

CROSSROADS OF ENLIGHTENMENT 1685-1850:
EXPLORING EDUCATION, SCIENCE, AND INDUSTRY ACROSS THE
DELESSERT NETWORK

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By

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ABSTRACT

The Enlightenment did not end with the French Revolution but extended into the nineteenth century, effecting a transformation to modernity. By 1850, science became increasingly institutionalized and technology hastened transmission of cultural exchange. Restricting Enlightenment to solitary movements, philosophic text, or national contexts ultimately creates insular interpretations. The Enlightenment was instead a transnational phenomenon, of interconnected communities, from diverse geographical and cultural spaces. A revealing example is the Delessert family. Their British-Franco-Swiss network demonstrates the uniqueness, extent, and duration of the Enlightenment.

This network's origins lie in the 1680s. French and British desires for stability resulted in contrasting policies. Toleration, through partial rights, let British Dissenters become leading educators, manufacturers, and natural philosophers by 1760. Conversely, Huguenots were stripped of rights. Thousands fled persecution, and France's rivals profited by welcoming waves of industrious Huguenots. French refugee communities became vital printing centres, specializing in Enlightenment attacks on the *Ancien régime*, and facilitated the expansion of the Delessert network. The Delessert banking family made a generational progression from Geneva to Lyon to Paris, linking them to Jean-Jacques Rousseau. His friendship fostered passions for botany and education. The Delesserts parlayed this into participation in Enlightenment science and industry, connecting them to the Lunar Society, Genevan radicals, and British reformers.

By 1780, a transition toward modernity began. Grand Tours shifted from places of erudition to practical sites of production. Lunar men sent sons to the Continent for

practical education, as Franco-Swiss visited English manufactories and Scottish universities to expand knowledge.

Moderates greeted the French Revolution with enthusiasm. In the early 1790s this changed significantly. Royalist mobs threatened Lunar men, destroying property, in Birmingham. In France, moderates tried to defend the monarchy from republican mobs. Even so, the network, fragmented both by revolution and war, continued espousing reform and assisting members who were jailed, endangered, or escaping to America.

The Delessert network reconnected in 1801. Franco-Swiss toured Britain as Britons visited Paris, gathering at the *hôtel Delessert*, a crossroads of the Enlightenment. New societies encouraged science, industry, and philanthropy. Enlightenment exchange continued, despite warfare, into the nineteenth century. Industrial partnerships and scientific collaborations, formed during the peace, circumvented trade barriers. Over three generations (1760-1850) cosmopolitanism helped usher in a transition to modernity. Ultimately, the Delessert network's endurance challenges traditional interpretations of the Enlightenment, and the Industrial Revolution.

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DEDICATION

I dedicate this dissertation to my wife Nana and son Samuel, as it could not have been written without their love, patience, and support.

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ABBREVIATIONS

- AEG – Archives d’État de Genève. Geneva, Switzerland.
AML – Archives Municipales de Lyon. Lyon, France.
AFD – Archives Famille Delessert
AP – Archives de Paris. Paris, France.
BCL – Birmingham Central Library, Birmingham England, U.K.
BGE – Bibliothèque de Genève. Geneva, Switzerland.
BL – British Library. London, U.K.
BLO – Bodleian Library Oxford, Oxford England, U.K.
BNF – Bibliothèque de France. Paris, France.
BRB – Beinecke Rare Book and Manuscript Library, Yale University, New Haven Connecticut, U.S.
CBD – Correspondance adressée à Benjamin Delessert.
CFLP – Cockburn Family Land Papers (1732-1864).
CJB – Bibliothèque des Conservatoire et Jardin Botaniques de la ville de Genève
DPDN – Du Pont De Nemours, BP – Business Papers, C – Correspondence.
EUL – Edinburgh University Library, Edinburgh Scotland, U.K.
HL – Hagley Museum and Library. Wilmington, Delaware, U.S.
JADP – Jean André DeLuc Papers.
JWP – James Watt Papers.
LC – Laing Collection, University of Edinburgh. Edinburgh, Scotland, U.K.
LSC – Lunar Society Correspondence.
MBP – Matthew Boulton Papers.
MHSG – Musée d’Histoire de Science de la Ville de Genève. Geneva, Switzerland.
MHS – Maine Historical Society. Portland, Maine, U.S.
NLI – National Library of Ireland. Dublin, Ireland.
NYSL – New York State Library. Albany, New York, U. S.
NYHS – New York Historical Society. New York City, N.Y., U.S.
PAB – Papers of Ann Boulton
PCB – Papers of Sir Charles Blagden
PDL – Papiers De Luc
PFC – Pierce Family Collection: Count Rumford Papers.
PPC – Pierre Prévost Correspondance.
RC – Rumford Collection.
RSCL – Rauner Special Collection Library, Dartmouth College. Hanover New Hampshire, U.S.
RRLP – Robert R. Livingston Papers.
RSL – Library of the Royal Society of London. London, England, U.K.
VDP – Victor Du Pont, BP – Business Papers, C – Correspondence.
YUL – Yale University Library: Manuscripts and Archives. New Haven, Connecticut, U.S.

NOTES ON THE TEXT:

Unless otherwise indicated all translations, from French to English, in the text are my own. All French manuscript letter addresses, printed letter addresses, and secondary sources titles are cited in French to indicate their original language. I have faithfully translated all French quotations, whilst attempting to render them comprehensible to modern readers. Additionally, I have preserved original grammar, punctuation, errors, and abbreviations, in French and English quotations, to retain the spirit of the material.

Preface

My proposition is that the Enlightenment did not die during the French Revolution in the 1790s with Condorcet and Lavoisier.¹ It did not succumb to a martyr's death, decapitated like St John the Baptist, by a fatal falling guillotine in the spectacle on the scaffold. The Enlightenment instead endured well into the nineteenth century, as European society completed the transition to modernity. A fundamental aspect of this shift was the extent of cultural traffic, which crossed back and forth over the English Channel, the Atlantic Ocean, and beyond. Broader scientific and industrial exchange involved the international transportation of people, books, letters, plants, animals, and ideas. This was moved by citizens of the Republic of Letters throughout Europe, and much further afield. Such interchanges were the lifeblood of the Enlightenment and helped to expand the early Industrial Revolution. This traffic signifies the need for a considerable reinterpretation of both spatial and temporal dimensions of traditional conceptions of the Enlightenment.

The most important Enlightenment traffic was transmitted by land and sea, but more spectacular forms flew in the air. In 1785, Madeline-Catherine Delessert (1747-1816) informed her eldest sons, then attending Edinburgh University, that their friend Benjamin Franklin (1706-90) was returning triumphantly to America.² Her sons began their Grand Tour of Britain following the 1783 Peace of Paris, which Franklin helped negotiate. This year witnessed not only the start of America's official sovereignty from Great Britain, but also the launch of the first hot-air balloon flights in France, and the founding of the "Wednesday Society" in Berlin. It was a philosophical debating club that

¹ Antoine Lavoisier (1743-94) and Marie-Jean-Antoine-Nicolas, marquis de Condorcet (1743-94).

² 147. Madeline-Catherine Delessert (Passy) à Jacques-Etienne "Stephen" et Benjamin Delessert (Édinbourg) 23 octobre [1785]. Ferri, *Lettres et manuscrits autographes. Documents historiques. Archives Delessert* (Catalogue de la vente aux enchères du 12 octobre 2007 à Drouot, Paris), p. 32.

was popular in this period. In a local periodical a member of this new society posed an important query: “What is enlightenment?” This question’s most celebrated answer was articulated 360 miles east in Königsberg, by philosopher Immanuel Kant (1724-1802).³ These events saw American colonies free themselves from the bonds of the British Empire, aeronauts free themselves from the grasp of the earth’s gravity, and Kant explain how to free oneself from self-imposed tutelage. Kant’s essay and the “balloonomania” have often been used as emblems “of the age of Enlightenment.”⁴ However, I contend that the Delesserts’ cosmopolitan network was more critical to the Enlightenment, and more grounded in utilitarianism, than aerostatic balloons and Kant’s esoteric essay.

Many individuals, including the famous industrialist partners James Watt (1736-1819) and Matthew Boulton (1728-1809), made brief forays into hot-air ballooning. Watt sent an account of their manned-launch in Birmingham to James Watt junior (1769-1848) in Geneva.⁵ Watt’s report, coincidentally, was made the same day as the first balloon flight over the English Channel.⁶ A letter from Birmingham to Paris at this time could take as little as five days, revealing the rapidity of Enlightenment exchange. Boulton and Watt, quickly recognizing the futility of aerostatic experiments and the idleness of the “ballonomaina” craze, returned to more practical matters.⁷ This included sending their sons to the Continent to complete their education and to expand Boulton & Watt’s

³ The group’s official name was “Society of Friends of Enlightenment.” Roy Porter, *The Creation of the Modern World: The Untold Story of the British Enlightenment* (New York: Norton, 2000), pp. 1-2; Gunter Birtsch, “The Berlin Wednesday Society,” trans. Arthur Hirsh, in *What Is Enlightenment?: Eighteenth-Century Questions*, ed. James Schmidt, (Berkeley: University of California Press, 1996), pp. 235-52;

⁴ Michael R. Lynn, *Popular Science and Public Opinion in Eighteenth-Century France* (Manchester: Manchester University Press, 2006), p. 123.

⁵ BCL Muirhead IV box 15, J. Watt snr (Birmingham) to J. Watt jnr, Birmingham, 7 January 1785.

⁶ French inventor Jean-Pierre Blanchard (1753-1809) and American physician John Jeffries (1744-1819) accomplished the first flight, from Dover to Calais, in less than three hours. Richard Gillespie, “Ballooning in France and Britain, 1783-1786: Aerostation and Adventurism,” *Isis* 75, no. 2 (1984), pp. 254-62.

⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to Dr James Lind, 26 October 1784; *Ibid.*, J. Watt snr (Birmingham) to Dr James Lind, 26 December 1784.

business abroad. These tours were largely facilitated by the Delessert family in Paris, vital proponents of a British-Franco-Geneva nexus.

The Delesserts developed ties to prominent figures through their industries, banks, philanthropy, salons, and education. They were Huguenots who likely escaped religious persecution in sixteenth-century France, settling in the Swiss canton of Vaud. The family moved from Geneva to Lyon in 1725, and opened a banking house. Etienne Delessert (1735-1816) moved them to Paris in 1777,⁸ but they maintained Swiss and Lyonnaise links. The Delesserts became leading French bankers and built up considerable wealth through shrewd investment, propitious relocations, and strategic marriages. They profited by operating banking houses and were central players in organizing French banking.⁹ The family's Enlightenment connections came from education, science, and industry. This included Jean-Jacques Rousseau (1712-78), James Watt, Matthew Boulton, Benjamin Franklin, Jeremy Bentham (1748-1832), and Pierre Samuel du Pont de Nemours (1739-1817). It is my view that these scientific and industrial bonds, which extended to Britain and America well into the nineteenth century, were imperative for the continuance of the Enlightenment. Yet, the Delesserts and their international connections have been oddly neglected by historians. A focus on their vital role in education, industry, and science challenges past conceptions of the Enlightenment and of the Industrial Revolution.

⁸ AP AFD. V13S 1, Adolphe and Alexandre Delessert, *Notice Généalogique et Historique sur la Famille Delessert* (Lausanne: Genton, Voruz et Vinet, 1855), pp. 14-19.

⁹ The Delesserts benefited from foreign trade, lending funds to clients and countries, handling bills of exchange including drafts of foreign clients, and speculating on the Paris Bourse. Etienne also established the first fire insurance company in 1782, and helped found and govern the *Caisse d'Escompte* or discount bank. In 1803, Benjamin served as the regent of for the *Banque de France*, as his brother François later did the same, and together they helped establish French savings banks. Séverine de Coninck, *Banquiers et philanthropes: la famille Delessert, (1735-1868), aux origines des Caisses d'épargne françaises* (Paris: Economica, 2000), pp. 7-34, 63-80; Fritz Redlich, "Jacques Laffitte and the Beginnings of Investment Banking in France," *Bulletin of the Business Historical Society* 22 no. 4/6 (1948), pp. 137-61.

Bankers by profession the Delesserts used commercial houses, in Paris and Lyon, as sites of scientific sociability and collection. This developed concurrent to an expansion of their British-Franco-Swiss network. It stemmed from the family's links to Geneva, intimacy with Jean-Jacques Rousseau, dedication to education, and interest in science and industry. Their network was one of many within the greater infrastructure of the Republic of Letters. Consequently, it was built upon the letter as a transmission medium, which was of utmost importance during the late Enlightenment. Members of this network used letters to exchange personal information, political news, scientific discoveries, industrial secrets, mechanical instructions, and privileged entry into sites of scientific innovation. Letters also, however, predicated the Delesserts' absence from the historical record. The family's correspondence, the *Archive Delessert*, remained in the private hands of their descendants until the twenty-first century. This appearance, and the scattered remnants of their letters in various archives, has finally allowed their vital network to be uncovered. It was an extension of the *hôtel Delessert's* salons and collections, both of which were middling grounds, where professional and amateur scientists mingled sharing information and materials. The Delesserts' correspondence network, and their participation in the late Enlightenment, reveals the utility of practical science during an Applied Enlightenment.

Restricting the Enlightenment to solitary movements, philosophic text, or national contexts ultimately provides insular interpretations. Instead it is critical to approach the Enlightenment as a transnational phenomenon, of interconnected communities, from diverse geographical and cultural spaces. The Delessert family is a revealing example. Their British-Franco-Swiss network stretched from Geneva to Edinburgh to America. It demonstrates the uniqueness, extent, and duration of the late Enlightenment.

Research for this dissertation involved crossing both the Atlantic Ocean and the English Channel, but contrasted considerably with Enlightenment Grand Tours. Passages by aircraft high over the Channel, and under it by railway, obscures sensory perceptions experienced by eighteenth and early nineteenth-century travellers. My archival tours by rapid transit were hasty, and did not encourage the recording of the names of crafts and captains, wind speeds, duration of passage, or long conversations with fellow passengers.

This project began through a conversation with my advisor Dr Larry Stewart on a family named Delessert who had connections to the Lunar Society. Since that fateful day my research into the Delesserts has uncovered their archives and important material in other collections. Frans Stafleu's article, for decades the sole English-language text on Benjamin Delessert (1773-1847), revealed that Delessert's botanical library was left to the *Bibliothèque de l'Institut de France* after his brother François' death (1868).¹⁰ This was confirmed in Thierry Hoquet's recent articles on Delessert's *bibliothèque botanique*.¹¹ François' daughters broke up the large herbarium and library, but maintained the family archives until 2007. The division of Delessert's collection, renowned for accessibility to professional and amateur scientists, marked the end of an era. Yet, this coincided with a wider movement of institutionalization. Stafleu and Hoquet lamented the collection's break-up and library's transfer behind the walls of the *Institut*. Hoquet alluded to Honoré de Balzac (1799-1850) to make his point.¹² The meaning was lost on

¹⁰ Frans A. Stafleu, "Benjamin Delessert and Antoine Lasegue," *Taxon* 19, no. 6 (1970), pp. 920-36. This was the only English work on Delessert in the twentieth century. For recent work see: Marc MacDonald "The Delesserts of Geneva, Lyon, Paris...and Rosendale?" *Natural News (The Century House Historical Society)*, 12 no. 2 (2010), pp. 1-7; Thierry Hoquet, "Botanical Authority: Benjamin Delessert's Collection between Travelers and Candolle's Natural Method (1803-1847)," *Isis*, 105 no. 3 (2014), pp. 508-39.

¹¹ Thierry Hoquet, "La bibliothèque botanique de Benjamin Delessert," *Bulletin du bibliophile*, 1 (2002), pp. 100-141; Thierry Hoquet, "Gravures, science et mécénat: les livres de plantes réalisés au musée Delessert (1820-1847)," *Bulletin du bibliophile* (2007), pp. 103-41.

¹² Hoquet, "La bibliothèque botanique," pp. 109-12; Stafleu, "Benjamin Delessert," pp. 929-35.

me until I stayed in a flat on *rue Mazarine* behind the high walls of the *Institut*. The reference embodied wider institutionalization and cultural shifts occurring around 1850.

For me this marked the start of my research into this fascinating but neglected family. I travelled to Paris to examine the *Bibliothèque Delessert*. The *Institut*'s austere library housed vital material on Delessert's botanical collections. Unfortunately, these manuscripts provided little background information on the Delessert family and network. However, a curator directed me to two recent, but seemingly out-of-place, acquisitions relating to this family. These were catalogues of two auction houses: *Trajan* (2001) and *Ferri* (2007).¹³ After a trail through the streets of Paris to auction houses and a manuscript expert's shop, I learned that much of the collection had been purchased by *Les Archives de Paris*. Subsequently, I have uncovered further parts of this sale as well as material on the Delesserts in French, Genevan, British, and American archives. These finds will help reveal the Delesserts' undertakings at Passy and *rue Montmartre*, which have previously suffered from scant sources and subsequent scholarship.

Research into the endeavours of the Boulton & Watt firm at Soho and the Lunar Society has also advanced at a slow pace. This is not from a lack of material, but from the vast amount of manuscript material on these subjects, particularly at Birmingham's Central Library. Fortunately, over the last few decades historians have explored many vital aspects of the Lunar Society and Soho. I rely heavily on manuscript and secondary sources from both sides of the English Channel, and Atlantic Ocean, and I am indebted to archivists and historians in our modern digital descendent of the Republic of Letters.

¹³ Ferri, *Lettres et manuscrits*, pp. 30-50; Alain Nicolas et Trajan, *Herbier de Jean-Jacques Rousseau et correspondance à Madame Delessert* (Catalogue de la vente enchères du 16 octobre. Espace Trajan, 2001), pp. 1-41.

Introduction: Mapping the Enlightenment Beyond a National Context

The focus of this dissertation is an Enlightenment that existed underneath the traditional Enlightenment centred in Paris, as interpreted by intellectual historians. Their version fit conveniently in general Western history. “The Enlightenment” was depicted as mainly an eighteenth-century and French movement – falling between the Scientific Revolution of the seventeenth century and the Industrial Revolution of the nineteenth century, both largely dominated by Britain – that ended in 1789 with the French Revolution. These neat chronological divisions still often form precise chapters in history textbooks, or sections in survey courses, but do not agree with recent historiography. For the past forty years cultural historians have been working, justifiably and industriously, to reveal the many national Enlightenments that existed beyond France, and persisted past 1789. This work included the English, Irish, Scottish, American, Swiss, and German Enlightenments, as well as variations such as the Industrial Enlightenment, the Atlantic Enlightenment, and studies on voyages of discovery. In spite of all this scholarship, scholars have neglected a cultural network centred on the Delessert family in Paris, which united these disparate incarnations of the Enlightenment. This British-Franco-Swiss network was truly liminal, as it spanned Europe and the Atlantic Ocean, the late Enlightenment and the early Industrial Revolution, and the shift from antiquarianism to modern science and industry.

Members of the Delessert’s network participated in what I refer to as the Applied Enlightenment. It is not a complete neologism, as ‘applied’ was used to explain practical matters. Robert Fulton (1765-1815), American engineer and inventor, discussed “genius applied to useful works” in reference to James Watt’s steam engine. Dr Thomas Beddoes referred to “applied airs” to describe pneumatic medicine practiced with Watt. James

Watt junior also used “an enlightened age” to describe the period.¹ Yet, the now widely accepted “the Enlightenment” did not appear in English until the 1860s. Popular usage only began around 1950.² This all-embracing term has now been rendered unworkable, as Enlightenment was a global phenomenon with various national variants. The international and cosmopolitan British-Franco-Swiss network functioned beyond borders. Finally, the Delesserts and other members participated in the ‘Industrial Enlightenment.’ This term, coined by Joel Mokyr, is used to describe the social changes that allowed for connections between technical knowledge and production.³ I required a new term, as pioneering work by the Delessert network in agriculture, education, philanthropy, political economy, and other fields did not always relate to production or industry. I use Applied Enlightenment to describe a period where people began applying Enlightenment knowledge to improve everything from children’s education to Merino-sheep breeding. This began in the 1760s, when the Lunar Society and the Delessert network were in their preliminary stages, and closed around 1850, with the passing of the network’s second generation. By this point industrial, scientific, and technological improvements, which three generations of families tied to this network helped pioneer, had effected a transformation to modernity.

The endurance of these educational, scientific, and industrial bonds stemmed from cultural factors, which united bourgeois across the English Channel. Historians working on France’s unique path in the Industrial Revolution have provided bottom-up and top-

¹ BCL MS 3219/6/2 F. R. Fulton (Paris) to J. Watt jnr, 5 February 1802; T. Beddoes to J. Wedgwood, 12 August [1795]. Quoted in Trevor H. Levere, “Dr Thomas Beddoes (1760-1808) and the Lunar Society of Birmingham: Collaborations in Medicine and Science,” *Journal for Eighteenth-Century Studies* 30, no. 2 (2008), p. 214; BCL MS 3219/4/13/43 J. Watt jnr (Nantes) to J. Watt snr (Birmingham), 17 October 1792.

² John Lough, “Reflections on Enlightenment and Lumières,” *British Journal of Eighteenth-Century Studies* 8, no. 1 (1985), pp. 1-15.

³ Joel Mokyr, *The Gifts of Athena: Historical Origins of the Knowledge Economy* (Princeton University Press, 2002), pp. 28-77.

down approaches.⁴ This scholarship has comprehensively documented how government policy and workers shaped French industrialization, successfully challenging the canard of France's absence from the Industrial Revolution. However, work on the middle class who participated in this development is still needed. François Crouzet called for such a study in 1990, seeking research on "social structures" and "entrepreneurial mentalities," instead of that of general French and English society: "After all, the Industrial Revolution was not made in England but in a few small districts of England – south Lancashire, some sectors of the East Midlands and Yorkshire, Birmingham, and the Black Country."⁵ The bourgeois of England's industrial districts funded investment and furnished merchant-manufacturers, inventors, entrepreneurs, and the skilled and prosperous artisans. Thus, Crouzet states that a researched comparison of "these English nurseries of the Industrial Revolution and some French industrial centres" would be useful. He also asks if the form of wide collaboration, like that required among multiple figures for the improvements to Watt's steam engine, was hampered by French geographical factors. In further questions about French industrial delay, Crouzet wonders if the Enlightenment had less impact on industry in France because ideas remained more theoretical and lacked the practicality of groups like Birmingham's Lunar Society. Finally, he asks if basic or classical educations of French merchants was a hindrance compared to the progressive educations of English Dissenters and Scots, whose middle class were leaders in Britain's Industrial Revolution.⁶

The Delesserts of Passy provide both an answer and a challenge to these queries.

⁴ William H. Sewell, *Work and Revolution in France: The Language of Labor from the Old Regime to 1848* (New York: Cambridge University Press, 1980), pp. 1-78; Jeff Horn, *The Path Not Taken: French Industrialization in the Age of Revolution, 1750-1830* (Cambridge: MIT Press, 2006), pp. 1-16, 127-294.

⁵ François Crouzet, *Britain Ascendant: Comparative Studies in Franco-British Economic History* (Cambridge: Cambridge University Press, 1990), p. 30.

⁶ *Ibid.*, pp. 30-1.

The scholarship by economic historians on European regional industrialization cleared up a central misconception but perpetuated an oversight. Some studies continued to view Britain as dominating the Industrial Revolution.⁷ However, work focused on how industries developed in regions throughout Europe, as opposed to across entire countries, also created alternate accounts of France. This has led to a clear articulation of France having taken an alternate path to industrialization, instead of the traditional view of it failing to match British development.⁸ An ongoing oversight in these broad studies has been contributions from French bourgeois like the Delesserts, despite the inclusion of advances in beet-sugar refining and Merino sheep breeding.⁹ This thesis intentionally employs a thorough focus, on the cosmopolitan British-Franco-Swiss network, to reveal how its members impacted the late Enlightenment and early Industrial Revolution.

Two current terms, tied to technological and economic overlap, relate to trends operating in the Applied Enlightenment. Members of the British-Franco-Swiss network participated in something similar to what we today call the “sharing economy.” Instead of using the Internet to engage in a collaborative economy, participants utilized the Republic of Letters exchange information. This let them arrange, at a distance, everything from boarding houses and transportation to local banking and privileged admittance to sites of scientific production. The British-Franco-Swiss network connected and functioned using such channels, instead of resorting to industrial espionage or cold commercial exchange, as did customers outside of such social Enlightenment networks. A second uniting trend

⁷ *Ibid.*, pp. 1-104; Sidney Pollard, *Peaceful Conquest: The Industrialization of Europe* (New York: Oxford University Press, 1981), pp. 3-190.

⁸ Patrick O’Brien and Caglar Keyder, *Economic Growth in Britain and France 1780-1914: Two Paths to the Twentieth Century* (Boston: Allen & Unwin, 1971), pp. 15-198; Sewell, *Work and Revolution in France*, pp. 146-61; Horn, *The Path Not Taken*, pp. 1-16.

⁹ *Ibid.* pp. 196-203; Pollard, *Peaceful Conquest*, pp. 160-3.

was a cultural practice similar to current “early adopters,” who quickly incorporate new technology. The Delessert network partook in this cultural practice by connecting with the wider Enlightenment. Members were thus able to quickly adopt new philosophies or technologies, such as those of Jean-Jacques Rousseau on education, those of Boulton & Watt on the steam engine, those of Jeremy Bentham on the panopticon and economy, or those of Benjamin Thompson Count Rumford on economic soups for the poor. The latter chapters of this thesis will explore how these cultural links functioned and expanded the Enlightenment into the nineteenth century. However, it is first necessary to examine the origins of the British-Franco-Swiss network, which had its roots in the 1680s.

Many members of the British-Franco-Swiss network were Huguenots whose history intersected widely with the Enlightenment. This began with their flight from France to neighbouring states, notably after 1685 with the Revocation of the Edict of Nantes. The expulsion of scores Huguenots damaged French industries, depriving them of thousands of skilled subjects. French rivals benefitted immensely from this influx.¹⁰ It helped Geneva develop prosperous trades and wealth. By 1750, this small republic enjoyed a disproportionate influence on European science, education, commerce, and politics. The exile of reformers, following a failed revolution in Geneva in 1782, sent another wave of Protestants exiles across Europe. Genevans and Huguenots came to constitute a prominent component of the British-Franco-Swiss network, and the *hôtel Delessert* was a vital nexus connecting Britain and the Continent.

The period from 1680 to 1750 provides an insightful parallel to the Applied Enlightenment. Through both periods young men acted as intermediaries, transmitting materials and translating manuscripts. By the 1780s, visits to centers of erudition to meet

¹⁰ Pollard, *Peaceful Conquest*, pp. 81-2, 144-52.

with renowned scholars increasingly shifted to visiting scientific or industrial sites to meet with leading *savant-fabricants*. During the earlier period some *savants* tried to circumvent traditional protocols, to establish reputations, by attacking and linking their names with *les grands* like John Locke (1632-1704) or Pierre Bayle (1647-1706).¹¹ In the Applied Enlightenment *fabricants* used espionage, to steal industrial secrets from famous entrepreneurs like Matthew Boulton and James Watt, to advance their careers.¹² Political policies and religious expulsions forced families abroad. An unforeseen result of these conflicts was expanded networks, which helped exiles overcome such tumult. Ultimately, it was not expulsions, wars, nor revolutions that completely transformed movements like the Enlightenment, but technological-scientific shifts, which it had helped spawn.

Voltaire's (1694-1778) long eventful life led to him being a transitional figure throughout the 1700s. The Republic of Letters shifted as *savants* focused more on society and applying learning to it, instead of simply collecting and compiling knowledge, as the *philosophes* accused the *érudits* of doing. Charles-Etienne Jordan (1700-45) of Berlin, a decedent of Huguenot refugees, was a product of this shift. He set out to make his way in erudite circles, but instead made his career by attaching himself to Voltaire, a poet, who had earned his own career by attacking the learned community.¹³ Yet, Voltaire too was a liminal figure, as he relied on patronage and correspondence networks, and served as a link between the early Enlightenment and its applied form. In the 1730s, Voltaire used England's progress to promote science, industry, and toleration to French readers. He

¹¹ The young Huguenot's *voyage littéraire* reveals how the Republic Letters functioned as a pan-European network united by community, learning, and manners. Anne Goldgar, *Impolite Learning: Conduct and Community in the Republic of Letters, 1680-1750* (New Haven: Yale University Press, 1995), pp. 1-250. .

¹² On industrial espionage against British firms see John R. Harris, *Industrial Espionage and Technology Transfer: Britain and France in the Eighteenth Century* (Aldershot: Ashgate, 1998), pp. 287-565.

¹³ Goldgar, *Impolite Learning*, pp. 1-10, 240-50.

criticized France's expulsion of Huguenots which had fuelled the commerce of rivals. In the 1760s, Voltaire enticed Huguenots back from Geneva, by transforming Ferney into a minor industrial town with tanneries, watchmaking, and silk production.¹⁴ Voltaire was a *savant*, not a *fabricant*, but his words and actions influenced the Applied Enlightenment.

The Applied Enlightenment, representing the Age of Reason's third and final act, is the period that has been most neglected. This is a result of historiography focusing on *philosophes*, the 1700s, or national contexts. In the early Enlightenment travellers relied on cultural connections to journey abroad on Grand Tours. This continued into the 1800s, but a fundamental shift occurred around 1760, revealing the very pivot of modernity. By the 1780s Grand Tours shifted away from being circuits of cathedrals, palaces, ancient ruins, erudite centres, and cabinets of curiosities. This is notably the case of aspiring as well as accomplished *savant-fabricants*. Instead they sought out industrial and scientific sites, like the Boulton & Watt manufactory in Soho and the Delesserts' *musée* in Passy. The participation and interests in science and industry demonstrates the realization of the Enlightenment's most practical form, and its endurance into the nineteenth century.

Families linked to the Delesserts and to the Lunar Society of Birmingham were part of the same Protestant and commercial movement. The Lunar Society, a collection of intriguing English and Scottish thinkers, met each month close to the full moon.¹⁵ By the 1760s Britons, French, and Swiss were visiting towns like Birmingham and Edinburgh. They were attracted to the Midlands' industrial towns and Scottish universities renown for study in medicine, philosophy, and science. In many ways, the Delesserts reflected the priorities of their British contacts. Their network combined science, industry, technology,

¹⁴ Voltaire, *Letters on England* (Harmondsworth: Penguin, 1980), pp. 1-119; Roger Pearson, *Voltaire Almighty: A Life in Pursuit of Freedom* (New York: Bloomsbury, 2008), pp. 338-406.

¹⁵ BCL MS 3219/4/123 James Watt snr (Birmingham) to Jean-André Deluc, January [n.d.] 1784.

and liberal ideals to create successful factories, inventions, industries, and democratized knowledge. These interests led to a commitment to practical education, and sending their sons across the Channel to attain scientific and industrial knowledge to improve their own undertakings. Such links were vital for the spread of the Enlightenment in Europe. Even with some recent attention by historians,¹⁶ the Lunar Society's role in this period is not fully understood and that of the Delesserts, and the seminal connections between them, have been significantly neglected within the historiography of the Enlightenment. Exploring the cross-Channel exchange between the two generations of the Lunar Society and the Delesserts will enhance our understanding of the Enlightenment and the intellectual, commercial, and scientific traffic that sustained it. The Delesserts and members of their British-Franco-Swiss network were cosmopolitan but typically not *philosophes*, and hence do not fit into the traditional categories applied to examine intellectual history or national contexts of the Enlightenment.

There are two obvious difficulties in traditional and Enlightenment historiography covering the period from the late seventeenth to the mid-nineteenth century. The first is a temporal shortcoming in the history of early-modern science that compartmentalizes the period into three neat chronologically linear stages: the Scientific Revolution, the Enlightenment, and the Industrial Revolution. Second is a spatial limitation, which viewed the Enlightenment as fundamentally French, textual, and philosophic. Historians, such as Ernst Cassirer, depicted the Enlightenment as a segment spanning from Gottfried Wilhelm Leibniz (1646-1716) to Immanuel Kant (1724-1804), within the greater line of

¹⁶ For recent works on the Lunar Society see Jennifer S Uglow, *The Lunar Men: Five Friends Whose Curiosity Changed the World* (New York: Farrar, Straus, and Giroux, 2002), pp. 3-501; Peter M. Jones, *Industrial Enlightenment: Science, Technology and Culture in Birmingham and the West Midlands, 1760-1820* (Manchester: Manchester University Press, 2008), pp. 48-237.

Western Philosophy. Cassirer examined the Enlightenment's philosophy and sought to take the first step toward repairing the Romantic Movement's disparaging verdict of it. For Cassirer, Enlightenment thinkers made important contributions, but were ultimately defeated by German philosophy.¹⁷ Other historians, especially Peter Gay in the 1960s, attempted to respond to narrow intellectual histories with what he called "the social history of ideas." Gay's aim was to value ideas on their own terms and within their particular social context. This led to Gay's interpretation of the Enlightenment as a unified pan-European movement extending even to America, even if the Enlightenment's capital was still identified as Paris. Gay's view saw Enlightenment as typically French, rather radical, and culminating in the 1780s with the American and French Revolutions. Such interpretations, however, still relied heavily upon the celebrated French *philosophes* and their texts.¹⁸ Jonathan Israel's recent trilogy has continued in this intellectual history tradition. Yet, Israel's nuanced comparison of the moderate and radical Enlightenments provides an expansive study of cultural ideas across Europe from 1650 to 1790.¹⁹

In the last few decades temporal and spatial interpretations of the Enlightenment have been challenged. Historians focused on England have complicated the beginning of the period, undermining traditional notions of the Scientific Revolution.²⁰ This included

¹⁷ Ernst Cassirer, *The Philosophy of the Enlightenment*, trans. Fritz C. A. Koelln and James P. Pettegrove (Boston: Beacon Press, 1951), pp. x-xi, 93-133, 197-8, 270-8.

¹⁸ Peter Gay, *The Enlightenment: An Interpretation* (New York: Knopf, 1966), vol. 1: pp. 1-19, 427; vol. 2: pp. 555-68; Peter Gay, *The Party of Humanity: Essays in the French Enlightenment* (New York: Norton, 1963), pp. 114-81.

¹⁹ Jonathan I. Israel, *Radical Enlightenment: Philosophy and the Making of Modernity 1650-1750* (New York: Oxford University Press, 2001), pp. 3-720; *Ibid.*, *Enlightenment Contested: Philosophy, Modernity, and the Emancipation of Man 1670-1752: Philosophy, Modernity, and the Emancipation of Man 1670-1752* (New York: Oxford University Press, 2006), pp. 3-871; *Ibid.*, *Democratic Enlightenment: Philosophy, Revolution, and Human Rights 1750-1790* (New York: Oxford University Press, 2011), pp. 1-952.

²⁰ Margaret C Jacob, *The Cultural Meaning of the Scientific Revolution* (Philadelphia: Temple University Press, 1988), pp. 15-96; *Ibid.*, *The Newtonians and the English Revolution, 1689-1720* (Ithaca: Cornell University Press, 1976), pp. 240-50; *Ibid.*, *The Radical Enlightenment: Pantheists, Freemasons and Republicans* (London: Allen & Unwin, 1981), pp. 30-90; Steven Shapin, *The Scientific Revolution*

interpretations that saw John Locke and Isaac Newton (1642-1727) as part of the early English Enlightenment, thereby stretching the movement back into the seventeenth century.²¹ Concurrently, historians working on Enlightenment in national contexts have challenged traditional spatial views. The extent of this scholarship is evident in an essay collection, edited by Roy Porter and Mikuláš Teich, exploring the central issues of the Scottish, Italian, Austrian, and Russian Enlightenments as well as the Enlightenment in England, France, Switzerland, Sweden, the Netherlands, America and Catholic and Protestant Germany.²² This list illustrates the expansive research into how Enlightenment transpired in numerous nations. Porter's role as a contributor and editor to this collection is consistent, given his effort to have Britain's Enlightenment taken seriously.

Like many historians Roy Porter begins his study of the Enlightenment with Immanuel Kant. This is not to deploy Kant's 1784 essay "What is Enlightenment?" in the orthodox fashion as a convenient summary and jumping off point. Instead Porter questions if Kant, a clergyman and a civil servant who had "never ventured his gouty toes outside East Prussia," had the cosmopolitan capacity to respond to such a query. Porter argues in his work on a, until recently, long-neglected British Enlightenment that British *savants* shared a common Enlightenment culture with their Continental counterparts. But circumstances in Britain were also unique, as Britons enjoyed more social freedoms and mechanical improvements than other Europeans.²³ Porter's work reveals many neglected

(Chicago: University of Chicago Press, 1996), pp. 1-14; Larry Stewart, *The Rise of Public Science: Rhetoric, Technology, and Natural Philosophy in Newtonian Britain, 1660-1750* (Cambridge: Cambridge University Press, 1992); pp. 3-97; Porter, *The Creation of the Modern World*, pp. 1-30.

²¹ *Ibid.*, pp. 1-22; Jacob, *The Cultural Meaning*, pp. 73-97; Jacob, *The Radical Enlightenment*, pp. 59-90.

²² Roy Porter and Mikuláš Teich, eds., *The Enlightenment in National Context* (Cambridge: Cambridge University Press, 1981), pp. 1-214.

²³ Porter, *The Creation of the Modern World*, pp. 1-22.

factors and Britain's rightful place in the Enlightenment. Yet, it remains bound by the limits and inherent problems of debating the Enlightenment in unique national contexts.

Much scholarship on France explored the Enlightenment's non-elite elements, but continued to conclude with the French Revolution.²⁴ Deena Goodman and Robert Darnton provide very different depictions of representatives of the 'late' or 'high' Enlightenment. Goodman views them as important *philosophes* who participated in salon and journalistic culture, providing French translations of significant foreign works. Yet Darnton, in his study of the French literary underground, views the late *philosophes* as ultimately institutionalized, having become "respectable, domesticated, and assimilated" into elite culture to collect pensions, having written or challenged little.²⁵ Nevertheless, one of the few points Goodman and Darnton agree upon is that the Revolution effectively brought an end to the Enlightenment and its institutions. The historians say conspicuously little about the activities of the *philosophes* during and in the aftermath of the Revolution.

Historians of the 1970s and 1980s reacted against past intellectual interpretations of the Enlightenment. They achieved Gay's intention of a "social history of ideas." The scholars of Darnton, Goodman, and Porter's generation surpassed intellectual history, and contributed to a greater cultural history extending back to the seventeenth century. They typically were, however, reluctant to move beyond national contexts. Gay lamented a lack of focus upon "lieutenants" or "privates of the movement" who are little known but

²⁴ Robert Darnton, *The Business of Enlightenment: A Publishing History of the Encyclopédie, 1775-1800* (Cambridge: Belknap, 1979), pp. 460-545; Deena Goodman, *The Republic of Letters: A Cultural History of the French Enlightenment* (Ithaca: Cornell University Press, 1994), pp. 281-304; Daniel Roche, *France in the Enlightenment*, trans. Arthur Goldhammer (Cambridge: Harvard University Press, 1998), pp. 641-73.

²⁵ The typical late *philosophes* were André Morellet (1727-1819) and Jean-Baptists-Antoine Suard (1734-1817). Goodman, *The Republic of Letters*, pp. 70-72, 160-167. Robert Darnton, "The High Enlightenment and the Low Life of Literature in Pre-Revolutionary France," *Past and Present*, vol. 51 (1971), pp. 84-90.

played critical supporting roles.²⁶ Historians subsequently filled in gaps and documented the roles of tertiary figures. Likewise, Porter regretted what he failed to discuss:

I greatly regret that more is not said here about Continental influences upon Britain, and the reciprocal uptake of British thinking overseas. Insular history has no virtues, and any claims staked below about the Englishness of the English Enlightenment, or about 'English exceptionalism', must rest on firmer foundations than 'fog over the Channel' obliviousness to developments elsewhere.²⁷

The best way to lift the 'fog over the Channel' is to move beyond narrow contexts, ending the oscillation between France and England. Indeed, the English Channel played a more important role and witnessed more significant events than many parts of the British Isles, or European Continent. Movement over the Channel endured throughout the Enlightenment. This affirms the need for revising the *where* or place of Enlightenment beyond the national borders within which it has been too long constrained.

A death knell of national Enlightenments was recently wrung by Charles Withers. Ultimately, neither a single unified movement nor multiple individual national contexts is sufficient for a continuing understanding of Enlightenment. Withers' more encompassing approach takes the 'geographic turn' to interpret Enlightenment in the context of diverse places. When viewed in this way the Enlightenment as a national phenomenon becomes problematic. The conception of 'nation' remained ambiguous in the eighteenth century. Work focused on national Enlightenments typically display varieties of cultural reception within nations, not contrasts between nations, and look mainly on Europe, neglecting international relations and that other sites may have had their own Enlightenment.²⁸

²⁶ This included Étienne Noël Damilaville (1723-68), Friedrich Melchior Grimm (1723-1805), and Jean-François Marmontel (1723-99). Gay, *The Enlightenment*, 17-18.

²⁷ Porter, *The Creation of the Modern World*, xx.

²⁸ Charles W. J. Withers, *Placing the Enlightenment: Thinking Geographically about the Age of Reason* (Chicago: University of Chicago Press, 2007), pp. 6-9.

Recent scholarship by historians focused on England extended the conclusion of the Enlightenment.²⁹ For them, it did not make sense to conclude with 1789, as political revolution clearly did not take hold in England. Some historians have taken a more comprehensive approach, exploring a practical Industrial Enlightenment.³⁰ The term is complicated, however, by some cultural and economic historians who still have difficulty shedding the traditional view that France arrived to the Industrial Revolution, long after the traditional terminus for the Enlightenment. My application of elements of Withers' methodology, to the Delesserts' vast commercial-intellectual network and cultivation of international traffic, expands on vital scholarship on early industrialism, and challenges traditional misconceptions of France in this period.

France's place within the Industrial Revolution has been debated by traditional economic historians and by historians of science.³¹ Many studies have examined the origins of the Industrial Revolution, the speed and cause of development, why Britain apparently led Europe, and causes of seeming delay on the Continent.³² The causes for Britain's lead, though recognized as nuanced, for David Landes were the entrepreneurial adoption of factory innovations and better access to raw materials, for Joel Mokyr were the conditions allowing for shared and growing technological progress, and for Margaret

²⁹ Margaret C Jacob and Larry Stewart, *Practical Matter: Newton's Science in the Service of Industry and Empire, 1687-1851* (Cambridge: Harvard University Press, 2004), pp. 93-154.

³⁰ Mokyr, *The Gifts of Athena*, pp. 28-77; Joel Mokyr, *The Enlightened Economy: Britain and the Industrial Revolution, 1700-1850* (New Haven: Yale University Press, 2009), pp. 40-98. Jones, *Industrial Enlightenment*, pp. 1-21.

³¹ For the most recent contribution see Margaret C. Jacob, *The First Knowledge Economy: Human Capital and the European Economy, 1750-1850* (New York: Cambridge University Press, 2014), pp. 136-84.

³² *Ibid.*, pp. 201-27; Margaret C Jacob, *Scientific Culture and the Making of the Industrial West* (New York: Oxford University Press, 1997), pp. 131-41; Joel Mokyr, *The Lever of Riches: Technological Creativity and Economic Progress* (New York: Oxford University Press, 1990), pp. 239-69. Roy Porter and Mikuláš Teich, eds., *The Industrial Revolution in National Context: Europe and the USA* (Cambridge: Cambridge University Press, 1996), pp. 1-388; Jeff Horn, Leonard N. Rosenband, and Merritt Roe Smith, eds., *Reconceptualizing the Industrial Revolution* (Cambridge: MIT Press, 2010), pp. 1-328. David S Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (London: Cambridge University Press, 1969), pp. 124-92.

