tarts because Barbados had such a “great store of sugar”. To his copy of the letter from Browne in Barbados, Hartlib added a note regarding a vintner in Paris who had experimented successfully with changing sour wine into “good and sweet Wines”.<sup>173</sup> From the Dutch, Hartlib learned a way of preserving biscuits, some of which had made a round trip to the West Indies and were still edible.<sup>174</sup> This was done, he wrote, by lining the food storage barrels with tin and closing them “soe that no aire can come in vnto them”. A soft metal, tin was able to be moulded to create an air-tight, if not vacuum-sealed, compartment in 1654, amounting to an early canning process for the preservation of perishable food storage.

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<sup>172</sup> Ephemerides, 1653 Part 4. [2 Sep-31 Dec], *HP* [28/2/74/B].

<sup>173</sup> Thomas Brown to ?, & Note on French Vintner, In Hartlib’s Hand. 13 Apr 1654, *HP* [26/44B].

<sup>174</sup> Ephemerides, 1654 Part 3. [4 Aug-31 Dec], *HP* [29/4/24B].

#### 4.7. Jamaica: 1655-1660



Figure 4.5: Jamaica c. 1700

The conquest of Jamaica resulted from the Western Design and Cromwell's attempt to capture the larger and more valuable island of Hispaniola. It quickly became the second most important English colony in the West Indies, a fact that is reflected in its increasing presence in the Hartlib correspondence. At 4,240 square miles, Jamaica is 25 times larger than Barbados, and it had obvious strategic significance for European powers. Although the island was originally populated by native Arawak and Taino Indians, these had been killed by war and disease long before the first English soldiers arrived. Spain claimed it from 1494 as part of the Treaty of Tordesillas, planted its first settlement there in 1509, and by the seventeenth-century the island had become one of the most important Spanish colonies. Perhaps because of its southwestern location, however, Spain invested in few fortifications there, and had garrisoned few troops in 1655. Indeed, slaves far outnumbered the Spanish soldiers and settlers.<sup>175</sup>

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<sup>175</sup> See Matthew Craig Harrington, "'The Worke Wee May Doe In The World': The Western Design and the Anglo-Spanish Struggle for the Caribbean, 1654-1655", Master's thesis, Florida State University, 2004; Carla Gardina Pestana, "English Character and the Fiasco of the Western Design" in *Early American Studies* 3:1 (Spring 2005): 1-31, and *The English Conquest of Jamaica: Oliver Cromwell's Bid for Empire* (Los Angeles,

After the civil wars, Cromwell sought to expand England's territorial claims in the West Indies and since the availability of uninhabited and unclaimed islands had evaporated, he targeted the profitable colonies of rival nations under the Western Design. The Reduction of Barbados provided an opportunity for the English to seize a significant prize from the Spanish with the navy already positioned in the Caribbean. Once Willoughby had surrendered his command in Barbados and "the other plantations now in defection" had been brought under Cromwellian control, colonial planners both within and without the government bureaucracy in the West Indies and in London drew up plans to capture Hispaniola.<sup>176</sup> The English attempt to capture Hispaniola was ambitious, but it was thought that the Spanish troops stationed there were particularly vulnerable. The fleet spent ten weeks in Barbados planning and building up supplies for the strong assault that began on 23 April, 1655.<sup>177</sup> Seventeen warships and 20 transports, equipped with 325 cannon, 1,145 seamen, and 1,830 soldiers, were commanded by Admiral William Penn and General Robert Venables but despite reinforcements from neighbouring islands, the siege of Santo Domingo was a colossal and notorious failure.<sup>178</sup>

Rather than retreat in defeat, however, Penn and Venables chose to reorganise their men for a consolation assault against Jamaica. This attack, beginning on 9 May, caught the 1,500 Spanish soldiers stationed there by surprise and it turned out to be both an easy and a momentous victory for the English.<sup>179</sup> Sir George Ayscue, who joined the fleet at Barbados and made a vital contribution to the effort, may be the "Lord General" whom Hartlib said was

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2017); and David L. Smith, "The Western Design and the Spiritual Geopolitics of Cromwellian Foreign Policy" Published online by Cambridge University Press 40:2 (Aug 2016): 279-92.

<sup>176</sup> "America and West Indies: Feb 1651", in *CSPC, America and West Indies: Volume I, 1574-1660*, ed. W Noel Sainsbury (London, 1860), i, 349-53.

<sup>177</sup> Amussen, *Caribbean Exchanges*, p. 33

<sup>178</sup> N. A. M. Rodger, *The Command of The Ocean: A Naval History of Britain 1649-1815* (New York, 2004), pp. 23-4. See also Robert Venables, *The Narrative of General Venables: With an Appendix of Papers Relating to the Expedition to the West Indies*, ed. Charles Harding Firth, (London, 1900).