Jacob were a culture of education in science and mechanical knowledge. These views, despite conceding that France ‘caught up’ industrially in the nineteenth century,³³ have been accused of Anglocentrism by Jeff Horn.³⁴ Horn counters that French development was gradual, but surpassed Britain by the late nineteenth century. These points expand on work done by William Sewell.³⁵ Despite diverging interpretations historians often cite the 1851 Crystal Palace Exposition and Jean-Antoine Chaptal (1756-1832), interior minister under Napoleon Bonaparte (1769-1821), as epitomizing national industrialization.³⁶

J.-A. Chaptal, for example, has remarkably monopolized considerable attention in studies on France’s Industrial Revolution. Peter Jones, pointing to the excess of rhetoric in France on the uniting of arts and sciences, refers to Chaptal’s claim that after him many other chemists established great factories and in their revolution “improved everything.”³⁷ Such hyperbole was not limited to views on France. Benjamin Delessert’s nephew, François Benjamin Delessert (1817-68), asserted in the nineteenth century “the [Crystal] Palace of Sydenham, this living and progressive encyclopaedia of the nineteenth century, is at the same time a centre of union[,] a guarantee of peace[,] and a means of perfecting all humanity.”³⁸ Beyond this rhetoric, the Delesserts appear ultimately as Franco-Swiss “homegrown Boultons and Watts.”³⁹

³³ *Ibid.*, pp. 124-230; Jacob, *Scientific Culture*, pp. 165-86; Mokyr, *The Lever of Riches*, pp. 239-69.

³⁴ Jeff Horn, “Avoiding Revolution: The French Path to Industrialization,” in *Reconceptualizing*, p. 99.

³⁵ Horn, *The Path Not Taken*, pp. 1-9. Sewell, *Work and Revolution in France*, pp. 143-61.

³⁶ Horn, *The Path Not Taken*, p. 3, 169-293; Landes cites evidence from Chaptal on French development, but does not elaborate on his role. Landes, *The Unbound Prometheus*, p. 111, 124, 181; Mokyr, *The Lever of Riches*, p. 104; Mokyr, *The Gifts of Athena*, p. 64, 74; Jacob and Stewart, *Practical Matter*, pp. 39, 58-9, 139, 145-54; Jeff Horn and Margaret C. Jacob, “Jean-Antoine Chaptal and the Cultural Roots of French Industrialization,” *Technology and Culture* 39, no. 4 (1998), pp. 671-98.

³⁷ Jones, *Industrial Enlightenment*, p. 225.

³⁸ AP VI3S 3. François Benjamin Delessert, “Le Palais Cristal de Sydenham,” *Extrait de La Revue des deux mondes* (Paris : 15 juillet 1854), p. 12.

³⁹ Jacob and Stewart, *Practical Matter*, p. 139

Chaptal had lasting success as a politician, and has received far more attention by historians than the Delesserts. However, Jones questions what tangible success Chaptal actually attained.⁴⁰ Contemporary views concurred. Charlotte Edgeworth (1783-1807), daughter of Lunar man Richard Lovell Edgeworth (1744-1817), reported: “My father saw Chaptal at the national institute – he did not appear to be any thing [*sic*] very remarkable nor is he much respected here.”⁴¹ By comparison, the Delesserts surpassed Chaptal in practical science, as the chapters below will reveal, through their work on botany, beet sugar, and the breeding of much sought after Merino sheep. Chaptal is also given, and claimed, credit for founding the *Société d’encouragement pour l’industrie nationale*.⁴² It was actually an outcome of Benjamin Delessert and Augustin-Pyramus Candolle’s work, in the *Société philanthropique*, and a gathering hosted in Passy at the *hôtel Delessert*.⁴³ Chaptal initially reacted to their idea of founding the *Société d’encouragement* with timidity, fearing its failure, and instead sent his staff members to Delessert’s salon.⁴⁴ Like Chaptal, the Delesserts had ties to French Freemasonry.⁴⁵ Unlike Chaptal, however, the Delesserts had direct and enduring contact with Birmingham entrepreneurs James Watt and Matthew Boulton, as well as receiving practical instruction during visits to Soho. The Delesserts’ undertakings in Passy, from 1780 to 1850, made them liminal figures between Britain and France, and even more broadly between the European Enlightenment and the

⁴⁰ Jones, *Industrial Enlightenment*, p. 225.

⁴¹ NLI MS 10166/7 FTF 320. C. Edgeworth (Paris) C. Sneyd (Edgeworthstown), 8 December 1802.

⁴² Horn, *The Path Not Taken*, pp. 196-203, Horn, “Avoiding Revolution,” p. 96, 104 n. 18.

⁴³ Candolle’s memoirs were originally published in 1862. Augustin Pyramus de Candolle, *Mémoires et souvenirs (1778-1841)*, ed. Jean-Daniel Candaux and Jean-Marc Drouin (Genève: Georg, 2003), pp. 200-1.

⁴⁴ AP AFD V13S 3. Étienne Join-Lambert, *Benjamin Delessert, Son œuvre législative et sociale* (Paris: Librairie Sociale et Economique, 1939), p. 100.

⁴⁵ AP AFD V13S 4. Loges maçonniques, Rose-Croix de François Delessert : brevet come S.P. dans le souverain Chapitre de Saint Caroline de la Vallée de Paris, 17 mars 1809 ; F. Bernard Raymond (Paris) « Ordre du Temple Grant Convent Métropolitain, » N° 98. Pour M. le Chevalier François Marie Delessert (Paris), 1 Tammuz 694 (1 février 1813). Horn and Jacob, “Jean-Antoine Chaptal,” pp. 675-81.

Industrial Revolution. The Delessert family represent unheralded Continental *savant-fabricants* who complicate the historiography of this period.

The Delesserts were entrepreneurs and engineers who pursued private interests and industry in France, independent of government. Jacob borrows the terms “savans [sic]” and “fabricans [sic]” from Élie Decazes (1780-1860), a successor of Chaptal as *ministre de l’intérieur*, to discuss the recognition in France of a need for collaboration. Decazes believed a union of *savant* and *fabricant* in the form of a *mécanicien* (mechanic) would produce even more prosperity in French manufacturing. Yet, the term that has remained popular in scholarship following Jacob is *savant-fabricant*.⁴⁶ The terms, the aspirations behind them, and persons who fit the hybrid designation were already present in France by 1780. As this thesis will reveal, the Delesserts collaborated with the Lunar Society before the French Revolution. Corruption and patronage in the *Ancien régime* undoubtedly obstructed some partnerships between Soho and Passy. Political change allowed for great development during the 1790s and the Napoleonic era. But, ‘top-down’ government initiatives were often less effective than private bourgeois and cosmopolitan ones. Studies focused on Chaptal’s measures give much credit to state policies, and the new order wrought by the French Revolution.⁴⁷ Private families like the Delesserts worked steadily and quietly implementing British advances in French industries.

Links between Delessert and Lunar Society *savant-fabricants* endured throughout the Enlightenment. Peter Jones finds many examples, “in Britain at least,” of those who

⁴⁶ Élie Decazes, “Le ministre de l’intérieur aux préfets des départmens,” in *Description des expositions des produits de l’industrie française, faites à Paris depuis leur origine jusqu’à celle de 1819 inclusivement*, ed. Louis-Sébastien Le Normand and J.-G.-V. Moléon (Paris: Bachelier, 1824), vol. 1: pp. 18-21; Jacob, *Scientific Culture*, p. 183. Both Mokyr and Jones have used this terminology to discuss the Industrial Enlightenment. Mokyr, *The Gifts of Athena*, pp. 54-74; Jones, *Industrial Enlightenment*, pp. 15-8, 116-29.

⁴⁷ Jacob, *Scientific Culture*, pp. 178-83; Horn, *The Path Not Taken*, pp. 196-210.

united the actions of *savant* and *fabricants*, such as Lunar men like Matthew Boulton and James Watt. Yet, Jones suggests that this was undermined in France because there was not enough common ground between *savants* and *fabricants*.⁴⁸ The Delesserts and other Franco-Swiss *savant-fabricants* in their network, however, complicate this conclusion. The Delesserts acted as a locus, connecting sites of science and industry from Geneva to Edinburgh, helping to move *savants* and materials across Europe. In 1794, James Watt junior had prematurely told Stephen Delessert (1771-94) that he would henceforth remain bound to Britain. However, after the Napoleonic Wars, exchange between the Delesserts and the Lunar Society resumed, lasting into the 1820s. This included James's visits to the Delesserts and other scientific friends in Paris in 1816, and his crossing of the Channel by steamboat in 1817 to expand the application of steam technology to a growing industry.⁴⁹

Intellectual traffic, the lifeblood of the Enlightenment, was fuelled by cosmopolitan and commercial factors. Even so, there were factions who obstructed foreign influences and worked instead to strengthen national identities.⁵⁰ Such attitudes are Linda Colley's focus in her history of Britons and the forging of the British nation. She argues that an emergent nationalism depended on Britain's general culture of Protestantism, fears and patriotism created by constant warfare (especially that with France), and unity created by governing foreign people in a massive global empire. The accord achieved by war and imperialism enabled Britain to avoid civil war and gain from imperialism abroad, especially as Scotland became its "arsenal." These ties were fortified during a one hundred and thirty-year period of successive wars between France and

⁴⁸ Jones, *Industrial Enlightenment*, p. 17, 226-7.

⁴⁹ BCL MS 3219/4/129 J. Watt jnr (Soho) to S. Delessert (New York), 10 September 1794; BCL MS 3219/4/36. J. Watt jnr (Paris) to J. Watt snr (Birmingham), 24 October 1816; *Ibid.*, J. Watt jnr (Rotterdam) to J. Watt snr (Glasgow), 16 October 1817.

⁵⁰ Porter, *The Creation of the Modern World*, pp. 1-2.

Britain.⁵¹ British military conflicts and imperialism were instrumental in building British nationhood. Nevertheless, the British Enlightenment flourished in this same period.

Critics of Colley challenge her views that a few English traits were characteristic of the entire nation, and that Protestantism, mercantilism, and imperialism alone forged a British national identity. These historians instead focus on the Whig aristocracy and the Augustan elite, as well as fashion, the arts, and philosophy, but fail to address, or even acknowledge science and industry. By focusing on elite aristocratic English ties to France, through polite society, these works fail to effectively challenge Colley's interpretation.⁵² The Lunar Society's combination of Dissent, commerce, and science increased their links to France. This was despite members of the Lunar Society sharing many attributes Colley identifies as critical in forging British nationalism.⁵³

Despite frequent wars and imperial conflict, much Enlightenment exchange continued between Britain and the Continent. Specifically, this interexchange thrived during periods of peace, and form central themes for the chapters below. From the 1765 Peace of Paris to 1776 Lunar men made their first forays on the Continent. Matthew Boulton, Richard Lovell Edgeworth, and Joseph Priestley (1733-1804) each visited France. Early contacts were made on these tours, which were strengthened between the 1783 Peace of Paris and 1789. Between 1783 and 1787 Benjamin and Stephen Delessert undertook an educational tour of Britain, as Mathew Robinson Boulton, Joseph Priestley junior (1768-1833), and James Watt junior completed their education on the Continent. In

⁵¹ The periods of Franco-British war were: 1689-1697, 1702-1713, 1743-1748, 1756-1763, 1778-1783, 1793-1802, and lastly 1803 to Napoleon's defeat at Waterloo in 1815. Linda Colley, *Britons: Forging the Nation, 1707-1837* (New Haven: Yale University Press, 2005), pp. 1-130.

⁵² Robin Eagles, *Francophilia in English Society, 1748-1815* (New York: St. Martin's, 2000), pp. 1-13; Frédéric Ogée, "Amicable Collision": Some Thoughts on the Reality of Intellectual Exchange between Britain and France in the Enlightenment" in *Better in France?*, (Lewisburg: Bucknell University Press, 2005), p. 20-8. The other essays in *Better in France?* explore similar aesthetic themes. *Ibid.*, pp. 37-289.

⁵³ Colley, *Britons*, pp. 1-9.

1786 Matthew Boulton and James Watt made an official visit to France, as mechanical consultants. During the French Revolution (from 1791 to 1794) James Watt junior, the Priestleys, Abraham Guyot (1743-94), and the Delesserts were, like many of their friends, forced to escape violence. The Peace of Amiens (1801-1803), a brief respite during the Napoleonic Wars, enabled many Franco-Swiss to visit Britain and many Britons tour the Continent. This Enlightenment traffic, which resumed after Napoleon's fall in 1814, included numerous members of the British-Franco-Swiss network. These surges of cross-Channel exchange fostered intellectual, commercial, and scientific connections. This was fundamental for the Enlightenment's expansion, breadth, and endurance.

Savant-fabricants on both sides of the Channel, and the Atlantic, mourned interruptions to science and industry created by war. This position was well articulated by Robert Fulton, the American engineer. Fulton contacted Boulton & Watt in 1794, about nautical steam power, but elicited no immediate response.⁵⁴ It was not until 1802, after Fulton improved the steamboat and met Gregory Watt (1777-1804) in Paris, that Fulton fostered exchange with the *savant-fabricants* of Soho's second generation. Fulton's missive, sent by Gregory to James Watt junior,⁵⁵ identified Watt's steam engine as the most important invention for Britain's industrial development, as it freed Britain from dependence on other countries' raw materials, and established Britain's lead over the Continent. Fulton argued that the steam engine and England's productive factories did not depend on the state. In his view, improving domestic industries was the true path to national wealth. By contrast, the value of Britain's colonies would never equal the navy

⁵⁴ Robert Fulton (Manchester) to Boulton & Watt, 4 November 1794. Alice Crary Sutcliffe, *Robert Fulton and the "Clermont", the Authoritative Story of Robert Fulton's Early Experiments, Persistent Efforts, and Historic Achievements, Containing Many of Fulton's Hitherto Unpublished Letters, Drawings, and Pictures*, (New York: The Century Co., 1909), pp. 303-4.

⁵⁵ BCL JWP C2/10 11. G. Watt (Paris) to J. Watt jnr (Soho), 22 pluviôse [11 February] 1802.

required to protect them, nor the millions spent on the war with America.⁵⁶ Fulton believed that the wealth created by the steam engine surpassed the entire production of Britain's East and West Indies possessions combined. He declared:

In the pursuit of useful improvements it sometimes happens, that the exertions of one ingenious man renders more service to his country and benefit to mankind, than the whole projects of statesmen aided by fleets, armies and foreign possessions Yield [*sic*] in centuries; it is indeed a question worth of consideration whether the latter materials are not a constant interruption to the increase of riches and the civilization of a nation, whereas genius applied to useful works in direct progression to the increase of the enjoyment of life.⁵⁷

This proposition, one supported across the British-Franco-Swiss network, favoured encouraging industry and trade instead of imperial possessions and the cost of war.

A widespread desire within the Delessert network for international commerce and trade, over war and imperialism, fostered cooperation and exchange.⁵⁸ The Applied Enlightenment began in the 1760s, as members of the Lunar Society visited France and Franco-Swiss made sojourns to England and Scotland. Early tours were motivated by education, commerce, and mechanics. This expanded in the 1780s. Exchanges in science and industry constituted much traffic over the English Channel. Connections formed at this time strengthened and expanded the British-Franco-Swiss network, which sustained its members through revolution and war, endured into the nineteenth century, and helped usher in the transition to modernity.

⁵⁶ BCL MS 3219/6/2 F. R. Fulton (Paris) to J. Watt jnr, 5 February 1802.

⁵⁷ *Ibid.*

⁵⁸ On the wider movement that championed commerce over war see Istvan Hont, *Jealousy of Trade: International Competition and the Nation-State in Historical Perspective* (Cambridge: Belknap, 2005), pp. 27-70, 200-354.

**PART I: EARLY ENLIGHTENMENT TRAFFIC AND NETWORK
CONNECTIONS (1685-1775)**

1. Tide Change: Dispersing Huguenots, Tolerating Dissenters, and Harboring Jean-Jacques Rousseau

The Enlightenment was a product of many complex factors, but the 1680s were a clear point of origin. Aside from influential publications by Pierre Bayle, Isaac Newton, and John Locke, there were political shifts that ignited the Enlightenment. The analogy of Voltaire's *Letters on England* as the "first bomb" launched at the *Ancien régime*, made by Gustave Lanson in 1906 and echoed by Peter Gay at mid-century,¹ is a lasting and fitting tribute. Yet, at the outset of the twenty-first century, it is due for a revision. Voltaire's exile in England began on Whit-Monday 30 May 1726, when he crossed the English Channel.² His incendiary text is more accurately described as a counter-attack. The French government under Louis XIV (1638-1715) made the first strikes, culminating in October 1685, with the Revocation of the Edict of Nantes (Edict of Fontainebleau). The onslaught, and initial assaults preceding it, rocked France, forcing waves of Huguenots into a fertile crescent. Protestant printing centres (in England and the Swiss, German, and Dutch states), once used to wage the Reformation, were filled by Huguenots. A diaspora thousands of refugees spread across Europe and beyond. Britain received Huguenots, and retained its Dissenters through limited toleration, in an act of compromise. Both French and British policies were essential for the Enlightenment. By the 1740s young men, such as Jean-Jacques Rousseau, were drawn to Paris and rallied around reform projects like the *Encyclopédie*. He later broke with its editors, and found refuge with Madeleine-Catherine Delessert's (1747-1816) family. Rousseau's intimacy with this family, like the political shifts in the 1680s, was critical for the formation of the British-Franco-Swiss network.

¹ Gustave Lanson, *Voltaire* (Paris: Hachette, 1906), p. 52; Peter Gay, *Voltaire's Politics: The Poet as Realist* (Princeton: Princeton University Press, 1959), p. 48.

² John Churton Collins, *Bolingbroke, A Historical Study; and Voltaire in England* (London: J. Murray, 1886), p. 231.

1.1. The Huguenot Diaspora and the Delessert Family

The Revocation of the Edict of Nantes in 1685 and the events leading up to England's Glorious Revolution of 1688, created much traffic in Europe. Political and religious dissenters like John Locke, John Toland (1670-1722), and Pierre Bayle fled to or returned from the safety of the Netherlands. This set the stage for the Enlightenment, as *savants* in France, supported by printers on its periphery, attacked the *Ancien régime*.

The Huguenot expulsion was devastating for individuals, but beneficial for states bordering France. Waves of Huguenots poured into cities like London and Amsterdam, bringing both capital and mercantile skills. It was particularly auspicious for Swiss states and the Geneva city-state. In the seventeenth century its population declined by almost a quarter from famine and disease. The Huguenot influx increased Geneva's industries and population. Migrants skilled in leather, precious metals, and watchmaking significantly added to its success. Geneva flourished into the late 1700s through these industries, and by developing a prosperous banking trade. It was, ironically, fuelled by great borrowing by French kings.³ Frequent wars were expensive. Huguenot and Swiss bankers used this and their financial acumen to their advantage. Louis XIV attained greater domestic religious conformity, but by doing so he seeded the fertile crescent, and strengthened the position of rival states. In the early Enlightenment a Huguenot diaspora facilitated the publication of seminal polemical texts.⁴ In the late Enlightenment Europe-wide networks, and a Swiss diaspora, fuelled the circulation of science, industry, and radicalism.

Many studies of Benjamin Delessert indentify his family among the victims of the Revocation of the Edict of Nantes. These include Frans Stafleu's English journal article,

³ Nicholas Dungan, *Gallatin: America's Swiss Founding Father* (New York: NYU Press, 2010), p. 11.

⁴ Robert Darnton, "Sounding the Literary Market in Prerevolutionary France," *Eighteenth-Century Studies* 17, no. 4 (1984), pp. 477-88; Goodman, *The Republic of Letters*, pp. 12-25.

and nineteenth-century French biographies that appeared after Delessert's death.⁵ This assessment is incorrect. "Contrary to a rather widespread opinion," Étienne Join-Lambert clarifies, "the Delessert family was not forced to expatriate at the time of the Revocation of the Edict of Nantes. The reality is less romantic and less touching."⁶ Join-Lambert's study appears, astoundingly, to be the sole monograph on Delessert in the twentieth century.⁷ In it he strives, as does Séverine de Coninck with his more recent examination,⁸ to correct this error. Both studies explore the social and philanthropic work of the family. Interestingly, both men begin their first chapter trying to dispel this romanticized account of the family's origins, which so often adorned the opening pages of nineteenth-century biographies.⁹ A Swiss and French heritage bound the Delesserts to both states. Their movements have produced contradictory accounts of their origins. Yet, evidence suggests that the family fled France during an earlier bout of religious persecution. They were also tied to the Revocation through marriage and the Huguenots populating their network.¹⁰

⁵ Stafleu, "Benjamin Delessert," p. 923; Antoine Argout, *Notice sur la vie de Benjamin Delessert* (Paris: Plon Frères, 1847), p. 4; Paul-Antoine Cap, *Benjamin Delessert* (Paris: Plon Frères, 1850), p. 2; Pierre Flourens, *Eloge historique de Benjamin Delessert* (Paris: F. Didot, 1850), p. 1; Adrien Jarry de Mancy, *Notice sur Étienne Delessert, né à Lyon, le 30 avril 1735* (Paris: Paul Rebouard, 1837), p. 1.

⁶ AP AFD V13S 3. Join-Lambert, *Benjamin Delessert*, p. 19.

⁷ There were works on the family early in the century including, CJB 92 f Del. Gaston de Lessert, *Famille de Lessert, souvenirs et portraits* (Genève: Société Anonyme des Arts Graphiques, 1902), pp. 9-70. By 1970 there was a renewed interest in the family, including Stafleu's article and Romuald Szramkiewicz, *Les régents et censeurs de la Banque de France nommés sous le Consulat et l'Empire* (Genève: Droz, 1974), pp. 76-86. In the 1990s, more texts appeared: Cécil Tric, *La Vie quotidienne de Benjamin Delessert, banquier parisien durant la première moitié du XIXe siècle*. Mémoire de Maîtrise (sous la direction de Jean-Pierre Chaline). Université de Paris IV. juin 1993, pp. 1-217; *Ibid.*, *Le rôle de Benjamin Delessert pour l'administration hospitalière*, Pour l'Institut Benjamin Delessert, 1996; and *Ibid.*, *Benjamin Delessert, membre de la chambre de commerce de Paris (1803-1807, 1808-1811)*. Pour l'Institut Benjamin Delessert, 1998; Société Internationale de Conchyliologie (Lausanne), "Benjamin Delessert (1773-1847) et la Malacologie." *Bulletin de la Société Internationale de Conchyliologie (SIC)*, vol. 19, 3 (1997), pp. 1-44.

⁸ Coninck, *Banquiers et philanthropes*, p. 7-8.

⁹ AP AFD V13S 3. Join-Lambert, *Benjamin Delessert*, p. 19, n. 1.

¹⁰ By family tradition Claude de Lessert fled France for Vaud around 1540. 'De Lessert' families and place-names existed both sides of the border. Family members believed they were from France, as the elements of their coat-of-arms were French. AP AFD V13S 1. Delessert and Delessert, *Notice Généalogique*, pp. 6-7. Gaston de Lessert traced their origins two generations past Claude. Information is sparse, but Gaston notes that they lived in Vaud in 1430. CJB 92 f Del. Lessert, *Famille de Lessert*, pp. 5-11. The family

The task for historians documenting the Delesserts' origins has been frustrating. This is evident for both Séverine de Coninck and Frans Stafleu. They each acknowledge the incompleteness of their studies, given the family's private nature.¹¹ Coninck states:

Cultivating a taste for discretion, the Delesserts felt a certain reluctance to reveal any information relative to members of their family. Many contemporaries who attempted to write their biography came up against their silence. Resorting to archives or to writings left by the people who were familiar with them is therefore essential to progress in the knowledge of this family. This book does not purport to be completely exhaustive, to the extent that we did not have access to their private archives.¹²

Join-Lambert was unique, as he was given access to the family's private archives.¹³ He was able to use François Delessert's copy of *Notice Généalogique* to study their origins.¹⁴ Fortunately this text, along with many other personal documents relating to the Delessert family, is now within the public domain and was accessed for the present study.¹⁵

Benjamin Delessert was very humble and private;¹⁶ a trait shared by his family and its descendents. He stands in great contrast to most French Enlightenment figures. The fame (and infamy) of celebrated *philosophes* came from concerted self-promotion,

believed late into the 1800s that Claude escaped French persecution of Huguenots. Join-Lambert agrees with this origin theory based on place-names, coat-of-arms, French Delesserts, and family accounts. AP AFD V13S 3 Join-Lambert. *Benjamin Delessert*, p. 19, n. 2. Coninck, *Banquiers et philanthropes*, pp. 12-3.

¹¹ Stafleu, "Benjamin Delessert," p. 923. Coninck, *Banquiers et philanthropes*, pp. 2-7.

¹² *Ibid.*, p. 7.

¹³ Join-Lambert dedicated a copy of his biography, held in the *Archives Delessert*, to Rodolphe Hottinguer. AP AFD V13S 3 Join-Lambert, *Benjamin Delessert*. In 1832 François Delessert's eldest daughter, Caroline (1814-80), married the baron Jean-Henri Hottinguer (1803-66). The Delesserts' papers remained in this family's possession until 2007. *Archives Famille Delessert (1776-1899)*. V13S 1-6. Répertoire numérique. 2008. ed. Alexandra Machado. Les Archives de Paris. Paris, 12 février 2008, pp. 1-4.

¹⁴ AP AFD V13S 1. Delessert and Delessert, *Notice Généalogique*, p. 3. Adolphe Delessert sent this copy, writing a dedication its cover, to his cousin François Delessert.

¹⁵ Ferri, *Lettres et manuscrits autographes*, pp. 30-50.

¹⁶ Join-Lambert notes Delessert's modesty in discussing his role founding the *Société d'encouragement pour l'industrie nationale*. AP AFD V13S 3. Join-Lambert. *Benjamin Delessert*, p. 100. Richard Lovell Edgeworth's (1744-1817) daughters gave similar reports on a visit to Paris. Charlotte referred to Delessert as "long pale goodnatured rather cold & swiss [*sic*]" NLI MS 10166/7 314. C. Edgeworth (Paris) to Emmeline King (London), 29 October 1802. Maria noted, "I can only say that he appeared reserved & stiff in his manners something like Lord Selkirk." *Ibid.*, 313. M. Edgeworth (Paris) to Mary Sneyd, 31 October 1802. Delessert's close friend A.-P. Candolle stated that Benjamin's "manner was then especially cold and reserved by effect of his modesty and a certain timidity." Candolle, *Mémoires*, p. 112.

such as Pierre-Louis Moreau de Maupertuis (1698-1759);¹⁷ one's works being publicly burnt like those of Jean-Jacques Rousseau, or a stint in prison as with Denis Diderot (1713-84). Voltaire's great fame was aided by all three of these methods. The figures of the Applied Enlightenment, who will form the nucleus of this study, were much less public. Delessert like members of the Lunar Society, with whom he associated, sought less publicity. Robert Schofield had made the case for the Lunar Society: "In a period of persistent self-advertisement quiet activity did not win distinction."¹⁸ This explains the early neglect of this society, but also lends itself to the Delesserts, and many people tied to them through their British-Franco-Swiss network. Schofield continues: "Nor was this a period in which memory of the Lunar Society would be prized. The impact of the French Revolution on Britain at the turn of the century produced a distaste for the liberal, free-thinking spirit of such an organization."¹⁹ Their great productions were not the relatively few literary texts they produced, but the actual work they did. It is ironic that the very characteristics that elevated the Enlightenment above past periods, the ability of its proponents to interact with the physical world, caused these figures to be neglected. The members this network lived (and worked) the Enlightenment attaining minimal fanfare, and quietly cultivated their gardens, especially after the French Revolution.

1.2. Toleration of British Dissenters and Burgeoning Bourgeois Industrialism

The deteriorating conditions for French Huguenots in this period contrasted considerably with that of British Dissenters. Their situation improved as they attained partial rights in a compromise, against the presumed greater threat of Catholicism, with the Toleration Act

¹⁷ On Maupertuis' self-promotion see Mary Terrall, *The Man Who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment* (Chicago: University of Chicago Press, 2002), pp. 1-15.

¹⁸ Robert E Schofield, *The Lunar Society of Birmingham: A Social History of Provincial Science and Industry in Eighteenth-Century England* (Oxford: Clarendon Press, 1963), p. 4.

¹⁹ *Ibid.*

of 1689. This was not a victory of “cultural rationalism” but instead, as Richard Ashcraft argues, “the product to deep-rooted fears and prejudices directed against Catholicism which, momentarily, produced a political alliance between Anglicans and dissenters in their common struggle against James II’s attempt to reclaim the throne following the Glorious Revolution.”²⁰ Many English viewed the Toleration Act as transitory measure employed during a transitional phase.²¹ However, the outcomes of British and French policies, compromise versus expulsion, contrasted sharply.

In 1733, Voltaire was kind enough to give an early assessment of the contrasting effects of French and British approaches. His exile to England in the 1720s led to *Letters on England*. It focused on English customs, religions, literature, and science. Voltaire’s text, his first major polemic, recognized progressive English developments as a device for critiquing France, a technique that he would frequently employ. One of the characteristics Voltaire admired most was England’s relative religious freedom.²² Voltaire eventually desired universal toleration for its own sake,²³ but his aim at this point was to reveal its immediate utility for France. He argued that Englishmen of all religions gathered as equals at the Royal Exchange to increase personal wealth and thus benefit England:

²⁰ Richard Ashcraft “Latitudinarianism and Toleration: Historical Myth versus Political History,” in *Philosophy, Science, and Religion in England, 1640-1700*, ed. Richard W. F. Kroll, Richard Ashcraft, and Perez Zagorin (Cambridge: Cambridge University Press, 1992), p. 152.

²¹ Toleration was a practical, if unintended, result of a failed strategy. The Comprehension Bill went before the House of Lords and that on toleration before Parliament. They were to be passed in chorus to integrate most Presbyterians into the Church of England, whilst isolating remaining nonconformists. Yet, this was abandoned and only the Toleration Act became law. Anglicans chose hegemony over integration, and Dissenters realized they could not return to, or reform, the Church. Rights remained limited, unless nonconformists converted to Anglicanism, but they still exerted much influence by occasional conformity. *Ibid.* John Spurr, “The Church of England, Comprehension and the Toleration Act of 1689,” *The English Historical Review* 104, no. 413 (1989), p. 927 C. D. Clark, *English Society, 1660-1832: Religion, Ideology, and Politics During the Ancien Regime* (New York: Cambridge University Press, 2000), pp. 66-81.

²² Voltaire, *Letters on England*, pp. 1-119.

²³ Voltaire supported limited toleration for security, but thought it was possible universally when people were suitably enlightened, and religion was separate from politics. 11654 Voltaire à Élie Bertrand (Berne), 26 mars 1765. Voltaire, *Correspondence* (Genève: Institut et musée Voltaire, 1953), vol. 57: pp. 236-7.

Go into the London Stock Exchange – a more respectable place than many a court – and you will see representatives from all nations gathered together for the utility of men. Here Jew, Mohammedan and Christian deal with each other as though they were all of the same faith, and only apply the word infidel to people who go bankrupt.²⁴

Voltaire's time in England, where he witnessed peaceful interaction of men from all religions, confirmed his belief that many religions were required for social harmony. Furthermore, it was a necessary cause for increasing the wealth of nations.

The issues Voltaire explored came to fruition near century's end. Many Dissenters in England's Midlands grew rich and powerful from industry and commerce. Yet, this did not incline them to joining the established Church, as Voltaire promulgated. Instead it often resulted in an outcome he would have much preferred, their adherence to his church of secularism. Voltaire and Max Weber (1864-1920), the German scholar who speculated on the role of the 'Protestant Ethic' in capitalism, were both somewhat correct. Religious persuasions of Dissenters heavily influenced English industry. The commercial success that it spawned, however, made them more secular, cosmopolitan, and enlightened, thereby dampening the very religiosity that helped them reach such Olympian heights.²⁵

Voltaire's *Letters on England* caused a sensation when it was published, for increasing interests in English Newtonianism, philosophy, literature, and commerce. Priests attacked the tract for its irreligion. The Catholic Church requested its suppression and the French crown, predictably, obliged by ordering the book to be burned in Paris.²⁶

Voltaire's intended purpose, not simply to insult France but show how reforms greatly

²⁴ Voltaire, *Letters on England*, p. 41.

²⁵ Max Weber, *The Protestant Ethic and the Spirit of Capitalism*, trans. Talcott Parsons (London: Allen & Unwin, 1930), pp. 95-183. On debates concerning Weber's thesis and early industrial Britain, see Jones, *Industrial Enlightenment*, pp. 163-66; Colin Campbell, *The Romantic Ethic and the Spirit of Modern Consumerism* (Oxford: B. Blackwell, 1987), pp. 99-137; Jacob, *Scientific Culture*, pp. 126-9; Margaret C. Jacob and Matthew Kadane, "Missing, Now Found in the Eighteenth Century: Weber's Protestant Capitalist," *The American Historical Review* 108, no. 1 (February 2003), pp. 20-49.

²⁶ The stable in Passy storing more copies was also raided. Pearson, *Voltaire Almighty*, pp. 97-120.

improved England, was lost on French authorities. Nevertheless, Voltaire's tome was an assault against the *Ancien régime*, and set the tone predicting many later developments.

1.3. The Fertile Crescent Bears Fruit

By the middle of the eighteenth century the seeds of dissent began to bear fruit. In France the Enlightenment attained what was arguably its most unified period around 1750.

Something approaching a consensus emerged among *philosophes*. This included support for reforming France's outdated institutions. Popular projects like the *Encyclopédie*, though later suppressed, revealed a common agenda. The editors, Denis Diderot and Jean le Rond d'Alembert (1717-83), recruited Jean-Jacques Rousseau, like them then still relatively unknown, among its original fifty contributors. This number grew as general support increased with each volume. The works of Voltaire and Charles de Secondat baron de Montesquieu (1689-1755) were praised by d'Alembert in *Preliminary discourse to the Encyclopédie* (1751). Both *philosophes* later joined the project as contributors.²⁷

Some of its most prominent articles, like contemporary popular books, attacked fanaticism, superstition, intolerance, and the influence of religion on government. These works also championed empiricism, studying nature, Newtonianism, and interdependence of different branches of human knowledge. The *Encyclopédie* was a medium to widely diffuse knowledge, and became one of the most ambitious ventures of the Enlightenment. Its scope enabled *philosophes* to assemble vast amounts of practical knowledge while promoting empirical philosophy, and a healthy dose of anticlericalism.

²⁷ The project's full title was *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers, par une société de gens de lettres*. Jean Le Rond d'Alembert, *Preliminary Discourse to the Encyclopaedia of Diderot*, Richard N. Schwab ed. (Chicago: The University of Chicago Press, 1995), ix n. 1, p. 3 n. 1, 98-100. After courting by *Encyclopédistes*, especially d'Alembert, Voltaire began contributing directly by 1754. *Ibid.*, p. 99 n. 51. Montesquieu's input to the *Encyclopédie* was minor, but his influence was great. He consented to write the benign article 'Taste,' but died in 1755 before finishing it. Ronal Grimsley, *From Montesquieu to Laclos: Studies on the French Enlightenment*, (Geneva: Droz, 1974), p. 99.

Detractors protested the *Encyclopédie* from the outset, asserting that was the work of deists and atheists. By 1758, the project was under increasing attack, and d'Alembert was considering leaving his position as editor. Opponents of the project were appeased when it was officially suppressed in 1759. This was part of a wider crackdown on subversive works, following an assassination attempt on Louis XV (1710-74) in 1757.²⁸ In Voltaire's letters he attempted to persuade d'Alembert to remain as editor. Voltaire, still believing in the potential for the *Encyclopédie* to spread enlightenment, argued that they should suspend official work. It would create a public outcry from their subscribers, and thus force the crown to lift the restrictions.²⁹ Voltaire also proposed another recourse. It involved the editors leaving France to continue their work in the printing centres on its periphery.³⁰ However, Diderot refused to leave France. He continued working in secret, eventually publishing the final ten *Encyclopédie* volumes in 1765.³¹ In this period Rousseau, a close friend of Diderot in the 1750s, published his most important works in Paris. Yet, he failed to do so secretly or anonymously. Consequently, his works were condemned and Rousseau spent years looking for refuge. Remarkably, families closely tied to the Delesserts participated in giving refuge to Rousseau and to the *Encyclopédie*.

The channels facilitating the traffic of clandestine books also served the British-Franco-Swiss network. Diderot finished the *Encyclopédie* in Paris. Later editions that saw it become a bestseller, however, were printed outside France. Firms such as the *Société*

²⁸ Robert-François Damiens (1715-57) tried to kill the king on 29 December. Denis Diderot, Jean le Rond D'Alembert et al., *Encyclopedia: Selections*, ed. and trans. Thomas Cassirer and Nelly N. S. Hoyt (New York: Bobbs-Merrill, 1965), pp. xii-iii; Frank A. Kafker, *The Encyclopedists as a Group: A Collective Biography of the Authors of the Encyclopédie* (Oxford: The Voltaire Foundation: 1996), pp. 101-20.

²⁹ Voltaire (Lausanne) to Jean le Rond d'Alembert, 8 January 1758. Voltaire, *The Selected Letters of Voltaire*, Richard A. Brooks ed. (New York: New York University Press, 1973), pp. 191-2.

³⁰ Voltaire (Lausanne) to Charles-Augustin Ferriol, d'Argental, 26 February 1758. *Ibid.*, pp. 194-6.

³¹ D. Diderot à Sophie Volland, 18 août 1765. Denis Diderot, *Correspondance*, (janvier 1765 – février 1766) ed. Georges Roth (Paris: Éditions de Minuit, 1959), vol. 5: pp. 91-2.

typographique De Neuchâtel printed the editions representing a of bulk sales of the great enterprise. It operated beyond France free from threats by its authorities, as Neuchâtel was a protectorate of Frederick II (1712-86) of Prussia.³² The press also had ties to the Delesserts. Jacques-François d'Arnal (1750-1830), an agent and banker in Lyon for the *Société typographique*, was Etienne Delessert's first cousin.³³ D'Arnal's brother, Jean-Baptiste-François (1754-1826), was the press' London agent.³⁴ In the 1780s the brothers aided the Delesserts with British and Continental educational tours. Yet, before these tours, or the press' printing of the *Encyclopédie* in the 1770s, Madeleine-Catherine Delessert's family gave Rousseau refuge in Yverdon and Neuchâtel.

1.4. Rousseau's Formative Friendships, Ruptures, and Revelation

The origins of J.-J. Rousseau's ties to the editors of the *Encyclopédie* and the Delesserts began in concert. In 1741, Rousseau moved to Paris and began several bonds that were fundamental to his future. This included an enduring and intimate friendship with Daniel Roguin (1691-1771), Mme Delessert's great-uncle, who became Rousseau's link to the Delessert family. Roguin, a banker and like Rousseau Swiss, provided vital introductions in Paris, including one to Denis Diderot. Rousseau's friendship with Diderot, though not as enduring as that with Roguin, was intense and significant for Rousseau's success as a writer. Diderot was from Langres and, like Rousseau, a craftsman's son drawn to Paris to

³² For the *Société typographique* and *Encyclopédie* see Darnton, *The Business of Enlightenment*, pp. 3-52.

³³ D'Arnal's mother, Françoise (*née* Brun b. 1736), and Etienne's mother, Marguerite (*née* Brun 1708-99), were sisters. In 1777, d'Arnal married Rose-Frédérique Bosset (1759-1829), daughter of Abraham Bosset de Luzé (1731-81), a rich manufacturer from Neuchâtel and one of the *Société typographique* partners. The d'Arnal brothers were merchant bankers and represented Lyon in the *assemblée de la noblesse* at the *États-Généraux* in 1789. *Ibid.*, p. 42, 104; Coninck, *Banquiers et philanthropes*, pp. 12-3; Julien Baudier, and Léon Galle, *Armorial des bibliophiles de Lyonnais, Forez, Beaujolais et Dombes* ed. William Poidebard (Lyon: Au siège de la Société, 1907), p. 16.

³⁴ Darnton, *The Business of Enlightenment*, p. 309, 259 n. 32;

make a name for himself.³⁵ Through the 1740s, Rousseau sustained friendships with both Roguin and Diderot, despite breaks away from Paris. Rousseau recalled: “I had not neglected either of them, and had indeed grown daily more intimate with the former.”³⁶ Diderot was a year younger than Rousseau and they, as Robert Darnton puts it, “fell into matrimony.” Or as Rousseau notes: “He had a Nanette, as I had a Thérèse, which gave us one more circumstance in common.” Diderot chose marriage, despite the difficult nature of Anne-Toinette (*née* Champion 1710-96), but Rousseau was in no rush to do the same with his pleasant and enduring partner Marie-Thérèse Levasseur (1721-1801).³⁷

Rousseau’s friendships expanded into a fellowship of young men seeking to be recognized as men of letters. He and Diderot formed a comradeship with the Abbé de Condillac (1715-80). Jean le Rond d’Alembert, the only one to have attained any acclaim (for his mathematical work), soon joined them. Each week they met to dine at a *Palais-Royale* tavern and soon began to plan a periodical, though it failed to materialize. In 1747 Diderot and d’Alembert were contracted to edit the *Encyclopédie*.³⁸ This, Rousseau noted, “was at first to be merely a sort of translation of Chambers, more or less resembling James’s *Dictionary of Medicine*, which Diderot had just completed.”³⁹ Rousseau contributed many articles on music to the great enterprise. As with later periods of the Enlightenment young men were keen to publish periodicals, and translations, to advance new ideas. It was a quick, cheap, and easy method to establish a reputation.

³⁵ *Ibid.* p. 160. Rousseau, struggling like many young men to survive in Paris, apologized to Roguin for not repaying a loan. Roguin replied that it was not an issue and offered more help. Roguin’s friendship was one of the few that endured throughout Rousseau’s turbulent life. *Ibid.*, p. 196.

³⁶ Jean-Jacques Rousseau, *The Confessions of Jean-Jacques Rousseau* (New York: Penguin, 1953), p. 324.

³⁷ Robert Darnton, “The High Enlightenment and the Low-Life of Literature in Pre-Revolutionary France,” *Past & Present*, no. 51 (1971), pp. 83-4; Rousseau, *The Confessions*, p. 324.

³⁸ *Ibid.* pp. 324-5

³⁹ *Ibid.*, p. 325. The translation of Ephraim Chambers’ (c. 1680-1740) *Cyclopaedia* (1728) was to be similar to Diderot recent translation of Robert James’ (1703-76) *A Medical Dictionary* (1743-5).

Denis Diderot's imprisonment in 1749, ostensibly for irreligion, was a seminal moment for he and Rousseau. Production of the *Encyclopédie* was interrupted, as Diderot was sentenced to Vincennes. *Pensées philosophiques* (1746) caused undue attention, but *Lettre sur les aveugles* (1749) offended enough people to earn Diderot a *lettre de cachet*. Upon his release he agreed to not publish offensive material. Thus, the books for which Diderot is most known were unpublished in his lifetime;⁴⁰ whereas a walk by Rousseau to visit Diderot at Vincennes, about six miles beyond Paris,⁴¹ helped Rousseau find a voice. He recounted the now well-known tale in the *Confessions*. It has been immortalized, by Rousseau and others writers, as his moment of conversion, as if he was St Paul on the road to Damascus. Rousseau paused on the roadside because of the heat and read of a contest by the Dijon Academy, in the *Mercur de France*. It asked: "Has progress of the sciences and arts done more to corrupt morals or improve them?" Rousseau, with typical embellishment, suggested that after reading it he "beheld another universe and became another man," reaching the prison "in a state of agitation bordering on delirium." Diderot noticed his disquiet. Rousseau revealed his revelation, and his plan to take the negative position. Rousseau concluded: "[Diderot] encouraged me to give my ideas wings and compete for the prize. I did so, and from that moment I was lost. All the rest of my life and my misfortunes followed inevitably as a result of that moment's madness."⁴² In 1750 Rousseau's essay, *Discourse on the Arts and Sciences*, won the Dijon prize. The episode has come to be seen as the point that Rousseau's 'break with the Enlightenment' began.⁴³

⁴⁰ *Ibid.*; Leopold Damrosch, *Jean-Jacques Rousseau: Restless Genius* (Boston: Houghton Mifflin, 2005), pp. 207-11. This included *Le rêve d'Alembert* (1830), *Jacques le fataliste et son maître* (1796) and *Le neveu de Rameau ou la satire seconde* (1805).

⁴¹ Rousseau, *The Confessions*, p. 327.

⁴² *Ibid.* pp. 327-32.

⁴³ This began in 1749 with Rousseau's first *Discourse* and ended with *Letter to d'Alembert on the Theatre* in 1758. Called "a break with the Enlightenment," it refers to his scorn for salons and *philosophes*, yet the

Rousseau's friendships and period in Paris had a profound effect. Weekly dinners and discussions with Condillac, d'Alembert and Diderot were, Leopold Damrosch notes, "an indispensable stage in Rousseau's apprenticeship as a writer and thinker."⁴⁴ Rousseau conceded in *Émile* that more was gained from discussion with authors than reading their books. The most benefit came from social interchange: "It is the spirit of societies that develops a thinking mind, & which extends its views as far as it can go. If you have a spark of genius, go spend a year in Paris. Soon you will be all that you can be, or you will never come to anything."⁴⁵ This was not the solitary Rousseau. Yet, his isolation was exacerbated as close friendships were extinguished, and Rousseau was driven into exile.

1.5. Rousseau's Refuge among the '*Roguinerie*'

In 1762, Rousseau was forced into a period of exile from the storm created by *Émile*.⁴⁶ This was, as he revealed to Guillaume-Chrétien de Malesherbes (1721-94), the third of three works spawned from his conversion on the road to Vincennes. Rousseau was led to write these texts to reveal mankind's natural goodness and its corruption by institutions. Thus he declared: "Everything that I could retain from these crowds of great truths, which illuminated me beneath that tree in that quarter of an hour, were weakly scattered about in my three principal writings; namely, the first discourse, that on inequality, and the treatise

Enlightenment extended beyond both. It was a personal rupture between Rousseau and friends belonging to what he called 'd'Holbach's coterie.' He railed against them and some *salonières*, but remained close to select *philosophes* and *salonières* until his death. Rousseau did split with conventional thought, but was closest philosophically with those whom he broke with furthest, such as Diderot. Alan Charles Kors, "The Myth of the Coterie Holbachique," *French Historical Studies* 9, no. 4 (1976), pp. 573-95. "The Break with the Enlightenment," in Damrosch, *Jean-Jacques Rousseau*, pp. 284-305. Graeme Garrard, *Rousseau's Counter-Enlightenment: A Republican Critique of the Enlightenment* (Albany: State University of New York Press, 2003). The 'break' also represents one for historians. Those defending the Enlightenment often use it to break from Rousseau, whereas scholars supporting him use it to depart from the Enlightenment.

⁴⁴ Damrosch, *Jean-Jacques Rousseau*, pp. 207-8.

⁴⁵ Jean-Jacques Rousseau, *Émile Ou De L'éducation. Par J. J. Rousseau* (Francfort: 1762), vol. 3: p. 156.

⁴⁶ The *Parlement* of Paris condemned *Émile* on 9 June 1762, for political and religious reasons. Ten days later Geneva's *Conseil de vingt-cinq* publically burned *Émile* and *The Social Contract* for similar reasons. Damrosch, *Jean-Jacques Rousseau*, pp. 357-9; Cyprian Blamires, *The French Revolution and the Creation of Benthamism* (Basingstoke: Palgrave Macmillan, 2008), p. 102.

on education; these three works are inseparable, and together form a whole.”⁴⁷ A narrow focus on Rousseau’s personal disputes and *Discourses*, as well as mythology built around them, has distorted his relationship with the Enlightenment. This has also obscured the liminal role played by the Delesserts and the British-Franco-Swiss network.

In 1762, Rousseau was no longer welcome in his adopted France or his native Geneva. After failing to secure refuge in England he turned to Swiss friends for help. First among them was Daniel Roguin, as Rousseau sates in *The Confessions*: “When I left Montmorency for Switzerland I made up my mind to stop at Yverdun with my dear old friend, M. Roguin, who had retired there some years before, and had invited me to go and see him there.”⁴⁸ Rousseau lived at Roguin’s villa on Lake Neuchâtel for several weeks.⁴⁹

Rousseau enjoyed his time at Yverdon but it was not to last. It was part of the republic of Berne and shared Geneva’s religious fervour. In July 1762, Berne’s senate agreed to ban *Émile*, as well as Rousseau from its territory.⁵⁰ Rousseau explained: “The difficulty was to know where to go, seeing that Geneva and France were closed to me.”⁵¹ Offers from England and Zürich were vague and a Rhineland château on offer was too distant to be prudent. Instead Rousseau chose a more appealing prospect:

Mme Boy de La Tour suggested that I should go and live in an empty but fully furnished house belonging to her son in the village of Motiers, in the Val-de-Travers, in the country of Neuchâtel. I had only to cross the mountain to get there. This offer was particularly opportune because on the King of Prussia’s territory I should naturally be safe from persecutions; at least religion could hardly be used as an excuse for them.⁵²

⁴⁷ J.-J. Rousseau (Montmorency) à C.-G. Malesherbes, 12 janvier 1762. Jean-Jacques Rousseau, *Œuvres: Quatre lettres à m. le président de Malesherbes* (Paris: Deterville, 1817), p. 12.

⁴⁸ Rousseau, *The Confessions*, p. 542. Roguin’s family continued to help Rousseau with finances for years.

⁴⁹ Maurice Cranston, *The Solitary Self: Jean-Jacques Rousseau in Exile and Adversity* (Chicago: University of Chicago Press, 1997), pp. 1-15.

⁵⁰ *Ibid.*, p. 1, 13; Damrosch, *Jean-Jacques Rousseau*, pp. 362-6.

⁵¹ Rousseau, *The Confessions*, p. 547.

⁵² *Ibid.* The Môtiers house was actually owned by Mme Boy de la Tour. Cranston, *The Solitary Self*, p. 15.

There, in the rural setting of the Jura mountain foothills, Rousseau stayed for three years writing and receiving visitors. He formed acquaintances with British visitors like Daniel Malthus (1730-1800), father of the famous political economist Thomas Malthus (1766-1834), and James Boswell (1740-95). Rousseau also rekindled Swiss ties to Charles Pictet (1713-92), Jacques-François Deluc (1698-1780), and François-Henri d'Ivernois (1722-78).⁵³ The guests were of service to Rousseau. The sons of the Swiss men became tied to the Delesserts and their network, with Rousseau remaining a vital bond. He linked Franco-Swiss exiles and Continental Anglophiles to British Huguenots and Francophiles. The following chapters will examine the network's establishment and expansion.

1.6. Conclusion

Contrasting French and British policies of the 1680s, revocation versus comprehension, precipitated both the Enlightenment and the Delessert network. Huguenots and Dissenters constituted minor segments of the French and British populations, but contributed vitally to their respective economies. The Huguenots diaspora significantly improved industries of French rivals. A direct effect of the revocation was suffering for scores of Huguenots. Yet, in the long-term French refugee communities throughout Europe helped spread the Enlightenment, and cosmopolitan networks. Among them was the British-Franco-Swiss network, which included many Huguenots. The Delesserts intimacy with Rousseau and dedication to education, as will be shown below, initiated their network. It expanded further, in the 1780s, through links to Britain. Religious toleration had, as Voltaire predicted, led to economic prowess. Members of the Lunar Society, many of whom were Dissenters, helped fuel British development, and it is to this society that we now turn.

⁵³ Damrosch, *Jean-Jacques Rousseau*, p. 366; Cranston, *The Solitary Self*, pp. 47-76, 164; Patricia James, *Population Malthus, His Life and Times* (London: Routledge & Kegan Paul, 1979), pp. 10-2.

2. Travelling by the Light of the Moon: Early Journeys of Lunar Men on the Continent (1765-1774)

The Lunar Society's seminal place in Britain's Enlightenment and Industrial Revolution has been established, but its relationship to the Continent remains obscure. Matthew Boulton's visit to France, in November 1765, was the first by a member of this society. His long and rocky passage of the English Channel, to secure materials and conduct business in Paris,¹ was indicative of his future commercial relationship with France. This visit took place just months after the Society's earliest incarnation, the Lunar circle.² Other future Lunar men were also on the move in this period. Scotsmen James Keir (1735-1820) and James Watt both travelled during the Seven Year's War (1756-63), before settling in Birmingham. Keir served in Britain's army in the war.³ Watt avoided military service. He instead trained in London and Glasgow, as a maker of mathematical instruments, which influenced his later success. Boulton left as his Soho manufactory neared completion, and after early Lunar stirrings. However, it was because of the first enterprise that Boulton went to France in search of materials and commercial prospects.

Early tours were of a different sort than later ones, but taken together they mark full participation in Enlightenment culture. Joseph Priestley's Continental tour in 1774, with his patron Lord Shelburne (1737-1805), most closely bridged past Grand Tours with those that were emerging. There was a shift away from visiting cathedrals, palaces, and

¹ BCL TS 3782/16/24. PAB. Matthew Boulton (Calais) to Anne Boulton (Birmingham). 17 November 1765. [Misdated as 18 November].

² Scholars agree that it began in 1765, if not its name and informal organization that developed later. Schofield uses 'circle' to identify the earlier group, suggesting that 'Lunar Society' appeared in 1775 and set meetings in 1780. Schofield, *The Lunar Society*, pp. 17-46. Jones reveals evidence and dates for Lunar meetings held in the early 1770s, if not the mid 1760s. Jones, *Industrial Enlightenment*, p. 89.

³ James Keir joined the Lunar group in 1767, a few months after Watt. Keir was from Edinburgh, where he met Erasmus Darwin (1731-1802) in 1754. They were medical students, but Keir disliked medicine. He left to fight in the Seven Years War and moved to Birmingham upon tiring of the military. Keir devoted years to Lunar pursuits, including experiments making alkali from salt, translating P. J. Macquer's *Dictionary of Chemistry*, and operating a glass manufactory. Schofield, *The Lunar Society*, pp. 75-82.

ancient ruins to touring scientific and industrial sites. Priestley partook in chemical experiments with French chemists and *savants* who supported chemical and mechanical discoveries. An inability to speak French or tolerate Parisian social life, to which Shelburne subjected him, saw Priestley flee France early. This atmosphere, enjoyed by David Hume (1711-76) and Adam Smith (1723-90) in the 1760s, was less palatable to Priestley's social tastes. Increasingly travellers sought to visit factories, which inspired and were influenced by Smith's *On the Wealth of Nations* (1776).⁴ Lunar men pioneered such scientific exchange, which expanded in the 1780s. Early Lunar crossings led to mixed perceptions, receptions, and success in France. Ultimately the tours significantly impacted each traveller, strengthening the Lunar Society's connections to the Continent.

2.1. From the Scottish to the Midlands Enlightenment

The previous chapter examined the origin of the Delesserts' bond to Rousseau. It let them profit from his pedagogy that influenced many parents, but most were limited to books like *Émile*. Rousseau's influence, pervasive on both sides of the Channel, expanded after philosophic ruptures around 1760. Initial unity and subsequent discord fostered literary productivity. It and the 1763 Peace fuelled a rush of Enlightenment traffic. Britons, such as Scots and Dissenters of England's Midlands, visited Paris and Geneva. This included Hume and Smith's young friend Sir James Macdonald (1741-66), a Highland chieftain. His classic education at Eton and Oxford inspired visits to sites of antiquity on his Grand Tour, including Mount Vesuvius.⁵ Conversely, educational tours facilitated through the

⁴ Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (London: W. Strahan and T. Cadell, 1778), pp. 9-32.

⁵ J. Macdonald (Rome) to W. Pepys, 5 January – 5 July 1766. William W. Pepys and Alice C. C. Gaussen, *A Later Pepys: The Correspondence of Sir William Weller Pepys, bart., Master in Chancery 1758-1825, with Mrs. Chapone, Mrs. Hartley, Mrs. Montagu, Hannah More, William Franks, Sir James Macdonald, Major Rennell, Sir Nathaniel Wraxall, and others* (New York: J. Lane, 1904), pp. 278-87.

British-Franco-Swiss network led young men to scientific-industrial sites like Soho, and to tour Vesuvius for geological interests. This cultural exchange, led to significant French translations of Scottish works, and the Lunar Society's initial forays abroad. James Watt came close to being the first Lunar man across the Channel. He lived in London in 1756, years before he moved to Birmingham or the Lunar Society's formation. It is perhaps Watt who most represents a link between the Scottish and the Industrial Enlightenment.

James Watt's father, James Watt (1698-1782), initially intended for Watt to take over the family maritime merchant business. Thus, he did not attend Glasgow University. After his father undertook several unsuccessful ventures, however, it became necessary for Watt to pursue his own vocation. Watt demonstrated an interest and ability to train as a mathematical instruments maker,⁶ and was sent to Glasgow in 1754. He received good introductions from his relative George Muirhead (1715-73), Chair of Humanity at the university. In Glasgow, Watt benefitted from the intellectual clique he joined, but not enough from the optician under whom he was learning a trade.⁷ Through Muirhead, Watt met Robert Dick (d. 1757), a young professor of natural philosophy and friend of Dr Joseph Black (1728-99).⁸ Dick, seeing Watt's ability and ambition, determined he would not learn the craft in Scotland and directed him to London. It was, H. W. Dickinson notes, "the mecca of English instrument makers."⁹ In June 1755, Watt left on horseback for London with John Marr, a friend and son of his former mathematics instructor.

James Watt's time in London was formative. He and Marr arrived in the capital on 18 June. Watt quickly connected with merchants known to his father, but had mixed

⁶ *Ibid.*, p. 110.

⁷ Dickinson, *James Watt*, p. 20.

⁸ Crowther, *Scientists of the Industrial Revolution*, p. 110.

⁹ Dickinson, *James Watt*, pp. 20-2.

impression of their district and London.¹⁰ He reported to his father: “I have been down at Wapping. Which is an ugly Confused place. the streets here are most of them very crok[ed] and dirty but there is the Finest shops here I ever saw.”¹¹ A distain for London, mixed with admiration for its productions, persisted throughout Watt’s life. Marr found employment as a naval instructor soon after arriving,¹² but Watt had difficulty. His father, from financial limits, did not want Watt to spend years in London. Master instrument makers, however, insisted on indentured terms of some years for apprentices. Tradesmen required payment for hiring and training. By late June Watt began training in the shop of John Neale, a watchmaker and globe seller, who introduced Watt to instrument makers in Westminster. They were more amenable than those of London.¹³ Watt sought to improve his skills, not apprentice for years, and had difficulty finding a master. Those who agreed to take him wanted a year’s service and payment.¹⁴ In July Watt had trials with John Morgan, mathematical instrument maker on Finch Lane in Cornhill.¹⁵ By early August they came to terms and Watt began training.¹⁶ He laboured for a year, regularly reporting his progress to his father, as he excelled in quadrants, rules, and compasses. Watt worked diligently, mastering what he could, as a typical apprenticeship took seven years.

2.2. James Watt’s Near Channel Crossing of 1756

During James Watt’s time in the capital he feared forcible confinement and transportation across the English Channel, or the Atlantic Ocean. He spent much time in the workshop, as he told his father: “I have Scarce time to write a letter now as we work to nine oclock

¹⁰ BCL MS 3219/6/46 34. James Watt (London) to James Watt [of Greenock], 19 June 1755.

¹¹ *Ibid.*

¹² Dickinson, *James Watt*, pp. 20-2.

¹³ BCL MS 3219/6/46 33. John Marr and J. Watt (London) to J. Watt (Greenock), 24 June 1755.

¹⁴ BCL MS 3219/6/46 37. J. Watt (London) to J. Watt [Greenock], 1 July 1755.

¹⁵ BCL MS 3219/6/46 38. J. Watt (London) to J. Watt (Merchant in Greenock N. Britain), 15 July 1755.

¹⁶ BCL MS 3219/6/46 28. J. Marr and J. Watt (London) to J. Watt (Merchant in Greenock N. Britain), 15 July 1755.

every night except Saturdays.”¹⁷ It was just as well, Dickinson notes, as Watt “durst hardly stir abroad for fear of being taken by the press gang to serve in his Majesty’s Navy or, worse still, by kidnappers to work on the plantations.”¹⁸ His liberty was restricted, as he feared the Royal Navy’s press-gangs. They were part of the English preparations for the war with France, and efforts to fill the navy’s warships.¹⁹ Watt, demonstrating his particular vulnerability, wrote to his father in March 1756:

[T]hey now press any one they can gett Landmen as well as seaman, except it be in the Liberties of the City, where they are obliged to carry them before my Lord Mayor first & unless one be either a’prentice or a Creditable Tradesmen, there is scarce any getting off again & if I was carried before my Lord Mayor I durst not avow I wrought in the City, it being against their Laws for any unfreeman to work even as a journeyman within the Liberties.²⁰

Watt nonetheless avoided capture.

The hard work paid off, but had a lasting effect upon Watt’s health. Dickinson explains: “The confinement, the long hours, the poor food had told on upon [Watt]; he had never worked so hard before. He had a ‘racking cough, a gnawing pain in the back and weariness all over the body.’” This did little to help an already delicate constitution. Watt experienced painful headaches and depression, both of which he suffered into his later years.²¹ A meagre diet was part of a Watt’s modest existence, as he tried not to burden his father. Watt complained of London’s high prices, explaining: “I find now that I am pretty well acquainted [with] this place that I cannot Live under 8/ [shillings] a week

¹⁷ BCL MS 3219/6/46 19. J. Watt (London) to J. Watt (Merchant in Greenock N. Britain), 25 October 1755.

¹⁸ Dickinson, *James Watt*, p. 22. Besides press-gangs men feared transportation to tobacco plantations in the Americas. Watt broke the law by working in London. In this period Scottish, English, Irish, and African men were forced on transport ships and to work in harsh conditions for planters. Peter Linebaugh, *The London Hanged: Crime and Civil Society in the Eighteenth Century* (New York: Verso, 2003), pp. 167-70.

¹⁹ In July Watt’s friend Colin Moss joined the navy, as a surgeon’s mate on the *Greyhound*. BCL MS 3219/6/46 38. J. Watt to J. Watt [Greenock], 15 July 1755. John Marr passed an examination at Trinity House to enter the navy. *Ibid.*, 30. J. Watt (London) to J. Watt [of Greenock], 21 July 1755.

²⁰ BCL MS 3219/6/46 10. J. Watt (London) to J. Watt (Merchant in Greenock N. Britain), 31 March 1756.

²¹ Dickinson, *James Watt*, p. 23.

without pinching my Belly & I Live in as frugal a manner as I can.”²² Frugality was also a trait that stayed with Watt for decades. This experience in prudent living was in marked contrast to his son’s practical education on the Continent in the 1780s. Such disparity, as well as James Watt junior’s political persuasions, created terse exchanges between them.

The barriers to James Watt’s career by traditional guild structures led him to rely on scientific friends. In 1756, he returned to Scotland. For four months Watt recovered with his father in Greenock, but it proved too small for Watt to establish a business. He moved to Glasgow,²³ and began friendships with Joseph Black, the new professor of Chemistry and anatomy at Glasgow, and with John Robison (1739-1805), a recent graduate. Robison later explained: “The University were then building an astronomical observatory. M^r. Watt came to settle in Glasgow as a Math^l. & Phil^l. Instrument maker, and was employed to repair & fit up a very noble collection of Instruments bequeathed to the University by M^r. M^c Farlane of Jamaica, a Gentleman well known in the scientific world.”²⁴ The connection to the university was crucial. It led to employment when other avenues become blocked, and eventually influenced Watt’s steam inventions. Black later reflected: “M^r Watt came to settle in Glasgow, as a maker of Mathematical Instruments; but being molested by some of the corporations who considered him as an intruder on their privileges, the University protected him by giving him a shop within their precincts, and by conferring on him the title of Mathematical instrument maker to the University.”²⁵

²² BCL MS 3219/6/46 25. J. Watt (London) to J. Watt [Greenock], 29 August 1755.

²³ Crowther, *Scientists of the Industrial Revolution*, p. 111.

²⁴ BCL MS 3219/6/17. J. Robison, “Extract from a Memorial by D^r. John Robinson relative to his first acquaintance with M^r. Watt; and the improvements of the latter on the Steam Engine. Written in 1796,” p. 1. Alexander McFarlane (*d.* 1755), a rich merchant, built an observatory in Jamaica. Crowther, *Scientists of the Industrial Revolution*, p. 111.

²⁵ BCL MS 3219/4/39 J. Black “Memorial by D^r. Black respecting M^r. Watt’s Invention of his Improvements on the Steam Engine &c. Written in 1796,” p. 1. Watt received the post, living space, and a

Watt's friendship with Robison and Black endured throughout his life. He remained in Glasgow for almost two decades, beginning his family and starting the experiments to improve steam-engines, as well the first partnership and effort to patent his invention.²⁶

After the 1763 Peace of Paris several men, who became prominent members of the Lunar Society, did manage Channel-crossings. This was in the form of several tours in France between 1763 and 1774. The first man to cross was Boulton. Watt's first trip to the Continent finally occurred in 1786. It was undertaken with Matthew Boulton in the form of a state invitation to Paris, from the French crown, who paid their expenses.²⁷

2.3. Matthew Boulton's First Channel Crossing of 1765

1765 was a busy and significant year for Matthew Boulton. He made his first trip across the English Channel, and he was also involved in the organization of two ventures that would occupy much of his time over the following decades. In May, Dr William Small (1734-75), after teaching for six years in Virginia, moved to Birmingham. He arrived with a recommendation to Boulton from Benjamin Franklin who had met Boulton and his friends in 1758 on a visit to the Midlands. Dr Small established a medical practice and the Boulton family became his patients. Small's arrival and focused sociability brought unity,

workshop months after arriving. This resulted from the influence of professors like Muirhead and Adam Smith who disagreed with the dominating guilds. Crowther, *Scientists of the Industrial Revolution*, p. 111.

²⁶ In 1763 John Anderson (1726-96), Professor of Natural Philosophy, had Watt fix a model Newcomen steam engine. It had been sent to a London instrument maker for repair, but did not work. Watt eventually fixed it and began his revolutionary steam-engine improvements, specifically the separate condenser. He worked in his shop, but had to work as a surveyor to support his family, leaving little time for experiments. Watt's Scottish friends supported him. Joseph Black helped with chemistry, finances, and by introducing him to Dr John Roebuck (1718-94), a chemical manufacturer from Birmingham, through whom Watt made contacts. On Watt's first visit in 1765 Dr William Small showed him the Soho manufactory. In 1769 he assisted Watt attain a patent for his invention. Roebuck was interested in it to remove water from coalfields. They became partners but in 1773 Roebuck went bankrupt. In 1774 Matthew Boulton settled with him, as Watt moved to Birmingham. The Boulton & Watt partnership formed. In 1775, through an act of Parliament, they had their patent extended to 1800. *Ibid.*, pp. 118-42; Dickinson, *James Watt*, pp. 32-47.

²⁷ BCL MS JWP Box IV 82. J. Watt snr (Birmingham) to M. Boulton, 3 October 1786.

and some informal organization, to the Lunar circle.²⁸ By July 1765, as Peter Jones notes, Boulton “opened the gates of his new Manufactory to visitors” as “Birmingham was already a recognized stopping-place on the industrial tourist map of provincial England.”²⁹ The Lunar circle and Soho marked the culmination of Boulton’s early career.

Unlike most Lunar men Matthew Boulton came from Birmingham, a place that dominated his life. He was born 3 September 1728, but information on his early life is scarce. Two misfortunes in 1759, allowed Boulton to embark on an ambitious course in the 1760s. A month after the death of Boulton’s first wife, Mary (born Robinson 1727-59) his father died. Boulton had been directing their buckle and button manufactory for several years. The death settlements and remarriage, to Mary’s sister Anne (1733-83), provided Boulton ample capital to initiate independent undertakings. These holdings were increased further by the death of Anne’s brother Luke Robinson (1731-64), as Boulton inherited the family’s fortune.³⁰ It was timely for Boulton who belonged to a budding group. Referring to them Samuel Johnson (1709-84) suggested: ““An English merchant is a new species of gentlemen.””³¹ Johnson was critical of James Cook’s (1728-79) South Seas voyage, retorting that as many new species could have been found if they stayed in

²⁸ Small was a Scot and attended the University of Aberdeen. He began at the College of William and Mary as Professor of Natural Philosophy in 1758. Small introduced European lecture formats, but his health and happiness suffered. In 1764 the college allotted funds to buy scientific apparatus and Small left, bought the instruments, and stayed in England. He earned his medical degree in Aberdeen. In 1765 he began a practice in Birmingham, joining Boulton’s circle. It included Erasmus Darwin and John Whitehurst, a Derby instrument maker, since about 1755. Schofield, *The Lunar Society*, pp. 15-39. In Virginia Small’s circle included Thomas Jefferson (1743-1826). Small’s addition to the Lunar circle brought unity, helping solicit Scots James Watt and James Keir in 1775. Robert E. Schofield, “The Lunar Society of Birmingham; A Bicentenary Appraisal,” *Notes and Records of the Royal Society of London* 21, no. 2 (1966), p. 147.

²⁹ Peter M. Jones, “I had L[or]ds and Ladys to wait on yesterday ...’: Visitors to the Soho Manufactory,” in *Matthew Boulton: Selling What All the World Desires*, ed. Shena Mason (Birmingham: Birmingham City Council, 2009), p. 71.

³⁰ Jones, *Industrial Enlightenment*, pp. 48-9; H. W. Dickinson, *Matthew Boulton* (Cambridge: Babcock & Wilcox, 1936), pp. 30-7.

³¹ James Boswell, *Life of Johnson*, ed. Augustine Birrell (Westminster: Archibald Constable and co, 1896), vol. 2: p. 153, vol. 3: p. 103.

England. Hybrid landed-industrialist, a new species evolving in the Midlands, mixed the lines between traditional landed gentry and burgeoning mercantile wealth.³²

The influx of new capital allowed Boulton to plot an ambitious course that saw a substantial expansion of his business, both in Birmingham and abroad. In 1761, he leased a thirteen-acre parcel of land in the county of Handsworth known as Soho. There, close to Birmingham but beyond the town proper, Boulton built his immense Soho Manufactory. He poured his new and good fortune into this great enterprise. Yet, his habit of moving to a new project before the first was finished, and using loans to finance them, insured that it took years before any business was profitable. This was somewhat offset as Boulton took on a series of partners, who brought new capital. The first was John Fothergill (c. 1730-82) in 1762. Their partnership was timely, as Birmingham's industries had entered a phase of intense expansion.³³ They manufactured hardware and metal goods, including buckles, jewellery, chains and buttons, then known as 'toys.' These wares were sold, in line with changing fashions, throughout Europe. Fothergill's dour German character possessed much less entrepreneurial spirit than Boulton. However, Fothergill had business connections on the Continent, which he pursued relentlessly searching for buyers. In the 1760s and 1770s Fothergill travelled in France, Sweden, Denmark, German and Eastern European states, and ventured as far as St. Petersburg.³⁴ Boulton too travelled to the Continent for the partnership, but his travels were far more modest.

Boulton's participation in traffic over the Channel after the Seven Years War was for business. He first went to London, but his intent there and in Paris was commercial.

³² Jones, *Industrial Enlightenment*, p. 49. Jones cites Johnson and Mason on Boulton blurring lines between landed and mercantile wealth, and "bent on gentrification." Mason, *The Hardware Man's Daughter*, p. xiii.

³³ Dickinson, *Matthew Boulton*, pp. 28-48; Jones, *Industrial Enlightenment*, pp. 49-50.

³⁴ *Ibid.*, pp. 28-46; Rita McLean, "Introduction: Matthew Boulton 1728-1809," in *Matthew Boulton*, pp. 1-4

Boulton expected to save hundreds of pounds from the collapse of Mayer Oppenheim (c. 1720).³⁵ Oppenheim, a Jewish glassmaker, immigrated from Pressburg to England. By 1755 he had a glass patent in London, but later moved to Birmingham and secured a red-glass patent.³⁶ In 1765, Boulton knew that Oppenheim was near bankruptcy. Boulton & Fothergill were minor creditors. Boulton secured goods in London and went to Paris to acquire more capital, but wanted his scheme kept quiet.³⁷ He was reluctant to travel, but was encouraged by Fothergill, and their friends John Motteux (1736-93) and William Small.³⁸ Boulton secured materials and cleared debt owed, a wily manoeuvre, as primary creditors were closing in on Oppenheim.³⁹ He staved off bankruptcy, perhaps with help from Boulton,⁴⁰ but continued to struggle. By 1777, Oppenheim was insolvent. After time in debtor's prison he moved to France, where his troubles continued.⁴¹ Boulton's trip, for covert industrial collection and to market his firm's goods,⁴² gave him insights on France.

Boulton's crossing (16 November 1765) provided him with his first impressions of France. He was impressed by French architecture, but dismayed by the great poverty of a nation displaying so much pomp. He wrote from Paris to provide Anne "some Idea of this grand & paltry Country, a Country that abounds wth pompous poverty & is in most

³⁵ BCL TS 3782/16/1/22. PAB. M. Boulton (London) to A. Boulton (Birmingham). 7 November 1765.

³⁶ Oppenheim manufactured red glass for Birmingham trades. In 1784 he obtained a French privilege to use coal to make flint glass, at his Rouen works. This establishment collapsed in 1786, possibly from poor quality glass, which stopped his expansion in northern France. Harris, *Industrial Espionage*, p. 341.

³⁷ Boulton's prediction was correct and he secured all he could from Oppenheim (£200 of paper boxes and almost £115 of chains) in London. BCL TS 3782/16/1/24. M. Boulton (Calais) to A. Boulton (Birmingham). 17 November 1765. (Misdated as 18 November). Boulton was seasick on the ship.

³⁸ BCL MS 3782/12/60 21. J. Fothergill (Birmingham) to M. Boulton (London), 4 November 1765.

³⁹ BCL MS 3782/12/60 30. J. Fothergill (Soho) to M. Boulton (Paris), 20 November 1765. BCL MS 3782/16/1/27. J. Fothergill (Birmingham) to M. Boulton (Paris), 13 November 1765.

⁴⁰ BCL TS 3782/12/60 39. J. Fothergill (Soho) to M. Boulton (London), 22 December 1765.

⁴¹ Oppenheim's relative Nathan Oppenheim took over the firm. It left no further record. Harold Pollins, *Economic History of the Jews in England* (Rutherford: Fairleigh Dickinson University Press, 1982), p. 84.

⁴² Boulton brought samples and pattern books, visited merchant houses, and recognized the cleverness of Paris' craftsmen. Peter M. Jones, "Living the Enlightenment and the French Revolution: James Watt, Matthew Boulton, and Their Sons" in *The Historical Journal* 42, no. 1 (1999), p. 163.

particulars quite in the papie[r] Macher style: except their palaces, Churches, Sculpture, Carving, paintings & in general their Designs are beyond all things I have ever seen.” This included, above all, the Palace of Versailles where Boulton was taken by his hosts. It was, Boulton noted, the “largest palace in Europe,” which impressed him by its “Fine painting, very fine Sculpture in Marble” and “Water works & curious workmanship.”⁴³ It was this grand palace that occasioned his return to France in 1786. He and James Watt were invited to consult on Versailles’ *Machine de Marly*. It was built in the 1680s, at the height of Louis XIV’s power. But by the 1780s the *Marly*’s power, like that of the monarchy, was diminishing and it struggled to furnish Versailles water.⁴⁴

Boulton’s first journey to France gave him a sense of its industries and its social contrast. Later Channel-crossings by he and Watt were much different in form. Their visit in 1786-7, and Watt’s return in 1802, occurred after they earned international reputations as *savant-fabricants*. These visits coincided with tours for practical education by their sons, and strengthened connections with Continental counterparts like the Delesserts. In spite of enduring exchange Boulton remained cautious about France. Boulton, Peter Jones notes, maintained “a utilitarian attitude towards England’s closest neighbour and principal commercial rival, avoiding both the adulation and the execration of things French that would possess so many of his friends and contemporaries.”⁴⁵ Two of these friends were R. L. Edgeworth and Thomas Day. Their tours of France, and experiments with Rousseauist education, will be explored below. Joseph Priestley made his solitary visit to France in the 1770s. Priestley was much more liberal in his politics than Boulton, but likewise maintained an ambivalent view of France.

⁴³ BCL 3782/16/1/26. M. Boulton (Paris) to A. Boulton (Birmingham). 24 November 1765.

⁴⁴ Jones, “Living the Enlightenment,” p. 164.

⁴⁵ *Ibid.*, p. 163.

2.4. Priestley's Solitary and Short Tour of the Continent

In 1774, the year after R.-L. Edgeworth returned from France, Priestley made a tour of the Continent. Priestley, unlike Edgeworth, travelled before he joined the Lunar Society, while he was under the patronage of Lord Shelburne.⁴⁶ Initially the employment offer was vague. Priestley believed he was to supervise the education of Shelburne's children, for which was well qualified.⁴⁷ Yet, he was hired as "companion-librarian and supervisor of the tutor."⁴⁸ Shelburne and Priestley's liaison and Continental tour resembled more David Hume and Adam Smith's period in Paris, than later trips by other Lunar Men. This was Priestley's only visit to the Continent. They travelled through the Low Countries and Rhineland cities and stayed a month in Paris. In Paris Priestley, Robert Schofield notes, "dutifully accompanied Shelburne on state visits to dignitaries and to see paintings, cathedrals, and religious services." They also attended salons of A.-R.-J. Turgot (1727-81), Baron d'Holbach (1723-89), and Trudaine de Montigny (1733-77). Priestley, "the insular middle-class Englishman," was not as fond of these milieux and soon "tired of public spectacles and assemblies."⁴⁹ He told Theophilus Lindsey, a friend and fellow Unitarian, he was "quite tired of the idleness" in which he spent much time in Paris, as he

⁴⁶ William Petty, Lord Shelburne, first Marquess of Lansdowne was a wealthy Anglo-Irish landowner. On Shelburne's eccentric political career, patronage of liberal thinkers, and support of liberal economics see Dorothy Medlin and Arlene P. Shy, "Enlightened Exchange: The Correspondence of André Morellet and Lord Shelburne," in *British-French Exchanges in the Eighteenth Century*, ed. Kathleen Hardesty Doig and D. Medlin (Newcastle: Cambridge Scholars Publishing, 2007), pp. 34-45.

⁴⁷ Shelburne's offer was vague and Priestley was apprehensive about receiving a salary unless he gave "an equivalent service." Priestley was also happy as a Dissenting minister in Leeds. 50. J. Priestley (Leeds) to Richard Price, 21 July 1772. Joseph Priestley, *A Scientific Autobiography of Joseph Priestley, 1733-1804*, ed. Robert E Schofield (Cambridge: M. I. T. Press, 1966), pp. 105-6.

⁴⁸ Shelburne hired Thomas Jervis as tutor. Robert E. Schofield, *The Enlightened Joseph Priestley: A Study of His Life and Work from 1773 to 1804* (University Park: Pennsylvania State University Press, 2004), p. 5.

⁴⁹ *Ibid.*, p. 7.

preferred instead “to be about my experiments, or some composition.”⁵⁰ There were elements of French society that Priestley found redeeming, mainly the philosophical and scientific circles. He enjoyed meeting men with influence on the government’s direction, which he valued, as it allowed him a greater understanding of French politics. The circle was likely that of Turgot, André Morellet, and Trudaine de Montigny, given Priestley’s ties and description. Priestley reported to Lindsey: “They are a set of philosophical men, whose objet is freedom of commerce, and universal peace.” Priestley was conceded about another party, then not favoured by the ministry, “whose object is the very reverse.”⁵¹ This might, Priestley feared, change as France’s power and wealth increased.⁵²

Priestley felt most at ease in the French scientific community. He connected with leading chemists, including Antoine Lavoisier and De Montigny, and exhibited several pneumatic experiments. The tour came at an inopportune time for Priestley’s chemistry, interrupting a pioneering series of experiments. These, Schofield explains, had led to the “isolation and identification of dephlogisticated air (oxygen)” and tests which produced mercuric oxide, “an air with curious properties.”⁵³ The inability for further scrutiny led to a period of uncertainty while Priestley was in France. Like results in Paris led Priestley to suggest, Schofield adds, that the new air “supported combustion better than common air, but the Parisians remained doubtful.” Lavoisier had a different opinion of the air.⁵⁴ Yet,

⁵⁰ *Ibid.*; Joseph Priestley (Paris) to Rev. Theophilus Lindsey (Holborn), 21 October 1774 in Joseph Priestley, *The Theological and Miscellaneous Works of Joseph Priestley, LL.D. F.R.S., &c.*, ed. John Towill Rutt (London: G. Smallfield, 1817), vol. 1: pp. 251-4.

⁵¹ J. Priestley to T. Lindsey, 21 October 1774. Priestley, *The Theological and Miscellaneous*, vol. 1: p. 253.

⁵² *Ibid.*

⁵³ Schofield, *The Enlightened Joseph Priestley*, p. 105.

⁵⁴ *Ibid.*, p. 111. For more on Priestley and Lavoisier’s experiments in this period see Henry Guerlac, “Joseph Priestley’s First Papers on Gases and Their Reception in France,” *Journal of the History of Medicine and Allied Sciences* 12 (1957), pp. 1-12.

the phlogiston and water controversies, between British and French chemists, were still about a decade away.

Priestley, despite exchange with likeminded *savants*, departed France early. He did not wait for his patron, returning to Britain before Shelburne with Jean Hyacinth De Magellan (1722-90), an instrument dealer.⁵⁵ This was Priestley's only Channel crossing, but it did not sever his links to the Continent, some of which preceded his tour. In 1772 Morellet, sponsored by his patron Trudaine de Montigny, toured England as a guest of Shelburne. Morellet visited Boulton's Soho factory, the Society for the Encouragement of the Arts, Manufactures, and Commerce in London, and the naturalists David Solander (1733-82) and Joseph Banks (1743-1820). They had recently returned from James Cook's first South Seas voyage (1768-71). At Shelburne's Bowood estate, Morellet met Priestley and other liberal thinkers.⁵⁶ In 1773, Jean-André Deluc (1727-1817) visited Priestley at Calne, after relocating from Geneva to England. Deluc hoped Priestley's pneumatic work would help clarify his metrological research in the Alps.⁵⁷ Priestley, Deluc, and Morellet each took part in the educational tours of young men in the 1780s, including Priestley's son Joseph who went to Geneva in 1784.⁵⁸ By then, Priestley had departed Bowood, and Shelburne, for a Unitarian ministry in Birmingham. Two liberals to succeed him under

⁵⁵ Priestley did not find France desirable to live in, or even visit for long. He questioned how Britons could expended so much time and money there. Priestley, *The Theological and Miscellaneous*, vol. 1: pp. 256-7. Magellan, a Portuguese Jesuit, was a well-travelled and connected man of science. He found and improved English instruments for European contacts. After tiring of Paris society Priestley shared much time with Magellan, who was a cultural guide on their return to England. *Ibid.*, p. 198. In 1783, James Watt thanked Magellan for books delivered by Priestley, and asked for French texts on mechanics and science for the Lunar Society. BCL MS 3219/4/123 J. Watt to J.-H. Magellan, 18 December 1783.

⁵⁶ Shelburne met Morellet in Paris in 1771 and a friendship formed. Their exchange of letters, ideas, and books lasted for thirty years. Morellet had a far more systematic mindset, but Shelburne's liberalism and love of learning led him to patronize Morellet. For five months Morellet collected accounts of English economic, political, and cultural developments, as Shelburne was attaining significant support from London radicals, *savant* Dissenters, and Midlands *fabricants*. Medlin and Shy, "Enlightened Exchange," pp. 34-40.

⁵⁷ Deluc first arrived in London in April 1773. Jean-André Deluc, "To the Conductors of the Edinburgh Review," *The Edinburgh Review: or Critical journal* (1805) vi: pp. 501-51.

⁵⁸ BGE Ms Suppl 1040 148-9. LJS. J. Priestley (Birmingham) to Jean Senebier (Geneva), 14 October 1784.

Shelburne's patronage, Morellet and Etienne Dumont (1759-1829), oversaw Continental tours by Shelburne's sons in 1784 and 1802. They, like Bowood Circle members Samuel Romilly (1757-1818) and Jeremy Bentham, remained tied to the Delesserts for decades.

2.5. Conclusion

The existence and endurance of these cross-Channel connections is understandable.

Liberals and cosmopolitans undertook the crucial work to translate, tutor, and transmit Enlightenment ideas. However, traffic in this period also began to take on new attributes. Grand Tours were moving away from traditional tours of cathedrals, palaces, ruins, and collections. Travellers were becoming more interested in scientific and industrial sites. It was natural for Shelburne to send Morellet to tour Boulton's Soho manufactory, as Lord and Lady Shelburne were among its first visitors in May 1766.⁵⁹ Forces motivating these visits were the same ones leading him to sponsor Priestley, Morellet, Bentham, Dumont, and Romilly.⁶⁰ They were bound by a common interest in education, industry, science, economic liberalism, and reform. Priestley's shift from Bowood to Birmingham was not altogether difficult, as some of these forces were even stronger within the Lunar Society.

Collectively the Continental tours in the 1760s and 1770s by Boulton, Edgeworth, Day, and Priestley reflect the comprehensiveness of the Lunar Society. The tours inspired and influenced later cultural connections, helping to expand the Society's crucial place in the Enlightenment. The isolated early tours were less conducive to cross-Channel accord, as proper French and Swiss connections had not yet been forged. The experimental work

⁵⁹ The Shelburnes toured Birmingham examining its great industrial sites. Soon the town became part of "an established tourist circuit." Jones, "I had L[or]ds and Ladys to wait on yesterday," p. 71. Boulton hosted wealthy customers as well as Lunar Society meetings and foreign *savants* at Soho.

⁶⁰ For some fascinating links of the Bowood circle See Simon Schaffer, "Measuring virtue eudiometry, enlightenment and pneumatic medicine," in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and R. K French (Cambridge: Cambridge University Press, 1990), pp. 281-318.

in this period of Watt with mechanics, Boulton's manufactory in Soho, Edgeworth and Day in education, and Priestley in chemistry, significantly established the Lunar Society.

Practical education and tours further established many Enlightenment principles, helped to spark links with like-minded Europeans, and surfaced in Lunar activities. Maria Edgeworth's (1768-1849) favourite passage in *On the Wealth of Nations* (1776) was pin-making in Smith's section on the division of labour.⁶¹ Smith's influence, like that of her father's friends, shone through in Maria's works. In her book for children, *Harry and Lucy* (1825), the title-characters took vacations with their father, touring cotton and steel mills and Josiah Wedgwood's (1730-95) pottery factory at Etruria. Their father lectures them on the cotton jenny, productivity, work ethic, and chemical processes. He also read them a passage from Sir Walter Scott's (1771-1832) preface in *The Monastery* (1820), praising Watt and his famous steam engine.⁶² The influence of Smith and other British writers reached across the English Channel. It motivated Etienne Delessert to send his two eldest sons to finish their education in Britain in the 1783.⁶³ In the 1780s, common interests created a late-Enlightenment corridor from Geneva to Edinburgh. J.-A. Deluc, Marc-August Pictet (1752-1825), the Delesserts, and many others Franco-Swiss crossed to Britain. Conversely, the sons of Lunar men were sent to Paris and Geneva. These new Grand Tours epitomized and disseminated the Enlightenment between 1780 and 1820.

⁶¹ M. Edgeworth (La Celle) to Frances Anne Edgeworth, 4 June 1820. Maria Edgeworth, *Maria Edgeworth in France and Switzerland*, ed. Christina Colvin (Oxford: Clarendon Press, 1979), p. 151.