<sup>179</sup> Aylmer, *The State's Servants*, p. 218.

given “A very rare booke” by Thomas Browne.<sup>180</sup> Before he migrated to Jamaica Browne himself was based in St. James Parish of Barbados, and in 1649 he told Hartlib that he had a copy of “Franciscus’ *Mauritias*”, the work mentioned above.<sup>181</sup> Adding Jamaica to the stable of English West Indian colonies significantly increased the English production of sugar. Because sugar had long been produced on Jamaica and because the English had proven expertise in sugar cultivation by 1655, the time required to realise profits from the colony was greatly truncated.<sup>182</sup> Hartlib noted that Jamaica was also an excellent source of saltpetre as confirmed by “men amongst vs who are Powder-men of London” and he added that Boyle had informed him that a new discovery had been made there of “Moschus” or musk glands of crocodiles, which he said “will prove a rich merchandise to England” as it was a resource used to make perfumes.<sup>183</sup>

Settlers were quickly recruited from Bermuda, Nevis, and Virginia to bolster the English presence in Jamaica, and additional female prisoners were brought from England since the Cromwellian regime explicitly aimed to plant a permanent colony to be inhabited by families. Jamaica, being a much larger volcanic tropical island, offered better opportunities than Barbados for younger men and new adventurers of lesser means to build wealth in a greater variety of occupational professions.<sup>184</sup> The longer voyages to Jamaica, however, forced ship captains to pay closer attention to the details of navigation.<sup>185</sup> Navigators of trans-Atlantic voyages needed technically proficient navigators, and in 1655, Hartlib noted that William Potter had found an instrument for measuring speed and distance travelled by a ship at sea.

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<sup>180</sup> Ephemerides, 1653 Part 3 [May-2 Sep], *HP* [28/2/70A].

<sup>181</sup> Ephemerides, 1649 Part 2 [Apr-Aug], *HP* [28/1/14B-26A].

<sup>182</sup> Willes, *The Curious World*, p. 196.

<sup>183</sup> See Ephemerides, 1658 [29/7/1A-16B]; and Note on Saltpeter Ex Mercurius Politicus No 269, Hartlib, undated, *HP* [39/1/23A-B].

<sup>184</sup> Amussen, *Caribbean Exchanges*, p. 37.

<sup>185</sup> Charles Webster, *Great Instauration*, p. 352.

Potter was looking for “an Ingenious Mariner” who would put his instrument to trial and return an observation of its performance, and a typically hopeful Hartlib recorded that this would likely solve the elusive “defect” of determining longitude while at sea.<sup>186</sup> These experiments overlapped with other plans and activities, such as the idea in Ligon's natural history that telescopes could be made from palm trees, that were supposed to facilitate travel to and from the Caribbean.<sup>187</sup> A number of Hartlib's acquaintances discussed the application of the latest astronomical knowledge to navigation, and Hartlib, Beale, and Worsley discussed the relationship between the situation of the West Indies and Copernican astronomy. In 1658, for example, Beale sent Hartlib a book by Copernicus, presumably an edition of, or commentary on *De Revolutionibus*, as part of a packet Hartlib was instructed to convey to Worsley to aid their discussion of navigational issues in the New World English colonies.<sup>188</sup>

Although the best locations for mining precious metals had been claimed by the Spanish and were vigorously defended by their forces, the strategic interests of the English government focussed on islands that were suitable for agriculture development. In Jamaica, more milling was being done than mining, despite the fact that adventurers continued to be inspired by tales of Spanish gold and silver, and key members of the Hartlib Circle continued to promote mining for a range of strategic resources. Besides sugar, other milling activities in the West Indies included the construction of gunpowder mills in Jamaica. Some advocated building these mills in England, and Hartlib noted that this was possible because saltpetre was a good “traveller”.<sup>189</sup> Other mills were proposed for processing tobacco, silk, pineapples, corn, poultry, rabbits, diamonds, and pearls even though Hartlib's one solid contact in Barbados, Thomas Browne,

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<sup>186</sup> Ephemerides, 1655 Part 2 [Feb-21 Apr], *HP* [29/5/15A].

<sup>187</sup> John Beale to Hartlib, 7 Dec 1658, *HP* [51/39A-40B].

<sup>188</sup> John Beale to Hartlib, 7 Dec 1658, *HP* [51/39A-40B].

<sup>189</sup> Note on Salpeter Ex Mercurius Politicus No 269, Hartlib, undated, *HP* [39/1/23A].

told him that it was hard to find sufficient products to be milled.<sup>190</sup> Browne also stated that there were no indigenous bees in Barbados, and that there could therefore be no export of honey, but in fact, as Hartlib suspected, there were several types of bees on the island.<sup>191</sup>