⁶² Edgeworth began the book fifty years earlier for his children, as there were so few. Maria cited it as the first try to properly teach children in science with narrative. Maria Edgeworth, *Harry and Lucy concluded: being the last part of early lessons* (London: R. Hunter, and Baldwin, Cradock, and Joy, 1825), vol. 1: pp. vii-viii, 211-34, vol. 2 pp. 1-41, 164-78, 335-7. On bourgeois ideology and the children's books by the Lunar group see Isaac Kramnick, "Children's Literature and Bourgeois Ideology: Observations on Cultural and Industrial Capitalism in the Later Eighteenth Century," in *Culture and Politics from Puritanism to the Enlightenment*, ed. Perez Zagorin (Berkeley: University of California Press, 1980), pp. 223-7.

⁶³ Catherine Duprat, *Le temps des philanthropes: la philanthropie parisienne des Lumières à la monarchie de Juillet* (Paris: Éditions du C.T.H.S., 1993), vol. 1: p. 319; Coninck, *Banquiers et philanthropes*, p. 24.

3. All Roads Pass Through Geneva: The Pivotal Place of the City-State and the Swiss Diaspora

Eighteenth-century Geneva and its compatriot Swiss states were small, in population and size, but had much influence in education, science, and industry. A new Swiss dispersal emerged late in the century. It was not one created by religious persecution, but through political strife and the pursuit of better opportunities. Therefore, instead of a great influx of Huguenots migrating to the Swiss states, from France, this dispersal saw young Swiss and Genevans dispersed through Europe, and beyond. They were drawn to larger countries like Britain and France to whom they maintained, respectively, religious and linguistic ties. This group might most accurately be termed a phalanx and not a diaspora. It was made up of about thirty *savants* who were exceedingly active in politics, science, commerce, and industry. Despite its small size this group had a fundamental influence on developments of the late Enlightenment.

Political instability in Geneva and its neighbouring Swiss states was vital for the development of the British-Franco-Swiss network. In the late seventeenth century the fertile crescent around France gained from a Huguenot diaspora. In the late eighteenth century, however, countries like France and Britain, and families like the Delesserts, were the beneficiaries. Indeed, the expansion of the Delessert network to Britain resulted not from new British or French connections, made after relocating to Paris, but from old Genevan ones. It was Jean-Jacques Rousseau who emerged as the greatest unifying force for Genevans, as well as Huguenots and British Francophiles. Rousseau, a native son of Geneva, had become one of the most prominent figures of the Enlightenment by mid-century. Though he was reluctant, Rousseau joined political and philosophical struggles in Geneva in the 1760s. This brought him into contact with the Deluc family and other

Genevan reformers. Rousseau also wrote some of his greatest works during this period. He remained, even after his death, a unifying force for exiled Swiss. Their number increased from Swiss political upheavals between 1760 and 1800, as well as the resulting economic slumps. Consequently, young Swiss pursued economic opportunities in Britain, France, and America. Other Swiss went to Scotland to attend Edinburgh University or to London to preach. Established Huguenot communities made relocations easier. Matters came to a head in 1782, with the Genevan revolution. It failed in the short term. Yet, the flight of its leaders led to them joining French and British reform movements. The Swiss diaspora was fundamental for the flow of late Enlightenment education, science, industry and commerce, as well as the expansion of the British-Franco-Swiss network.

3.1. Early Genevan links to Britain: Jean-Pierre Du Roveray

The relocation of the Genevan merchant Jean-Pierre Du Roveray (1742-1810) to Britain created an early link in the British-Franco-Swiss network. His presence in London was crucial to the prosperity of his merchant house. It traded British goods on the Continent, but Du Roveray also served as an enduring link in other capacities. He was a contact for the Genevan Louis Odier (1748-1817), who studied medicine at Edinburgh in the late 1760s. In the 1770s, Du Roveray aided the establishment of fellow Genevan merchants moving to London. He likewise assisted political exiles in the 1780s. Finally, J.-P. Du Roveray acted as intermediary between Etienne Delessert and Matthew Boulton's Soho Mint in the 1790s. Commerce, politics, science, and industry were intimately intertwined within the British-Franco-Swiss network, as they were within the wider Enlightenment.

J.-P. Du Roveray moved to London from Geneva by 1765, seeking his fortune, but retained ties to his native city. He was, like Etienne Delessert, of Huguenot and Swiss

origin. Du Roveray's motivation to relocate for economic opportunity was a common one in this period. His famous brother Jacques-Antoine Du Roveray (1747-1814), however, fled to England because of the failed 1782 revolution.¹

Political disturbance created further Enlightenment traffic. Following J.-A. Du Roveray's banishment from Geneva he moved throughout England, Ireland, and the Continent. James Watt was, however, suspicious of Du Roveray. Matthew Boulton and Watt were growing increasingly concerned about industrial espionage, against their Soho steam-engine works. Foreigners posed a particular threat. Watt declared to Boulton: "That Scoundrel Du Roveray was here yesterday also, & about the manufactory which he should not have been if I had known in time."² Even so, Boulton & Watt maintained a long business relationship with J.-P. Du Roveray.

J.-P. Du Roveray's ties to Soho began by 1771, a few years after he became established as a merchant in London, and lasted until at least 1804. He ordered and sold Soho goods through his merchant house, which focused on foreign trade. This included placing orders for various metal goods from Boulton & Fothergill, writing a French prospectus for the Boulton & Watt letter-copying machine, and taking orders to export their fire engines to Rouen, as well as an engine for a watermill in America.³ They discussed commercial matters by correspondence, and in person, when Boulton or Watt saw Du Roveray in London. Du Roveray's dedication to his business led him to seek them out as well. Therefore, in 1780, Du Roveray explained to Boulton:

¹ David H. Weinglass, "F.I. Du Roveray, Illustrated-Book Publisher 1798-1806: I: The Life of a Huguenot Publisher and Connoisseur in London," *Bulletin / Biographical Society of Australia and New Zealand* 12, no. 1 (1988), p. 3.

² BCL MS JWP Box IV 38. J. Watt snr (Birmingham) to M. Boulton (Chasewater), 3 November 1785.

³ For Button orders see: BCL MS 3782/12/36 341. J.-P. Du Roveray (London) to M. Boulton (Soho), 19 December 1772; Metal goods: *Ibid.*, 342. J.-P. Du Roveray (London) to M. Boulton (Birmingham), 8 April 1773; Copying machine and engines *Ibid.*, 347. J.-P. Roveray (London) to M. Boulton (Soho), 4 September 1780; Watermill engine: *Ibid.*, 353. J.-P. Du Roveray (Great Helen's) à M. Boulton, 27 juin 1782.

Intending to set off in a very few days for a grand tour in England with a view to observe whatever may be of any use to a Merchant who is interested in knowing every manufactory every port every place that may have some connections with foreign trade, the better to succeed in my plan I have thought proper to begin by Devonshire & Cornwall.⁴

Du Roveray was likewise a vital contact between Britain and the Continent. Frederick Romberg & Co., a large Flemish merchant transport firm, employed Du Roveray as its “special Agent” and overseer of shipping to England.⁵ Du Roveray also expanded his English business.⁶ Besides being versed in exchange with Boulton, for finished and unfinished metal, Du Roveray had significant Continental and shipping contacts. His position as an established London merchant made him an ideal partner in Etienne Delessert’s later efforts to manufacture French coin.

Political disturbance created vast threats as well as great prospects for members of the British-Franco-Swiss network. Du Roveray was, as will be shown below, a central partner in Delessert’s negotiations with Boulton’s Soho mint in the 1790s.⁷ The changes caused by the French Revolution offered an opportunity for them to supply France with new coins, but also complicated negotiations. The Revolution ultimately brought about Du Roveray’s bankruptcy, and threatened Boulton and Delessert’s respective affairs.

3.2. Early Genevan links to Britain: Dr Louis Odier

Louis Odier was another Genevan to establish early links to Britain. Like the Delesserts, and the Du Roverays, the Odiers were Huguenots. They came from Dauphiné, France,

⁴ BCL MS 3782/12/36 348. J.-P. Du Roveray (London) to M. Boulton (Chacewater), 14 September 1780.

⁵ The firm had at least 35 ships operating from Brussels and Ghent. It served most English Channel ports, moving goods and people by sea and land. BCL MS 3782/12/36 348b. “List of Vessels belonging to F. Romberg & Son, of Brussels,” (Brussels), 4 September 1780.

⁶ The order related to a scheme Du Roveray hatched, with Boulton, to sell tin to his friend in Flanders. It hoped to take advantage of the coinage price and allow the Flemish contact to secure much of the business BCL MS 3782/12/36 349. J.-P. Du Roveray (Manchester) to Thomas Wilson; BCL MS 3782/12/36 350. J.-P. Du Roveray to M. Boulton, 13 October 1780. Wilson was Boulton & Watt’s agent in Cornwall.

⁷ BCL MS 3782/12/36 332. J.-P. Du Roveray (London) to M. Boulton (Birmingham), 13 May 1791; *Ibid.* 246. E. Delessert (Paris) to M. Boulton (London), 16 May 1791.

but fled as refugees to Geneva. The family eventually became prosperous enough to attain citizenship in the city-state. In 1767, Odier went to Edinburgh to study. He was the first of a group of Genevan students to attend medical school at Edinburgh.⁸ Odier, soon after arriving in Edinburgh, contacted his friend Pierre Prévost (1751-1839). Prévost later tutored for the Delesserts before becoming a renowned professor and scientist in Geneva. Over the next few decades, Odier helped young Genevan students studying at Edinburgh, and young British students who studied in Geneva.

Louis Odier's time in Edinburgh formatively influenced his medical career. The university emerged by this time as a leader in scientific education, especially medicine.⁹ After three years Odier became a doctor of medicine, in 1770, but he only returned to Geneva in 1773. Odier planned to spend two additional winters at Edinburgh and a year at Montpellier, the famous French medical school.¹⁰ He was president of Edinburgh's Royal Medical Society in his final two years there.¹¹ Odier's praise of the professors and medical school, specifically Dr Joseph Black and Dr William Cullen (1710-90), led Odier to continue studying with them.¹² He filled volumes with notes on Cullen's medical lectures and clinical work.¹³ Upon leaving Edinburgh, Odier considered establishing a medical practice in a provincial British town. Remuneration was higher, yet language and

⁸ Eduard-Rudolf Müllener, "Six Geneva Physicians on Meningitis," *Journal of the History of Medicine and Allied Sciences* XX, no. 1 (1965), p. 23.

⁹ BGE Ms. fr. 251. PPC. L. Odier (Edinburgh) à P. Prévost (Genève), 1 août 1769. For more on this see J. B. Morrell, "The University of Edinburgh in the Late Eighteenth Century: Its Scientific Eminence and Academic Structure," *Isis* 62, no. 2 (1971), pp. 158-71.

¹⁰ William Robertson (1721-93), historian and university principal, gave Odier his doctorate of medicine on 12 September 1770. BGE Ms. fr. 255. PPC L. Odier (Edinburgh) to P. Prévost, 9 octobre 1770.

¹¹ BCL 3219/4/11/14 J. Watt jnr (Genève) à J. Watt snr (Birmingham), 24 mars 1785.

¹² *Ibid.*; BGE Ms. fr. 251. L. Odier à P. Prévost, 1 août 1769.

¹³ MHSZ MS Z 60 Louis Odier "A Syllabus of the Lectures of D^f Cullen on the Nervous System," 1 vol. (Edinburgh: 1769); *Ibid.*, Z 61 Louis Odier, "A Clinical Lectures of D^f Cullen for the year 1770," 2 vol. (Edinburgh: February); *Ibid.*, Z 62 Louis Odier, "Clinical Cases," 10 vol.; *Ibid.*, Z 63 Louis Odier, "A Course of the Lectures on the Practice of Physick by D^f Cullen," (Edinburgh: 1769-70) 13 vol.

customs were barriers for foreign physicians. Ultimately Odier chose Geneva, where he quickly married and established a practice.¹⁴

Once home Odier assisted Pierre Sylvestre (1759-95) and Alexandre Marcet (1770-1822). These men went to Edinburgh after fleeing political revolutions in Geneva, in 1782 and 1793 respectively.¹⁵ In Geneva, as E.-R. Müllener asserts, Odier became “for the next forty years the busiest and most prominent practitioner and research worker of the town.”¹⁶ Odier profited from his training and experience to become an enlightened physician. He developed a successful medical practice despite the competitive medical marketplace of eighteenth-century Geneva.¹⁷ In Geneva, Odier introduced new reforms and established new institutions.¹⁸ He maintained ties to Edinburgh through the British-Franco-Swiss network. Odier and J.-P. Du Roveray created vital bonds between Geneva and Britain. However, the most important early contact to establish himself in Britain, for the Delessert network, was Jean-André Deluc.

3.3. All Roads Pass Through Geneva: All Roads Pass Through Rousseau

The Delesserts maintained strong links to Geneva and developed close bonds with many important Genevans. Foremost among them was J.-J. Rousseau. This lasting tie inspired their dedication to education and botany. The Delesserts’ links to Rousseau, and banking,

¹⁴ Philip Rieder and Micheline Louis-Courvoisier, “Enlightened Physicians: Setting Out on an Elite Academic Career in the Second Half of the Eighteenth Century,” *Bulletin of the History of Medicine* 84, no. 4 (2010), pp. 590-5.

¹⁵ BGE Ms Dumont N° 33. f. 234. Pierre Sylvestre (Edinburgh) à Etienne Dumont, 28 septembre 1783. Saba Bahar, “Jane Marcet and the Limits to Public Science,” *The British Journal for the History of Science* 34, no. 01 (2001), pp. 30-1.

¹⁶ Müllener, “Six Geneva Physicians,” p. 23.

¹⁷ Philip Rieder, “The Physician Louis Odier and the Medical Market in Geneva (1774-1817),” *Gesnerus* 69, no. 1 (2012), pp. 54-75; Rieder and Louis-Courvoisier, “Enlightened Physicians,” pp. 578-606.

¹⁸ Odier founded the *Société de médecine* in 1775, served as secretary, and was medical editor for the *Bibliothèque britannique*. He tried to bring medical education to Geneva, but it was resisted until the 1799 French occupation. The chair of medicine was given to Odier, who taught as a professor. In 1798 M.-A. Pictet brought to a copy of Jenner’s text from England. Odier translated sections for Pictet’s journal, coined the term ‘vaccine,’ and promoted its use for smallpox. Müllener, “Six Geneva Physicians,” p. 23.

facilitated friendships with leading political reformers, including J.-A. Deluc and Etienne Clavière (1735-93). Deluc was the Delesserts' link to Britain and its leading scientists.

The connection between the Delucs and Rousseau began in 1754, upon his return to Geneva. A friendship emerged between Rousseau and Jacques-François Deluc (1698-1780). J.-F. Deluc was active in Genevan politics and was, since the 1730s, a leader in the *bourgeois* conflict against the government. Rousseau renewed ties to his birthplace through J.-F. Deluc. In turn Rousseau aided the *bourgeois*.¹⁹ Despite political liberalism, J.-F. Deluc remained a devout conservative Calvinist.²⁰ He withheld contact, as Rousseau found refuge in Môtiers in 1762, because of *Émile*'s irreligious sentiments. They soon overcame their differences, however, to again support each other. Deluc worked with the *représentants*, trying to have the magistrates overturn the condemnation of *Émile* and *The Social Contract*. In turn Rousseau helped them in meetings, provided advice, and penned *Letters from the Mountain* (1764). It was a response to the Genevan authorities' refusal to honour historic rights of *bourgeois* in the *Conseil général*. However, Rousseau had little patience for the glacial pace of political concessions, the government's refusal to overturn decisions against him, and its practice of bowing its protector: the French crown. In 1763, Rousseau renounced his citizenship, gradually severing ties to Geneva and the Delucs.²¹

It was in this heated atmosphere of Genevan politics that J.-A. Deluc came of age. He participated with his father in the *bourgeois* cause since 1756. J.-A. Deluc and his brother, Guillaume Antoine (1729-1812), assisted their father's campaigns and thereby

¹⁹ Helena Rosenblatt, *Rousseau and Geneva: From the First Discourse to the Social Contract, 1749-1762* (New York: Cambridge University Press, 1997), pp. 180-1; Cranston, *The Solitary Self*, pp. 42-8, 64-82.

²⁰ *Ibid.*, p. 65.

²¹ *Ibid.*, pp. 5-11, 64-82, 100-9.

became tied to Rousseau.²² The Delucs' wavering relationship with Rousseau was bound to the turbulent state of Genevan politics. Yet, they also shared a mutual appreciation of natural history, making a Swiss tour together in 1754. These passions were an important part of eighteenth-century Swiss science, and in the Delucs friendship with Rousseau.²³

J.-A. Deluc first gained a livelihood as a merchant, but became devoted to natural philosophy. His father was a master watchmaker in this thriving industry. J.-F. Deluc's wealth and intellect allowed him to give his sons a quality education. Thus, J.-A. Deluc developed an interest in science and admittance to Swiss scientific circles.²⁴ Eighteenth-century Geneva could not support grand academies and societies on the stature of London and Paris. However despite a small size, and limited institutional infrastructure, Geneva incubated an inordinate level of *savants*.²⁵ Deluc's scientific contributions included extensive meteorological experiments and geological fieldwork, with his brother, in the Alps in the 1750s and 1760s.²⁶ In the 1750s, Rousseau had offered to help J.-F. Deluc have his sons' research on glaciers appear in d'Alembert and Diderot's *Encyclopédie*, but the offer was refused. The Delucs differed from *Encyclopédists* in aiming to employ natural philosophy to confirm Christianity, not crush it.²⁷

²² Michel Porret and Jacques Berchtold, *Rousseau visité, Rousseau visiteur: les dernières années (1770-1778)* (Geneva: Librairie Droz, 1999), pp. 154-5; Rosenblatt, *Rousseau and Geneva*, pp. 180-5.

²³ Rousseau's 1754 Swiss Tour with the Delucs, and nature walks with the brothers, affected their scientific writing and his philosophic works. Their Calvinism clashed with his natural religion, but a love of nature united them. Discovering fossilized shells on mountain walks led the Delucs' theory of the earth's origin, supporting Genesis and the Deluge. Rousseau accepted Comte de Buffon's secular speculations on the earth's origins. Alexis Francois, "Jean-Jacques Rousseau et la science genevoise au XVIIIe Siècle: Ses rapports avec les naturalistes de Luc," *Revue d'Histoire littéraire de la France* 31, no. 2 (1924), pp. 206-24.

²⁴ Paul A. Tunbridge, "Jean André De Luc, F.R.S. (1727-1817)," *Notes and Records of the Royal Society of London* 26, no. 1 (1971), pp. 15-8.

²⁵ Jan Lacki, "The Physical Tourist. Geneva: From the Science of the Enlightenment to CERN," *Physics in Perspective* 9, no. 2 (2007), pp. 231-44.

²⁶ Tunbridge, "Jean André De Luc," pp. 15-20.

²⁷ Rousseau spoke about the inclusion of their research to Diderot and d'Alembert, who agreed. 273 J.-F. Deluc à J.-J. Rousseau, 20 janvier 1755. Jean-Jacques Rousseau, *Correspondance Complète De Jean Jacques Rousseau*, ed. R. A. Leigh. (Genève: Institut et Musée Voltaire, 1982-98), vol. 3: pp. 93-5.

Instability on the Continent drove Deluc to Britain, where his passion for natural philosophy increased. Before relocating Deluc was nominated to become a Fellow of the Royal Society of London in 1772, mainly for his atmospheric work in the Alps. In 1773 he was elected Fellow and moved to London, and in 1774 Deluc was named Reader to Queen Charlotte (1744-1818). The post brought security and patronage.²⁸ It is not clear, as Peter Jones states, “whether political antagonisms or business failures were the main reason for” Deluc’s move to England.²⁹ An interruption in Franco-Swiss commerce in the 1770s led to a decline of his merchant house.³⁰ The relocation led to Deluc becoming, Jones explains, a “contact point for a whole generation of Swiss travellers to Britain” and a “two-way conduit for knowledge and ‘know how’ exchange.”³¹ Through this medium, as a strategic contact, Deluc aided the Delesserts. He recommended British *savants* to them, in Paris, and facilitated visits by family members to Britain.

Deluc’s friendship with the Delesserts must have begun before to his arrival in London, but it is unclear when exactly it developed. In 1764 Deluc visited the property of Mme Delessert’s mother, to bring documents to Rousseau.³² The link between them may have begun at this point, as they were soon on close terms and were corresponding by the

Douglas G. Creighton, *Jacques-François DeLuc of Geneva and his Friendship with Jean-Jacques Rousseau* (University: Romance Monographs, 1982), p. 28; Richard Whatmore, *Against War and Empire: Geneva, Britain, and France in the Eighteenth Century* (New Haven: Yale University Press, 2012), p. 73.

²⁸ Deluc’s nomination as a Fellow was signed by Charles Stanhope (1753-1816), Charles l’Epinasse, Abraham Trembley (1710-84), and Charles Bonnet (1720-93). Tunbridge, “Jean André De Luc,” pp. 15-20; Peter M. Jones, “Knowledge and Technology Transfer during the Industrial Enlightenment: Swiss Visitors to the Soho Manufactory, Birmingham, circa 1765–1820,” *Traverses: Zeitschrift für Geschichte / Revue d’histoire* 3 (2010), pp. 44-9.

²⁹ *Ibid.*, p. 49.

³⁰ Tunbridge, “Jean André De Luc,” p. 17.

³¹ Jones, “Knowledge and Technology Transfer,” p. 44.

³² Like his father a few months previous Deluc took sick upon arriving at Môtiers. The papers were crucial for Rousseau’s *Letters from the Mountain*. Cranston, *The Solitary Self*, p. 76. Deluc’s other purpose during his stay at Môtiers was to do atmospheric research. Francois, “Jean-Jacques Rousseau,” pp. 220-1.

1770s.³³ Their friendship began to blossom just as that between Rousseau and the Delucs withered. In 1772, after no contact for four years, J.-F. Deluc wrote to Rousseau but elicited no response. J.-A. Deluc tried to mend the rupture in 1773, visiting Rousseau in Paris, on route from Geneva to London. In a three-hour meeting, as Michel Porret and Jacques Berchtold explain, Deluc tried to “justify the conduct of the *Représentants* in general and that of his family in particular, in the Geneva troubles.”³⁴ Deluc argued that Rousseau too played a part in the conflicts, but understood his desire to recuse himself from these affairs and avoid the “*Genevèse*.”³⁵ Beyond a few letters to the brothers, and the 1773 meeting, contact ceased. The Delesserts then became essential liaisons between Rousseau and the Delucs. It was only through Mme Delessert’s letters that J.-A. Deluc received occasional updates from Rousseau.³⁶ Mme Delessert remained an intermediary between them, both socially and scientifically, until Rousseau’s death in 1778.³⁷

3.4. Romilly and Roget: Vital Huguenot Links in the Swiss Diaspora

Many intersections between the British-Franco-Swiss network and the Swiss diaspora emerged in the 1780s. In 1781 the Grand Tour of Samuel Romilly forged several seminal connections. His parents, Peter Romilly (1712-84) and Margaret Garnault (*d.* 1796), were from Huguenot families. They immigrated to England as a result of religious persecution tied to the Revocation of the Edict of Nantes. Peter Romilly apprenticed with his father, and practiced as a jeweller for years. The family became well established in English

³³ The only published letters between the Delesserts and Deluc are those concerned with Rousseau. The first letter is from Etienne in 1775. Rousseau, *Correspondance Complète*, vol. 40: p. 5.

³⁴ Porret and Berchtold, *Rousseau visité*, p. 154.

³⁵ *Ibid.*, 154-5.

³⁶ *Ibid.*, p. 155. See also 4059. J.-J. Rousseau à J.-A. and G.-A. Deluc 24 février 1765; 6317. J.-F. Deluc à J.-J. Rousseau avril 1768; 8 septembre 1772; 7009. J.-A. Deluc à G.-A. Deluc 15 septembre 1773.

Rousseau, *Correspondance Complète*, vol. 24: pp. 67-8; vol. 35: pp. 237-42; vol. 39: pp. 106-8, 195-6.

³⁷ *Ibid.*, pp. 154-5. Mme Delessert also helped deliver Deluc’s gift of a microscope to Rousseau, to be used for his botanical studies. *Ibid.*, vol. 40: pp. 162-213.

Huguenot circles and assisted French and Swiss immigrants.³⁸ One of whom was Jean Marc Roget (1753-83) a Genevan pastor. He was hired on 26 October 1775 at the Carré Church in London's Soho district. It was one of many French Protestant churches in Britain in this period. Peter Romilly was one of the officials to sign the papers making Roget their pastor.³⁹ The Romillys were taken with Roget. They welcomed him into their home and Roget breathed new life into their chapel. He encouraged Samuel in his legal career, and introduced him to the writings of Rousseau. A different interest was taken in Samuel's sister Catherine (1755-1835), who married Roget in 1778. After the birth of their son, Peter Mark (1779-1869), Roget became sick with consumptive symptoms. His physicians suggested he return to his native air in Geneva. Roget travelled with Catherine and reached Geneva, despite his great illness. Following a partial recovery they requested that the Romillys send Peter Mark, who was left in their care in England, to Geneva. This resulted in the first of Samuel Romilly's many visits to the Continent.⁴⁰

Romilly's first Continental Tour led to a union with future revolutionary leaders. In June 1781 he made a formative visit to Geneva, reflecting in his memoirs: "[Geneva] was in the midst of those political contests which, soon afterwards, ended so fatally for that republic."⁴¹ Romilly became friends with Etienne Clavière, J.-A. Du Roveray, David Chauvet (1738-1803), Etienne-Solomon Reybaz (1739-1804), and François D'Ivernois

³⁸ Samuel Romilly, *Memoirs of the Life of Sir Samuel Romilly: With a Selection from His Correspondence* (Shannon: Irish University Press, 1971), vol 1: pp. 1-30.

³⁹ Jefferson P. Selth, *Firm Heart and Capacious Mind: The Life and Friends of Etienne Dumont* (Lanham: University Press of America, 1997), p. 15.

⁴⁰ They went by Ostend and the Low Countries, as Calais was not an option. France and England were engaged in the American Revolutionary War (1775-83). Romilly, *Memoirs*, vol. 1: pp. 30-53.

⁴¹ *Ibid.*, p. 55.

(1757-1842).⁴² Following the revolution in 1782 all of these men, and many of their co-conspirators, were either banished for life or exiled from Geneva.⁴³

Etienne Dumont was the most prominent contact Samuel Romilly made on his first visit to Geneva. Roget knew both men. His favourable reports insured an amiable meeting, resulting in an immediate and lifelong friendship.⁴⁴ Dumont did not participate in the revolution, he was still training to be a Calvinist minister, but he was friends with its leaders and supported their cause. Its failure deprived Dumont of many friends and he entertained joining a Swiss community in Britain. His growing and vocal displeasure with Geneva made life unpalatable. Dumont escaped to Russia in 1784, his only stable offer, where he worked as a pastor for a year. However, Dumont's friends in London secured an appointment with Lord Shelburne. Dumont joined the Bowood Circle in 1786, serving as Shelburne's companion and librarian, as well as tutor of his sons. This was similar to the post Joseph Priestly held until his departure for Birmingham in 1780.⁴⁵ At Bowood, Dumont finally joined the Swiss revolutionaries, who later served as leading figures in the French Revolution, and the liberal Britons who championed reform.

The final significant connections Samuel Romilly made on his first Continental Tour were in Paris. They were a product of his father's benevolence and Jean Romilly (1714-94), a celebrated Genevan watchmaker in Paris. They were not related but he was of great service to Romilly. Jean Romilly wrote the articles relating to his profession for the *Encyclopédie*. Samuel Romilly's father had assisted Jean's son to establish himself in

⁴² *Ibid.*, p. 56. Roget gave Romilly introductions for them. Selth, *Firm Heart*, p. 16.

⁴³ Edwin G. Burrows, *Albert Gallatin and the Political Economy of Republicanism, 1761-1800* (New York: Garland, 1986), p. 60.

⁴⁴ Romilly, *Memoirs*, pp. 58-9.

⁴⁵ Dumont's first sermon was a thinly veiled attack on Genevan authorities. On his flight from Geneva, post as a pator in St. Petersburg Russia, and appointment by Shelburne see Selth, *Firm Heart*, pp. 18-40.

London, as a pastor at a French Protestant church. The son Jean Edmé Romilly (1739-79), like his father, wrote articles for the *Encyclopédie*. They were the celebrated articles “Virtue” and “Toleration.” Yet, illness caused him to return to Geneva where he died.⁴⁶ This family provided introductions for Romilly in Paris. He recalled this included Diderot and d’Alembert, editors of the *Encyclopédie*, and “all the society I knew at Paris; which was confined, however, to the *bourgeoisie*.”⁴⁷ Diderot’s irreligion and the Paris-centricity of d’Alembert did not endear them to Romilly.⁴⁸ His admiration for Rousseau, however, made this a foregone conclusion. Nevertheless, this also created intimacy with the most significant friendships Romilly formed in France.

Romilly was one of the Delesserts’ most enduring British friends. They became acquainted on his Grand Tour in 1781, and stayed linked for decades by cross-Channel visits, letters, and literary exchange. Romilly, alluding to the start of this bond, reflected: “The other valuable acquaintance which I have said that I formed at Paris was that of Mad^e Delessert, one of the most benevolent and amiable of women.”⁴⁹ He formed an even more intimate attachment with Madeleine. Romilly noted: “At [Mme Delessert’s] country house at Passy, in her society, and in that of her amiable daughter, then a girl of fifteen, of a very agreeable person and of a very cultivated understanding, I spent most usefully the time I passed at Paris.”⁵⁰ In 1783, Romilly renewed ties with them at Passy, and made the acquaintance of their neighbour Benjamin Franklin. This sojourn was a

⁴⁶ Romilly, *Memoirs*, vol. 1: pp. 62-5.

⁴⁷ *Ibid.*, p. 64. He mildly praised d’Alembert and Diderot as France’s best living writers. *Ibid.*, p. 63.

⁴⁸ S. Romilly (Gray’s Inn) to J. Roget, 24 January 1782. *Ibid.*, p. 197-201.

⁴⁹ *Ibid.*, p. 65.

⁵⁰ Romilly’s praised Mme and Mlle Delessert, inspiring his veneration for all wise women. *Ibid.*, pp. 65-6.

much more somber occasion. Romilly's brother-in-law Roget had finally died in Lausanne and Romilly travelled to take his sister and her two children back to England.⁵¹

Some of the earliest and most significant bonds linking the British-Franco-Swiss network resulted from the illness and early death of Jean Roget. This unfortunate event deprived Peter Marc Roget of a father, however, it also provided him with three crucial surrogates. Besides his uncle Romilly's continual guidance and assistance, Roget had Dumont, who supported the family and encouraged Roget in his studies. Finally there was David Chauvet. After returning to England Roget and his family lived with Chauvet in Kensington. Roget attended Chauvet's private school for Protestant boys for several years.⁵² Despite an inauspicious beginning Peter Roget had a successful and versatile career. This was not, as his Genevan and family heritage might suggest, as a pastor or jeweller. Nor was it a legal or political career like his famous uncle. While Romilly took up the cause of reform within British society, Roget did so in the natural sciences.

The British-Franco-Swiss network helped Peter Marc Roget emerge as a late-Enlightenment polymath. After attending Chauvet's school Roget studied medicine at the University of Edinburgh (1793-98). There he met R. L. Edgeworth's son Lovell (1775-1842). In 1798, they toured the Midlands and Roget became acquainted with the Lunar Society. Roget, like many of the sons of Lunar men, partook in medical scientific work at Clifton with Dr Thomas Beddoes (1760-1808) and Humphry Davy (1778-1829). Roget, through Romilly, became tied to the Bowood Circle, and was hired as a travelling tutor in 1802 for the sons of a leading cotton-mill owner in Manchester. Lovell Edgeworth again

⁵¹ *Ibid.*, p. 68.

⁵² Selth, *Firm Heart*, p. 23. Joshua C Kendall, *The Man Who Made Lists: Love, Death, Madness, and the Creation of Roget's Thesaurus* (New York: Berkley Books, 2009), pp. 34-44.

joined Roget, who was given introductions to the Delesserts in Paris from Romilly.⁵³

Roget and Romilly relied on the British-Franco-Swiss network and its connections helped shape their success. The 1802 peace, as will be examined below, saw a confluence of science, industry, and education. However, before the network was interrupted by war, it was expanded by revolution.

3.5. The Genevan Revolution, Neuchâtel Encounters, and New Geneva

Genevan peace and prosperity in the middle of the eighteenth century brought an influx of capital, visitors, and ultimately unwanted attention. Many of Geneva's industries flourished, especially watchmaking, leading to expanded wealth. Geneva's geographic position fostered commerce and tourism. The city became a standard stop for travellers, including many Britons, on Grand Tours to warmer parts of Europe. Voltaire's proximity added an appeal for visitors.⁵⁴ The 1782 revolution in Geneva failed, but was a pivotal moment for the republic and the rest of Europe. It was a culmination of a protracted internal political conflict, which helped fuel reform movements abroad. In this struggle, as with those in France at the end of the decade, the *bourgeois* found itself navigating a difficult course between aristocracy and lower social orders. Most Genevan exiles ended up in Britain. There they tried, in vain, to establish a 'New Geneva' watchmaker colony in Ireland. The exiles then joined reform circles in France and Britain. Ultimately, eighteenth-century Geneva had an inordinate influence in politics, as it did in science and education.

⁵³ *Ibid.*, pp. 55-120; W E Swinton, "The Remarkable Accomplishments of Dr. Peter Roget," *Canadian Medical Association Journal* 123, no. 9 (1980), pp. 917-8; June Z. Fullmer, *Young Humphry Davy: The Making of an Experimental Chemist* (Philadelphia: American Philosophical Society, 2000), pp. 123-32.

⁵⁴ Burrows, *Albert Gallatin*, pp. 44-6.

In 1781-2 the *représentants* made a strategic political gamble and took over Geneva, which led to their flight and exile. After the aristocratic party was restored in 1782, twenty-one *représentants* were exiled *in absentia* from Geneva. The permanently banished included Etienne Clavière, J.-A. Du Roveray, and François d'Ivernois. David Chauvet was exiled for ten years. E.-S. Reybaz, a pastor and vocal *représentant*, was not exiled but fled.⁵⁵ So too did many revolting *natifs* including Dr Pierre Sylvestre.⁵⁶ During the revolution he fought beside Clavière, Chauvet, and Du Roveray.⁵⁷ As a consequence, Sylvestre fled what he considered “an oppressive & detested government.”⁵⁸ He joined the effort to found a ‘New Geneva’ in Ireland.⁵⁹ Yet Sylvestre, as he later explained to James Watt, chose to head first to Edinburgh:

Hoping that I might still join the Colony, some of my Countrymen were preparing to form in Ireland, I thought that no scheme would answer better for me in that case than to go to Edinburgh & to wait there a twelve months improving & increasing more & more my stock of knowledge under those eminent Masters, whose reputations had been a strong inducement to bring me thither.⁶⁰

Despite Sylvestre’s departure, he remained in contact with the pharmacist and natural philosopher Henri-Albert Gosse (1753-1816) and Etienne Dumont.⁶¹ Sylvestre’s time in Britain created more connections within the British-Franco-Swiss network. It was a consolatory redemption. He and fellow malcontent *représentants* had fled the revolution with their lives instead of defending Geneva to their deaths.

⁵⁵ *Ibid.*, p. 60; Whatmore, *Against War and Empire*, pp. 10-11.

⁵⁶ Dr Sylvestre was one of four *natifs*, including pharmacist Henri-Albert Gosse, permitted to practice by the medical faculties. Léon Gautier, *La médecine à Genève jusqu'à la fin du dix-huitième siècle* (Genève: Jullien, 1906), p. 324.

⁵⁷ Otto Karmin, *Sir Francis D'Ivernois 1757-1842 : sa vie, son oeuvre et son temps* (Genève: Revue Historique de la Révolution Française et de l'Empire, 1920), p. 89.

⁵⁸ BCL MS 3219/4/98 5. Pierre Sylvestre (London N^o. 1 Staple’s Inn buildings, Holborn) to J. Watt (Birmingham), 14 July 1785.

⁵⁹ BGE Ms Dumont N^o 33. f. 232-3. P. Sylvestre (Dunkerque) à P. E. Dumont (Genève), 13 août 1783.

⁶⁰ BCL MS 3219/4/98/5. P. Sylvestre to J. Watt, 14 July 1785.

⁶¹ Dumont and Gosse were intimate friends of Sylvestre. They were both among the witnesses to sign his marriage contract in 1785. AEG MS Notaire de Gabriel Binet de 1785 IV f. 456-60.

The exiled *représentants*, unlike earlier *bourgeois* rebels, took advantage of global Enlightenment shifts and tried their schemes elsewhere. Instead of suffering in exile, or in a prison in Geneva, the exiles flourished. They were significantly aided in that many European *savants* shared their ideas, both in politics and on liberating trade. The success of the revolution in America also helped the exiles' cause. Influential British politicians also, for a variety of political and economic reasons, generously assisted these victims of French monarchical overreach. The complete failure of the 'New Geneva' in Ireland was offset by critical connections made by the exiles in London and Neuchâtel.⁶²

Two serendipitous encounters in Neuchâtel were significant for the exiles' future. In this Prussian protectorate, a refuge for liberty, the exiles reunited with Jean-Pierre Brissot (1754-93). They had met him in Geneva, as Brissot toured to see the birthplace of his hero Rousseau. He was in Neuchâtel seeking to have the *Société Typographique* publish his works.⁶³ The exiles also met Honoré-Gabriel de Riqueti, comte de Mirabeau (1749-91). Mirabeau, low on funds, was there to sell works to his Swiss editor. The exiles likely funded Mirabeau, and certainly enlisted him in their cause. A similar alliance was formed between Clavière and Brissot. Brissot's liberal philosophy took on more of a Genevan republican bent after contact with Clavière and d'Ivernois.⁶⁴ These links had revolutionary consequences for French commerce and politics. Neuchâtel continued to be a haven for liberty. In the 1780s it harboured exiles and printers, as it had Rousseau in the 1760s, and the *Société Typographique* printing the *Encyclopédie* in the 1770s.

⁶² On the complicated and protracted history of Geneva's political and class conflict see Whatmore, *Against War and Empire*, pp. 21-173 and Burrows, *Albert Gallatin*, pp. 26-50.

⁶³ Leonore Loft, *Passion, Politics, and Philosophie: Rediscovering J.-P. Brissot* (Westport: Greenwood Publishing Group, 2002), pp. 8-9.

⁶⁴ Whatmore, *Against War and Empire*, pp. 14-5.

‘New Geneva’ was well supported and promised respective parties what they desperately needed. Samuel Romilly received direct knowledge of its progress, which he sent to Jean Roget in Lausanne. King George III (1738-1820) gave permission and ample funds to establish the colony. It was to include 1,000 Swiss skilled in watchmaking. The colony was to have much independence, and had support from several British nobles offering land on their Irish estates. Waterford, the location selected, was ideal as it was at the meeting of two rivers, close to the sea, and not far from Dublin.⁶⁵ Finally, the colony was to have Geneva’s best features, but be free of its worst. Romilly informed Roget: “[d’Ivernois] hinted to me that, besides the watch manufactory, there was some thoughts of instituting a French College at the New Geneva (for so the city is to be called). It is to resemble the old Geneva in every thing, except in having an upper and a lower town.”⁶⁶ The former was Geneva’s Elysium, from where aristocracy excluded lower classes from admittance and citizenship. Thus in ‘New Geneva’ the exiles would have independence and their British hosts would attain industries for Ireland. As Richard Whatmore argues “The expectation was that a second Huguenot diaspora might do for the Irish economy what the late-seventeenth century immigration had done for English trade.”⁶⁷ Yet, within two years the colony failed.⁶⁸ Numerous Genevan exiles joined Shelburne’s reformist Bowood Circle. In the late 1780s, as political and economic crisis hit France, several exiles left for Paris and joined Mirabeau’s political faction. During the French Revolution members of the British-Franco-Swiss network again came under threat. This time they

⁶⁵ Romilly received intimate details and documents on the colony from d’Ivernois. XXV. S. Romilly (Gray’s Inn) to Jean Roget, 25 October 1782. Romilly, *Memoirs*, vol 1: pp. 242-5.

⁶⁶ *Ibid.*, pp. 244-5.

⁶⁷ Whatmore, *Against War and Empire*, p. 179.

⁶⁸ D’Ivernois was the main driver. He was in contact with influential Britons soon after fleeing Geneva. In England d’Ivernois had the scheme promoted to Shelburne, the new Prime Minister. See Jennifer Powell McNutt and Richard Whatmore, “The Attempts to Transfer the Genevan Academy to Ireland and to America, 1782-1795,” *The Historical Journal* 56, no. 2 (2013), pp. 351-55.

looked to establish a refuge colony in America. The dreams and faults of ‘New Geneva’ were repeated with British, French, and Genevan utopian colonies in America.

3.6. Conclusion

Geneva played a pivotal role in Enlightenment Europe. The city and its Swiss compatriot cantons provided refuge for Huguenots fleeing France in the 1680s. This created great prosperity, as the republic’s industries developed throughout the eighteenth century. Nevertheless, great problems also emerged from a complex system of class structures, inert politics, and wider European alliances. Huguenot and Swiss communities abroad became vital in the 1780s, as political revolution sent a phalanx of exiles throughout Europe. They helped to, and were helped by, the solidification of the British-Franco-Swiss network. Traffic moved through its conduits as French and Swiss Anglophiles increasingly took part in British travel, transmissions, and translations. Conversely, British Francophiles visited the Continent, creating corresponding traffic in the other direction. People, books, letters, and materials were continually sent along a path, from Geneva as far as Edinburgh, with connecting nodal points in Birmingham, London, Paris, and Lyon. The number of people forced into exile, by increasing political struggles, continued in the 1780s and erupted in Paris in the 1790s. Yet, before coming to that, it is necessary to examine how tours in the 1760s, connected to industry and education, and new Grand Tours of the 1780s, expanded this late-Enlightenment network.

**PART II: ENLIGHTENMENT EXPERIMENTS IN EDUCATION
(1771-89)**

4. Rousseau's Cakes: Practical Education and Marguerite-Madeleine Delessert's *Elementary Letters on Botany*

It is astonishing that Jean-Jacques Rousseau became the eighteenth-century's most influential pedagogical writer. Rousseau, not suited as a tutor, later conceded: "I had almost enough knowledge for a tutor, and I thought I had the aptitude. The year I spent at M. de Malby's gave me time to undeceive myself."¹ He also infamously abandoned five children had with Thérèse to the foundling hospital, but not his pedagogical pursuits. Rousseau, the likely source of the famous quote attributed to Marie Antoinette (1755-93) about cake,² was often guilty of the cake idiom of trying to have it both ways. This is clear through his educational experiment with the Delesserts, as are the contradictions and practical aims in Rousseau's philosophy of nature.

In 1771 Rousseau began helping cultivate a love of botany within the Delessert family. He wrote letters of elementary instruction for Madeleine-Catherine to teach her daughter. This seed blossomed and the Delesserts' botanical collections became one of the largest of the nineteenth century. However, they also inherited Rousseau's recipe for proverbially having their cake and eating it too. His fondness for botany, and devotion to Linnaean classification, related to thornier issues of Rousseau's philosophy. Rousseau was, epistemologically, a champion the 'natural,' but he relied on civilization's 'artificial' artifice when it was convenient. The Delesserts maintained his practice of organizing their herbarium by the Linnaean system, but used A.-P. de Candolle's 'natural' system to classify plants. They also managed the Herculean feat of a lasting kinship with Rousseau, who alienated so many friends, and cultivated connections to utilitarian British *savant-fabricants*. By the 1780s, Mme Delessert was well practiced in educating young people,

¹ Rousseau, *The Confessions*, p. 253.