Despite opportunities for improvement, progress continued to be throttled by discontent among the labour force. Unsurprisingly, bitterness and exploitation caused Irish servants, such as Cornelius Bryan, to rebel in 1656, even though he was an overseer.<sup>192</sup> The numbers of Irish servants had grown so large, and relations with English masters so tense by 1657 that laws were enacted by assemblies within the West Indian colonies to disarm and demobilise the Irish. Governing planters were concerned that Irish servants would assist rival European powers at war with England or unite with other servants or African slaves to create rebellion. As Cromwell sent more and more Irish men and women to the West Indies, constables in Barbados were ordered to whip any Irish, male or female, “wandering up and down from Plantation to Plantation”.<sup>193</sup> There is evidence in the Hartlib Papers that some planters chose to reduce their dependence on Irish servants by encouraging the resident Africans on the West Indian plantations to reproduce, although these programmes were also quickly banned. Despite being forbidden by legislation after 1660, this practice, which increased the mulatto population and reduced the profits of trans-Atlantic slave traders, was a common practice in the period. Unwritten custom held that any child born to a slave, within the broader definition of the term, was also enslaved.<sup>194</sup>

Once Jamaica was secured, Admiral Robert Blake openly attacked the Spanish port of Cadiz with 40 English ships of war. At the same time, Capt. Edward Blagg attacked northern

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<sup>190</sup> Notes & Extracts on Bees, Hartlib, 13 Apr 1654, *HP* [26/29/58A].

<sup>191</sup> See *Barbados Pocket Guide* (St. George: Sun Group, Inc., 2015).

<sup>192</sup> See O’Callaghan, *To Hell or Barbados*, p. 123-9.

<sup>193</sup> Lucas MSS 1.368. 22 Sept. 1657. Bridgetown Public Library.

<sup>194</sup> Jolley, “The Irish in Barbados”, p. 80.

Spain with eight other ships, before Blake could sail from the Caribbean to join him. On the way, Blake captured a Spanish fleet and took treasure worth more than £2,000,000.<sup>195</sup> Peter Figulus wrote from the continent, having heard from the Dutch that the English had lost these naval battles, and suspicious of the accuracy of the reports, to ask Hartlib that he might “be assured of the better newes from your owne hand”.<sup>196</sup> Figulus’ letter is one of many examples that reveal Hartlib to be an information link between the West Indies and Protestants on the continent.

In the meantime, Protestant evangelism among Native Americans in the West Indies was of a limited success, not least because there were very few natives remaining on islands where the English had planted colonies. The small population that lived among the planters and labourers were those who had been imported from mainland South America to teach servants and slaves how to cultivate in the West Indian soil and climate. Evangelism among the African labourers, however, was a very different proposition and became more complicated as the number of slaves increased. Most of the indentured servants were already Christians, in part because all the Irish were Catholic, but the Africans, having come from a variety of locations in Africa, held a wide diversity of non-Christian religious beliefs. According to Ligon, some Africans had asked to become Christian, but he noted that some of them were denied Christianity “when they earnestly sought it”.<sup>197</sup>

Many planters, who exercised immediate authority over whether African slaves might be allowed to receive baptism, were convinced that baptism would legally qualify slaves for emancipation, based on the commonly held belief that there could be no enslavement of Christians. Against this, proselytising Hartlibians like Boyle, chairman of the Committee for

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<sup>195</sup> Herbert William Richmond, *The Navy as an Instrument of Policy: 1558-1727* (Cambridge, 1953), p. 134.

<sup>196</sup> Peter Figulus to Hartlib, 4 Jul 1657, *HP* [9/17/1A].

<sup>197</sup> Ligon, *A True and Exact History*, p. 54.

the Propagation of the Gospel, argued that any prohibition against baptising slaves was an arbitrary doctrine not found in law.<sup>198</sup> Although two bills were drafted in Parliament to promote Christianity among African slaves, and much thought was given to the building of churches for Africans in the West Indies, the planters were not persuaded. Little evangelism was permitted in the West Indies before 1660, and as a result, there were very few churches founded in the Caribbean in comparison with colonies in Ireland, New England, or Virginia. Despite Hartlib's support and cooperation in other areas, any active efforts to evangelise slaves in the West Indies were suppressed by merchants and planters. Morgan Godwyn, (1640-1686), for example, who was forced to leave Virginia for his proselytising among African slaves, fled to Barbados and found even greater opposition. Godwyn wrote several treatises in favour of evangelism but found no success in Barbados because planters claimed that religious instruction was expensive, and a Sabbath day's rest would have a severe impact on productivity within the plantations. Some complained that a common faith could ignite thoughts of equality that would prove disruptive to the maintenance of public order. Slaves, in the West Indies, according to the planters, were not qualified for Christianity.<sup>199</sup>

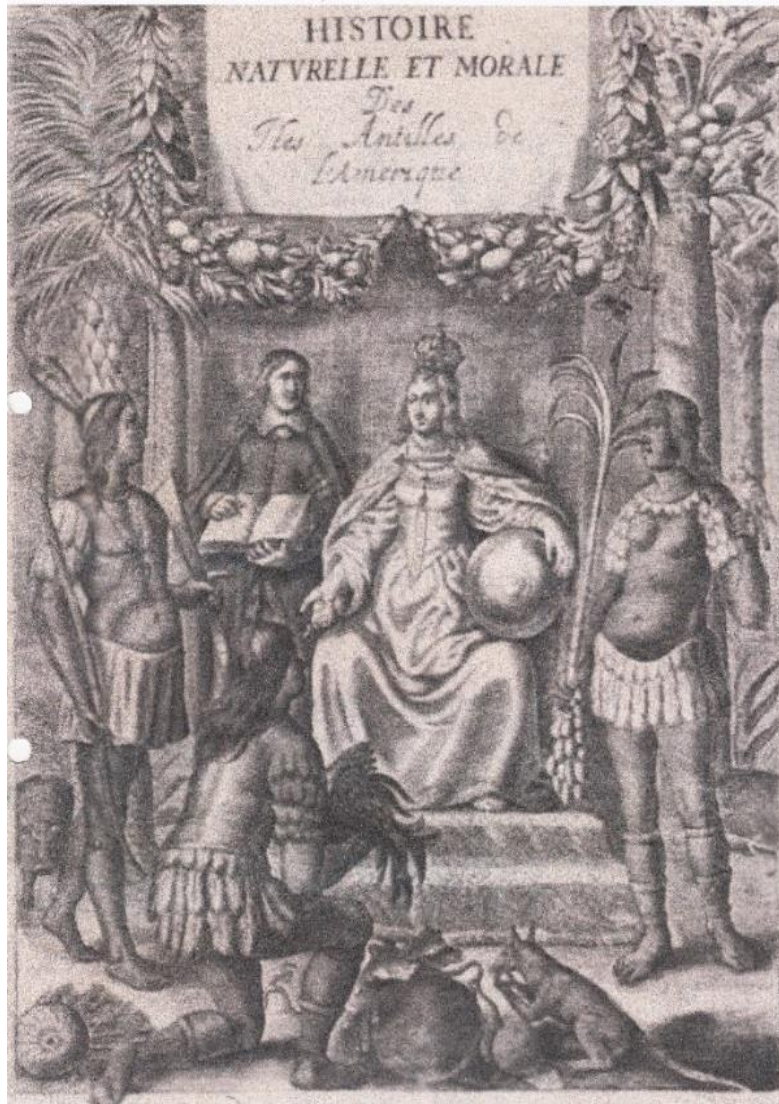
The final natural history that was useful for Hartlib in connection with the West Indies was Charles de Rochefort's *Histoire Naturelle et Morale Des Iles Antilles de l'Amerique*, a French work that Hartlib misattributed to Jacques Amproux Seigneur de L'Orme.<sup>200</sup> It was, according to Hartlib, "An excellent Natural History of the Cariby Islands", and his son-in-law Clodius told him that it was for sale in Rotterdam for 11 shillings and contained a Caribbean vocabulary. Hartlib referred to the *Histoire* on a number of occasions but did not mention that

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<sup>198</sup> Hunter, *Boyle*, p. 228.

<sup>199</sup> Jacob, *Robert Boyle*, p. 149.

<sup>200</sup> Ephemerides, 1658, *HP* [29/7/15A].



*Figure 4.6: Frontispiece of Charles de Rochefort's Histoire Naturelle et Morale Des Iles Antilles de l'Amerique (1658)*

the centre of attention on the very busy and crowded cover was a pineapple being presented by a Carib Indian to the king of France. Pineapples, or the 'Queen Pine', were found growing naturally on several West Indian islands including Barbados, and in 1656 and 1658, Hartlib recorded that pineapples were being used to cure “the Trembling palsy”.<sup>201</sup> Beale urged Hartlib to encourage importation of the Queen Pine from Barbados for wine and compared this to his

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<sup>201</sup> Ephemerides, 1656 Part 1, Jan-May, HP [29/5/68A].

Herefordshire cider,<sup>202</sup> describing the taste of pineapple juice as “The amazing beauty of heavens” and comparing it to the “Sweetest Musique”.<sup>203</sup> Both Hartlib and Beale learned much about pineapples from Ligon’s manuscript natural history, and as a result they were already discussing pineapples before the work was published. Ligon confirmed Beale’s opinion regarding pineapple juice and argued that even though pineapples took a full year to produce, twice as long as plantain, they were nevertheless worthwhile because of their rare taste.<sup>204</sup> John Evelyn claimed that he had personally seen the first Queen Pine brought from Barbados and presented to Cromwell in 1657 – an event that took place at least one year after the first pineapples were brought from Barbados and known to Hartlib.<sup>205</sup>



*Figure 4.7: The Queen Pine from Ligon's History of Barbados (1657)*

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<sup>202</sup> See Ephemerides, 1656 Part 1, Jan-May, *HP* [29/5/58A-70B]; and Beale To Hartlib [With Edmund Pytt To Beale?], 14 Dec 1658, *HP* [51/43A-B].

<sup>203</sup> John Beale to Hartlib, 21 Dec 1658, *HP* [51/52A-54B].

<sup>204</sup> Ligon, *A True and Exact History*, p. 82.

<sup>205</sup> *John Evelyn's Diary*, p. 128.