² He ate cake instead of bread, with wine stolen from Malby, to avoid detection. *Ibid.*, p. 333, 245-5.

as Britons sent sons to the Continent for practical educations. Regrettably Rousseau's *Letters on Botany (Lettres élémentaires sur la botanique)* remains the only well known remnant of her participation in this enterprise. Mme Delessert's friendship with Rousseau began during her childhood. Therefore, is essential to examine these roots to understand the Delesserts' passion for botany and their relationship to the wider Enlightenment.

4.1. Mutual Aide between Rousseau's and Boy de la Tours

Rousseau provided services for the Boy de La Tours in return for their assistance to him. Two particular deeds were of direct and enduring benefit to the Delesserts. The Roguin-Boy de la Tour family gave Rousseau refuge, in 1762, when he was in his most desperate state. In the month after Rousseau arrived at Môtiers, he was visited by Mme Boy, who passed through the village on route to her farm in the mountains. Rousseau joined her family on their rustic journeys, helping to reawaken his passion for botany. "Her farm was at an altitude of thirty-five hundred feet," Maurice Cranston notes in his biography of Rousseau, "and in the meadows around it Rousseau was delighted to find the wild alpine flowers he had first learned to identify as a youth" as well as his enthusiasm for "open-air exercise."³ Ultimately, botany perpetually intertwined Rousseau and the Delessert family.

An unwelcome suitor accompanied Madeleine and Mme Boy on one visit to see Rousseau. This was their cousin Colonel Roguin who accompanied them more out of his interest in "*la petite blonde*" than out of loyalty to his friend. Rousseau liked socializing with Mme Boy and her daughters, but not Colonel Roguin's intentions with Madeline.⁴ Rousseau, often remembered for his misogyny, recounted in the *Confessions*:

³ Cranston, *The Solitary Self*, p. 29. Mme Boy offered Rousseau a farmhouse flat as a getaway but he declined, insisting to pay rent for her cottage. Thus she tried to pay for repairs to make it liveable. *Ibid.*

⁴ Col Roguin had served in the Sardinia army. *Ibid.*, p. 1, 28-9.

The daughter was intended by M. Roguin for his nephew the Colonel, who was already elderly, and who also displayed the greatest affection for me. But although the uncle was widely in favour of the marriage and the nephew also strongly desired it, and although I was extremely anxious for the happiness of them both, the great disparity of age and the young lady's extreme repugnance to the match made me help the mother to get it put off; and in fact it did not take place.⁵

Thus in 1762 Rousseau joined the effort to prevent the marriage. However, the issue of the marriage was only resolved after three years, and Rousseau's departure for England.⁶

Daniel Roguin agonized over Madeline's marriage, which caused tension with Rousseau.⁷ In August 1765 Mme Boy and two of her daughters visited Rousseau at Môtiers seeking help.⁸ Thereafter Rousseau asked Roguin to stop interfering in the matter of Mlle Boy's marriage. Rousseau's involvement was growing disagreeable, as it distanced him from friends at Yverdon.⁹ Roguin apologized for putting Rousseau in this position. However, Roguin could not shed his preoccupation, revealed by his preference between the two younger suitors: François-Antoine Rougemont (1740-81) a twenty-four-year-old banker in Paris and nephew of Roguin's friend.¹⁰ Rousseau's intervention, however, insured that the decision was no longer Roguin's to make.

Madeline Boy de la Tour benefited from Rousseau's assistance and chose well in selecting a husband. This was, Roguin informed Rousseau, "a young de Lessert of Lyon

⁵ Rousseau, *The Confessions*, p. 545.

⁶ After a peaceful time in Môtiers, Rousseau's ties to Swiss political conflicts again made it wise for him to flee. He returned to France, and then to England with David Hume. Cranston, *The Solitary Self*, pp. 110-60.

⁷ Roguin feebly defended his plan noting Rousseau's links to each side, affection for Mme Boy and her daughter, and attempt to remake the plan. Fruitlessly Roguin tried to defend each side. Roguin feared Madeleine suffering under her husband's parents until he retired. Only then could she return to her family and Switzerland. As Roguin knew the challenges of French banking he wanted her to avoid them. 4612. D. Roguin (Yverdon) à J.-J. Rousseau, 25 [ou 26] août 1765. Rousseau, *Correspondance Complète*, pp. 254-8.

⁸ Cranston, *The Solitary Self*, p. 128.

⁹ 4629. J.-J. Rousseau à D. Roguin, [1? septembre 1765]. Rousseau, *Correspondance Complète*, p. 279. This is one of several missing replies from Rousseau to Roguin, but Leigh notes its substance.

¹⁰ Rougement was seen in Paris as a smart young man, running a thriving banking house, who matured with his parents' early deaths. 4635. D. Roguin (Yverdon) à J.-J. Rousseau, 3 septembre 1765. *Ibid.*, pp. 286-7.

also in Commerce, but under His Father who holds the house.”¹¹ The union proceeded despite Roguin’s fear that Etienne Delessert was under his parents’ tutelage. Madeleine informed Rousseau, who had by then fled to England, of the news before members of her family.¹² Roguin’s fears proved unfounded, but came from a genuine care for his family’s welfare. The marriage was prosperous producing a large family excelling in educational, scientific, commercial, and agricultural pursuits. It was “altogether happier,” Cranston concludes, than the marriage of “Rousseau’s other protégée,” Isabelle d’Ivernois (1735-97).¹³ Indeed the Delesserts benefitted more from Rousseau’s matrimonial aid, enduring friendship, and educational advice than did many of their contemporaries.

The marriage of Madeleine and Etienne Delessert was a vital link for the British-Franco-Swiss network. They married in Lyon in October 1766, and remained there for a decade before relocating to Paris. The Delesserts’ return to France was recent. Originally French the family fled persecution of Huguenot around 1540, settling in the Swiss canton of Vaud where Etienne’s father Benjamin was born in 1690.¹⁴ He became a *bourgeois* in Geneva in 1724, but established himself in Lyon in 1725. There he married Marguerite Brun and their sons were born: Jean-Jacques (1731-1817), Etienne, and Paul-Benjamin (1738-1818). Benjamin began a banking house, the first to use the Delessert name, which held financial interests of members of his extended family. He later formed *DeLessert et*

¹¹ *Ibid.*

¹² Madeleine explained that Etienne was a merchant in Lyon with whom she was long acquainted. Besides Etienne’s frankness and good character, Madeleine noted that instead of seeking social praise, he fulfilled his duties. XXIII. Madeleine Boy de la Tour (Vichy en Bourbonnais) à J.-J. Rousseau (Wotton en Derbyshire), 4 mai 1766. Jean-Jacques Rousseau and Madeleine-Catherine Delessert, *Lettres inédites de Jean-Jacques Rousseau à Mmes Boy de la Tour et Delessert comprenant les lettres sur la botanique*, eds. Philippe Ernest Godet et Maurice Boy de la Tour (Genève: A. Jullien, 1911), pp. 219-22.

¹³ On d’Ivernois’ ties to Rousseau and Isabelle’s marriage see Cranston, *The Solitary Self*, pp. 80-5, 128.

¹⁴ AP AFD V13S 1. Adolphe and Alexandre Delessert, *Notice généalogique*, pp. 10-5.

filis, which his sons took over upon his death in 1765.¹⁵ Etienne attained full management of the firm soon after his father's death.¹⁶ The family chose well. By 1777 Etienne was established in Paris, where he had connections, to expand his commercial interest.¹⁷

The Delesserts began to grow their family during their years in Lyon. This further cultivated their bond with Rousseau. Mme Delessert's first child, Marguerite-Madeleine (1767-1839) has received even less scholarly attention than the paltry amount paid to her brothers. This is despite a relationship with Rousseau, being the object of his *Letters on Botany*. Mlle Delessert also had prominent friendships, which included the luminaries Sir Charles Blagden (1748-1820), professor Marc-Auguste Pictet, and Sir Samuel Romilly.¹⁸

4.2. The First Letter on Botany and Rousseau's Larger Programme

Mme Delessert took a dominant role from the outset to ensure that her children received excellent educations. Her correspondence with Rousseau began in 1762, when she was fifteen. It continued until 1776, when she moved to Paris, and they socialized in person during Rousseau's final two years of life. Yet, it was the letters Rousseau dedicated as botanical lessons for Mme Delessert's daughter, which were first published and are most known. They spanned from 22 August 1771 to the spring of 1774, when Mme Delessert lived in Lyon.¹⁹ Marguerite-Madeleine was not quite five-years-old when they began.

Rousseau began the botanical letters as a distinct sequence within his general correspondence with Mme Delessert. In the first lesson he noted that he had previously avoided discussing plants. This was, Rousseau stated, "because that item alone demanded

¹⁵ Marguerite returned to Switzerland, dying there in 1799, at ninety-two years of age. *Ibid.*

¹⁶ *Ibid.* pp. 19-34.

¹⁷ *Ibid.* pp. 19-20.

¹⁸ The Delesserts' first son Jules-Jean-Jacques (1769-79) died young. Three more sons were born in Lyon: Jacques-Etienne (1771-94), Benjamin, and Alexandre (1776-1833). The rest of the children were born in Paris: Jeanne-Emilie (1778-1830), François (1780-1868) and Gabriel (1786-1858). *Ibid.*, p. 19; Coninck, *Banquiers et philanthropes*, p. 14.

¹⁹ Rousseau and Delessert, *Lettres inédites*, pp. 60-164.

an entire letter which I could write you more at leisure.”²⁰ There were other reasons in his decision, including that their general correspondence had dealt with personal matters.²¹ It was also very likely that Rousseau intended from the outset to publish the letters.²² Their main focus was elementary instruction in botany. Rousseau’s lessons, like his other epistolary texts, used a personal approach that was easily received by a wide audience. Ultimately, *Letters on Botany* presented an opportunity for Rousseau to assist a close friend instruct her daughter, as well as to further his wider philosophical agenda.

Rousseau established his premise from the outset of the letters on elementary botanical instruction. He attributed their idea to Mme Delessert: “Your idea of amusing the vivacity of your daughter a little, and exercising it to [pay] attention to agreeable and varied subjects such as plants, seemed excellent to me; but I would not have dared to propose it for fear of playing the Monsieur Josse.”²³ This was a goldsmith, in Molière’s (1622-73) play *L’Amour médecin* (1665), who pursued self-interest by having a man buy jewellery to improve his daughter’s health.²⁴ Rousseau presented his lessons as a moral panacea, if not a medical one. Consequently he fully approved Mme Delessert’s idea. Rousseau was “persuaded that at any age, the study of nature dulls the taste for frivolous amusements, prevents the tumult of the passions, and brings the soul a nourishment

²⁰ [J.-J. Rousseau to M.-C. Delessert], August 22, [1771]. Jean-Jacques Rousseau, “Letters to Mme Madeleine-Catherine Delessert The So-Called ‘Elementary Letters on Botany,’” in *The Reveries of the Solitary Walker; Botanical Writings; and Letter to Franquières*, ed. Christopher Kelly, trans. Charles E Butterworth, Alexandra Parma Cook, and Terence Marshall (Hanover: UPNE, 1999), p. 130.

²¹ The initial paragraph of the first letter was omitted in the manuscripts at Neuchâtel’s library. It and other personal details were returned in the Boy de la Tour and Godet edition. Mme Delessert requested all private details be removed in the first published edition. The Delesserts’ descendants kept the original letters. *Ibid.*, p. 309, n. 106. In 2001, they were part of the fifty-five letters addressed to the Boy de la Tour and Delessert families sold at auction. Trajan et Nicolas, *Herbier de Jean-Jacques Rousseau*, pp. 1-41.

²² See Roger Lawrence Williams, *Botanophilia in Eighteenth-Century France: The Spirit of the Enlightenment* (Boston: Kluwer, 2001), pp. 92-6.

²³ J.-J. Rousseau to M.-C. Delessert, 22 August [1771] (Letter I). Rousseau, “Letters to Mme Madeleine-Catherine Delessert,” p. 130.

²⁴ *Ibid.*, p. 309, n. 107.

which profits it by filling it with the most worthy objects of its contemplations.”²⁵ He saw botany as a moral check diverting children from depravity. Such lofty goals were linked to his general philosophical programme, as well as his interest in education and botany. However, the majority of the *Letters on Botany* focused on practical lessons for children.

For Rousseau learning botany began by observing actual plants, not their names, or systems of classification. He began the first lesson with an acknowledgment that Mme Delessert had started on the correct path. This was by teaching her daughter to name all of the plant species they found around them. The small group of plants she could identify would form the basis of parts for comparison, and growth of her understanding. Yet, that alone was not enough. Rousseau, at an impasse, acknowledged Mme Delessert’s request for a short catalogue of common plants listing distinguishing characteristics. However, he was reluctant to provide this in written form, even in a systematic format, as mother and daughter would first have to know botany’s language. Its terms formed a vocabulary that could only be understood once it was learned.²⁶ As an instructor, Rousseau wanted his students to surpass simple nomenclature, as it was “merely a herborist’s knowledge,” and one could be “a very good botanist without knowing one plant by its name.” Arriving at the most crucial and practical element of his instruction, Rousseau exclaimed: “without wanting to make of your daughter a great botanist, I believe nonetheless that *it will always be useful to her to learn to see what she sees well.*”²⁷ Botany was an educational tool enabling Mme Delessert’s daughter to properly and practically learn what she saw.

²⁵ *Ibid.*, p. 130.

²⁶ Rousseau thought indentifying plants by name too simple for their intelligence, as it would but briefly occupy her daughter. He sought instead to give them the basic concepts of plant structure. *Ibid.*, p. 130.

²⁷ My emphasis. *Ibid.*, pp. 130-1.

In tune with Rousseau's philosophy his students were to abide nature's course. Lessons began after the spring, when plant structure is at its simplest. As they awaited the next spring, mother and daughter they were to learn terms to organize their observations. They dodged memorizing botanical nomenclature, but were to study flower parts as no botanical lesson was fully devoid of memorization.²⁸ The flower was vital to Rousseau's botanical instruction. Sounding like a typical Enlightenment devotee of nature, Rousseau began with the flower, as it was there "that nature has enclosed the summary of her work, it is by this that she perpetuates it, and it is also of all the parts of the vegetable usually the most striking, and always the least subject to variations."²⁹ The lily, which could still easily be found in flower, was chosen for the first lesson. Rousseau insisted that if his descriptions were followed closely they would know, through regular observation and careful inspection, if a plant was of the lily family, even if they did not know the plant's name.³⁰ A simple practical lesson on a lily quickly revealed its wider application, as Rousseau concluded making his greater point:

You see that this is no longer a simple exercise in memory, but a study of observation of facts truly worthy of a naturalist. You will not start by telling all this to your daughter, and still less subsequently when you will be initiated into the mysteries of vegetation; but you will develop in her by degrees only what can suit her age and sex, *in guiding her to find things by herself rather than by teaching them to her.*³¹

Observation and self-discovery, rather than memorization and teaching, was a central plank in Rousseau's pedagogy. Thus they were a constant theme in his botanical lessons.

²⁸ Rousseau provided them with a list of an ideal plant and its parts. From these basic elements, which he assumed they were partly familiar, he moved to the reproductive parts of the flower and fruit *Ibid.* p. 131.

²⁹ *Ibid.* The flower was also central for other eighteenth-century naturalists, including Erasmus Darwin and the celebrated Swedish natural historian Carl Linnaeus (1707-88).

³⁰ Rousseau distinguished a lily's corolla from its flower, which was made up of several parts. *Ibid.*

³¹ My emphasis. *Ibid.*, p. 133.

The second lesson built upon the first, but was more complex. Rousseau asked Mme Delessert and her daughter to not spend time observing doubled plants they found. Mainly this was because they would be ‘disfigured,’ or cultivated by European custom and fashion, and thus unnatural. Rousseau, referring to sterility in hybrids, concluded: “nature will not find herself reproduced in them anymore; she refuses to reproduce by monsters thus mutilated.”³² The championing of natural, over what he saw as the artifice of civilization, was not restricted to Rousseau’s famous discourses. Even in these lessons, intended to instruct botany to children, Rousseau’s larger programme is evident.

In the third lesson Rousseau first discussed herbaria, which he saw as a deterrent of vice.³³ Rousseau eventually made a herbarium for the Delessert family, which formed the basis for Benjamin’s ultimately massive collection. At this point he slyly sidestepped the task, informing Mme Delessert how she would obtain her own superior herbarium: “For, you dear Cousin, if I do not promise you an herbarium from my hand it is in order to procure you a more precious one from the hand of your daughter, if you continue to follow with her this sweet and charming study which fills with interesting observations on nature the empty spaces of time which others devote to idleness or worse.”³⁴ Rousseau’s bourgeois Calvinist heritage insured that he associated idle hands with vice and active ones with virtue. Incidentally, this likewise later became a dominant theme in British children’s books, including those by the Delesserts’ Lunar friends.

Rousseau’s method of instruction depended on botany being approached in a piecemeal manner. The structure was consistent, as each letter introduced new families of

³² J.-J. Rousseau (Paris) to M.-C. Delessert, 18 October 1771 (Letter II). *Ibid.*, pp. 133-4.

³³ *Ibid.*, p. 311, n. 121. The herbarium mentioned was for Mme Delessert’s sister Julie-Emilie Willading-Boy de la Tour (1751-1826). J.-J. Rousseau to M.-C. Delessert, 16 May 1772 (Letter III). *Ibid.*, p. 136.

³⁴ J.-J. Rousseau to M.-C. Delessert, 16 May 1772 (Letter III) Rousseau, “Letters to Mme Madeleine-Catherine Delessert,” p. 136. Rousseau was not related to Mme Delessert, but intimately called her cousin.

flowers and parts to examine. The first two lessons had description of two orders of flowering plants for his students to identify. Rousseau only explained his aim in the third lesson. It was to describe six plant families for his students to become acquainted with basic forms and distinguishing parts. Rousseau noted that ongoing patience was required for the remaining families. Then they would depart from this fruitful field to study plant generative structures. Consequently, even if Mme Delessert and her daughter only knew a few plants they would be familiar with the entire vegetable kingdom.³⁵

Mme Delessert struggled with Rousseau's method of instruction, but persevered because of their friendship. In line with both his philosophy and character he clearly explained why he, along with nature, wanted to be their only instructor:

But I forewarn you that if you want to take books and follow the ordinary nomenclature, with many names you will have few ideas; those which you will have will become blurred, you will not follow well neither my progress nor that of others, and will have nothing more than a *knowledge of words*. Dear Cousin, I am jealous of being your sole guide in this subject. When it is time I will indicate to you the books which you can consult. In waiting have the patience *to read only in this book of nature, and to stick to my letters*.³⁶

Mme Delessert's request for books, and need for her own herbarium, was to simplify this attempt at long-distance epistolary instruction. Despite struggles she ultimately limited her daughter's instruction to the 'book of nature' and Rousseau's lessons.

4.3. Rousseau's Nature and Science of Education

The attempt at epistolary botanical instruction was an educational experiment. Each lesson, important in and of itself, was intended as part of the general and practical instruction of Mme Delessert's children. Rousseau explained:

If we give your children only an amusing occupation, we miss the best half of our aim which is in amusing them, to exercise their intelligence and accustom them to

³⁵ *Ibid.*, p. 137.

³⁶ My emphasis. *Ibid.*, p. 137.

paying attention. *Before teaching them to learn to name what they see, let us begin by teaching them to see it. This science, forgotten in all educations, ought to comprise the most important part of theirs.* I will never repeat often enough; teach them never to satisfy themselves with words, and to believe they know nothing of what has only entered their memory.³⁷

When applied, Rousseau's methods did not always remain so practical. Yet his constant refrain, in both *Émile* and *Letters on Botany*, was that children should be taught to first observe what they encounter before they are made to memorize signifiers.³⁸

Despite an impassioned conviction against memorizing names Rousseau did partially relent to Mme Delessert. One problem with epistolary instruction was that the students often could not locate the plants to which he referred. It was especially difficult in the absence of herbaria or books to consult.³⁹ Rousseau provided the names of plants, and later a herbarium, after Mme Delessert and her daughter's botanical knowledge grew.

In Rousseau's final three lessons he realized that his approach was not as effective as he desired. He took solace as his students could identify plant families by observing their structure. There remained many aspects of the first five plants families to discuss. Rousseau conceded that he was not always sure how to make his descriptions available to their little '*Botanophile*.' His aim was to give enough detail so that, after several months botanizing, they had a basic sense of each family. Ultimately, Rousseau hoped they could identify a plant upon encountering it. Only later would they learn genus and species.⁴⁰ Familiarity with actual plants was needed before a student proceeded to nomenclature.

Fittingly Benjamin, a future botanist, was the only one of Mme Delessert's eight children born during the botanical lessons. Two months after Benjamin's birth Rousseau

³⁷ My emphasis. *Ibid.*, pp. 144-5.

³⁸ *Ibid.*, p. 311, n. 131; Rousseau, *Émile*, vol. 1: pp. 192-228.

³⁹ J.-J. Rousseau to M.-C. Delessert, 16 May 1772 (Letter III) Rousseau, "Letters to Mme Madeleine-Catherine Delessert," p. 145.

⁴⁰ J.-J. Rousseau to Mme Delessert, 2 May 1773 (Letter VI). *Ibid.*, p. 150.

sent Mme Delessert what he considered the eighth and final lesson.⁴¹ He expressed joy that she recovered her health, which would be fortified with a resumption of good weather and her more active life in Lyon. It would be strengthened further, Rousseau declared, by “the pleasure of filling with the sweetest success” her maternal role, which he saw as “the most respectable of functions.” He added that Mme Delessert would be less upset by Etienne’s time away “in the midst of the dear signs of his attachment and the continual cares your children demand of you.”⁴² In Rousseau’s eyes life was in a most robust state, whether in the plant world or the domestic sphere, when it was natural.

By spring 1773 Rousseau, champion of practical over theoretical pedagogy, knew that his lessons suffered too much abstraction. An alternative approach was required to correct the divergence, and to connect ideas to particular objects. Rousseau thought that this could have been avoided by supplying Mme Delessert specimens from the start. It would have saved her the difficulty of envisioning plants and the burden of descriptions, which could simply be had with a look.⁴³

Early evidence of the success of both the herbarium and Rousseau’s lessons were shown by the progress of Mme Delessert and her student. Herbaria was presented as the means to clarify confusion arising from epistolary botanizing. Yet, Rousseau may have intended from the outset for it to form the final lessons.⁴⁴ Rousseau, after work on the herbaria began, questioned his students keen eyesight. He was astonished by their skill of independently identifying a large Marguerite flower’s many stamens and petals:

⁴¹ J.-J. Rousseau to M.-C. Delessert, 11 April [1773] (Letter VIII). The sixth and seventh letters came after this date, but Rousseau wanted the eight letter, which dealt with the herbaria, to come last. *Ibid.*, p. 159.

⁴² Etienne went to Paris for his firm’s business. *Ibid.*, p. 159.

⁴³ Rousseau’s plan was for them to simultaneously build their herbarium and send him samples so he could familiarize them with their collection. *Ibid.*, pp. 160-3.

⁴⁴ At the start of the sixth lesson Rousseau asked Mme Delessert that the previous one on herbaria not be placed in accordance with “the order of composition.” This was because it would interfere with the order already determined. J.-J. Rousseau to M.-C. Delessert, 2 May 1773 (Letter VI). *Ibid.*, p. 150.

I beg you tell me with the veracity that I expect of you if someone put you on the trail. If you have found this on your own, and if your small companion with her keen eyes saw it then, I predict to you boldly that in a few years you will both be, alone of your sex with Madame the Duchess of Portland among the very few true botanists, and that the covering of the earth will soon offer nothing foreign to your eyes.⁴⁵

Despite underlying doubt Rousseau offered high praise if the discovery was independent.

He had met the Duchess of Portland (Margaret Cavendish Harley Bentinck 1715-85) in 1766 during his exile in England. Their acquaintance also blossomed into an exchange of botanical letters, specimens, and books.⁴⁶ Portland's independence, intellect, and wealth enabled her to become a leading natural-history collector and patron of the period.⁴⁷

Rousseau's bold prediction that Mme Delessert and her daughter would in several years join the Duchess, as one of the few true female botanists, was a high compliment indeed.

The creation of the Delessert herbarium paradoxically represented both a failure and a crowning achievement of Rousseau's *Letters on Botany*. Their letters of botanical experiment officially ended in 1774. Yet they continued discussing plants and herbaria in general correspondence.⁴⁸ The spillover was understandable, as they had raised common

⁴⁵ *Ibid.*, p. 155.

⁴⁶ Alexandra Cook suggests that their decade-long correspondence "constituted a *gentlemanly* scientific exchange typical of the period." [Author's emphasis]. In total Rousseau sent sixteen letters. Cook asserts that among Rousseau's botanical correspondents Portland was the greatest recipient of letters. She initiated the exchange, but only Rousseau's letters are extant. Alexandra Cook, "Botanical Exchanges: Jean-Jacques Rousseau and the Duchess of Portland," *History of European Ideas* 33, no. 2 (2007), p. 143. This is also the case for Mme Delessert's letters to Rousseau, but four written before her marriage remain. Rousseau and Delessert, *Lettres inédites*, pp. 189-91, 210-4; 219-22. She no doubt began both their general and botanical correspondence. M. Boy de la Tour (Lyon) à J.-J. Rousseau (Môtiers-Travers), 26 octobre 1762 and J.-J. Rousseau à M.-C. Delessert, 22 août 1771 in *Ibid.*, pp. 189-91; 63-4. Mme Delessert was both a botanical and a personal correspondent. Most of their extant correspondence came from Rousseau, and more than a quarter of the fifty-eight letters discuss plants in some form. *Ibid.*, pp. 4-179.

⁴⁷ Portland's wealth and passion for botany began early. She amassed great plant and animal collections, patronizing prominent natural historians like Daniel Solander. He was assistant to Banks on Cook's first voyage and a leading Linnaean. Rousseau collected plants and made herbaria for Portland, who instructed him in botany. Like the Delesserts she has been neglected, despite ties to Rousseau and natural history, as her great collections were dispersed and sold off after her death. Cook, "Botanical exchanges," pp. 142-56.

⁴⁸ J.-J. Rousseau to M.-C. Delessert, [late March/early April 1774 (Letter VII). Rousseau, "Letters to Mme Madeleine-Catherine Delessert," pp. 156-9. This letter and private ones in 1773 discussed herbaria,

topics of interests within letters dedicated to botany including mutual acquaintances and commerce.⁴⁹ Despite pitfalls in their epistolary educational experiment, it was ultimately successful. Its lasting legacy is evident through the high level of intellect of the Delessert children and the prominence of education and botany in their family. Mme Delessert and her daughter, Mme Gautier, dominated the commitment to education. Botany was primarily the purview of the latter's brothers. However, the entire family supported both enterprises. The legacy of the letters and herbarium surpassed the *hôtel Delessert*. It was crucial in fostering the popularization of public botany into the nineteenth century.

4.4. The Dissemination of the *Letters* and Rousseau's Philosophy of Nature

Letters on Botany was not published in Rousseau's lifetime, but evidence suggests that it was intended to reach beyond letters for a friend. Nevertheless, historians have debated the issue.⁵⁰ It remains unknown how wide manuscripts of the letters circulated in Parisian salons, after Rousseau completed them in 1774. After Rousseau's death in 1778, an initial edition was published in 1781 in Geneva.⁵¹ Many editions and translations appeared thereafter. The *Letters on Botany* has since become obscure, but was disseminated across

including that he made for them, and a list identifying their plants. Rousseau, "Further Letters to Mme Delessert," (24 May 1773; Paris, 9 August 1773; 30 August 1773). *Ibid.*, pp. 164-73.

⁴⁹ Rousseau praised Mme Delessert's views on commerce. J.-J. Rousseau to M.-C. Delessert, 16 July [1772]. *Ibid.*, p. 143. Mme Boy reorganized Rousseau's small savings in 1762. Cranston, *The Solitary Self*, p. 1. In the 1770s, Rousseau entrusted his money to Delessert and benefited from their adept managing of his finances. Rousseau, "Letters to Mme Madeleine-Catherine Delessert," pp. 156-60.

⁵⁰ Williams cites evidence from Rousseau's letters on his displeasure of the lack of elementary instruction books, before he wrote one for Mme Delessert. Williams, *Botanophilia*, pp. 92-6. Damrosch disputes this asserting that Rousseau did not want his works on botany published, as botany was best studied for its own sake. Damrosch, *Jean-Jacques Rousseau*, p. 472. In 1770 Rousseau noted that he did not intend to write a text on the subject. Yet he considerably reworked the letters on botany and left an edited manuscript, from which early publications derive. It was found in his Ermenonville desk and is now held at the *Bibliothèque publique et universitaire de Neuchâtel*. Alexandra Cook, "Propagating Botany: The Case of Jean-Jacques Rousseau," in *The Transmission of Culture in Western Europe, 1750-1850: Papers Celebrating the Bicentenary of the Foundation of the Bibliothèque britannique (1796-1815) in Geneva*, ed. David M. Bickerton and Judith K. Proud (Bern: P. Lang, 1999), p. 78, n. 15. The letters were held privately by the Delessert-Hottinger family until 2001. Trajan et Nicolas, *Herbier de Jean-Jacques Rousseau*, p. 3.

⁵¹ *Letters on Botany* was not published in Paris until the 1800s. In 1805 an expensive illustrated edition was printed, which became a coveted item for affluent botanical collectors. Williams, *Botanophilia*, p. 95.

Europe into the nineteenth century. Rousseau's letters added to and benefited from intense interest in botany at this time. In 1785, Thomas Martyn (1735-1825), Cambridge Professor of Botany, translated the letters with Rousseau's introduction to his botanical dictionary. The translation promoted Rousseau's botanical works and vitally contributed to a broader passion for botany. Martyn's text continued to be published in the 1800s, including illustrated editions.⁵² Martyn went beyond translating the original eight letters to Mme Delessert, adding twenty-four subsequent letters, to better inform readers of the Linnaean system.⁵³ Yet, Rousseau's position on Linnaeus' system was nuanced. After the Martyn text appeared Rousseau's botanical works were translated into other European languages, from the original French and its English translation.⁵⁴ This aided significantly in the transmission and propagation of Rousseau's philosophy of botany.⁵⁵

Rousseau did not live to see it, but his approach revolutionized botany to conform to his philosophy of nature. It spread through his botanical works. Christopher Kelly and Alexandra Cook, modern editors of Rousseau's *Botanical Writings*, argue: "Transformed into public work, these various collections of Rousseau's botanical writings contributed to a significant tradition of epistolary popularization of scientific ideas. They present Rousseau's view of nature in its most accessible form and did much to establish his enduring image as a lover of nature."⁵⁶ The works also formed new concepts of botany and nature. A French cult of sensibility emerged from two cultural phenomena. One was botany's appearance as an autonomous science. The second was the belief that nature

⁵² Christopher Kelly and Alexandra Parma Cook, "Introduction," in *The Reveries of the Solitary Walker*, p. xiii.

⁵³ Jean-Jacques Rousseau, *Letters on the Elements of Botany Addressed to a Lady. By the celebrated J. J. Rousseau. Translated into English, with Notes, and Twenty-Four Additional Letters, Fully Explaining the System of Linnaeus*, ed. and trans. Thomas Martyn (London: B. White and Son, 1787), pp. i-xxv.

⁵⁴ The translations included Danish, Portuguese, and Russian. Cook, "Propagating Botany," pp. 69-94.

⁵⁵ *Ibid.* pp. 76-87.

⁵⁶ Kelly and Cook, "Introduction," pp. xiii-iv.

produced all that was moral and sublime. Rousseau's most celebrated profession of faith on the beauty and centrality of nature was *La Nouvelle Héloïse*. This famous sentimental epistolary novel had instant and durable success.⁵⁷ The cult of sensibility of Nature was bolstered as Rousseau pursued botany, as an amiable pastime, late in life.

Rousseau's promotion of botany helped popular botany grow apart from the more scientific form. Ultimately, he revolutionized how amateurs practiced of botany. Roger Williams concludes on Rousseau's influence on popular botany: "Before Rousseau, a substantial proportion of amateurs had sought *simples*, herbal remedies. After Rousseau, those same amateurs looked for *plants*."⁵⁸ As *botanophilia* declined in Europe, by the late 1800s, so too did interest in Rousseau's botanical works.⁵⁹ It is thus not surprising that the Delesserts, for whom Rousseau wrote the *Letters on Botany*, share in this obscurity.

4.5. Artificial versus Natural: Paradoxes in Rousseau's Botany

Rousseau employed Linnaean classification in some works, but was not fully devoted to it. This stemmed from thornier issues of 'natural' and 'artificial' in his philosophy. In reference to the paradox in Rousseau's approach to botany, Williams suggests:

It would seem logical that Rousseau, given his equation of Nature and virtue, would have been drawn to the study of botany. It might seem equally plausible that he could have shunned botany on the grounds that it had become the fashionable pursuit of a society he had rejected as artificial and unvirtuous. In fact, he had it both ways, which was very characteristic of him: He found in botany an intense, personal, unique escape into virtuous Nature; and he scorned those facets of botany, the scientific and the medical, that were the common concern of others.⁶⁰

⁵⁷ The novel appeared in seventy-two French editions from 1761 to 1800. Its title depicted it to be letters of two lovers from an Alpine town collected and published by Rousseau. Williams, *Botanophilia*, pp. 90-6.

⁵⁸ *Ibid.*, pp. 95-6. Emphasis is author's original.

⁵⁹ Many nineteenth-century Continental scholars were influenced by and celebrated Rousseau's writings on botany. Yet these works have since become largely forgotten, especially in Anglo-lingual countries. Kelly and Cook, "Introduction," p. xxii.

⁶⁰ Williams, *Botanophilia*, p. 90.

Nowhere is this more evident than in Rousseau's statement in the introduction to his dictionary of botany. He declares: "The first misfortune of Botany is to have been regarded since its birth as a part of Medicine."⁶¹ This remains for him a persistent theme.

In the last letter on botany Rousseau assured Mme Delessert that inherent utility was not required to enjoy botany. He believed that there was no need to place extraneous value on botany, as it was: "a study of pure curiosity and which has no other real utility than that which a thinking and sensitive being can draw from the observation of nature and the marvels of the universe." After considering the 'natural,' the focus predictably shifted to the 'artificial.' Men "denatured many things" to improve their utility. This was excusable, but its corollary was not. Rousseau declared: "but it is not less true that he has often disfigured them and that when in the works of his hands he believes he truly studies nature, he deceives himself. This error occurs especially in civil society; it likewise occurs in gardens." Rousseau used the example of sterile double flowers and grafted fruit trees. They could not maintain fertility, which nature bestowed on all its creations. One could become acquainted with Nature's pears or apples in forests, not by observing them in gardens. Natural fruit were less succulent and smaller. Yet, their seeds reproduced and ripened better, as the trees were considerably taller and heartier.⁶² Rousseau's larger programme, whether explicit or implicit, was ever-present.

The dominion of classification is where Rousseau sought to have the best of two different systems. In his more formal works on botany he championed the Linnaean system of binomial classification. In Rousseau's fairly informal letters on botany to Mme Delessert he espoused a less 'artificial' system. It grouped plants by many characteristics,

⁶¹ Rousseau, *The Reveries of the Solitary Walker*, p. 93.

⁶² J.-J. Rousseau to M.-C. Delessert, [late March/early April 1774]. Rousseau, "Letters to Mme Madeleine-Catherine Delessert," pp. 156-7.

not only sexual ones like Linnaeus.⁶³ Rousseau's importance, as with his critique of Linnaeus, was related to issues central to eighteenth-century debates in botany.

In the *Confessions* Rousseau went so far as criticize Linnaeus. During Rousseau's exile in Neuchâtel in 1765 he spent hours each morning botanizing. This included, he noted, "especially the system of Linnaeus, for whom I conceived a passion that I have never been able entirely to throw off, even after discovering its deficiencies."⁶⁴ The issue with the system was its artificiality. Rousseau nonetheless maintained an enduring respect for Linnaeus, as he was unique in exploring botany as a scientist and philosopher.⁶⁵ These were the traits that Rousseau affirmed, in *Discourse on Inequality*, as needed by explorers to write reliable accounts of distant lands.⁶⁶ Rousseau levelled like criticism at Linnaeus that Louis de Bougainville (1729-1811), the great French explorer, had at Rousseau. In *Voyage autour du monde* (1772), and Bougainville's *Pacific Journal* (1767-8), Rousseau was attacked for observing nature in enclosed spaces.⁶⁷ In turn, Rousseau argued that Linnaeus "studied too much from gardens and collections of dried plants, and not enough from Nature herself."⁶⁸ Linnaeus travelled briefly as a young man, but did not again leave

⁶³ *Ibid.*, p. xiii, xxvi.

⁶⁴ Rousseau, *The Confessions*, p. 588, 593.

⁶⁵ *Ibid.*

⁶⁶ Rousseau bemoaned that centuries of European exploration left only poor accounts of far lands, because travellers who undertook extensive voyages made meagre observations. His solution was to send men with eyes trained to see, like Diderot, Buffon, d'Alembert, or Condillac to make observations. Rousseau argued that these men could be trusted to determine whether a particular animal was a human or a beast. Such trust was not given to "coarse travellers." Jean Jacques Rousseau, *Discourse on the Origin and the Foundations of Inequality Among Men*, ed. N.K. Singh (New Delhi: Global Vision, 2006), pp. 115-7.

⁶⁷ Rousseau was attacked for relying on philosophical writings and rejecting observations of travellers. Bougainville's disdain of "indolent haughty writers, who in their closets reason in *infinitum*" but "observed nothing themselves" referred to Rousseau. Louis-Antoine de Bougainville, *A Voyage Round the World: Performed by Order of His Most Christian Majesty, in the Years 1766, 1767, 1768, and 1769*, trans. Johann Reinhold Forster (London: J. Nourse and T. Davies, 1772), p. xxvi. Louis-Antoine de Bougainville, *The Pacific Journal of Louis-Antoine de Bougainville, 1767-1768*, ed. and trans. John Dunmore (Hakluyt Society, 2002), pp. 12-25; François Moureau, "L'Ancre et le Plomb: l'édition des voyages maritimes en France au Siècle des Lumières," in *Pacific Journeys: Essays in Honour of John Dunmore*, eds. Glynnis M. Cropp and Roger D. J. Collins (Wellington: Victoria University Press, 2005), p. 60.

⁶⁸ Rousseau, *The Confessions*, p. 593.

his native Sweden.⁶⁹ Rousseau lamented that old age and illness stopped him from embarking on a voyage of discovery, as Daniel Solander did with Joseph Banks.⁷⁰ The cloistering of local botany, though, was a disorder Rousseau sought to remedy in Europe.

Rousseau's innovation was the promotion of botany beyond traditional spaces and audiences. His writings played an essential role in turning amateur botanists' attention to plants in nature, instead of cloistered herbaria. Furthermore Rousseau was at the forefront of introducing botanical education to groups traditionally ignored by botanists: women and children. This was closely linked to his system and science of education, as revealed in *Émile*.⁷¹ Rousseau's proposal, that his two *Discourses* and *Émile* were linked forming a unified work, is less hyperbolic when their common themes are explored.⁷² The traits sought in worthy explorers were the same as those Rousseau espoused for the education of *Émile*. Rousseau, appealing to ancients, endorsed travelling on foot like Pythagoras and Plato. Consequently, Rousseau queried: How could philosophers travel otherwise, removing themselves from nature and the treasures it placed at their feet. How could people passionate about agriculture ignore crops or cultivation in their travels? Or how could a natural historian pass terrain and not explore it, stones and not break them, mountains and not botanize, and rocks without searching for fossils as they walk?⁷³

Keeping with Rousseau's mantra of interacting with nature, he declared:

Your salon Philosophers study natural history in cabinets; they have trinkets, they know the names & have no idea of their nature. But *Emile's* cabinet is more rich than that of Kings; his cabinet is the whole earth. Everything is in its place; the

⁶⁹ Joyce Appleby, *Shores of Knowledge: New World Discoveries and the Scientific Imagination* (New York: W. W. Norton, 2013), pp. 138-42.

⁷⁰ J.-J. Rousseau (Paris) to M. C. Bentinck, 23 January 1772. Jean-Jacques Rousseau, "Letters to Margaret Cavendish Bentinck, Duchess of Portland," in *The Reveries of the Solitary Walker*, p. 189.

⁷¹ Kelly and Cook, "Introduction," p. xxiii.

⁷² Rousseau to Malesherbes, 12 January 1762. Rousseau, *Œuvres: Quatre lettres Malesherbes*, p. 12.

⁷³ Rousseau, *Émile Ou De L'éducation*, vol. 4: pp. 105-6.

Naturalist who took care in arranging all things in the finest order; d'Auberton could not do better.⁷⁴

In this perspective the creator, or 'Naturalist,' formed the world. Rousseau made Nature the basis of his programme of philosophy, and central to his pedagogy of interaction over memorization.⁷⁵ Rousseau saw his approach, revealed in the lessons for Mme Delessert, as the best way to learn. It was a moralistic pursuit, preventing idleness, to be practiced in Nature where plants had been arranged by the creator. With instructional botany Rousseau furthered his ideological agenda, and filled a scholarly void.⁷⁶

The eighteenth century witnessed lively debates and speculative discussion over methods of classification. Voyages of discovery and expanded Enlightenment traffic led to a great influx of new flora and fauna into Europe, engendering increased taxonomy. Early efforts sought to base botanical taxonomy on the flower. Yet, the sexual system of Linnaeus succeeded.⁷⁷ Rousseau's modern botanical editors Kelly and Cook explain:

The Linnaean system of classification achieved a synthesis of these efforts, thereby providing a temporary answer to the practical aspect of the taxonomic problems, for it was relatively easy to learn and employ. Linnaean binomial names, as Rousseau predicted, won the day, but matters were less clear-cut for the Linnaean system of classification.⁷⁸

The system was practically useful, but structurally artificial, as Linnaeus admitted. Based on sexual characteristics it grouped species together, though they shared no likeness other than quantity of reproductive parts. The system was assailed as artificial by George Louis Leclerc, comte de Buffon (1707-88). He summoned great influence, as he was director of the *Jardin du Roi* and the most preeminent French naturalist. Buffon favoured alternative

⁷⁴ *Ibid.* Louis-Jean-Marie Daubenton (1716-99), curator of the king's cabinet at the *Jardin du Roi*, was one of Buffon's naturalists. They expanded and arranged the collection, making it a respectable natural history institution. Williams, *Botanophilia*, p. 2, 46-7, 87.

⁷⁵ Kelly and Cook, "Introduction," p. xxiii.

⁷⁶ Rousseau was unique in targeting ignored audiences in an approachable fashion. *Ibid.*

⁷⁷ Kelly and Cook, "Introduction." p. xxv.

⁷⁸ *Ibid.*

‘natural’ methods of classification, like that of Bernard de Jussieu (1699-1777). Rousseau was long acquainted with the *Jardin du Roi*, having attended courses on chemistry there in the 1740s, and he was personally acquainted with Jussieu.⁷⁹

Rousseau praised Linnaeus for the unity and communicability of his system, but used a different taxonomy to classify plants. This one was seen as less arbitrary and more natural. It was the system devised by Bernard de Jussieu and his nephew Antoine-Laurent de Jussieu (1748-1836). The pair worked for years on their classification system at the *Jardin du Roi*. Rousseau became familiar with it by learning from them in Paris.⁸⁰ He used their ordering system by family, not Linnaeus’ sexual taxonomy, in letters to Mme Delessert. Martyn’s English translation of them mischaracterized the nuanced position of Rousseau, with its additional letters dedicated to the system of Linnaeus.⁸¹ The Jussieus’ system was also employed by Rousseau in his botanical dictionary to classify plants. Rousseau that lover of cakes again tried to have it both ways.⁸²

4.6. Legacy of Rousseau and the Delesserts’ *Letter on Botany and Herbarium*

Rousseau’s influence on the Delesserts was enduring. Benjamin has received more notice than other family members, as he maintained the longest and deepest botanical interest. Studies on him, his botanical collection, and those examining Rousseau’s botany cite the

⁷⁹ Buffon was *intendant* of the *Jardin du Roi* (1739-1788). *Ibid.*, p. xxv. He, Rousseau and Diderot attended chemistry lectures by Guillaume-François Rouelle (1703-70) at the *Jardin*. Jessica Riskin, *Science in the Age of Sensibility: The Sentimental Empiricists of the French Enlightenment* (Chicago: University of Chicago Press, 2002), pp. 1-52.

⁸⁰ A.-L. Jussieu published *Genera plantarum* in 1789. It organized plants in a hundred families with classification based on numerous different features. Kelly and Cook, “Introduction,” p. xxvi.

⁸¹ *Ibid.*, p. xxvi; Rousseau, *Letters on the Elements of Botany Addressed to a Lady*, pp. iv-xxv.

⁸² Referring to Rousseau’s penchant for seeking to have it both ways, Kelly and Cook note: “Encountering these epistemological dilemmas, Rousseau trod a middle way. On purely practical grounds he adopted Linnaean names and often used the sexual system of classification; he praised the achievements of Linnaeus, while recognizing his limitations.” Kelly and Cook, “Introduction,” p. xxvi.

herbarium as the impetus for Benjamin's passion.⁸³ Benjamin warrants any modicum of attention given him by historians, but it does not belong to him alone. The creation, the expansion, and the maintenance of the herbarium remained a family affair.

Edited forms of Mme Delessert's botanical letters were published and translated, but the family preserved the actual letters and herbarium for over two centuries.⁸⁴ They remained ornaments in what grew into a very massive collection. In 1786, James Edward Smith (1759-1828), an English Dissenter and prolific botanist, visited the Delesserts at Passy. It was likely on this French Tour that he became friends with Stephen Delessert. Each man had attended university at Edinburgh in the early 1780s.⁸⁵ Smith founded the *Natural History Society of Edinburgh* in 1782, and in 1783 became its first president.⁸⁶ Stephen was an equally enthusiastic natural historian. He and his tutor Abraham Guyot were later elected members of this society.⁸⁷ In Smith's account of his Continental Tour he discussed the Delesserts' ties to Rousseau and botany:

Enthusiastically fond of the study of nature, and of Linnaeus, as the best interpreter of her works, he [Rousseau] was always warmly attached to those who agreed with him in this taste. The amiable and accomplished lady to whom his Letters on Botany were addressed, concurs in this account, and holds his memory in the highest veneration.⁸⁸

⁸³ Stafleu, "Benjamin Delessert," p. 923; Hoquet, "La bibliothèque botanique," p. 105; Antoine Lasègue, *Musée botanique de M. Benjamin Delessert: Notices sur les collections de plantes et la bibliothleque qui le composent; contenant en outre des documents sur les principaux herbriers d'Europe et l'exposé des voyages entrepris dans l'intéret de la botanique* (Paris: Librairie de Fortin, Masson et Cie., 1845), p. 45; Cook, "Propagating Botany," p. 81. Williams, *Botanophilia*, p. 96.

⁸⁴ Trajan et Nicolas, *Herbier de Jean-Jacques*, p. 3.

⁸⁵ Etienne and Benjamin Delessert lived in Edinburgh from 1784 to 1786. Smith studied there from 1781 to 1783. BCL MS 3219/6/2 D Stephen Delessert (Edinburgh) to James Watt jnr (Geneva), 11 June 1785; James Edward Smith, *Memoir and Correspondence of the Late Sir James Edward Smith*, ed. Pleasance Reeve Smith (London: Longman, Rees, Orne Brown, Green and Longman, 1832), pp. 17-70.

⁸⁶ *Ibid.*, pp. 44, 63-6. See also D. E. Allen, "James Edward Smith and the Natural History Society of Edinburgh," *Journal of the Society for the Bibliography of Natural History*, 4 (1978), pp. 483-93.

⁸⁷ EUL-L MS La. III 352/1 Abraham Guyot (Edinburgh) to Thomas Beddoes (President of the Natural History Society), 19 January 1786. Lasègue, *Musée botanique de M. Benjamin Delessert*, p. 43.

⁸⁸ James Edward Smith, *A Sketch of a Tour on the Continent, in the Years 1786 and 1787* (London: J. Davis, 1793), pp. 110-1.

Mlle Delessert let Smith examine their herbarium. Smith, referring to it, explains: “Her charming daughter shewed me a collection of dried plants made and presented to her by Rousseau, neatly pasted on small writing paper, and accompanied with their Linnaean names and other particulars. Botany seems to have been his most favourite amusement in the latter part of life.”⁸⁹ The part of the collection created by Rousseau would have, at the time of Smith’s visit, likely formed the majority of the Delessert’s herbarium.

Rousseau’s botanical and pedagogical influence extended beyond the Delesserts. During his exile to England, in 1766, he botanized with Daniel Malthus and the Duchess of Portland. After returning to the Continent Rousseau kept a correspondence with each of them, which included transmitting botanical books.⁹⁰ Rousseau likewise made a strong impression on German thinkers. Johann Wolfgang von Goethe (1749-1832), the poet and naturalist, described the letters to Mme Delessert as a supplement to *Émile*.⁹¹ Promotion of Rousseau, by Goethe and others, lasted into the 1800s, influencing reform in German schools and natural history.⁹² A beneficiary of such interest was the German explorer Alexander von Humboldt (1769-1859). He and Rousseau shared the view of the bond between geography and botany.⁹³ In 1799, Humboldt and French botanist Aimé Bonpland (1773-1858) attained Spanish royal ascent, and almost unprecedented access, to explore

⁸⁹ *Ibid.*, p. 111.

⁹⁰ James, *Population Malthus*, pp. 10-3, 76-8; Rousseau, “Letters to Margaret Cavendish,” pp. 173-93.

⁹¹ See Cook, “Propagating Botany,” p. 69, 83-7.

⁹² *Ibid.* pp. 86-9.

⁹³ Alexandra Cook, “Jean-Jacques Rousseau’s Anticipation of Humboldt’s Plant Geography,” in *Alexander von Humboldt: From the Americas to the Cosmos* (New York: Bildner Center for Western Hemisphere Studies, 2004), pp. 375-90. <http://web.gc.cuny.edu/dept/bildn/publications/AlexandervonHumboldt.shtml>.

the natural history of its South American and Caribbean colonies.⁹⁴ Benjamin Delessert and his family befriended both men in the 1800s, serving them as patrons and bankers.⁹⁵

4.7. The Delesserts' Cakes

Benjamin Delessert continued Rousseau's practice of disseminating botany to amateurs. Delessert accomplished this by employing an accessible classification system, as well as by producing inexpensive books.⁹⁶ Both were part of Delessert's general philosophy. In 1800, he and A.-P. Candolle pioneered the distribution and promotion of economic soups in Paris. They also played critical roles in founding the *Société Philanthropique* and the *Société d'encouragement pour l'industrie nationale*.⁹⁷ Each young man came to perceive that philanthropy, industry, and science were interdependent. They promoted Rumford soups for the same reasons that they disseminated cheap botanical books. As a polymath Delessert combined interests, thereby improving each of them as well as those of his contemporaries, by transmitting his ideas. The Delesserts maintained intimate ties and a lasting veneration for Rousseau, but they were not blind disciples. Ultimately, Rousseau was not the only prominent Enlightenment thinker to impact their actions.

The common interests linking the Delesserts to British *savant-fabricants*, and the Lunar Society in particular, appear Baconian in nature. Rousseau's instructions for Mme Delessert focused on botany's potential for pleasure, pedagogy, and proper conduct. Yet, there was a utilitarian bent to Benjamin Delessert's *musée at rue Montmartre* (1815-60).

⁹⁴ Alexander von Humboldt and Aimé Bonpland, *Essay on the Geography of Plants*, ed. Stephen T. Jackson, trans. Sylvie Romanowski (Chicago: University of Chicago Press, 2010), pp. 8-17. Stephen Bell, *A Life in Shadow: Aimé Bonpland in Southern South America, 1817-1858* (Stanford: Stanford University Press, 2010), pp. 142-222; Hoquet, "La bibliothèque botanique," p. 118.

⁹⁶ Books were costly despite nineteenth-century innovations, like steam-presses and industrial manufacture of paper. It was compounded for science texts with small audiences, especially those with elaborate plates. Stafleu explains: "Delessert's books were not made for the bibliophilic happy few, but for the scientific community as a whole. They were not very refined typographical productions but served their purpose excellently: dissemination of scientific information." Stafleu, "Benjamin Delessert," pp. 927-8.

⁹⁷ Candolle, *Mémoires*, p. 112.

It may have been inspired by, and almost matched, Joseph Bank's (1775-1820) collection at Soho Square. The "enlightened sponsors" supported science by their passion, aid, and *musée*. Frans Stafleu argues that Banks and Delessert mark a shift from mere collecting of curiosities to an order of practical science. In this time the study of plants and animals, once assistants to medicine and leisure activities, evolved from natural history to the science of biology.⁹⁸ In discussing the conflict between utility and pleasure Stafleu notes:

Banks as well as Delessert built their private museums with a strictly scientific purpose; they did not collect for the sake of collecting, nor to 'amuse' or to edify, but simply for the sake of research. Joseph Banks had the modern concept of a taxonomic research institute in mind: a herbarium, a library, a scientific staff, a botanical garden and direct contact with botanical exploration and plant instruction in general. This scientific ideal fitted the early romantic movement; it had evolved from the ideas of the Enlightenment on nature but it had left behind the emphasis on direct utility and, even more, on edifying pleasures.⁹⁹

There is a danger in trying to divorce Banks and Delessert too far from the Enlightenment or utilitarianism, because of their passions for botany. Both men displayed no qualms in serving the state by finding the utility in nature's products; be this Bank's breadfruit, Delessert's beet-sugar or their common interest in Merino sheep.

4.8. Translating, Transmitting, and Transporting Baconianism

The contrasting views of nature as displayed in the ideologies of J.-J. Rousseau and Sir Francis Bacon (1561-1626) are central to this issue.¹⁰⁰ Rousseau, a republican nomad, saw botany requiring no inherent utility beyond enjoying nature,¹⁰¹ whereas Bacon, a

⁹⁸ The *musée* outgrew the *hôtel* on rue Coq-Héron by 1815. Stafleu, "Benjamin Delessert," pp. 921-31.

⁹⁹ *Ibid.*

¹⁰⁰ Kelly and Cook discussed this in terms of Rousseau's botanical writings. They quote Bacon, but cite Margaret Jacob, in reference to his influence on Western science. Quoting Bacon's *New Atlantis*, they state that "Rousseau's nature study opposes the Baconian interrogation of nature on the rack. Bacon's object is to make nature serve 'the benefit and use of life,' while Rousseau's object is to reveal the antithesis of social desire and political authority." This aim could be accomplished through the study of botany, but only if it was undertaken for its own sake, not material gain. Kelly and Cook, "Introduction." p. xxiii.

¹⁰¹ J.-J. Rousseau to M.-C. Delessert, n.d. [late March/early April 1774]. Rousseau, "Letters to Mme Madeleine-Catherine Delessert," p. 156.

civil servant and Lord Chancellor of England, was the source of that nation's view of nature's intrinsic utility. The Enlightenment inherited many of Bacon's ideas, including state employment of natural philosophy.¹⁰² The eighteenth century – with its voyages and tours of collection, taxonomies to catalogue, and encyclopaedias to disseminate – was certainly Baconian. A crowning achievement of this mindset was the *Encyclopédie* of d'Alembert and Diderot, at midcentury. It sought to be a vast repository of systematic information and a bridge between men of letters and the mechanical arts. Bacon criticized lettered men who looked upon mechanical arts with derision. He suggested that nature would be a better, and more masculine, source of learning for aristocrats than the violent pursuit of game, fighting, and religious conflict. Catholic clergy was a particular target. Bacon saw them as restricting their minds to a few ancient authors, and their bodies to cloistered colleges, or monastery cells.¹⁰³ Charges of closeted scholars' inability to know the world, like many parts of Bacon's programme, rang throughout the Enlightenment.

The enduring appeal of Bacon's ideas, aside from their important content, was a product of wide dissemination. This resulted from Bacon's intentional effort to publish works in English at home and their translations abroad. His influence was prominent and durable on the Continent, especially in German and Dutch states. Bacon's appeal was greatest in urban and commercial zones, particularly for Protestants.¹⁰⁴ It was influential in the Netherlands through the 1600s. The period's leading professor of medicine the University of Leiden's Herman Boerhaave (1668-1738) struggled, Margaret Jacob notes, to "contain his rhetorical enthusiasm for the promise of medical advancement offered to

¹⁰² Jacob, *Scientific Culture*, pp. 28-9.

¹⁰³ *Ibid.*, pp. 28-9.

¹⁰⁴ Bacon made an intentional effort for a broad reading audience. Many of his principal books published in English. Latin translations were produced, often in Amsterdam, and spread across Europe. *Ibid.*, pp. 30-3.

those who would heed Bacon's call to experience nature for themselves."¹⁰⁵ Ironically, Rousseau thought botany's great misfortune was to have been limited, since its inception, by its perceived utility for medicine. Yet he, along with more utilitarian scholars, called for more voyages of exploration. Rousseau shared with Bacon a call for people to directly experience nature. There were contrasting ideologies underpinning both calls to action. Each scholar saw a different function for nature. However, some adherents to these views managed to straddle such opposing approaches. The Delesserts and the Lunar Society intersect at this confluence, as they enjoyed observing *and* cultivating their gardens.

4.9. Conclusion

The Delesserts were indebted to Rousseau, sharing his appreciation of nature as well as his Swiss-Calvinist heritage. They also inherited his penchant of wanting to have their cake and eat it too. This was by maintaining Rousseau's custom of ordering herbaria by the Linnaean system, but adopting Candolle's system to classify plants.¹⁰⁶ The Delesserts also sustained fidelity to Rousseau, and cultivated interchange with British industries and scientists. By seeking utility the Delesserts were Baconian but they, like Joseph Banks and other prominent Enlightenment figures, maintained a passion for nature. This is revealed, in the following chapters, by an examination of their educational and industrial pursuits. This included Stephen and Benjamin's British Tour to Boulton & Watt's Soho manufactory and the University of Edinburgh, uncovering the process for refining beet-sugar, partaking in the international exchange of Merino sheep, and using Rumford's cooking innovations to supply welfare soups in France. Through such mechanical and industrial endeavours they went beyond Rousseau and surpassed French contemporaries.

¹⁰⁵ *Ibid.*, p. 32.

¹⁰⁶ On Candolle's system, partnerships with Delessert, and links to the Jussieus see Hoquet, "Botanical Authority," pp. 524-36; Stafleu, "Benjamin Delessert," pp. 923-33; Cook, "Propagating Botany," p. 90.

5. Edgeworth's Education Experiments: From Rousseauist Child-rearing to Practical Lunar Instruction

Education was a fundamental area of concern throughout the Enlightenment, given its foundational role in acquiring knowledge. The English Channel-crossings of Richard Lovell Edgeworth and Thomas Day, in the early 1770s, followed from their respective educational experiments. Their tours, and experiments, related to intense Rousseauism. The noble and amiable Edgeworth had no trouble making social contacts in Lyon, which included Etienne Delessert. This initial trip to France by Edgeworth was critical. It saw a fateful meeting with Rousseau in Paris, the first contact between the Delesserts and the Lunar Society, and recognition of the futility of an educational experiment on his son Richard (1764-96). Edgeworth and Day held the Enlightenment view that education was an experimental science. They thus abandoned neither their projects nor their subjects. Accordingly, Edgeworth turned to other educational experiments, and was drawn further into the orbit of the Lunar Society.

5.1. Edgeworth's Educational Engineering

R. L. Edgeworth maintained an enduring dedication to education, which he identified as a science. After years of work on the subject Edgeworth published *Practical Education* (1798) with his daughter Maria Edgeworth. In its preface they declare:

To make any progress in the art of education, it must be patiently reduced to an experimental science; we are fully sensible of the extent and difficulty of this undertaking, and we have not the arrogance to imagine, that we have made any considerable progress in a work, which the labours of many generations may, perhaps, be insufficient to complete; but we lay before the public the result of our experiments, and in many instances the experiments themselves.¹

¹ Maria Edgeworth and Richard Lovell Edgeworth, *Practical Education* (London: J. Johnson, 1798), vol. 1: pp. v-vi.

The book took two decades to complete. It was not based on a single system, though the authors had consulted many books on education, as the Edgeworths had by then realized the futility of employing theories.² Instead, they championed practicability and utility, using real-life examples over didacticism, and note “that fictions, however ingenious, will never advance the science of education so much as simple experiments.”³ Edgeworth knew this from personal experience. He and Thomas Day’s early educational experiments were inspired by Rousseau’s novel *Émile*. The failures with this theoretical system ultimately pushed Edgeworth closer to the pragmatism of the Lunar Society.

In 1771, R. L. Edgeworth travelled to France with his son Richard, his friend Thomas Day, and Richard’s tutor. Their purpose for crossing the Channel was manifold. The impetus for the return and departure, of Edgeworth and Day, was their respective and unvarying troubles with women. Edgeworth was somewhat too successful with women while Day’s attempts were often ones of futility. They left for France so the married Edgeworth could avoid his extramarital passions for Honora Sneyd (1751-80) and so Day could improve his manners to court her sister, Elizabeth (1753-97). Beyond romantic misfortunes each man had been involved for some time with experiments in education.⁴

Day, as a wealthy gentleman and keen disciple of Rousseau, rather infamously conducted an actual test of the methods laid out in *Émile*. Edgeworth remarked in his memoirs: “[Day] determined to put in practice a scheme, which had long occupied his imagination. This was no common project, but a design more romantic than any which

² *Ibid.*, pp. viii-ix.

³ Edgeworth and Edgeworth, *Practical Education*, p. 587.

⁴ Richard Lovell Edgeworth and Maria Edgeworth, *Memoirs of Richard Lovell Edgeworth, Esq.*, ed. Maria Edgeworth (London: R. Hunter, 1820), vol. 1: pp. 214-60.

we find in novels.”⁵ Day adopted an orphan and a second girl from a London founding hospital in 1769, whom Day named Sabrina and Lucretia respectively. His plan was to educate them, and later determine which woman would be the most suitable wife. The experiment was mainly conducted in France, where Day and the girls lived in relative seclusion. He tried to inculcate in them literacy and disgust for fashionable society.⁶ Day’s project to train a suitable wife concluded by 1773. It ended, as had his efforts to court several British ladies, in complete disappointment.⁷

The attempt by Edgeworth to put Rousseau’s philosophical system of pedagogy into effect was lengthy, but futile. It began in 1767 after Edgeworth returned to England from Ireland. He married Anna Maria Elers (1743-73) in 1763, the first of his four wives. In 1764 their first child Richard was born. Edgeworth devoted himself to raising Richard by new methods: “I formed a strong desire to educate my son according to the system of Rousseau. His *Emile* had made a great impression upon my young mind, as it had done upon the imaginations of many far my superiors in age and understanding.”⁸ The vogue of Rousseau’s persuasive ideas, especially compared to methods used by Edgeworth’s acquaintances, ensnared the young father. He tried to literally test the theory. In practice it involved outfitting Richard in simple clothes and using little organized instruction, both of which were very unconventional. Richard formed talents for mechanics and invention,

⁵ *Ibid.*, p. 214.

⁶ *Ibid.*, pp. 209-17.

⁷ *Ibid.* The girls later found English husbands and Day married Esther Milnes (1752-92) in 1778. Accounts of this odd experiment appeared in Edgeworth’s memoirs *Ibid.*, pp. 214-45, and remain popular. See Julia V Douthwaite, *The Wild Girl, Natural Man, and the Monster: Dangerous Experiments in the Age of Enlightenment* (Chicago: University of Chicago Press, 2002), pp. 138-40; Uglow, *The Lunar Men*, pp. 181-93; Marilyn Butler, *Maria Edgeworth: A Literary Biography* (Oxford: Clarendon, 1972), p. 39, n. 2.

⁸ Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 178-9.

but lacked literary knowledge. He also developed discipline problems and was guided only by his own will. The trial lasted until Richard was eight-years of age.⁹

Remarkably, Edgeworth's experiment with Richard elicited more criticism than Day's experiment to train an orphan to be a perfect wife. Day began training the girls in London, but it was not conducive to his plan. Consequently, he relocated them to France to avoid scandal and attention in England. Their arrival in Avignon created shock, but Day won locals over by his character and actions. The peculiar arrangement also failed to create scandal when he moved with Sabrina to Litchfield. Day was recognized as a man of charity and decency, and both he and Sabrina became tied to the social elite.¹⁰ Edgeworth did not escape so unscathed. He suffered abuse for his project with Richard during his stays in Litchfield. Opposition to Edgeworth's experiment, in both Ireland and England, caused embarrassment for his family and friends, and derision from all sides.¹¹

In 1771, the experiment was still underway and Edgeworth had the opportunity to meet the master of this misfortune. He visited Rousseau in Paris for advice, as problems in Richard's development had already appeared. Edgeworth later reflected:

In passing through Paris at this time, we went to see [Rousseau]: he took a good deal of notice of my boy; I asked him to tell me any thing that struck him in the child's manners or conversation. He took my son with him in his usual morning's walk, and when he came back, Rousseau told me, that, as far as he could judge from two hours observation, he thought him a boy of abilities, which had been well cultivated.¹²

Rousseau was unable to detect any serious defects in Richard's development, or in the effects of his own educational system put into practice. Yet, doubts in Edgeworth's faith in Rousseau, and experiment with his system, surfaced before Edgeworth returned home.

⁹ *Ibid.*

¹⁰ *Ibid.*, pp. 214-6; 236-40.

¹¹ *Ibid.*, p. 178; NLI MS 10166/7 52. R. L. Edgeworth (Edgeworthstown) to T. Day (Chertsey), 8 July 1784.

¹² Edgeworth and Edgeworth, *Memoirs*, vol. 1: p. 258.

The tour by Edgeworth's party amounted to Enlightenment exchange of British ingenuity for French refinement. They only remained in Paris for two days, seeing little of its great attractions, before moving on to Lyon. The plan was to stay there for a winter, for Day to undergo training to improve his manners, as he had promised Elizabeth Sneyd. This, as Edgeworth recounted, was by a strict regimen "to compel his antigallican limbs, in spite of their natural rigidity" by dancing, fencing, and horse riding.¹³ Day tried to learn fashionable French manners, to impress an English lady. Edgeworth busied himself utilizing practical British ingenuity at Lyon ramparts, impressing his hosts.

Edgeworth lent his skill to great project of diverting of the Rhône River. It was a realization of the long-standing desire to build a canal to divert the river to expand Lyon. More land was needed to increase and improve its flourmills.¹⁴ Edgeworth's partaking in the project insured his prolonged stay in Lyon. He had his wife to join him in France, but Anna did not share her husband's fondness for French society. She became pregnant and, as Edgeworth noted, "had a dread of lying in at Lyons, or in any part of France." In 1772 Anna returned to England, with a more polished Thomas Day. The labour resulted in the birth of a daughter, but the mother's death in March 1773.¹⁵ This death, and birth of Edgeworth's fifth child (of the eventual twenty-two he fathered), hastened his return. It also suspended the academic project, which he had taken up when winter stalled his practical engineering work diverting the Rhône. Edgeworth sent an essay on his plans and experiments, on the construction of flourmills, to the company funding the diversion.¹⁶

¹³ *Ibid.*, pp. 259-60.

¹⁴ NLI MS 11132 (3): RLE Diversion of R. Rhône. "Project for mills on Rhône."

¹⁵ Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 272-3, 321.

¹⁶ Anna Maria (1773-1824), the daughter, was named after her mother. *Ibid.*, pp. 320-1; NLI MS 11132 (3): RLE Division of R. Rhône. M. de la Poype (Lyon) to R. L. Edgeworth (Northchurch), 18 April 1777; *Ibid.*, M. de Terrebasse (Lyon) to R. L. Edgeworth, 18 March 1778.

Edgeworth's involvement of with Lyon's civil works prevented full dedication to his son's education. After Day's departure the British tutor was unable to control an undisciplined Richard, who was enrolled in a Catholic seminary.¹⁷ This marked the start of Edgeworth's departure from Rousseau's system, and Richard's eventual estrangement from the family. In Edgeworth's *Memoirs*, he rehashed the unfortunate episode to help other parent's avoid his mistakes. He recognized two main faults. The first was that he started Richard's education on Rousseau's faulty system. It raised a healthy and robust child, but Richard was also stubborn and unruly. The second fault was Edgeworth's failure to closely monitor Richard's education in France, as was done in England.¹⁸

The realization of this failure led to a transitional stage for Edgeworth and his children's education. In June 1773, four months after returning from France, he married Honora. The family moved to Ireland, establishing themselves at the ancestral estate Edgeworthstown. Edgeworth attempted to organize his holdings and tenants, and the education of his growing family. He and Honora had no more success taming Richard than earlier tutors. By 1777, the couple had two of their own children and four from Edgeworth's first marriage. He later reflected that their focus, other than mechanics and literature, was on educating their children.¹⁹ Honora cared for the young children but the older three were sent to boarding schools.²⁰ Edgeworth regretted sending Richard, who was unprepared for the shift from a domestic Rousseauist education to that of a boarding

¹⁷ Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 273-4.

¹⁸ *Ibid.*

¹⁹ *Ibid.*, pp. 352-3.

²⁰ In 1776 Richard was sent to Charterhouse. Two years later he escaped to sea. In 1781 he joined the Royal Navy, but fled in 1783, leaving Edgeworth to cover a £10 debt. Lluís Barbé, *Francis Ysidro Edgeworth: A Portrait with Family and Friends*, trans. Mary C. Black (Northampton: Edward Elgar Publishing, 2010), p. 5. Maria also had behavioural problems and haphazard parenting as a child. She lived with her father and stepmother for two years in Ireland, but was sent to school in Derby in 1775. Her manners and relationship with her parents improved, especially after they returned to England in 1777. Emmeline too was sent to boarding school. Butler, *Maria Edgeworth*, pp. 51-5, 71; Uglow, *The Lunar Men*, p. 315.

school. Richard's character made him popular with schoolmates, but he did not take well to scholarship, or remain in Ireland.²¹ Edgeworth reflected: "[Richard] had acquired a vague notion of the happiness of a seafaring life, and I found it better to comply with his wishes, than to strive against the stream. He went to sea, readily acquired the knowledge requisite for his situation, and his hardihood and fearlessness of danger appeared to fit him for a sailor's life."²² Father and son maintained an ambivalent relationship, but hope that Richard would realize his family's aspirations endured.

5.2. Day's Enduring Responsibility for Educational Experiments

Richard's antics were not the only concern. On 30 April 1780 Edgeworth was again a widow. His beloved Honora died from consumption, despite efforts of Dr Erasmus Darwin and other physicians.²³ This was not the last time that Edgeworth, or the Lunar circle, lost family members to consumption.

Edgeworth was not deterred by the desertion of his first subject Richard, nor by the death his co-experimenter Honora. In 1781 Edgeworth consoled Maria on the loss of her stepmother. Maria was in London, at a second boarding school, and suffering from an eye ailment. Edgeworth explained that only "the loss of your late mother could give me more pain than to lose the fruits of her care & of mine assisted by your own industry & goodness in the course of your Education."²⁴ In an attempt to comfort her, he told Maria that he had news from Richard, who sent his love. Edgeworth concluded that his hopes

²¹ Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 352-3.

²² *Ibid.*, p. 353.

²³ *Ibid.*, vol. 1: pp. 363-70.

²⁴ NLI MS 10166/7 48. R. L. Edgeworth to Maria Edgeworth, 26 October 1781.

for his son were starting to revive.²⁵ Richard's life at sea meant that the family endured prolonged periods without having any news from the eldest son and heir.

The continuing hope for Richard's reform and concern about his conduct created conflict between Edgeworth and Thomas Day. Both men supported the other's projects and showed responsibility when they failed. Day admitted culpability in Richard's development. Edgeworth responded: "You refer...to my having gravely consider'd your having given Dick a taste for fun as one great cause of his corruption __ & you very wittily suggested another. I certainly before your face spoke of it as having been hurtful to him – but I never denied that the Ramparts of Lyons had been more so."²⁶ Indeed, Edgeworth saw his part in diverting of the Rhône River as the cause of Richard's failed education. Edgeworth took responsibility, suffering attacks on different occasions, as Day was not to blame.²⁷ In 1784 it was expected that Richard would return to England. Day was uneasy about taking Richard into his home in England, as was Edgeworth in Ireland. Ultimately asylum was not needed, as Richard deserted the navy at Goa, in western India, and did not take passage to Lisbon on the *Manmouth*.²⁸ Yet, Edgeworth still addressed his concerns with Day. They openly criticised each other, which fortified their friendship. Such staunch support emboldened them both to continue education experiments.

Another disagreement over Richard arose between Day and Edgeworth in 1787. Day criticised him for removing Richard from his will. Edgeworth replied that it was a preferable act to assuming Richard would return, and was meant to prevent future family disputes. The aim was not to punish him for past mistakes. Edgeworth still hoped Richard

²⁵ *Ibid.*

²⁶ NLI MS 10166/7 52. R. L. Edgeworth (Edgeworthstown) to Thomas Day (Chertsey), 8 July 1784.

²⁷ *Ibid.*

²⁸ *Ibid.*

would stay alive and reform. In the new will Richard was promised an amenity upon his return to Ireland. Lord Longford (1743-92) the will's signatory did not share Day's hopes or reservations. Longford believed Richard would never return.²⁹ Edgeworth teased Day for his wit of not making his own will, which brought one closer to death.³⁰ Longford and Day both were wrong: Day died within two years and Richard eventually returned.

On 28 September 1789, Day died unexpectedly of a fractured skull, after he was thrown from his horse, leaving Edgeworth to take over several of Day's responsibilities. Edgeworth was asked to quickly come to England, as it was mistakenly thought he and James Keir were Day's executors.³¹ Uncovering this error was fortunate, as Edgeworth made it no further than Dublin. The packet-ship on which he was to cross the Irish Channel was lost at sea.³² His presence at Edgeworthstown was crucial. His third wife, Elizabeth, had "just lain in" for her seventh child.³³ She was Day's old love interest and Honora's younger sister. The marriage like Edgeworth's first two caused controversy, but was actually a deathbed suggestion of Honora.³⁴ They named the infant Thomas Day Edgeworth (1789-92), but the Edgeworths soon had further concerns. Their daughter Honora (1774-90) suffered consumption, and was failing fast. Despite many hardships

²⁹ NLI MS 10166/7 57. R. L. Edgeworth to T. Day, 5 February 1787. Edgeworth's new will named his next son, Lovell, as heir to Edgeworthstown instead of Richard. Edgeworth and Edgeworth, *Memoirs*, p. 5.

³⁰ *Ibid.* Edward Michael Pakenham, 2nd Lord Longford, was a nobleman, friend, and neighbour.

³¹ Thomas Londes, Day's nephew, wrote to Edgeworth the next day. The horse was scared by a corn siren and Day died soon after falling, with no last words. NLI MS 22470 T. Lowndes to R. L. Edgeworth, 29 September 1789. Maria, who completed her father's memoirs, described the sad irony of Day's death. He was a "victim to his own benevolence," as he used an usual method to break horses without cruelty. Day's horse was not properly broken and threw him. Edgeworth and Edgeworth, *Memoirs*, vol. 2: pp. 103-4. Day had actually made a will. Londes found it at Day's house and learned that Mrs Day was "sole Executrix," not Keir and Edgeworth, as she thought. NLI MS 22470 T. Lowndes to R. L. Edgeworth, 2 October 1789.

³² NLI MS 22470 T. Lowndes to R. L. Edgeworth, 25 October 1789.

³³ *Ibid.*; NLI MS 22470 R. L. Edgeworth to T. Lowndes, 8 October 1789.

³⁴ Edgeworth and Edgeworth, *Memoirs*. vol. 1: pp. 369-80.

Edgeworth helped Mrs Day settle Day's affairs. This included an annuity for Sabrina, who became a widow with the death of Day's friend John Bicknell (1746-87).³⁵

Day's educational experiments have continued to engender debate. However, somewhat lost in this discussion is the fragility of life in this period. Sabrina certainly lived a preferable life than did the five children Rousseau abandoned to the foundling hospital. Within three years of Day's death Mrs Day, Honora, and young Thomas Day Edgeworth all died.³⁶ Sabrina outlived them, as well as Edgeworth, who continued to support her socially and financially until his death.³⁷ Had Edgeworth and Day saw their experiments as monumental failures, they might have concluded their efforts. They did not, despite what their critics may have wished, learn their lesson. Indeed, at the time of Day's unexpected death, the pair was involved in an epistolary debate on Edgeworth's plan "of taking a child from the lower class of life to educate for a higher rank."³⁸ They saw education as an experimental science. Therefore, failing experiments did not mean abandoning the entire discipline, and were not instantly evident. It required years for

³⁵ After Day's death his widow thanked Edgeworth and James Keir for their support of her marriage. She asked Edgeworth's guidance on her desire to provide for Sabrina (c. 1757-1843). Mrs Day wanted to provide her with an annuity between £30-50 per year. NLI MS 22470 E. Day to R. L. Edgeworth, 21 January 1790. Edgeworth also came up with methods to aid Sabrina. One was to publish Day's memoirs and correspondences, with profits going to Mrs Bicknell. NLI MS 10166/7 65. R. L. and Maria Edgeworth to M. Ruxton, [n. d. 1789].

³⁶ NLI MS 10166/7 92. R. L. Edgeworth to John Ruxton, 5 July 1792. Edgeworth thanked his brother-in-law for gently informing them of their infant's death, and lamented the short duration of his life. He noted the sad coincidence: "M^{rs} Day died suddenly the 2nd of last month a few days after she left us. There does not now, that little Thomas is gone, remain even a person of the same name as Mr Day. Nor any person that even pretends to be his heir." *Ibid.* Honora declined throughout 1789 and finally died early in 1790. NLI MS 22470 R. L. Edgeworth to J. Keir, n.d. 1790; *Ibid.*, J. Keir to R. L. Edgeworth, 31 March 1790.

³⁷ Edgeworth gave Sabrina £30 in 1808, but he did not keep an account of it. She send him a receipt and recalled it again in 1817. NLI MS 22470. S. Bicknell to R. L. Edgeworth, 21 April 1817. Presumably this was part of his effort to organized his affairs, as his health failed and he neared death. In May, he wrote to her and sent £50, apologizing that the sum was not greater, and that it may be the last because of his health. He explained that it was on account of his own financial strains from the economic situation. *Ibid.*, R. L. Edgeworth to S. Bicknell, 6 May 1817. Sabrina thanked him for the gift and reminded him that when he agreed to give her £10 annually, years earlier, it was on the condition that it was only so long as he could afford it. *Ibid.*, S. Bicknell to R. L. Edgeworth, 13 May 1817. Finally, Sabrina wrote to Maria after her father's death noting the kindness he showed her. *Ibid.*, S. Bicknell to M. Edgeworth, 30 June 1817.

³⁸ Edgeworth and Edgeworth, *Memoirs*, vol. 2: pp. 95-102.

them play out. In the case of Edgeworth, it was practically self-experimentation, as it involved his own family and fortune. Amidst events surrounding Day's death Edgeworth finally had news of Richard, after years of silence.

5.3. Edgeworth's Enduring Responsibility for Educational Experiments

R. L. Edgeworth maintained a lasting commitment to the subject of his first experiment. In 1791 Edgeworth thanked Mrs Day for the sending him books, and told her of the safe arrival of Day's mathematical instruments made by George Adams junior (1750-95), the famous instrument maker.³⁹ Edgeworth praised Maria, who along with Emmeline was to stay with Mrs Day that winter, and shared news about Richard: "My eldest son has been just heard of—he dates from Cheraw S. Carolina & I have sent for him to Ireland, that I may judge what way of life may be best suited to his present Disposition."⁴⁰ Five months later Edgeworth told his sister: "Dick is alive, married & has made me a Grandfather."⁴¹ They anticipated a visit soon, but the reunion did not take place at Edgeworthstown, or in Ireland. Richard Lovell Edgeworth's aspirations for the return of Richard, his prodigal son, arose as the family sought to prevent the death of Lovell, Edgeworth's favourite son.

³⁹ NLI MS 22470. R. L. Edgeworth to E. Day, 14 June 1791. Day made promises to his friends that were unsubstantiated by his will. This included bequeathing his library to Edgeworth, which had been promised to Mrs Day for years. She valued the books most of Day's property but planned to give some to his friends, with Edgeworth having priority, before she knew the library was once promised to him. Though she offered to order the desired books from John Stockdale (c. 1749-1814) in London, Edgeworth requested only about thirty of Day's books as a gift. He was also given Day's mathematical instruments, asking that they be sent to Adams for proper arrangement. *Ibid.*, E. Day to R. L. Edgeworth, 23 December 1789; R. L. Edgeworth to E. Day, 6 January 1790; R. L. Edgeworth to E. Day, 18 December 1790. Stockdale started his shop as a bookseller at Piccadilly in 1781. Edgeworth and Edgeworth, *Memoirs*, pp. 86-147. George Adams junior was, like his father, a great mathematical instrument maker. He also wrote and published textbooks on natural philosophy, experiments, and lectures. John R Millburn, *Adams of Fleet Street: Instrument Makers to King George III* (Aldershot: Ashgate, 2000), pp. 159-249.

⁴⁰ NLI MS 22470 R. L. Edgeworth to E. Day, 14 June 1791. The daughters stayed at Day house on different occasions. Edgeworth noted Day's kindness to Emmeline, during a dispute on Richard, and that she could not be better placed. NLI MS 10166/7 52. R. L. Edgeworth to T. Day. 8 July 1784.

⁴¹ NLI MS 10166/7 86. R. L. Edgeworth to M. Ruxton, 8 November 1791. Richard lived in Virginia from 1785 to 1787 and later in South Carolina as a tutor. He worked for the Anson Company in North Carolina after marrying Elizabeth Knight. Barbé, *Francis Ysidro Edgeworth*, p. 5. The family disapproved of her. Not because she was daughter to a hatter, but as they were Methodists. Butler, *Maria Edgeworth*, p. 106.

In 1791 Elizabeth and R. L. Edgeworth moved England to have Lovell treated, leading to auspicious connections. He suffered consumption (as had his sister and mother Honora). They crossed the Irish Channel to establish themselves in Clifton, near Bristol, to attend spas for the winter.⁴² In October Edgeworth gave Maria “sailing orders” for her to bring the rest of the family. He hoped she and her nearest sisters, Anna and Emmeline, “may see something of the world as it is called here and at Bath & perhaps by invitations at London. If we chuse it & find our finances adequate to the undertaking we may next year go further.”⁴³ Maria and other family members did later go further. In 1802, the family travelled to the Continent and Maria received a marriage proposal from a Swedish gentleman.⁴⁴ Her sisters had to venture no further than Clifton. Thomas Beddoes, a promising physician, moved to the area in 1793. Beddoes left Oxford on account of his democratic sympathies,⁴⁵ and settled in Bristol. Consumptive patients were attracted to Clifton’s spa resort Hotwells and Beddoes treated them with pneumatic medicine.⁴⁶ An admiration for the late Thomas Day led James Keir to introduce Beddoes to Edgeworth.⁴⁷ By July 1793 Beddoes proposed to Anna, which inspired Edgeworth’s great insight into Beddoes’ initial success and ultimate failure:

⁴² NLI MS 10166/7 77. R. L. Edgeworth to M. Edgeworth, 17 August 1791; Lovell continued to suffer, but they faithfully followed Dr Darwin’s directions: drinking the medicines he prescribed, and often taking the spa waters. The Edgeworths thought Clifton’s waters were popular because Bristol was large, crowded, and unclean. Many unhealthy people escaped to Clifton’s clean hills and quickly improved. *Ibid.*, 80. E. and R. L. Edgeworth to M. Ruxton, 9 October 1791. Despite scepticism they hoped for Lovell’s recovery.

⁴³ NLI MS 10166/7 81. R. L. Edgeworth to M Edgeworth, [October 1791].

⁴⁴ Abraham Niclas Clewberg-Edelcrantz (d. 1821) was employed by his king to travel and find useful technologies. He and Edgeworth shared scientific and mechanical interests. After Edelcrantz met the family a few times in Paris he proposed to Maria. Yet, she was unwilling to leave her family and friends in Ireland to live at Court in Stockholm. Butler, *Maria Edgeworth*, pp. 192-6, NLI MS 10166/7 318. M. Edgeworth to M. Ruxton, 1 and 3 December 1802, *Ibid.*, 321. M. Edgeworth to S. Ruxton, 8 December 1802.

⁴⁵ Levere, “Dr Thomas Beddoes,” pp. 210-5.

⁴⁶ Thomas Beddoes, *A Letter to Erasmus Darwin, M.D. On a New Method of Treating Pulmonary Consumption and Some other Diseases hitherto found Incurable* (Bristol: Bulgin & Rosser, 1793), p. 40.

⁴⁷ Edgeworth and Edgeworth, *Memoirs*, vol. 2: pp. 132-3.

Dr Beddoes the Object of Anna's Vows is a little fat Democrat of considerable abilities, of great name in the Scientific world as a Naturalist and Chemist – good humoured, good natured – a man of honor & Virtue, enthusiastic & sanguine & very fond of Anna... The doctor will settle at Clifton and if he will put off his political projects till he has accomplish'd his medical establishment he will succeed and make a fortune. But If he bloweth the trumpet of Sedition the Aristocracy will rather go to hell with Satan than with any democratic Devil.⁴⁸

Another Edgeworth daughter, Emmeline, married John King (1766-1846) in 1802. He was Swiss, trained in Britain as a surgeon, and became Beddoes' assistant. King worked at the Pneumatic Institution established by Beddoes in Bristol.⁴⁹ It relied on substantial backing from people tied to the Lunar Society, including major contributions from Lovell and Edgeworth.⁵⁰ Lovell was rare among his circle and overcame consumption, which saw him enjoy full participation in late-Enlightenment Grand Tours and education.

The Edgeworths were at residence in Clifton when the prodigal Richard returned from America seeking money. Before arriving he assured them that he would not stay in Ireland, not wanting to compete with his siblings for their Irish inheritance. Richard sent testimonies by references on his character, encouraged Edgeworth to make inquiries of his conduct since his move to North Carolina, expressed a desire to his father before one

⁴⁸ NLI MS 10166/7 105 R. L. Edgeworth to M. Ruxton (Blackcastle), 21 July 1793.

⁴⁹ King, born Johann Koenig, opposed the church career planned by his parents and went London to live by writing and engraving. He trained as a surgeon and met Beddoes in 1799, through John Abernethy (1764-1831) of St Bartholomew's Hospital. As a medical assistant King went to Jamaica with Tom Wedgwood. King then was hired by Beddoes to treat patients and assist with experiments, worked with Beddoes and Humphrey Davy, and joined their social circle. At the Institute and in his own practice King worked with the poor. This did not cure his financial woes, made worse as he shared Beddoes' radical views. Dorothy A Stansfield, *Thomas Beddoes, M.D., 1760-1808: Chemist, Physician, Democrat*, (Dordrecht: D. Reidel, 1984), p. 231; Muriel Maby, "John King: Surgeon of Clifton," *Thomas Lovell Beddoes Society Newsletter*, no. 14 (2010), pp. 40-2. King sought to marry Emmeline for years. Edgeworth did not approve, viewing King's prospects less favourably than those of Beddoes or Davy, of whom the family was fond. In 1802 Edgeworth relented, the couple wed, and received a small annuity. Emmeline travelled alone to Clifton for the wedding, as her family toured England and France. Butler, *Maria Edgeworth*, p. 142, 187-8. In 1803, Edgeworth refused the Kings' request for money, suggesting that Richard had taken too much from him and that they ask Beddoes. NLI MS 10166/7 340. R. L. Edgeworth to J. King, [1803].