Beale made a prediction that another drink from Barbados would grow in popularity and rival tea among the English because it had already been well received “by young & old in our Innes of Courts”. He and Hartlib were happy to agree that West Indian coffee, shipped as dried beans for grinding in England, would relieve their country from its dependence on Turkish coffee; more generally they believed that the growing English demand for the drink could be met by an increased production of English coffee that would be beneficial to the English economy. Coffee and tobacco had their moral complications as “our vanities”, Beale said, but they could be promoted as potentially valuable economic commodities.<sup>206</sup>

Despite discoveries of sulphur and saltpetre, silver, along with gold, remained the holy grail for English adventurers, who continued to explore, claim, and conquer in an unfulfilled quest to secure sources of these precious metals. Rich silver mines in central South America were strengthening Spain economically and politically, and despite other success, privateers and planters alike sought to locate new sources of silver or take it from Spanish transport ships. In a two-part essay, complete copies of which were sent to Hartlib, Robert Wood wrote that the Spanish had produced so much silver plate that they had driven the price down and the value of the metal had “continually fallen since the discovery of the west Indies”.<sup>207</sup> While the rates of commodities had gone up by degrees, he said, the value of silver had declined as a result of increased supply. The problem with devalued silver, according to Wood, was that silver English coins were being circulated for greater value than the value of the coin’s content of silver.<sup>208</sup> Although he stopped short of more radical solutions, he explained that coins made to equal the value of their contents would be too heavy for people to carry. England had long been seeking to undermine Spanish trade, but Wood suggested finding additional uses of silver

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<sup>206</sup> Letter, John Beale To Hartlib [With Edmund Pytt To Beale?], 14 Dec 1658, *HP* [51/43B].

<sup>207</sup> Copy Memorandum Concerning Coinage, Robert Wood. 1 Dec 1658, *HP* [18/14/1A-2B].

<sup>208</sup> Objections to Potter’s Further Work on Coinage, Robert Wood. 15 Jan 1659, *HP* [33/1/41A-42B].

to raise demand and offset increased supply. He estimated that English coins were worth one-sixth their face value if melted and was concerned that if this was commonly known, there would be a wholesale disappearance of coinage as sellers would refuse it and cause a critical disruption of trade in England.<sup>209</sup>

A key component of the economic model promoted by the Hartlibians was the importation of raw materials from colonies for processing in the home country. This would create employment for poor people in England and strengthen the national economy, whether finished goods were sold in England, on the continent, or the colonies. Commitment to this economic strategy is evidenced by Worsley, who, with support from friends in the Hartlib Circle, proposed and lobbied for passage of several navigation acts during the 1650s, which required colonies to trade exclusively with English merchants, even if this meant higher costs for settlers. The great distance from Europe, combined with the warm climate of the Caribbean and the saltiness of air and water in the Atlantic, required that certain commodities be transformed to a more sea-worthy state before shipment. The most important of these was sugar but another example was soap, which was made in the West Indies as elsewhere by boiling plant and animal oils with ash and salt. In the Caribbean, coconut was added to give West Indian soap a unique and pleasing fragrance. Barbadian soap was good for bathing and for smoothing the skin; it had a “fine fragranc<sup>y</sup>” according to Hartlib, and by 1658 could be purchased by the general public in Amsterdam.<sup>210</sup> It is remarkable that English West Indian soap had gone through and beyond London to the continent before the Restoration and was being sold in the largest Dutch city.

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<sup>209</sup> Robert Wood, “Memorandum Concerning Coinage”, 1 Dec 1658, *HP* [18/14/2B] and “Objections To Potter'S Further Work On Coinage”, 15 Jan 1659 [33/1/42B].

<sup>210</sup> *Ephemerides*, 1658, *HP* [29/7/1A-16B].

Beale was as excited about pearls from the West Indies as Hartlib was for sulphur. In the same year, he wrote a very long letter to Hartlib regarding pearl-bearing shellfish, mostly from Barbados. His letter demonstrates the encyclopaedic information he had at his disposal regarding both mussels and oysters, and he emphasised their potential as seafood. Nevertheless, he was more focused on the pearls and whether they were better from the red, yellow or white “mussels”.<sup>211</sup> Ligon had included shellfish and pearls in his history of Barbados, and Beale quoted him liberally, but he clearly had additional knowledge from other sources. At one point he referred to an example of biomimicry or secrets of nature hiding in plain sight as he compared shellfish, which had “sayles”, a “maine maste”, and a “rudder & ballast”, to ships such as those designed by Petty. This analogical mode of thinking was employed by many in the Hartlibian network to envisage or design inventions of tools and machines based on animals and plants. It is not known how Beale knew that the best time to gather pearls was a brief period from mid-March until mid-April, or how he knew locations where the greatest quantity and quality of pearls could be found, unless he had a copy of the Venetian Caesar Frederick’s *Voyage and Travaile* (1588).<sup>212</sup>

Beale knew about the boats that divers used in gathering pearls, how they built themselves “huts” on shore near the best pearl beds, and how they used oil, lard, or tallow to stop their ears for deep diving. Once gathered, he informed Hartlib, the shellfish were laid in the sun, causing them to open and allowing the “treasure” to be gathered. Beale revealed that long before, an Indian merchant had given him an instrument for measuring, weighing, and determining the true value of pearls. For someone with no personal experience of the West

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<sup>211</sup> Copy Letter in Scribal Hand K, John Beale to Hartlib, [10 Jan 1659], *HP* [55/23/1A-14B].

<sup>212</sup> M. Caesar Frederick, *The Voyage and Trauaile of M. Caesar Frederick, Merchant of Venice, into the East India, the Indies, and Beyond the Indies*, tr. T. Hickock (London, 1588), p. 14.

Indies, Beale's knowledge of pearls is noteworthy and represents a good example of how expertise within the Hartlib group could be gained by collating various sources.<sup>213</sup>

#### 4.8. Conclusion

The Hartlibians' participation in improvement of the West Indian English colonies fitted well into Hartlib's overall scheme. This included the three goals of advancing knowledge, propagating the Gospel, and generally benefitting the common good. The advancement of knowledge was related to Hartlib's universal reformation of epistemology from its scholastic constraints to a practically oriented Baconian empiricism that was fundamentally tied to natural history. The approaches associated with this new general method were employed with varying degrees of success in the West Indies as explorers, adventurers, and merchants observed the region and its contents. Armed with this information, Hartlibians and Hartlib in particular recorded and communicated it for redistribution and further use. The West Indies was a key element in Hartlib's programme to promote the common good, since it was evidently a wealthy tropical region with unique plants and soils coupled with a tremendous potential for creating beneficial medications. Further, it promised personal and societal economic benefits such as employment, longevity, and financial wealth. Hartlib believed cures would be found in the region, not only for West Indian diseases but also for those diseases already known in England. In one typically Hartlibian letter from a Caribbean correspondent, a friend noted that manatees:

hath a stone which is a very sovereign remedy for the stone in the bladder, & very helpful to women in travel . . . as also against the Cramp, for which particulars there are like wise many other things, as Sharkes stone, Crabs stone, and many other medicines from several sensibles and vegetables, for the diseases there, and also for the diseases raining in other parts.<sup>214</sup>

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<sup>213</sup> Copy Letter in Scribal Hand K, John Beale to Hartlib, [10 Jan 1659], *HP* [55/23/1A-14B].

<sup>214</sup> *Certain Inducements*, p. 6.

With so many natural advantages, the West Indies fitted perfectly into Hartlib's overall scheme.

Compared to the other colonial improvement regions in which members of the Hartlib Circle participated, the West Indies also offered the greatest economic potential, but many problems had to be overcome before these benefits could be realized. All the colonies utilised indentured servitude at first but each of them came ultimately to depend on involuntary servitude, mainly African slavery, during the Hartlibian period. Indeed, the English colonies in the Caribbean were particularly challenged by a chronic labour supply shortage, which resulted from the labour-intensive nature of the work performed in an unforgiving climate. Both planters and labourers suffered from a substantial variety of life-threatening diseases, pests, and weather. There were no longer any hostile indigenous populations in the West Indies to threaten settlements, but thousands of settlers died there as a result of non-human enemies. All of the colonies were divided by class, but in the West Indies there was a far greater numerical disparity between the planters and the labourers. This was partly because adventurers who migrated to the West Indies, unlike to Ireland, New England, or Virginia, usually travelled there without families and with the intention of working there temporarily before ultimately returning to England.

Partly as a consequence of this working pattern, there were far fewer females in the West Indian colonies compared to males, and this contributed to a completely different lifestyle for the inhabitants, negating any potential for positive domestic population growth. The West Indies were a far less religiously oriented region than New England, and its colonies displayed much less concern for confessional differences. The most influential colonists in New England were ministers but across all the English West Indies, during the Hartlibian period, there were only two small churches despite the fact that Barbados had roughly double the population of the northernmost colonies -- which had a church in every town.

Because of the rich variety of plants and volcanic soils in the tropics, Hartlib found the islands of the Caribbean intriguing. If his associates could only assist the West Indian planters in solving the chronic shortage of labour, Hartlib imagined the scientific and economic potential of Barbados and Jamaica to be limitless. He must have been overwhelmed with wonder as reports came to him of new discoveries there, fuelling his visions of new foods, medications, and other applications to improve transportation, extraction of resources, and the many general enhancements to quality of life from sealants to adhesives and cleaners. Worsley once identified three of Hartlib's many purposes for the Office of Address as producing saltpetre without petermen "diging of houses or Cellars", improving husbandry, and finding better fishing methods -- the West Indies were valuable to all these strategic industries.<sup>215</sup>