⁵⁰ Many Lunar Men supported Beddoes with generous financial subscriptions to the Institution. They also solicited subscriptions from others and offered public, scientific and material support. Levere, "Dr Thomas Beddoes, pp. 209-26; Larry Stewart, "His Majesty's Subjects: From Laboratory to Human Experiment in Pneumatic Chemistry," *Notes and Records of the Royal Society* 63, no. 3 (2009), pp. 232-41.

of them died, and awaited consent to visit. In April 1792 Edgeworth besought Richard to come at once, but asked why no reference was made to the £50 sent to him, or the state of his family.⁵¹ The Clifton visit was relatively short. Richard was on his way to London, to return to America, by the middle of August 1792. Maria informed her aunt that they were impressed with Richard, especially her father, who gave him almost £1000 Irish. Richard pledged to be prosperous with their investment, more so than other settlers, and regaled the family with the many methods of making money in America, as a merchant or farmer. He also promised to provide lengthy written accounts of his progress, to return again in four years, to send his eldest son to Ireland for Edgeworth to educate. Despite Richard's past he evidently had no reservations about his father's pedagogical abilities.⁵² Hope for the wayward son's reform blinded the family. They remained optimistic about Richard's potential, but a return visit was the only promise he kept.

In 1795, Richard returned with fresh schemes and was warmly welcomed back to Edgeworthstown. The merchant and farming plans were abandoned. Richard proposed studying for the Bar, as had his father and grandfather.⁵³ By autumn he had gone back to America. Maria revealed the family's enduring hope and naïveté to her cousin:

We have not yet heard from Poor Richard. I suppose he is now on the wide Seas and I fear we have no chance of seeing him five or six years—The more I saw; or rather the more I heard him the more the more deeply I regretted that instead of being one of the brightest ornaments of the Irish Bar & one of the most agreeable

⁵¹ Edgeworth told Col. Piques, one of Richard's references, that he would give Richard "eight hundred pounds to purchase land and stock with in America and if successful I shall give him further assistance." He also offered to send up to twenty "stout young men" from Ireland with him to America. Richard's letters to his father and Maria, and Edgeworth's reply to Richard, were transcribed by Maria in a letter to her aunt in April 1792. NLI MS 10166/7 91. M. Edgeworth to M. Ruxton, 28 April 1792.

⁵² NLI MS 10166/7 94. M. Edgeworth to S. Ruxton, 14 August 1792. This sum included clothes and cash. The family hoped fashion would help Richard's wife renounce Methodism. They heard of many ways to make money in America: a store of European goods, land cleared for rice or corn, and peach orchards for brandy. Maria was more critical of these schemes than her father. Good land was hard to find and Richard admitted he was ill-suited as a merchant. *Ibid.* 99. M. Edgeworth to M. Ruxton, 13 December 1792.

⁵³ Butler, *Maria Edgeworth*, pp. 16-24.

members of civilized Society he should return to the wilds of America & to people who can judge much better of Indian corn than of him – My Father has just written a long & most convincing and persuasive letter to him to prevail upon him to apply to the study of the Law in Charlston [*sic*] & go to the American Bar. The principal Lawyers in Charlston [*sic*] makes £2,000 P^r. Annum – I fear that Richard will not submit to the drudgery of learning Law or the constraint necessary in the Practice – otherwise how rapidly must abilities such as his, with the degree of Eloquence he professes make their way!⁵⁴

Edgeworth and Maria's aspirations for Richard were finally dashed by his death in 1796. He left behind three sons and a wife.⁵⁵ Edgeworth lamented in bittersweet tones to an old friend, Mary Powys: "All that he received from me in two years about £2000 was spent & his way of life was become such as promised no happiness to himself or his family. It is therefore better for both, that he has retired from the scene – You remember him a very promising boy!"⁵⁶ Richard's habits drained family capital on both sides of the Atlantic. His death ended Edgeworth's first, and unsuccessful, educational experiment. However, Edgeworth continued to support Richard's family. This included sending funds and plans to continue pursuing his penchant for pedagogy by teaching Richard's eldest son.⁵⁷

⁵⁴ NLI MS 10166/7 140. M. and R. L. Edgeworth to S. Ruxton, [n.d. 1795].

⁵⁵ Richard contracted pleurisy in Ireland, which led to his death in North Carolina in August 1796. On Richard's two visits to England he persuaded family members and his rich aunts to allow him to invest in land in America for them. It was ultimately a complete failure. Barbé, *Francis Ysidro Edgeworth*, p. 6.

⁵⁶ NLI MS 10166/7 154. R. L. Edgeworth to Mary Powys, 20 February 1797.

⁵⁷ *Ibid.* This was Nathaniel Lovell Edgeworth (1789-1872). Richard made a provision in his will (1792) for John Hardwick to take Nathaniel to Edgeworth in Ireland. Mary Louise Medley, *History of Anson County, North Carolina, 1750-1976* (Baltimore: Genealogical Publishing, 2007), pp. 80-1. Hardwick went with Richard to Edgeworthstown in 1795, and earned Maria's ire for influencing Richard against the law. NLI MS 10166/7 133. M Edgeworth to S. Ruxton, [n.d. October 1795]. Richard's follies haunted them beyond the grave. Thomas Edgeworth, who went to America with Richard, refused to pay Edgeworth about £800 for education and debts. *Ibid.* 259. M. Edgeworth to S. Ruxton, 2 December 1800. There were also challenges beyond Edgeworth's death. Nathaniel mistakenly thought that Edgeworthstown was on property left to Richard's sons, and sent an agent to sell the Irish land. They wanted to sell all lands left to them, as they needed money. The sons inherited Richard's poor money management. They erroneously believed an offer from Edgeworth for £700 was the entire amount and that £200 sent by Maria as a gift was included. Lovell solicited a top Dublin counsel to insure the £700 barred "all future claims from their descendants." *Ibid.*, 1366. M. Edgeworth to Charles Sneyd Edgeworth, [August 1817]. Demands in America on the money led Edgeworth to try to conclude the matter in 1810. He sold their Cork estate and sent money to America, to avoid Richard's son traveling to Ireland, and harm to all involved. *Ibid.*, 762. R. L. and M. Edgeworth to C. S. Edgeworth, 16 June 1810. Matters remained unresolved until 1817, when an end was finally found to their willingness to give money and Richard's family insatiable appetite for consuming it.

5.4. Edgeworth's Educational Engineering within a Lunar Orbit

R. L. Edgeworth was one of the first additions to the Lunar circle, in 1766, which arose by chance through his interest in mechanics. He designed an improved coach, based on a friend's description of Erasmus Darwin's coach, and had it built. This led to an invitation from Darwin, who thought Edgeworth a coachmaker, and friendship upon learning that Edgeworth was a learned gentleman.⁵⁸ Impressed by Edgeworth's mechanical talent and inventions, calling him the "Greatest Conjurer" he ever saw, Darwin introduced him to Matthew Boulton and William Small.⁵⁹ Boulton, after meeting Edgeworth in Lichfield, invited him to Birmingham to tour its primary manufactories. Edgeworth later reflected: "There, and at Soho, I became in a few hours intimately acquainted with many parts of practical mechanicks, which I could not otherwise have learned in many months."⁶⁰ The path from practical mechanics to practical education was gradual, but vital for the Lunar Society. Mechanics was an early and uniting concern in the 1760s, as they established or expanded industries and careers. By the 1780s, education became more important. The Lunar men, having established and expanded families, looked to provide their children with practical educations, and several fathers sought to train sons to be *savant-fabricants*.

Richard Edgeworth's death, in 1796, marked the end of R. L. Edgeworth's failed inaugural effort in educational engineering. However, he had begun a new experimental programme much earlier, after detecting the initial flaws in the Rousseauist system. By 1777, Edgeworth profited from past mistakes and abandoned his early methods. This occurred as he drew closer to the pragmatic methods espoused by the Lunar Society.

Edgeworth worked with his second wife Honora and their children to develop a practical

⁵⁸ On Edgeworth's various inventions see Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 111-168.

⁵⁹ BCL MS LSC ED 12. E. Darwin (Litchfield) to M. Boulton (Birmingham), [1766].

⁶⁰ Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 168.

education. The program was expanded and later published in collaboration with his daughter Maria.⁶¹ Their ideas, like those of other Lunar men, were influenced by Joseph Priestley's theories on education. Auspiciously Priestley became tied to the Lunar Society in the 1777-80 period, as Edgeworth searched for a new educational philosophy.⁶²

What Edgeworth found through Priestley was similar to what Priestley found by joining the Lunar Society in Birmingham: unity and clarity. This peculiar collection of *savants* and *savant-fabricants* created a community that allowed its members to feel a sense of comfort, as well as a fertile ground to share ideas. It was something they desired and cherished, as they did not fully feel, at least up to this point, at ease in either London or Paris. This would change when they met families like the Delesserts in Paris. Mutual interests made Lunar Society members feel at home in the Delessert salons.

Edgeworth shared his challenges in educating his children, and his conversion to a more utilitarian and practical approach, with Priestley. In Edgeworth's reading of John Locke, J.-J. Rousseau, and Claude-Adrien Helvétius (1715-71) he found many brilliant observations and advice on how to manage children. Yet, it was from reading Priestley's *Hartley's Theory of the Human Mind* (1775), that Edgeworth turned to David Hartley's (1705-57) "original work with attention [*sic*] the science of education."⁶³ Consequently, Edgeworth realized that the other books were fraught with problems. He saw an approach based on the other methods as challengingly, and unlikely to be successful for even the most optimistic character. Before reading Priestley and Hartley's works Edgeworth had struggled to manage the conduct of his children. He was able to instruct them in some

⁶¹ Edgeworth and Edgeworth, *Practical Education*, pp. iii-x.

⁶² Butler, *Maria Edgeworth*, pp. 58-65.

⁶³ BLO EP MS Eng misc c895: Papers relating to *Practical Education* (1780, 1798), C: (ff 79-82) draft letter by R. L. Edgeworth to J. Priestley (c. 1780).

languages and history, but his approach lacked precision.⁶⁴ Thus, Edgeworth declared that all finally became clear with Priestley's introduction of Hartley:

The Doctrine of Associations, struck me the moment I had learned it as the true foundation of universal education, and every thing that had formerly appeared to me unaccountable & anomalous wound itself at once into this comprehensive Theory – I now endeavour to associate pleasurable sensations with whatever I wished my Children to pursue and pain with what I wished them to avoid and by attending to the disposition of external and what are commonly considered as accidental circumstances, about them.⁶⁵

In Edgeworth's research he would have found much discussion of learning through empirical senses.⁶⁶ However, he did not attain certainty until he read Priestley.

Edgeworth had finally found a working theory, but was hindered by a dearth of proper learning material. One of his greatest challenges was finding books suitable for children to read. He had once examined about forty books for children, but could not find three pages suitable for a child's aptitude. It was a fundamental problem, but he also saw a benefit. The lack children's books delayed their comprehension saving them from learning, in the few books available, the basics of every form of depravity.⁶⁷ Referring to his former pedagogical guide, Edgeworth told Priestley:

Rousseau was so fully sensible of what might be lost and how little could be gained by the common methods of instruction that he thought it better not to teach a child to read until he was twelve or fourteen years of age. This is an experiment few parents should submit to; and he certainly acknowledged in a conversation which I had with him upon this subject that he had carried his caution to an extreme.⁶⁸

Edgeworth avoided telling Priestley about the scheme with Richard. Showing further aversion to Rousseau, Edgeworth noted that both the mind and body needed exercise to

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*

⁶⁶ Various empiricist theories appeared in works by authors read by Edgeworth. There were also utilitarian themes in Helvétius' books. See Riskin, *Science in the Age of Sensibility*, pp. 1-52.

⁶⁷ BLO EP MS Eng misc c895: draft letter by R. L. Edgeworth to J. Priestley (c. 1780).

⁶⁸ *Ibid.*

prevent weakness and disease. Furthermore, if parents did not have printed materials all of their time would be consumed trying to teach a single child.⁶⁹ This was something Edgeworth, Thomas Day, and other parents who attempted Rousseau's system, including the French revolutionary Mme Marie-Jeanne Roland (1754-93), painfully discovered.⁷⁰

The Edgeworths acknowledged their debt and esteem to Priestley by sending him the first version of *Practical Education*. Honora and Edgeworth had composed it based on their experimental pedagogical work with their children. Edgeworth explained that Honora had primarily written it for her own childrearing. Her main purpose was to have them pay attention to objects not normally noticed and to associate with them concepts of “analogy, causation and utility.”⁷¹ Edgeworth explained, requesting Priestley's feedback:

She proposes to pursue this plan and hopes with the assistance of her friends to *introduce different parts of her work the first principles of many sciences or rather the facts upon which those principles are founded*. She wishes to inscribe this volume to D^r. Priestly [*sic*], as she learned from his writing the Doctrine upon which it is founded; she request his stricture upon what has already been attempted before it be published; and his idea of what may be done in the subsequent volumes, and begs me to assure him that she joins in the highest respect for his Character & writings.⁷²

Finally Edgeworth provided evidence of the effectiveness of their methods with a story of their daughter Honora, using practical reasoning, to solve complex geometry problems.⁷³

⁶⁹ *Ibid.*, Edgeworth appears to have begun, in the draft letter, sharing his experiences raising Richard by Rousseau's scheme. However, he ultimately scratched it out. *Ibid.*

⁷⁰ Mme Roland's experiment in Rousseauist childrearing failed. Her daughter, Eudora Roland (1781-1858), developed limited intellectual ability and severe discipline problems. The great burden of time required became untenable, as the political and literary work of Mme Roland and her husband, Jean-Marie Roland (1734-93), took precedence during the French Revolution. Mme Roland capitulated and placed Eudora in a convent, but did not accept blame for her abortive experiment, citing the impracticality of Rousseau's methods and Eudora's inability. In Mme Roland's memoirs, written in prison awaiting execution, she maintained that Eudora was to blame for her failed education. See Douthwaite, *The Wild Girl*, pp. 141-4.

⁷¹ BLO EP MS Eng misc c895: draft letter by R. L. Edgeworth to J. Priestley (c. 1780).

⁷² My emphasis. *Ibid.*

⁷³ *Ibid.*; Another story of little Honora's mathematical prowess was recounted by Maria in her father's memoirs. Edgeworth and Edgeworth, *Memoirs*, vol. 2: pp. 123-5.

Priestley's influence on the Edgeworths was significant, but his response to their book was minimal. It came from Calne in February 1780,⁷⁴ five months before his move to Birmingham.⁷⁵ Priestley expressed pleasure for having acquainted them with new ideas on education, for their "little book," and for Honora's desire to dedicate it to him. Yet, he provided only a few technical critiques, and some interesting remarks. Hartley's doctrine of association, Priestley agreed, provided the best method to understand how minds work, especially concerning all things connected to education. Priestley conceded that applying the theory was not easy, or certain, without an understanding of what influenced children and enough time to devote to them. Though he noted that Edgeworth appeared to have both. Priestley concluded that children did not need large-print primers "and good books ought to be made as cheap as possible."⁷⁶ His democratic desires were ever-present. So too were epistolary collaborations. The Edgeworths primarily resided in Ireland, but their citizenship in the Republic of Letters insured their long attachment to the Lunar Society.

Edgeworth worked collaboratively for decades to educate his children, and work on *Practical Education* continued for decades. Fortunately, there exists an abundance of material on the family's pedagogical endeavours through the archival manuscripts in the papers of Maria Edgeworth, her collaborations with her father, and her independent works. Yet, their links to the British-Franco-Swiss network remain elusive.

⁷⁴ NLI MS 10166/7 20. 20 Feb 1780, J. Priestley to R. L. Edgeworth [typed copy] – Education criticism of *Practical Education* (1780).

⁷⁵ Schofield, *The Enlightened Joseph Priestley*, p. 147.

⁷⁶ The book suggested that a six-year-old girl could make her bed and get dressed on her own. These were tasks Priestley believed readers would not think children of that age able to do. NLI MS 10166/7 20. 20 Feb 1780. The Edgeworths must have been more familiar with small children. They believed discipline had to be enforced before the age of five. At three years children should get dressed and make their beds. Honora's methods worked on at least two of their children, likely Anna and Honora, who were not to eat breakfast until tasks were done. Butler, *Maria Edgeworth*, p. 50.

5.5. Conclusion

The Edgeworth's dedication to education was part of a wider Enlightenment movement, and tied to the shift to modernity. R. L. Edgeworth, not satisfied for his children to only have education in the classics, sought alternatives. The vogue of Rousseau's pedagogical theories was persuasive and pervasive enough to ensnare Edgeworth and Thomas Day. Their experiments created contemporary controversy, which has still not abated. During the Enlightenment, however, education was seen as an experimental science. Edgeworth and Day maintained enduring support for both their experiments and their 'test-subjects.' A false start with Rousseauism led Edgeworth to practical education, which sought to give children foundations for the first principles of the sciences.

Edgeworth's trip to France was fateful. It led to an encounter with Rousseau and a departure from his methods, Edgeworth's practical application of mechanics, and contact with the Delesserts. Edgeworth joined the Lunar circle through a collective passions for mechanics. Joseph Priestley's addition to this group provided a new focus, influencing Edgeworth's enduring work on practical education. Edgeworth's talents for mechanics led to his participation in the diversion of the Rhône River. This was the first example of Lunar ingenuity deployed on the Continent, but not the last. Edgeworth's sojourn in Lyon also witnessed the first contact between the Delesserts and the Lunar Society. This family was unique, as they successfully profited from Rousseau's methods, and practical education in Britain through the Lunar Society. In the 1780s, a shift from antiquarianism towards modernity accelerated. There was a considerable increase in both education and industrial exchange over the English Channel. The expansion of the British-Franco-Swiss network insured a far different reception for the Edgeworths' return to Paris in 1802.

6. '[S]he is a woman ... occupied entirely with the education of her children:' Mme Delessert and the Network's Dedication to Education

On the Continent, as in Britain, the commitment to education was frequently tied to dissenting faith, the creation of books for children, and innovation in industry. These principles came increasingly to be bridges across the English Channel. Families like the Delesserts faced even more challenges than did English Dissenters. Huguenots in France did not even possess the minimal toleration enjoyed in England. It was not until very late in the eighteenth century that Huguenots regained partial rights. In 1685, along with the loss of all other rights, Calvinist schools were closed in France.¹ As tolerance increased, in the eighteenth century, many Huguenots returned to France. Yet, they still had to place their children in Catholic schools, or educate them secretly. They also had the option of Swiss Calvinist colleges, just as sons of English Dissenters attended Scottish universities.

By the 1780s traffic began moving in a new direction, as cross-Channel exchange intensified. Swiss and Huguenots travelled to Britain to attend Scottish universities and to tour Midlands' factories. Lunar Men likewise sent sons to Paris, Geneva, and Germany for practical education. These trends often resulted from the Peace of Paris in 1763, and growing Genevan political unrest. Nevertheless, critical connections among the Lunar Society and Franco-Swiss formed in the 1760s and 1770s. It was also during this period that the Delesserts established their unique approach to education. Oddly historians, despite an enduring interest in J.-J. Rousseau, have neglected Mme Delessert and her daughter, Mme Gautier. Besides Rousseau's advice, and the *Letters on Botany*, this family employed skilled tutors and sent their sons abroad. Paradoxically, the Delesserts' comprehensive approach to education bound them to both Rousseau and Britain.

¹ The Revocation forbid Calvinist schools. Geoffrey Adams, *The Huguenots and French Opinion, 1685-1787: The Enlightenment Debate on Toleration* (Waterloo: Wilfred University Press, 1991), p. 8.

6.1. Early Connections with the Continent

The dedication to education shared by Joseph Priestley and the Edgeworth family was part of a general interest in science within the Lunar Society. Their commitment also reflected a more fundamental element. A number of Lunar men were, like Continental Huguenot counterparts, barred from official educational institutions on account of their nonconformist faiths. Families like the Delesserts could not have their children educated in their faith in France.² Things were marginally better in Britain. Eighteenth-century English Dissenters encompassed several Protestant faiths, including Congregationalist, Unitarian, Baptist, Quaker, and Presbyterian.³ Dissenting faith barred Unitarian scholars like Priestley from attending traditional English schools, be they grammar and public schools, or the universities of Oxford and Cambridge. Consequently, English Dissenters established independent academies. This development significantly impacted eighteenth-century educational thought in Britain,⁴ an influence apparent in the Lunar Society.

The high number of Dissenters within the Lunar Society, as with the Midlands generally, was significant. This included Joseph Priestley and the celebrated potter Josiah Wedgwood both Unitarians, Samuel Galton junior (1753-1832) a Quaker of the famous gunmaking family, and James Watt a Scots Presbyterian.⁵ Isaac Kramnick argues that Dissenters made up a very small percentage of the population, but “were at the heart of

² This is discussed by Antoine Lasègue (1792-1873), a curator of the Delessert *musée*, in a letter to A.-P. Candolle (28 August 1847) following Benjamin’s death. Stafleu, “Benjamin Delessert,” p. 925.

³ Kramnick, “Children’s Literature and Bourgeois Ideology,” p. 208.

⁴ Butler, *Maria Edgeworth*, p. 60. For a nuanced and compressive account see Nicholas A. Hans, *New Trends in Education in the Eighteenth Century* (London: Routledge, 1951), pp. 54-62.

⁵ Matthew Boulton, James Keir, and William Withering were moderate Anglicans, and Robert Augustus Johnson (1745-99) was a practicing Anglican minister. Conversely, Erasmus Darwin was a private non-believer, James Watt had lapsed as a Scots Presbyterian, and Joseph Priestley was a Unitarian, meaning he rejected that Jesus Christ was divine. Jones, *Industrial Enlightenment*, p. 183.

the industrial and bourgeois revolution that was transforming England.”⁶ Dissenters necessarily demonstrated a dedication to children’s education, a preoccupation derived from exclusion and an endeavour to maintain distinctiveness.⁷ Subsequently, as Kramnick concludes, Dissenters came to dominate education:

Thus it was that in eighteenth-century England the best schools were the dissenting academies. Joseph Priestley was here once again the central figure. He was perhaps the greatest of the teachers in the dissenting academies from the 1760s to the 1780s, and he educated a whole generation of the sons of the middle class, complete with such new studies as bookkeeping and mechanics.⁸

These fields and Priestley’s influence were vital in organizing industrial establishments.

The first acquaintance between the Delesserts and the Lunar Society was formed during R. L. Edgeworth’s time in Lyon (1771-3). Details of the early contact are limited. Edgeworth did not mention it in his memoir, but he discussed the connection in his correspondence. This was in anticipation of the 1802 Grand Tour by the Edgeworths, who wished to spend over year in Paris, Lyon, and Geneva. They were among the waves of visitors to the Continent, after the Peace of Amiens.⁹ Edgeworth requested advice and introductions from Genevan professor M.-A. Pictet, who had visited Edgeworthstown in 1801. He indicated that *Practical Education* insured their reputation in Paris. Translations from their book, and Pictet’s account of his British tour, appeared in the *Bibliothèque britannique*.¹⁰ Yet, Pictet did recommend them to the Delessert family.¹¹ The Edgeworths

⁶ Dissenters represented just seven per cent of England’s population. Anglicans, the dominant majority, formed more than ninety per cent. Kramnick, “Children’s Literature and Bourgeois Ideology,” p. 208.

⁷ *Ibid.*, pp. 208-9.

⁸ *Ibid.*, p. 209.

⁹ R. L. Edgeworth (Edgeworthstown) to M.-A. Pictet (Geneva), 22 December [1801], in Hans Walter Häusermann, *The Genevese Background: Studies of Shelley, Francis Danby, Maria Edgeworth, Ruskin, Meredith, and Joseph Conrad in Geneva, with Hitherto Unpublished Letters* (London: Routledge & Paul, 1952), pp. 60-1.

¹⁰ [M.-A. Pictet to R. L. Edgeworth from Copie-Letters], 15 February 1802, in *Ibid.*, pp. 61-2. *Practical Education*, translated into French by Pictet’s brother Charles Pictet-de Rochemont (1755-1824), appeared in twelve cereal volumes of the brothers’ journal, *Bibliothèque britannique*, in 1798-99. *Ibid.*, p. 31.

were thus introduced to Parisian scientific and cultural society. Pictet's recommendation, though, was actually a reintroduction. Pictet informed Edgeworth that Etienne Delessert was "one of the first bankers in Paris," and was currently concerned with commercial and agricultural pursuits.¹² Edgeworth replied: "You mention a Mon^r De Lessert at Paris – in 1772 I was acquainted with a banker of that name at Lyons – As Mon^r De Léssert is an agriculturist perhaps I might venture to send him my statistical survey of this district."¹³ The link between the Lunar Society and the Delesserts was enduring and diverse.

6.2. The Delessert Family's Manifold Methods and Parade of Preceptors

The Delesserts employed manifold educational methods to offset their exclusion from French schools. These included lessons from a *philosophe*, personal instruction, private tutors, and foreign colleges. As shown above, Mme Delessert sought Rousseau's help early on. She asked him to write letters *Letters on Botany* for her to tutor her daughter. It remains the only well-known example of Mme Delessert's dedication to her children's education. Besides personal interest in knowledge and learning her involvement resulted from Etienne's frequent absences for business affairs. Mme Delessert taught her children to read, and instructed them on morality and knowledge of plants. She sought Rousseau's council to give her children the best education, notably in selecting a proper tutor.¹⁴

Pierre Prévost, the preceptor chosen by Mme Delessert, proved to be a perceptive choice. Regrettably he has been somewhat forgotten, but was illustrious in scientific and

¹¹ *Ibid.*, p. 62.

¹² *Ibid.* Between Pictet's letter and Edgeworth's reply six variations of the Delessert name were used (*Gautier de l'Essert*, *Benjamin Del'Essert*, *Benjamin de l'Essert*, *M^r Delessert*, *Mon^r De Lessert*, and *Mon^r De Léssert*). This is but another factor in the neglect of this fascinating family. *Ibid.*, pp. 62-4.

¹³ [R. L. Edgeworth to M.-A. Pictet], Edgeworthstown 19 March 1802, *Ibid.*, p. 64. Edgeworth's links in France included elites in Lyon and André Morellet in Paris. Through Morellet, Edgeworth contacted d'Alembert to have him confirm the mathematics in Edgeworth's designs of flourmills for Lyon. Butler, *Maria Edgeworth*, p. 60, n. 1; Edgeworth and Edgeworth, *Memoirs*, vol. 2: pp. 273-4.

¹⁴ Coninck, *Banquiers et philanthropes*, p. 56. LII. J.-J. Rousseau (Paris) à M.-C. Delessert (Lyon), 23 août 1774. Rousseau and Delessert, *Lettres inédites*, pp. 168-9.

literary circles of the late Enlightenment. This came from his multifaceted interests that included languages, political economy, philosophy, literature, law, and physics as well as his long tenure as professor at the *Académie de Genève*. However, Prévost's career had a humble start.¹⁵ In 1773 he left Geneva to work as a tutor, after receiving a doctorate of law. Prévost's first post in Holland lasted less than a year, as he abandoned it to travel for several months in England. Upon returning to the Continent Prévost took up a much more enduring position.¹⁶ His time as tutor for the Delesserts had a profound effect. In 1774 he began instructing the children in Lyon, in 1777 he relocated with the family to Paris, and he continued as tutor until 1780. During this tenure Prévost kept notes on his methods and pedagogy, and consulted works by Enlightenment educational theorists.¹⁷ Ultimately, Etienne and Madeleine Delessert were very pleased with Prévost's performance.¹⁸

Pierre Prévost's role as tutor in Paris led to his career and an acquaintance with J.-J. Rousseau. In 1777 Prévost, as a messenger for Mme Delessert, had an introduction to Rousseau and a friendship developed. This connection during Rousseau's final residence in Paris, and Prévost's recording of it, has come to be savoured by Rousseau scholars. It was especially valued as Rousseau's paranoia alienated many acquaintances, and it was one of the final accounts of him.¹⁹ In March 1780 Prévost accepted a position in Berlin,

¹⁵ Porret and Berchtold, *Rousseau visité*, p. 155.

¹⁶ *Ibid.*, pp. 155-6; Augustin Pyramus de Candolle, "Notice sur M. Pierre Prevost, professeur émérite à l'Académie de Genève," *Bibliothèque universelle de Genève* 20 (1839), pp. 296-7.

¹⁷ This included J.-J. Rousseau, John Locke, Francis Bacon, and C.-A. Helvétius. BGE MS suppl. 1061/2 f. 67-13. Pierre Prévost, *Pédagogie et éducation Notes*, 1775-8.

¹⁸ BGE Ms. fr. 4736 PPC. f. 106. E. Delessert et M.-C. Delessert à P. Prévost (Genève), [n.d.]; *Ibid.*, 2463 PDL, f. 177-9. M.-C. Delessert (Lyon) à J.-A. Deluc (Lausanne), [27] janvier 1776.

¹⁹ Candolle, "Notice sur M. Pierre Prevost," p. 297. Porret and Berchtold, *Rousseau visité*, p. 155. Prévost recorded reflections on his time with Rousseau, and later sent a copy to the newly established *Journal de Genève*, published 28 February 1789. In 1804, Prévost sent a revised version to the *Archives littéraires de l'Europe*. Prévost, "Lettre du Professeur Prévost," pp. 201-6.

but provided the Delesserts time to replace him.²⁰ In Berlin, Prévost continued to excel. Frederick II of Prussia gave him the professorship in philosophy, at the academy for young nobles, and membership in the *Académie des sciences de Berlin*. Prévost, while tutoring the Delesserts, began his translation of *Euripides* (published in 1778 and 1782). In Berlin, Prévost expanded his work in chemistry, mathematics, physics, and political economy. Prévost returned to Geneva in 1784, and was named professor of *belles-lettres* at the *Académie de Genève*. He took the chair of philosophy in 1793, and professorship of general physics in 1810. These comprehensive interests, and reading of Smith's *On the Wealth of Nations*, led to Prévost translating the works of Dugald Stewart (1753-1828), Benjamin Bell (1749-1806) and Thomas Malthus.²¹ Prévost dedicated his translation of *Essay on Population* to Benjamin Delessert in honour of their long friendship and his philanthropy.²² Both Delessert and Prévost were important participants in the spread British ideas and reforms on the Continent, a mainstay throughout the Enlightenment

The Delesserts also sent their sons to Geneva for part of their education, where they attended the *collège académique*. Stephen and Benjamin were sent prior to 1784, and their study tour in Britain. Their younger brothers Alexandre, François, and Gabriel attended the college from 1792 to 1794.²³ There Alexandre and François befriended A.-P. Candolle. He later became a celebrated biologist, close friend of Benjamin, and proudly declared in his memoirs to have known five generations of the Delessert family.²⁴ At the college the boys followed an education that was partially classical, consisting of rhetoric,

²⁰ BGE MS 2463 PDL, f. 157-8. E. Delessert (Paris) à J.-A. Deluc (La Haye), 24 mars 1780.

²¹ Candolle, "Notice sur M. Pierre Prévost," pp. 297-304. Prévost also translated Adam Smith's *Essays on Philosophical Subjects* and Hugh Blair's (1718-1800) *Lectures on Rhetoric*. *Ibid.*, p. 304, n. 1.

²² Thomas Robert Malthus and Pierre Prévost, *Essai sur le principe de population: ou Exposé des effets passés et présents de l'action de cette Cause sur le bonheur du genre humain : suivi de quelques recherches relatives à l'essérance de guérir ou d'adoucir les maux qu'elle entraîne* (Paris: Paschoud, 1809), pp. v-viii.

²³ Coninck, *Banquiers et philanthropes*, p. 58.

²⁴ Candolle, *Mémoires*, pp. 111-4.

and particularly theological. The colleges' classical curriculum barely instructed skills for practical life, and certainly not ones for business and trades. Consequently, the Delesserts sent their two eldest sons across the English Channel to study.²⁵

A precaution taken by the Delesserts was the continual employment of tutors. In 1774, they hired Prévost after the complications with Rousseau in long-distance botanical instruction. With Prévost's departure the Delesserts sought aid from J.-A. Deluc's to find a new tutor.²⁶ By October they found Abraham Guyot. Etienne happily informed Deluc that Guyot was well versed in physics, had been reading Deluc's latest book, and was in Berlin engaged in study.²⁷ Guyot was Swiss, from Boudevilliers in Neuchâtel,²⁸ and had graduated from the *Académie de Genève* in theology in 1764.²⁹ He trained as a Protestant minister, but does not seem to have practiced. During Guyot's time in Geneva he tutored M.-A. Pictet for several months.³⁰ Subsequently, Guyot moved throughout Europe. He lived in Bordeaux for six years, becoming a corresponding member of its *Académie*. In 1780, Guyot spent several months in Berlin. He attended meetings of its *Académie* and observed scientific discoveries, which he shared in Paris.³¹ It appears that Guyot was also

²⁵ Coninck, *Banquiers et philanthropes*, p. 58.

²⁶ BGE MS 2463 PDL, f. 159-60. E. Delessert (Paris) à J.-A. Deluc (Londres), 19 avril 1780.

²⁷ BGE MS 2463 PDL, f. 157. E. Delessert (Lyon) à J.-A. Deluc (Londres), 18 octobre 1780. The text was probably Deluc's *Lettres physiques et morales sur l'histoire de la terre et de l'homme* (1779).

²⁸ EUL SPD MS GB237/352 30782 Louis Abram David Perret de Vallagin, "Abram Guyot de Boudevilliers Bourgeois de Vallagin," 5 février 1793.

²⁹ Sven Selling-Michaud et Suzanne Selling-Michaud, eds., *Le livre du recteur de l'Académie de Genève (1559-1878)*, (Genève: E. Droz, 1972), v. 3: p. 576.

³⁰ BCL MS 3219/4/10/3 A. Guyot (Édimbourg) à J. Watt (Birmingham), 7 novembre 1784.

³¹ BGE MS 2463 PDL, f. 212-4. M.-C. Delessert (Passy) à J.-A. Deluc, 3 octobre [1780]; François Rozier, Henri-Marie Ducrotay Blainville, and Jean-Claude de La Méthrie, eds., "Lettre de M. le Baron de Servières aux auteurs du Journal de Physiques, Sur un nouveau moyen de déphlogistiquer l'air d'un Appartement, imagine par M. Achard, de l'Académie de Berlin," *Journal de physique, de chimie, d'histoire naturelle et des arts* VIII, no. II (1781), pp. 499-500; Louis Cotte, *Mémoires Sur La Météorologie: Pour Servir de Suite & de Supplément au Traité de Météorologie, publié en 1774* (Paris: Imprimerie Royale, 1788), vol. 2: pp. 268-72.

a member of Berlin's *Académie des science* and the *Société de Harlem*.³² He conducted meteorological research in Bordeaux (1775-77), in the Swiss Alps in 1778, and in Paris and its environs in the 1780s.³³ On Guyot's peripatetic travels he formed friendships with numerous *savants*. This increased in the 1780s, when Guyot met leading British natural philosophers, as tutor for Stephen and Benjamin Delessert's Grand Tour in Britain.

Guyot's dedication to his position extended beyond the Delesserts and his time as a travelling tutor. When Guyot returned to Paris, he continued to tutor and live with his pupils. Guyot still held this post during Matthew Boulton and James Watt's 1786 visit to Paris, and helped both Watt and Boulton arrange their sons' education in Geneva and Paris respectively. In the early years of the French Revolution Guyot still lived with the Delesserts. Guyot approved of the storming of the Bastille in 1789, but by 1791 he feared that riots by Parisian mobs, and a failure by the *Assemblée nationale* to assume authority and stop them, had retarded the Revolution.³⁴ In 1792 moderate views became dangerous. Guyot left France after the September Massacres, yet he had trouble obtaining a passport, despite being Swiss.³⁵ In 1793 Guyot returned to Britain, seeking help from his friends in the Delessert network to find work as a tutor. Education remained a vital bond within this network, and the Delesserts continued to employ tutors into the nineteenth century.³⁶

³² EUL SPD MS GB237/352 L. de Vallagin, "Abram Guyot," 5 février 1793. YUL MS 179 JADP Box 2 1778-83. A. Guyot (Londres) à J.-A. Deluc, 25 août 1783.

³³ Cotte, *Mémoires Sur La Météorologie*, p. 268. EUL-L MS La. III 352/1 A. Guyot (Edinburgh) to T. Beddoes, 19 January 1786. BRC OSB MSS 51 Box 1 CBP, A. Guyot, "Mineralogy between Paris & Fontainebleau," 21 July [n.d.].

³⁴ Guyot's friend Sir James Hall (1761-1832) recorded Guyot's views in a 13 May 1791 journal entry of his tour on the Continent. See F. C. Green, "Sir James Hall's Impressions of France in 1791" *French Studies* vol. 18 (1964), p. 238; BCL MS 3147/3/391 73. A. Guyot (Paris) à J. Watt, (Heathfield) 21 février 1791.

³⁵ BCL MS 3219/6/23 A. Guyot (Neufchâtel) to J. Watt snr (Birmingham), 27 September 1792; BCL MS 3219/4/124 J. Watt snr (Heathfield) to Anne Watt, 14 October 1792; XCVII. S. Romilly (Lincoln's Inn) to Etienne Dumont, 2 October 1793. Romilly, *Memoirs*, pp. 26-7.

³⁶ This included M.-A. Pictet's relation who tutored Mme Gautier's children and Frederick Karl Ludwig Sickler (1773-1837), later a renowned archaeologist, who tutored for the Delesserts. M.-A. Pictet to R. L.

6.3. The Delesserts' Unique Approach to Education

The Delesserts' commitment to education has earned less attention than their botanizing, and much less notice than contemporaries who struggled with J.-J. Rousseau's system. By the 1780s, the Delesserts had taken on a greater British influence. Over at least four decades British, French, and Swiss visitors to Paris provided accounts of the Delessert family's enduring and unique approach to education.

Scottish philosopher Dugald Stewart, professor at the University of Edinburgh, provided excellent contemporary testimony of Mme Delessert's aptitude.³⁷ Stewart taught Stephen, Benjamin, and Guyot in 1784-6 in Scotland.³⁸ After meeting Mme Delessert France in 1789 Stewart told his friend Archibald Alison:

The pleasantest woman, by far, whom I have seen here, and the most respectable, is Madame de Lessert, the mother of two young gentlemen of that name who studied some years ago at Edinburgh. She, too, was a very intimate friend of Rousseau's, and it was for her daughter that he wrote his introduction to botany; but she is a woman perfectly free from every sort of pretension, and occupied entirely with the education of her children.³⁹

Stewart's account was very similar to ones given by Maria Edgeworth, the Swiss botanist Jean-Pierre-Etienne Vaucher (1763-1841), and French children's author Arnaud Berquin (1747-91).⁴⁰ Besides Berquin's highly acclaimed *Ami des enfants* (1782-3) he translated Thomas Day's *The History of Sandford and Merton* into French (1786-7).⁴¹ Berquin was

Edgeworth, February 15, 1802 in Häusermann, *The Genevese Background*, p. 62; Cave Edward and John Nichols, eds. "Obituary – Dr. F. K. L. Sickler," *The Gentleman's Magazine* 161 (1837), p. 326.

³⁷ Stewart was a qualified judge. He was chair of mathematics and then moral philosophy, and also tutored pupils, lodged them at his house, and made several tours on the Continent as a tutor. Gordon Macintyre, *Dugald Stewart: The Pride and Ornament of Scotland* (Portland: Sussex Academic Press, 2003), pp. 24-66.

³⁸ *Ibid.*, p. 70; BCL MS 3219/6/2 D S. Delessert to J. Watt jnr, 11 June 1785.

³⁹ Dugald Stewart to A. Alison, 17 September 1789. Dugald Stewart and John Veitch, *The Collected Works of Dugald Stewart*, ed. William Hamilton (Edinburgh: T. Constable, 1858), p. cxxx.

⁴⁰ *Ibid.*, p. cxxxi.; NLI MS 10166/7 318. M. Edgeworth (Paris) to Margaret Ruxton (Blackcastle), 1 December 1802; Jean-Pierre-Etienne Vaucher, *Journal de mon séjour à Paris, 1782*, eds. Patrick Bungener and Nathalie Vuillemin (Genève: Slatkine, 2012), pp. 95-6.

⁴¹ Day's *Sandford and Merton*, published in three parts, appeared in 1783, 1786, and 1789. J.- M. Carrière, "A French Adaptation of Sandford and Merton," *Modern Language Notes* 50, no. 4 (1935), pp. 238-9.

a close friend of the Delesserts and was, like Rousseau and Benjamin Franklin, a regular in their salons.⁴² Franklin served as an American diplomat in England and France for many years. During this time Franklin influenced the formation of the Lunar circle, on his tours of the Midlands, and befriended the Delesserts who were his neighbours in Passy.⁴³

A mutual dedication to education transcended national and linguistic boundaries. It allowed Lunar families to easily engage with the Delessert circle. Boulton and Watt's focus on education, A. E. Musson and Eric Robinson assert, was tied to Lunar pedagogy:

But the fathers built not only machines but also men. They took the greatest care to make their sons fit to succeed them and their views on education reflect a great deal of light on the ideas held by the midland philosophers as a group. R. L. Edgeworth and his daughter Maria, Erasmus Darwin, Thomas Day, Samuel Galton junior, and Joseph Priestley, all wrote books on education and were all close friends of Matthew Boulton and James Watt.⁴⁴

The men built by Boulton and Watt, like the machines, were not marooned in Britain. Like sons of other Lunar men they went abroad to finish their education. It was Mme Delessert's circle that united Birmingham and bourgeois education on the Continent.

6.4. The Delesserts' Unique Approach to Rousseau

Rousseau and education formed vital bond between the Delesserts and British friends. This included British legal reformer and Huguenot descendent Samuel Romilly, British botanist and Unitarian James-Edward Smith, and the Edgeworths. Mme Gautier reported to Romilly when her daughter was a year old, and had begun to walk and speak with a lisp: "in a little time we shall see her forming ideas. We shall endeavour to act with sense,

⁴² Duprat explains that they were regular visitors to *l'hôtel Delessert* in Passy. Catherine Duprat, *Usage et pratiques de la philanthropie: pauvreté, action sociale et lien social, à Paris, au cours du premier XIXe siècle* (Paris: Association pour l'étude de l'histoire de la sécurité sociale, 1997), vol. 2: pp. 1072-3.

⁴³ Schofield, "The Lunar Society," pp. 146-9. 147. M.-C. Delessert (Passy) à Jacques-Etienne et Benjamin Delessert (Édinbourg) 23 octobre [1785]. Ferri, *Lettres et manuscrits*, p. 32.

⁴⁴ Albert Edward Musson and Eric Robinson, *Science and Technology in the Industrial Revolution* (Toronto: University of Toronto Press, 1969), p. 200.

to follow the advice of our *Emile*, and not spoil this tender plant entrusted to our care.”⁴⁵

Mme Gautier’s reference to sense and botany, and reverence for Rousseau, reveal his enduring influence, as she continued to follow the guiding principles of *Émile*.

The Delesserts’ British friends also revealed how Rousseau felt comfortable and content in Mme Delessert’s society.⁴⁶ This was no doubt because her family’s familiarity with him provided an understanding few others had, or knew how to navigate. Evidence of Mme Delessert’s opinion of Rousseau’s mental state comes from Smith, who notes:

I have ventured to ask her opinion upon some unaccountable actions in his life, and especially about those misanthropic horrors and suspicions which embittered his last days. She seemed to think the last not entirely groundless; but still for the most part to be attributed to a [*sic*] something not quite right in his mind, for which he was to be pitied, not censured.⁴⁷

A visit to the Delesserts’ salon or *hôtel* was not complete until the guests were able to view Enlightenment relics, such as their letters or herbarium from Rousseau. In 1787, Smith examined the herbarium and botanical letters from Rousseau.⁴⁸ Romilly too was shown what he called the “charming Letters on Botany.” Mme Delessert also let him make copies of other letters from her correspondence with Rousseau.⁴⁹ Such hospitality

⁴⁵ M-M. Gautier to S. Romilly, 1791. Romilly, *Memoirs*, vol. 1: pp. 452-3.