In the short term, the islands of the West Indies, like Virginia, fell captive to a monocultural agriculture. Like tobacco, sugar came to be perceived by the planters as their best potential for large profits and they invested heavily in the crop. In both colonies, unlike New England and Ireland which maintained a more diverse agriculture, Virginia and the English West Indies were faced with food shortages and were as dependent on imported food as they were on imported labour. Like tobacco, sugar was exhaustive of the soil but, unlike Virginia, the West Indies were limited in terms of acreage and the capacity to simply move to new parcels. Because of the richness of the West Indian volcanic soils, however, sugar came to be as valuable as gold and the supply continued to increase to meet an increasing demand in Europe. Even as the wealth of the elites increased, the quest for political stability remained precarious. As the English republic got underway, and a New Jerusalem beckoned in England, Hartlib lamented that the situation in the colonies was on a knife-edge: "The mills being

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<sup>215</sup> Profits Presented to the Kingdom, undated, *HP* [53/32/1A].

destroyed in Brasil, the Sugar-trade in Berbados prospers the more. They refuse to obey either  
*king or Parliament*".<sup>216</sup>

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<sup>216</sup> Ephemerides 1649 Part 3. 1649 [Jul/Aug-Dec], *HP* [28/1/27A].

## CONCLUSION

In this thesis I have studied the active participation of Samuel Hartlib and his associates in efforts to develop various improvement projects in support of the mid-seventeenth-century English Empire. I have shown how Samuel Hartlib and his network of correspondents sought to coordinate exploration and research both in Ireland and in American and Caribbean colonies, and how Hartlib himself facilitated the sharing and preservation of practical knowledge for the benefit of the people in all parts of the empire. In the introduction I set out a research agenda in which I proposed that the history of the Early English Empire and that of the Hartlib Circle were incomplete without establishing a connection between himself, his associates, and like-minded people or potential contributors in the colonies. In other words, I have argued that the history of English colonialism during this revolutionary period cannot be properly understood without recognising the significant programmes for colonial technological and agricultural ‘improvement’ that were promoted by Hartlib and his correspondents. Equally, the Hartlibians's activities cannot be fully appreciated without acknowledging the plans they devised and the work they accomplished in support of both the practical and spiritual aspects of Atlantic-oriented colonialism.

In order to demonstrate the discursive and practical engagement of Hartlibians with English imperialism, I have explored an abundance of sources and a series of arguments. In Chapter I, I outlined the Hartlib Circle’s participation in the improvement of Ireland. In concert with the sustained and aggressive intervention of the English state, Hartlib and his associates contributed to the composition, publication, and distribution of a natural history of the island, conducted a survey of land, and worked to redirect wealth for public benefit through the Office of Address. Many of the short-term objectives of Hartlib and his allies were accomplished within the context of the Irish Rebellion of the 1640s and the later reconquest of Ireland, which followed the English civil wars. With active correspondents working in the colonial

bureaucracy of Dublin, and with the benefit of close associates who had lived in Ireland, Hartlib was able to gather knowledge from the island that was brought back to England or transplanted to the New World by his allies.

In Chapter II, I explored the participation of the Hartlib Circle in the several colonies of New England. I argued that Hartlib was able to navigate the political and religious obstacles raised by the colonial leadership to help establish new locations for education in the colonies. With knowledge of New England received from associates such as Robert Child and George Starkey, he was also able to assist a population of persecuted Huguenots in planning their future settlement. Compared to the conditions that existed in Virginia and in the Caribbean, members of the Hartlib Circle were able to work with relative ease, and they operated for the benefit of persons who held a variety of political and religious beliefs. While Massachusetts's religious intolerance was harmful to improvement, and drove several Hartlibians from the region, Hartlib never stopped encouraging those who stayed on and who continued to develop local agriculture while building schools and mills. My work confirms that while Hartlib is often identified as a radical puritan committed to advancing republican government and millennial Protestantism, his ultimate goals transcended political and religious divisions and allowed him to cooperate with all political parties and (nearly) all religious denominations.

Contemporaries knew Hartlib to be a man of connections, influence, and information. While he managed the creation and dissemination of useful and reliable knowledge to potential colonists, he also facilitated the flow of wealth from a variety of patrons to a range of explorers, adventurers, academics and mechanics. At least at the beginning, the vast majority of these individuals showed the potential to contribute to the broader Hartlibian programme. As for natural philosophers, religious or political affiliation did not necessarily disqualify them from being accounted a trustworthy associate, as long as their commitment was genuinely selfless and was aimed at benefitting the commonwealth. Hartlib worked equally well in the monarchy

as he did later in the Commonwealth and Protectorate, and the substantial network that he drew around himself included Catholics, non-conformists, independents and royalists.

In the third chapter I undertook an analysis of the Hartlib Circle's plans for improving the colony of Virginia. Despite the fact that there were few close associates located in Virginia, the commitment of Hartlibians to ensuring economic success for England in the New World was undiminished. Hartlib encouraged the improvement of Virginia tobacco while working furiously to locate, introduce, and encourage alternative crops in order to achieve a diversity of trade. As in all colonies, Hartlib collected natural histories as sources of information and encouraged the composition of new ones – in the case of Virginia, without success. Some in his orbit were keen to lobby Parliament for political change when the Virginian leadership clung to the past and threatened the future advancement of learning. Hartlib's associates remained consistent in crafting and shepherding improvement plans relating to agriculture, diversification of the economy, introduction of new industries, manufacturing, mining, navigation, and technology. Even as Parliament was distracted with pressing domestic issues, the Hartlib Circle was focused on colonial improvements and its members were unyielding in calling on the members of Parliament to consider their responsibilities to the plantations and the overseas English-speaking populations. Thus, while there are fewer letters between London and Jamestown when compared to those exchanged with associates in Dublin or Boston, the influence of the Hartlibian programme, as demonstrated by the Navigation Acts partially crafted by Worsley, was felt in Virginia just as much as in Ireland and New England.

Following from this, I examined the involvement of Hartlib and his associates in the development of English West Indian plantations by focusing on Barbados and Jamaica, which were by far the most beneficial colonies for the economic well-being of the Early English Empire. Hartlib and his network of correspondents were able to delegate various tasks specifically to those among his allies with experience and ideas in the most appropriate

disciplines. For example, while Worsley, a bureaucrat with policy-making experience, wrote trade legislation and lobbied Parliament for central control over colonial governments, Cressy Dymock continued to experiment with engines powered by renewable and natural sources of energy. The life of mid-seventeenth-century Barbados was transformed by the introduction of sugar into its economy, but Hartlib and a number of his acquaintances worked with planters to provide a sufficient labour supply to meet the demands of production -- even if they thought that the monocrop sugar economy was precarious.

The imperial effort of the period was characterized by a series of a privately led ventures, funded by private investors, effected by individual entrepreneurs, and assisted by enthusiastic Hartlibians who were half-heartedly endorsed by a distracted government. The cultivation of experimental natural philosophy expanded through the period in the laboratories, lands, letters, and minds of private individuals both eager for new knowledge about the natural world and committed to a genuine improvement of life for society at large. For many, the original motivation for advancing learning may have been a religious one, but the advantages to be achieved were physical benefits with practical applications that would ease the burden of manual labour, increase profits, remove disease, extend life, and lower unemployment. The combination of spiritual and practical aims within the Hartlibian programme is indicative of the deep interpenetration of religious and natural philosophical methods and aims. This issue was never a contradiction for Hartlibian philosophers because the Baconian ethos underpinning these endeavours was in part to return Mankind to the spiritual and corporeal purity of the pre-lapsarian state.

What, then, is the significance of the Hartlib Circle's participation in the Early English Empire? My thesis suggests that English imperial expansion in the seventeenth-century was far more complicated and involved a much greater segment of society than has been previously understood. Hartlib and his friends played a significant role in encouraging the English colonial

development, and they offered a set of tested, practical methods for enhancing the chances of success. Two broader issues emerge from this. First, the theme of improvement explored recently by a number of historians should be expanded to take into account the colonial aspirations and achievements of the Hartlibian programme. Secondly, the Eurocentric focus of Hartlibian scholarship should be turned westwards. Although it cannot be doubted that Hartlib was immersed throughout the period under review in European religious and political issues, Ireland and the Atlantic colonies offered the best and perhaps last hope for realising his various Antilian schemes.

In the end, as Bacon correctly expressed it, knowledge and power are inextricably intertwined. The practical information about colonial environments produced by Hartlibians produced important data for consumption and circulation in England, while equipping adventurers and other emigrants with knowledge that would be both useful and reliable for their colonial undertakings. Although few Hartlibian plans or schemes came to fruition, the enterprise can in no sense be called a failure. The local knowledge they encouraged and supported was exactly the sort of practical, useful knowledge that would enable colonies to thrive, and as numerous historians have shown, many Hartlibian approaches were taken up by the Royal Society in the Restoration. According to Michel Foucault, power is based on and makes use of knowledge but then also reproduces knowledge by shaping it with anonymous intentions.<sup>1</sup> In this sense, the Hartlibian colonial programme, with Hartlib at its physical and logistical centre, epitomizes the close connections between techno-scientific prowess and state power.<sup>2</sup>

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<sup>1</sup> Michel Foucault, *The History of Sexuality* (London, 2008).

<sup>2</sup> Harold A. Innis, *Empire and Communications* (Lanham, MD, 2007) and C. S. Lewis, *Abolition of Man* (Oxford, 1943).

Finally, it is crucial to realise that just as it had been in Bacon's vision of the future, Hartlib's support for the colonial enterprise was above all a spiritual project as much as it was an effort to support the successful technical management of bodies and material infrastructure. Perhaps Hartlib, motivated from the beginning by a desire to improve the common good, would ask with T. S. Eliot, "Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?"<sup>3</sup> Or best with Milton who wrote, "with what difficulty he passes through, directed by the power of that place, to the sight of this new world which he sought".<sup>4</sup>

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<sup>3</sup> Thomas Stearns Eliot. *Choruses from 'The Rock'* (New York, 1952), p. 96.

<sup>4</sup> John Milton, *Paradise Lost*, Book II intro (London, 1667).

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