⁴⁶ The Delesserts’ intimacy with Rousseau was recorded by British friends. Samuel Romilly noted in his memoirs: “[Mme Delessert was from Switzerland; was, as long as Rousseau saw any body, one of his best friends.” *Ibid.*, pp. 65-6. In 1802 Maria Edgeworth wrote to her aunt: “To recommend Mme Delessert more powerfully still to you I must tell you that she was the friend or rather benefactress of Rousseau—it is said that Rousseau was never perfectly good & happy except in her society. It was to her bounty that he owed his retreat in Switzerland.” NLI MS 10166/7 318. M. Edgeworth to Mrs Ruxton, 1 December 1802.

⁴⁷ Smith, *A Sketch of a Tour*, p. 111.

⁴⁸ Smith pursued natural history on his tour and busied himself in the *Cabinet du Roi* in Paris. His friend Dr William Younge recommended him to the Delesserts. Smith saw only the female members on his first visit, with the men in Lyon on business, but they soon returned and he dined with the family. Smith affirmed to Younge, that he had “never spend a more agreeable day.” J. E. Smith (Paris) to Dr Young, 13 October 1787. Smith, *Memoir and Correspondence*, p. 280. Smith used the word relic in discussing Rousseau and the Delesserts. He cited an example of Rousseau’s love for plants from a letter to Linnaeus printed in the *Journal de Paris*, “the original of which,” Smith preserved “as an inestimable relic.” *Ibid.*, p. 294.

⁴⁹ Romilly, *Memoirs*, vol. 1: pp. 65-6.

ensured that the Delesserts' British visitors, like Rousseau, felt welcome. This sentiment was a refrain repeated by guests who expressed feeling at home in the *hôtel Delessert*.⁵⁰

Mme Delessert and her daughter have unfortunately been overlooked compared to their contemporaries. This is despite sharing striking similarities with their acquaintances, including Mme Suzanne Necker (1739-94), her daughter Mme Anne-Louis Germaine de Staël (1766-1817), and Mme Marie-Jeanne Roland.⁵¹ Like these far more famous women, Mme Delessert and Mme Gautier hosted literary salons, venerated Rousseau's works, and employed them in their dedication to education. They also devoted themselves entirely to their children's education in a manner that their contemporaries, such as Mme Roland and Mme de Staël, could or would not. The Delesserts' close friendship with Rousseau provided direct insight into his character and mental state. This allowed them to pursue a middle course. Therefore, they practiced a more consistent and persistent Rousseauist model than the Neckers. Yet, they adopted the useful methods of Rousseau's pedagogical instruction without being blind followers. In doing this, the Delesserts avoided many of the pitfalls that plagued his disciples, especially during the French Revolution.

The Delesserts suffered in the French Revolution, but not as much as other people inspired by Rousseau. J.-P. Brissot, Etienne Clavière, and the Rolands, who were caught up trying to realize Rousseauist political experiments, all suffered violent deaths in

⁵⁰ This sentiment was expressed by Dr Younge. He informed Smith, prior to Smith's arrival in France: "What I regret, after you, is that I must bid a last adieu to my very good friends, the amiable family of Mr. De Lessert at Passy. With them I am as happy as if at home. You *must* know them. I have often spoke to them concerning you." Author's emphasis. Younge noted that his name or Smith's would, serve as an introduction to Delessert or Guyot, and he could find anyone to show him "their house at Passy: and on Wednesdays they dine at their town-house, No. 58 Rue Coqéron à Paris." Dr. Younge (Paris) to J. E. Smith (Geneva), 5 August 1787. *Ibid.*, pp. 265-6. A day after the Edgeworths arrived in Paris Benjamin invited them to a soirée at their house. Maria wrote of the evening: "We went – found an excellent house – a charming family – with whom we felt as if we were perfectly acquainted after we had been in the room with them 5 minutes." NLI MS 10166/7 313. Maria Edgeworth (Paris) to Mary Sneyd, 31 October 1802.

⁵¹ See Mary Seidman Trouille, *Sexual Politics in the Enlightenment Women Writers Read Rousseau* (Albany: State University of New York Press, 1997), pp. 163-236; Douthwaite, *The Wild Girl*, pp. 141-4.

1793.⁵² Conversely, moderate members of the Delessert network were dismayed by the Revolution's violent turn, and by what was done in Rousseau's name. Romilly declared:

It makes one's heart bleed to think what Rousseau must have suffered in the latter part of his life; and yet those sufferings were mild compared with what he must have experienced if he could have foreseen the events which have since happened, the horrors which have been committed by his pretended disciples and the calamities which have befallen the countries which of all others were dearest to him.⁵³

The Delesserts were scattered after becoming targeted during the Revolution because of their wealth and moderate position. They relied on British and Swiss friends for support. A mutual affinity for education, science, economics, and industry in the early 1780s had evolved into a full-fledged British-Franco-Swiss network.

6.5. Conclusion

Late-Enlightenment culture was interconnected and multifaceted. If education was only a matter of religious consideration and learning, then the Delesserts might only have sent their sons to college in Geneva. Likewise, James Watt and Matthew Boulton could have sent their sons to university in Scotland. Instead, they engaged in a confluence of natural philosophy, Protestant mores, and industrial culture. By 1780, these common interests led to an unofficial exchange program. Matthew Robinson Boulton (1770-1842) and James Watt junior were sent to the Continent, as were sons of other Lunar men: William Withering junior (1776-1835), Joseph Priestley junior, Tom Wedgwood (1771-1805), and Charles Darwin (1758-78).⁵⁴ Education provided a foundation for science and industry.

⁵² Richard Ballard, *A New Dictionary of the French Revolution* (New York: I.B.Tauris, 2011), pp. 50-1, 80-81, 310-12. Revolutionary leaders tried, inspired by texts like the *Social Contract*, to compel a general will through ceremony and rituals. See Lynn Hunt, *The Family Romance of the French Revolution* (Berkeley: University of California Press, 1992), p. 194.

⁵³ CXIV S. Romilly to M.-M. Gautier, 21 August 1798. Romilly, *Memoirs*, vol. 2: p. 67.

⁵⁴ Eric Robinson, "An English Jacobin: James Watt, Junior, 1769-1848," *Cambridge Historical Journal* 11, no. 3 (1955), p. 350; a) M.-A. Pictet à T. Wedgwood, 15 mai 1789. Marc-Auguste Pictet, *Correspondance: Sciences et techniques* ed. René Sigrist and David M. Bickerton (Genève: Slatkine, 2000), vol. 3: pp. 617-9.

Liberal and dissenting families in France and Britain followed similar courses. A primary motivation for James Watt to send his eldest son abroad for college, besides to improve his education, was fear over his behaviour.⁵⁵ Such fears were not the motivating factors for Etienne and Madeleine Delessert. Yet, their other reasons were similar to those of Watt and other Briton. Ultimately, the family utilized a unique and manifold approach to education. This dedication united them with British *savants* and Dissenters, and in particular with members of the Lunar Society. Stephen and Benjamin Delessert were sent to Britain, as were Alexandre (1767-1841) and François de Liancourt (1765-1848), two sons of the reformer François Alexandre Frédéric duc de La Rochefoucauld-Liancourt (1747-1827). Their English sojourn greatly mirrored that of the Delesserts, save that it was more agrarian than industrial. The Liancourt brothers stayed in Suffolk, as their family was connected to the great agricultural reformer Arthur Young (1741-1820). They toured the Midlands, calling on Joseph Priestley at Birmingham, but they did not tour Soho as Boulton was in London.⁵⁶ Similar factors motivated British and French moderates to send their sons abroad. This extended beyond being blocked from educational institutions. An incentive, beyond religious restrictions, was to study methods and languages to benefit their fathers' own business interests, and industrial pursuits.

In 1766 Erasmus Darwin sent his son Charles to France to cure his stammer. Philip J. B. Jackson, "Mama and Papa: The Ancestors of Modern-day Speech Science," in *The Genius of Erasmus Darwin*, ed. Christopher U. M. Smith and Robert Arnott (Burlington: Ashgate, 2005), p. 219.

⁵⁵ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 17 October 1784. See also Jones, "Living the Enlightenment," pp. 165-6; Musson and Robinson, *Science and Technology*, pp. 202-7.

⁵⁶ On Suffolk see François La Rochefoucauld and Alexandre La Rochefoucauld, *A Frenchman's Year in Suffolk: French impressions of Suffolk life in 1784*, trans and ed. Norman Scarfe (Woodbridge: Boydell & Brewer, 1988), pp. 109-15. For the Midlands tour see *Ibid.*, *Innocent Espionage: The La Rochefoucauld Brothers' Tour of England in 1785*, ed. Norman Scarfe (Woodbridge: Boydell Press, 1995), pp. 107-22.

PART III: NEW GRAND TOURS (1783-88)

7. ‘You cannot appreciate too much the importance of the epoch you are in there:’ The Delesserts’ Practical British Education

By the 1780s, Britain was home to the world’s leading manufacturing town, Birmingham, and one of its preeminent universities, Edinburgh. The Delesserts thus sent two of their sons to Britain. In August 1783, Stephen and Benjamin Delessert crossed the Channel to England with Abraham Guyot, their tutor.¹ He had studied in Geneva, at Europe’s other great university in the 1760s, and continued to pursue science. This tour, the first visit to Britain by a Delessert, was for practical study in England, and academics in Scotland. The sojourn also expanded the Delessert network. By relocating to Paris, the family had developed links to its Enlightenment culture, whilst maintaining commercial ties and property in Geneva and Lyon. Etienne also developed an affinity for British economic thought, especially Adam Smith. Yet, it was through an old Swiss friend, Jean-André Deluc, that the family gained access to Britain. The Delesserts enabled Deluc to maintain a link to Jean-Jacques Rousseau, and Deluc provided introductions to James Watt. These bonds formed a vital junction completing a British-Franco-Swiss nexus, spanning from Edinburgh to Geneva. The expansion had a critical and enduring influence on the Delesserts, and their wider network, linking them to British *savants* and *fabricants*.

7.1. An Old Acquaintance with New British Connections

Traditional accounts of Benjamin Delessert described his educational tour, undertaken with his brother, in a confused order. They were often described as having first studied in Edinburgh, followed by a period of training in Birmingham with James Watt, and finally learning from J.-A. Deluc at Windsor. Yet, their route was inescapably dictated by social

¹ YUL MS 179 JADP 2. A. Guyot (Londres) à J.-A. Deluc (Windsor), 19 août 1783. Mme Delessert told her sons that they could not overvalue the epoch they were experiencing in Britain and that the learning they acquired could influence their future success. M.-C. Delessert à S. et B. Delessert (Edinburgh), 23 octobre 1785, quoted in AP AFD V13S 3 Join-Lambert, *Benjamin Delessert*, p. 31 n. 1.

and geographical restrictions. Early accounts revealed few details on the Delesserts' British tour. Fortunately, evidence from the Boulton & Watt archives, and the papers of Charles Blagden and J.-A. Deluc, have allowed a fuller account to emerge. Guyot and his pupils stayed first in London, as they did not have contacts in Birmingham or Scotland. Their tour commenced in August 1783, but preparations had begun months earlier.²

Through J.-A. Deluc's auspices several Franco-Swiss made their way to Soho in the late eighteenth century. Ami Argand (1750-1803), a Swiss chemist and physicist who had invented an improved oil lamp in 1782, made a similar trek several months after the Delesserts' journey. Argand went first to London, where he met Deluc, and sought a British patent on his invention. In early 1784 Deluc gave him an introduction to Watt.³ As with the Delesserts, Watt helped Argand find a boarding house in Birmingham. Watt later recouped some of this goodwill – by using the services of Deluc, the Delesserts, and Argand – to send his eldest son to Geneva. Guyot and his pupils stayed in Edinburgh for the school years 1784-6, after a year in Birmingham.

7.2. Abraham Guyot and the Delesserts Arrive in London

The Delesserts' relied on their expanding network, populated by old Genevan friends and new British acquaintances, to send their sons abroad. On 19 August, Guyot and his pupils arrived in London. It was a stopover on the way to Birmingham but they had, through their Enlightenment contacts, introductions to the top ranks of British science.⁴

² *Ibid.*; BCL MS 3219/4/123 J. Watt (Birmingham) to J.-A. Deluc, 26 June 1783.

³ John J Wolfe, *Brandy, Balloons & Lamps: Ami Argand, 1750-1803* (Carbondale: Southern Illinois University Press, 1999), pp. 8-20. BCL MS 3219/4/123 J. Watt snr to J.-A. Deluc, 22 February 1784.

⁴ They lodged at the Prince of Wales Hotel, Suffolk St, Charring-Cross. YUL MS 179 JADP 2. A. Guyot à J.-A. Deluc, 19 août 1783. Guyot had to decline an invite to join Joseph Banks at his country estate, and that of Blagden to attend a Royal Society meeting. *Ibid.*, A. Guyot (Londres) à J.-A. Deluc, 25 août 1783.

The Francophile Charles Blagden was the Delesserts' main British contact in London. Blagden was a physician in the American Revolutionary War, elected to a Fellow to the Royal Society of London in 1772, a close friend of its President Joseph Banks, and recently named assistant and secretary to the great chemist Henry Cavendish.⁵ On Blagden's sojourn to Paris (June-August 1783) he became attached to the Delesserts.⁶ The connection came from J.-A. Deluc, their other primary London contact. Deluc had provided Blagden introductions to the family, and to leading French scientists.⁷ This became an exchange of science that endured for decades.

The arrival of Guyot's party reveals how the utility of Enlightenment science was transmitted by land and sea, as its spectacle was exhibited above. Blagden told Banks:

M. Guyot, the sensible Neufchâtelois I was telling you of, is arrived here & has been with me this morning. He tells me that all Paris is in an uproar about the flying machines; that besides the great one preparing by Montgolfier under the inspection of the Commissioners from the Academy, another upon D^r Franklin's plan of silk covered with elastic gum is making by subscription, & was to be ready within a week after he left Paris.⁸

Montgolfier was one of the brothers, Joseph-Michel (1740-1810) or Jacques-Etienne (1745-99), who invented and flew the first hot-air balloons. American statesman and scientist Benjamin Franklin was an early champion of ballooning, as well as a friend and

⁵ Danielle M E Fauque, "An Englishman Abroad: Charles Blagden's Visit to Paris in 1783," *Notes and Records of the Royal Society of London* 62, no. 4 (2008), p. 374. J.-B. d'Arnal, a London merchant and Etienne Delessert's cousin, was another contact. Mme Delessert asked him to provide a "pied à terre" for Guyot and his pupils near Deluc. YUL MS 179 JADP 2. A. Guyot (Passy) à J.-A. Deluc (Windsor), 7 août 1783. Guyot's duties did not allow him to accept invitations from Banks, to visit his country estate, and Blagden, to attend a meeting of the Royal Society. Stephen had been sick, but recovered after a visit by Blagden. YUL MS 179 JADP 2. A. Guyot (Londres) à J.-A. Deluc, 25 août 1783.

⁶ BRC OSB MSS 51 Box 1 Blagden, Travel Notes 12 June – 5 August 1783.

⁷ BGE MS Autograph. 1950/10. J.-A. Deluc (Pimlico) à C. Blagden, 28 mai 1783. Besides the Delesserts, Deluc gave Blagden letters for Jérôme de La Lande (1732-1807), Jean-Baptiste-Gaspard Bochart de Saron (1730-94), Pierre-Simon Laplace (1749-1827), Antoine Lavoisier, Alexandre-Théopihle Vandermonde (1735-96), Gaspard Monge (1746-1818), and Jean-Baptiste Le Roy (1724-1800).

⁸ 375. C. Blagden (Soho Square) to J. Banks (Spring Grove), 23 August [1783]. Joseph Banks, *Scientific Correspondence of Sir Joseph Banks, 1765-1820* (London: Pickering & Chatto, 2007), vol. 2: pp. 124-5.

neighbour of the Delesserts in Passy, near Paris.⁹ Madeleine Delessert was among the relatively small number of subscribers to witness the first balloon launch in Paris, on 27 August 1783. She and Franklin sent Blagden and Banks accounts of the launch, with full technical descriptions, as did her mother who watched the balloon from Passy.¹⁰

7.3. Jean-André Deluc: The Delesserts' Connection to Birmingham

The origin of the Delessert family's connection to James Watt and Mathew Boulton came through the broad Republic of Letters, and specifically through J.-A. Deluc. In 1781-2, when Deluc stayed with the Delesserts in Paris, his focus was chemistry. This included meeting with leading chemists: P.-S. Laplace, Lavoisier, Gaspard Monge, and A.-T. Vandermonde. Yet, Deluc's association with British chemistry began years earlier. His initial meeting with Joseph Priestley took place in 1773.¹¹ By the early 1780s Deluc was a vital link between the Lunar Society and the Continent. Deluc met Watt in 1782, on a visit to Birmingham. As was common they had corresponded before meeting in person. In December, Watt invited Deluc to stay with him, as he knew "how disagreeable it is for a Philosopher to lodge at an Inn."¹² Deluc's purpose, besides making the acquaintance of Watt, was delivering his daughter Frances (d. 1824) there to learn English.¹³

⁹ 147. M.-C. Delessert à J.-E. et B. Delessert, 23 octobre [1785]. Ferri, *Lettres et manuscrits*, p. 32; Gillespie, "Ballooning in France and Britain," pp. 254-62; Lynn, *Popular Science*, pp. 123-40.

¹⁰ *Ibid.*; RSL MS CB/1/3/262 M.-M. Delessert to C. Blagden, 31 August [1783]; *Ibid.*, 1/4/92. M.-C. Delessert (Passy) à A. Guyot (Londres), 28 août [1783], transcrire pour C. Blagden, 2 septembre [1783].

¹¹ Deluc, "To the Conductors of the Edinburgh Review," pp. 510-2.

¹² Chemistry was a frequent theme in their letters and Watt informed Deluc about recent experiments and observations including that "D^r Priestley has made a most surprising discovery" on Watt's theory of "water undergoing some very remarkable change" when switching from latent to sensible heat. BCL MS 3219/4/122 J. Watt (Birmingham) to J.-A. Deluc, 13 December 1782.

¹³ Watt told Deluc that James would have to learn French in Geneva by immersion, as Frances did English in Birmingham, hoping he would "be as apt a scholar." BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 17 October 1784. Deluc was motivated to have her learn English so she could write letters for him. In letters to Watt in the 1780s, Frances wrote to "address you in my father's name" or as "my father's secretary." *Ibid.*, 3219/4/37 J.-A. Deluc (Windsor) to J. Watt snr, 1 October, 1786; and 21 November 1787.

Throughout 1782-4, James Watt and J.-A. Deluc discussed scientific topics, including the nascent dispute over the composition of water and the manufacture of Argand's lamps.¹⁴ Deluc also sought Watt's help to find boarding houses in Birmingham for young people. The first request was for Frances. By November 1782, Watt's wife, Anne (born Macgregor c. 1750-1832), had found them a boarding house.¹⁵

The second boarding-house search revealed the concerns of Franco-Swiss seeking to settle sons in the industrial Midlands, and Birmingham's contemporary character. Six months after Deluc's visit he again sought Watt's aid. It was to find a proper place for his friends' sons, Stephen and Benjamin Delessert, to board. This was difficult, as Watt noted: "There are also few men of learning and in general, people of that life who are in tolerably easy circumstances, and were to take any part in the education of the young gentlemen would expect a higher reward than would perhaps be agreeable to give." The town afforded opportunities to learn "common English" and civility, yet Watt concluded: "politeness must be learnt in better company than this town affords."¹⁶ An English tutor could be found, but Watt thought it best that the boys to start with conversation.¹⁷

James Watt was doubtful about Birmingham's potential to fulfil the Delesserts' needs. Thus, in case he was unable to find something suitable he suggested alternatives,

¹⁴ BCL MS 3219/4/123 J. Watt (Birmingham) to J.-A. Deluc, 4 April 1784. Their letters discuss work on Argand's lamps and experiments on water. On Argand's lamps see Wolfe, *Brandy, Balloons & Lamps*, pp. 51-64; on the water conflict see David Philip Miller, *Discovering Water: James Watt, Henry Cavendish, and the Nineteenth Century 'Water Controversy'* (Burlington: Ashgate, 2004), pp. 27-81.

¹⁵ BCL MS 3219/4/123 J. Watt (Birmingham) to J.-A. Deluc, 25 November 1782; *Ibid.*, J. Watt (Birmingham) to J.-A. Deluc, 13 December 1782.

¹⁶ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 26 June 1783. Peter Jones uses Watt's description to show how contemporary industrial Birmingham offered less polite society than the neighbouring towns of Worcester and Litchfield. Jones, *Industrial Enlightenment*, p. 33. Deluc's failure to mention Guyot or the Delesserts by name, understandably, leads Jones to believe that the boarding house inquiries were being made for his daughter Frances. Yet, later references explain that Deluc was trying to help the Delesserts locate a place for Stephen, Benjamin, and their tutor Guyot.

¹⁶ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 26 June 1783.

¹⁷ *Ibid.*

the neighbouring ‘Cathedral towns’ towns: Worcester and Litchfield. They were, Watt explained, “resorted to by what is called polite company, that is clergymen, lawyers, old maids, widows, and some country gentlemen, & other idle people,” where the boys “may be situated more advantageously than in a town of industry.”¹⁸ Watt was not aware that the Delesserts had already situated their sons, ‘advantageously,’ in the polite company of Geneva’s clergymen and lawyers, and found it wanting.¹⁹ Instead, the Delesserts desired to situate their sons in a British industrial town, despite the risks of them keeping impolite company. Birmingham offered instruction in industry that could be found nowhere else.

Watt’s concerted effort to find a suitable college for his son James began by 1783. As Watt looked for accommodations for the Delesserts, he had Deluc procure an estimate from Georg Christoph Lichtenberg (1744-99), physics professor at Gottingen University and scientific correspondent of Deluc, who had visited Bowood to see Joseph Priestley experiment.²⁰ Yet Watt, finding the cost higher than he anticipated and much more than he could then spend on James, concluded that he would “therefore lay aside the thoughts of it at present.”²¹ Amidst these negotiations on education Deluc and Watt discussed ‘philosophical news,’ including Priestley’s experiments on dephlogisticated air.²²

Guyot and his pupils arrived in Birmingham in the summer of 1783,²³ and became acquainted with the Watt and Boulton families over their one-year residence. They were

¹⁸ *Ibid.*

¹⁹ Coninck, *Banquiers et philanthropes*, p. 58

²⁰ Watt referred to him as “professor Lichtenstein.” BCL MS 3219/4/123 J. Watt snr to J.-A. Deluc, 26 June 1783. YUL MS 179 JADP 2. G. C. Lichtenberg (Gottigen) to J.-A. Deluc, 2 December 1780. Schofield, *The Enlightened Joseph Priestley*, pp. 9-19, 56. Lichtenberg worked on chemistry into the 1790s, and published works on electricity and magnetism. 5. Alexandre de Humboldt à M.-A. Pictet, 5 novembre 1795. Pictet, *Correspondence: Sciences et techniques*, vol. IV: p. 661, n. 28.

²¹ BCL MS 3219/4/123 J. Watt snr to J.-A. Deluc, 26 June 1783.

²² *Ibid.*

²³ BCL MS 3219/4/123 J. Watt snr (Birmingham) to Gilbert Hamilton, 25 August 1784.

often guests in the Watt household, despite Guyot and Watt suffering ill health.²⁴ Another frequent guest was Matthew Robinson Boulton, as his father made regular business trips to Cornwall. At this point there were good reports of Matthew's behaviour, but this did not last.²⁵ Boulton and Watt's concerns over the conduct and education of their sons in Britain led to them being sent to the Continent. The planning and execution of their tours, like that of the Delesserts in Britain, strengthened the British-Franco-Swiss network.

7.4. From the Lunar Enlightenment to the Edinburgh Enlightenment

In Abraham Guyot's journey north with his students they progressed through various incarnations of the British Enlightenment. It began with J.-A. Deluc and Charles Blagden, who introduced them to scientific society in London. Guyot then taught his students for a year in Birmingham and became acquainted with the Lunar Society. He parlayed his links to it, and London, into recommendations to Scotland's natural philosophers.²⁶ Ultimately, the Delesserts' network was expanded by social and scientific connections.

James Watt did not ultimately send his eldest son to Scotland, but the enquiries he made on behalf of Guyot proved fruitful. Guyot wished to take his pupils there. Thus in August 1784 Watt queried Gilbert Hamilton (1744-1808), his brother-in-law in Glasgow, on education in Scotland: "There is at this town, a very worthy & agreeable Gentleman a native of Neufchatal [*sic*] who has been here about a year taking care of two young Parisians, the elder about 13 year [*sic*] old. He is a man of learning and science, his name is Gûyot."²⁷ This was a high complement considering Watt's own knowledge and talents.

²⁴ *Ibid.*, J. Watt snr (Birmingham) to J.-A. Deluc, 4 April 1784; *Ibid.*, J. Watt snr (Birmingham) to J.-A. Deluc, 2 May 1784; *Ibid.*, J. Watt snr (Birmingham) to J.-A. Deluc, 6 June 1784.

²⁵ BCL TS LSC JW Box III. 112. Ann Watt (Birmingham) to M. Boulton (Truro), June 1784.

²⁶ In September Mme Delessert had Guyot ask Blagden for letters of introduction, for Guyot and his pupils, to Edinburgh. RSL MS CB/1/4/91 A. Guyot (Birmingham) à C. Blagden (London), 21 septembre 1783.

²⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 25 August 1784.

Unfortunately, Watt did not specify which specific sciences they studied in Birmingham.

However, Watt did describe Guyot's intentions for his students in Scotland:

[Guyot] wants to bring his pupils who can now speak a little English to Edinburgh or Glasgow, but wants to know whether, Logic, Rhetoric, moral philosophy, natural philosophy, & Geometry are taught in English at Edinburgh or Glasgow. He would on several accounts prefer the later place if the lectures are delivered in English & any lectures on composition of the English language are read by any of the professors similar to those Dr. Blair used to read at Edinburgh.²⁸

Watt also inquired, for Guyot, if Scottish lectures could be attended without pupils registering as 'gown students.' The accommodations they wanted in Scotland were similar to those Watt was asked to find in Birmingham.²⁹ Finally they inquired into when classes began so Guyot and his students could begin to the trek north to Scotland.³⁰

Guyot appears to have initially preferred Glasgow for his pupils, but he decided instead on Edinburgh. It did not take the trio long to settle in the Scottish capital. They arrived in Edinburgh by late October 1784, and remained in contact with Watt.³¹ Besides seeking Guyot's help to send James to Geneva, the destination Watt finally selected, the pair discussed natural philosophy. Watt informed him that his paper on dephlogisticated air was printed, and that he would send Guyot a copy once the chance presented itself.³² Alluding to some of Guyot's activity in Birmingham, Watt noted: "D^r Priestley is going on with the same experiments you left him at" of decomposing water by means of iron,

²⁸ *Ibid.* This was Hugh Blair, Edinburgh University's former professor of rhetoric and *belles lettres*.

²⁹ They sought a large place from a respectable family, including board. Watt asked the cost for this or one at the college. *Ibid.* In postscript, Watt stated: "If M^r Guyot sh^d come to Glasg^w you will find him a value to your Society being a man of extensive knowledge, modest & obliging." Watt also noted: "The young Gentleman's name is Delessert their father is a great Bank[er] at Paris." Finally Watt told Hamilton that if James went to Glasgow, "it will not do to board him with any of his relations but only" with a "person who will superintend his education, otherwise time & money will be lost." Indeed, Watt sought to waste neither.

³⁰ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 7 September 1784.

³¹ *Ibid.*, J. Watt snr (Birmingham) to A. Guyot, 28 October 1784.

³² *Ibid.*

which Watt hoped would “throw much new light on Chemistry & will perfectly confirm my theory.”³³ Watt had entered the fray on the composition of water.³⁴

Guyot and his two pupils settled well in Edinburgh, mainly as a consequence of their ties to the Lunar Society. They were grateful for the warm welcome, by Dr Joseph Black and Dr James Hutton (1726-97), procured by Watt’s introductions. The brothers and Guyot followed Black’s chemistry lectures. This would, Guyot noted, compliment his reading of Watt’s “*mémoire sur l’air déphlogistiqué*.” He asked Watt to send him a copy when posting ones to friends in Edinburgh.³⁵ While there Guyot became acquainted with another member of the Lunar Society: Dr Jonathan Stokes (1755-1831), who Guyot described as a friend of James Keir. Stokes, then touring the Scottish countryside,³⁶ was a botanist and one of the Lunar Society’s new recruits in the 1780s. He joined the group by 1783, and shared with its members an interest in chemistry and botany.³⁷

New Grand Tours made by young men in the 1780s led to the participation of a new generation in the Enlightenment. Etienne (Stephen) Delessert *fils*,³⁸ and James Watt junior also began their correspondence in this period. The Delessert brothers regretted that James’ stay in Geneva would long deprive them of his company. They had wished

³³ *Ibid.*

³⁴ Watt discussed his theory, experiments, the controversy and its priority in letters to his friends in this period. See especially BCL MS 3219/4/123 J. Watt to J.-A. Deluc, 13 December 1782; *Ibid.*, J. Watt to J.-A. Deluc, 30 December 1783; *Ibid.* J. Watt to J. Priestley 2 May 1783; *Ibid.* J. Watt to J. Black, 21 April 1783, *Ibid.* J. Watt to J.-A. Deluc, 22 February 1784; *Ibid.*, J. Watt to Banks, 12 April 1784, and *Ibid.*, J. Watt to J. Fry, 15 May 1784. For an account of the controversy, see Miller, *Discovering Water*, pp. 27-81.

³⁵ BCL MS 3219/4/10/2 A. Guyot (Edinburgh) à J. Watt (Birmingham) 4 novembre 1784. Guyot sent Watt the address “at Mrs Rufton’s Chappel Street N^o 80,” to send his paper on dephlogisticated of air.

³⁶ *Ibid.* Guyot later asked to Watt to inquire of Keir as to when his *Dictionary of Chemistry* would be appearing. BCL MS 3219/4/98/3 A. Guyot (Edinburgh) to J. Watt snr, 11 May 1785.

³⁷ The other recruits were Samuel Galton junior, son of a leading gunmaker, in 1781, and R. A. Johnson, son of a cleric, in 1787. Stokes knew Dr William Withering (1741-99) since childhood. As a medical student, at Edinburgh, Stokes wrote on foxglove (*digitalis*) treatments. Its use to cure dropsy led to fame for Withering and conflict with Erasmus Darwin. On Stokes’s complex relationship to the Lunars Society, time as a physician in Birmingham, and wide botanical activities see Schofield, *The Lunar Society*, pp. 219-230.

³⁸ Jacques-François-Gabriel-*Etienne* went by the last of his first names. After arriving in England he often used the Anglicized *Stephen*, as in signing this letter, as well as J. E. Delessert and Etienne Delessert *fils*.

that he would also be sent to Edinburgh. Nevertheless, Stephen hoped James would be satisfied with Geneva and would make great progress in French. Despite their youth they were training in the Enlightenment art of transmission.³⁹ Stephen told Watt: “We are much obliged to you for your asking if we have any thing to send to France: We have now nothing ready to trouble you with, But . . . visit our family as soon as you are arrived at Paris. Because my dear mother, certainly will be very glad to be useful to you in any thing within her power.”⁴⁰ Besides James, the Delessert brothers befriended Matthew Robinson Boulton and Isaac Walker in Birmingham.⁴¹ These relationships, especially those between Watt and the Delesserts, persisted for decades, despite revolution and war.

7.5. The Delessert Brothers and the Scottish Enlightenment

Abraham Guyot and his pupils were instructed by great masters at Edinburgh. Séverine de Coninck, taking a cue from early biographers, argues: “Thus, in 1784, Etienne sent two of his sons, Jacques-Étienne and Benjamin, to Great-Britain, to follow the teaching of Hutton and Playfair, David Hume, Dugald-Stewart and Adam Smith at the University of Edinburgh where new approaches were taken in the physical sciences, philosophy, history, [and] political economy.”⁴² The boys were instructed in new methods, and by most of these *savants*, yet, not all of these men or courses were then at the university.

The Delesserts did not take classes from Hume or Smith, but were influenced by them and instructed by their successors. Hume, defeated in his attempts to gain a chair at a university in Scotland, died eight years before the Delesserts arrived there. Smith had retired from teaching decades earlier, but spent the last twelve years of his life (1778-90)

³⁹ BCL MS 3219/4/10/2 S. Delessert (Edinburgh) to J. Watt jnr, 4 November 1784.

⁴⁰ *Ibid.*

⁴¹ *Ibid.*

⁴² They were then to have studied with Watt in Birmingham. Coninck, *Banquiers et philanthropes*, p. 58.

in Edinburgh.⁴³ Guyot and his pupils took lectures from, and were acquaintances with, Smith's closest friends. It is possible, as Join-Lambert argues, that "Dugald Stewart did not hesitate to present them to Adam Smith, who was happy to instruct them on his discoveries."⁴⁴ This claim is unsubstantiated, but would have been desired. Their father championed Smith and his *On the Wealth of Nations*.⁴⁵ This work, along with the histories of Hume and William Robertson, formed part of the Delessert library.⁴⁶

The Delesserts had an early introduction to the Scottish Enlightenment. Their first tutor, Pierre Prévost, was later a leading French translator of Scottish philosophy. In 1770 Louis Odier, while studying medicine at Edinburgh, strongly recommended the histories of Robertson and Hume to Prévost, then a student in Geneva.⁴⁷ In 1784, James Watt gave Guyot introductions to Black and Hutton,⁴⁸ who were Smith's primary friends. The three men founded the Oyster Club after Smith's return to Edinburgh, and they were literary executors upon his death.⁴⁹ The British-Franco-Swiss network insured the Delesserts and Guyot's immersion in Scotland's Enlightenment. They witnessed the growth of the new sciences of chemistry and geology, and the emergence of a new generation of *savants*.

⁴³ Hume looked to work as a tutor in 1739, but later turned down a post as travelling tutor. His friends supported him for the chair of Ethics and Philosophy at Edinburgh. It failed because of civic and clerical opposition to Hume and his *Treatise of Human Nature* (1739-40). Hume repeated the process in 1752, futilely standing for Chair of Logic at Glasgow University. Ernest Campbell Mossner, *The Life of David Hume* (Oxford: Clarendon Press, 1980), pp. 149-62, 230, 247-9. Smith began lecturing on English literature at Edinburgh University in 1748. In 1752 he became Chair of Logic at Glasgow, moving on to the Chair of Moral Philosophy in 1753. He gave it up in 1764 to travel as tutor of a British nobleman in France. John Rae, *Life of Adam Smith*, (New York: A. M. Kelley, 1965), pp. 30-65, 325-38.

⁴⁴ AP AFD. V13S 3. Join-Lambert, *Benjamin Delessert*, p. 31.

⁴⁵ Duprat, "Pour l'amour de l'humanité," p. 319, n 135; Coninck, *Banquiers et philanthropes*, p. 24, 55.

⁴⁶ The library held an English copy (1778) and Garnier's translation (1822). It also held an English copy of Smith's *Essays on Philosophical Subjects* (1795), Pierre Prévost's French translation of it (1797), as well as histories by Hume and Robertson. BNF NAF 6300 MS Catalogue [alphabétique de la bibliothèque] Delessert. 128 f. 2 mai 1892, S – K = 2, I = 2, A = 6; H – A = 6; R B = 5, 4, 6, G = 4.

⁴⁷ BGE Ms. fr. 253. PPC. L. Odier (Edinburgh) à P. Prévost, 10 août 1770.

⁴⁸ BCL MS 3219/4/10/2 A. Guyot (Edinburgh) à J. Watt snr, 4 novembre 1784.

⁴⁹ Smith returned to Edinburgh in 1778 and died there in 1790. Rae, *Life of Adam Smith*, pp. 335-8, 434; Davis D. McElroy, *Scotland's Age of Improvement: A Survey of Eighteenth-Century Literary Clubs and Societies* (Pullman: Washington State University Press, 1969), pp. 168-70.

A silence fell on contact between Birmingham and Edinburgh during the winter of 1784-5. In November Guyot had given further advice to help establish James Watt junior in Geneva. Contact resumed in the spring through the auspices of ‘Dr. Siemerling’ who, expecting to pass through Birmingham, desired to meet Watt.⁵⁰ Guyot did not elaborate, but this physician was likely Samuel Thomas von Soemmerring (1755-1830), a leading German anatomist.⁵¹ The resumption of Enlightenment traffic allowed Guyot to inform Watt on their progress in Scotland. Guyot updated Watt on his Scottish friends. With respect to Black, and his famous chemistry course, Guyot declared:

I follow the course of [Black] with great interest, but with the regret of only being able to partake in Chemistry during the Lecture, because of my duties at the lodging house with my Students. I cannot say enough how much I am pleased by the clear manner with which your friend treats his science; and how much his modesty, his candour, and his kindness make me cherish his character.⁵²

Guyot hoped the summer would see him spend more time with Black doing chemistry.⁵³

At Edinburgh Guyot and his pupils benefitted not only from Black, one of the century’s foremost chemists, but also from James Hutton, one of its leading geologists. Guyot attended Hutton’s mineralogy lecture before the Royal Society of Edinburgh. Hutton’s geological theory, Guyot explained to Watt, was that fossils formed in a state of compression. Guyot believed that Hutton’s observations deserved more notice from

⁵⁰ BCL MS 3219/4/98/3 A. Guyot (Édinbourg) à J. Watt (Birmingham by the favour of Dr. Siemerling), 11 mai 1785.

⁵¹ Soemmerring studied medicine at Göttingen with G. C. Lichtenberg and others, made a British tour to London and Edinburgh in 1778, became close to J. G. A. Forster, and had in an epistemological dispute with Immanuel Kant in the 1790s. Forster reported to Banks that Soemmerring studied anatomy in Holland with Camper, in London with Dr Hunter, and in Edinburgh with Dr Munro. 197. Johann Georg Adam Forster (Cassel) to J. Banks, 26 November 1780 (Soho Square). Banks, *Scientific Correspondence*, vol. 1: pp. 252-3. Steve Naragon, “Samuel Thomas von Soemmerring (1755-1830),” in *The Dictionary of Eighteenth-century German Philosophers*, ed. Heiner Klemme and Manfred Kuehn (New York: Continuum, 2010), vol. 3 pp. 1094-98. Frank W. Stahnisch, “The Emergence of *Nervennahrung*: Nerves, Mind and Metabolism in the Long Eighteenth Century,” *Studies in History and Philosophy of Biological and Biomedical Sciences* 43, no. 2 (2012), pp. 411-2.

⁵² BCL MS 3219/4/98/3 A. Guyot à J. Watt, 11 mai 1785.

⁵³ *Ibid.*

geologists, as the method of fossil formation remained unknown.⁵⁴ Hutton's paper, read at three meetings of the Royal Society in 1785, was an early version of his *Theory of the Earth*. It was only published in 1788, when the first issue of the Society's *Transactions* appeared. In the conclusion Hutton argued that the earth had experienced successive revolutions of almost unknown length, which like those of the planets, were part of the system of nature. He concluded the paper with his celebrated line on the earth's origins: "The result, therefore of our present enquiry is, that we find no vestige of a beginning, — no prospect of an end."⁵⁵ Watt no doubt welcomed scientific news, but may have already learned of parts of Hutton's revolutionary geological theories.⁵⁶

In Britain the Delesserts and Guyot were exposed to radical thinkers. Besides Hutton, this included members of the Lunar Society and fellow students in Edinburgh. Ironically, two of the most vocal and persistent critics of Hutton's 'Plutonian' position were 'Neptunists' with close ties to the Lunar Society: J.-A. Deluc and the Irish chemist Richard Kirwan (1733-1812).⁵⁷ For Guyot and his pupils the connection to Hutton saw them encounter ideas, on the earth's formation, radically different than the conservative ones of Deluc. Meeting Hutton was an auspicious encounter.⁵⁸

⁵⁴ *Ibid.*

⁵⁵ James Hutton, "Theory of the Earth; or an Investigation of the Laws Observable in the Composition, Dissolution, and Restoration of Land Upon the Globe," *Transaction of the Royal Society of Edinburgh* (1788), vol. 1: pp. 209-304. The celebrated quotation central to Hutton's theory appears on the last page.

⁵⁶ Hutton formed ideas on heat's role in geology and formation of minerals around 1760. Years of farming in the Lowlands, and natural history tours in Scotland and Europe added to his work. In the 1780s, he entertained geologists on Scottish tours, including Saint-Fond, and read H.-B. de Saussure's *Voyages dans les Alpes* (1779). By 1785, Hutton's work was advanced enough to be read publically. Saint-Fond, Erasmus Darwin and Watt likely knew some of the theories, and Black was among the few to know it in full. Dennis R. Dean, *James Hutton and the History of Geology* (Ithaca: Cornell University Press, 1992), pp. 8-17.

⁵⁷ *Ibid.* pp. 53-99; Patsy A. Gerstner, "The Reaction to James Hutton's Use of Heat as a Geological Agent," *The British Journal for the History of Science* 5, no. 4 (1971), pp. 355-7. 'Plutonists' followed a uniformitarian principle of gradual geologic change driven by volcanic activity, whereas 'Neptunists' attributed it to water and catastrophes. See Thomas L Hankins, *Science and the Enlightenment* (Cambridge: Cambridge University Press, 1985), pp. 153-7.

⁵⁸ Dean, *James Hutton and the History of Geology*, pp. 1-10.

Guyot attended Dr Black's pioneering chemistry lectures and Dr Hutton's lecture on geology at the Royal Society of Edinburgh.⁵⁹ Given Guyot's purpose in Edinburgh, and dedication as a tutor, he would have explained to his pupils of the content of Hutton's lectures.⁶⁰ In 1788, Guyot's name was one of two put forth for membership, by Dugald Stewart, in the Royal Society of Edinburgh. Guyot is today somewhat less remembered than the other person that Stewart proposed – this was Thomas Jefferson, the primary author of America's Declaration of Independence.⁶¹

Dugald Stewart was drawn to Paris several times in the 1780s, where he first met Jefferson, and relied on Guyot. In 1785, Jefferson succeeded Benjamin Franklin, as the United States' Minister Plenipotentiary to France. Jefferson met Stewart in 1788, through mutual acquaintances.⁶² Stewart and Guyot's friendship began in Edinburgh in 1785, and lasted until Guyot's death there in 1794.⁶³ In 1789 Stewart again returned Paris, where he found Guyot to be of more use than any other acquaintance.⁶⁴ In turn, Stewart welcomed members of the British-Franco-Swiss network who visited Edinburgh.

7.6. The Delessert Brothers and the University of Edinburgh

It was in a vibrant atmosphere in Edinburgh that preceptor and pupils revelled throughout 1784-5. Consequently, they remained the following winter. Guyot praised his students and the university, informing Watt: "I was indeed so satisfied with their Emulation and the steady effects which it has produced that I have asked for a continuation from their

⁵⁹ BCL MS 3219/4/98/3 A. Guyot à J. Watt, 11 mai 1785.

⁶⁰ *Ibid.* Guyot informed Watt that he attended the 4 April meeting. It is unclear if Guyot attended the other readings. On 7 March Black read the first part of Hutton's discourse. Hutton read a third section at the Society's meeting in July. Dean, *James Hutton and the History of Geology*, p. 17.

⁶¹ This was noted at a meeting of the Physical Class of the Royal Society of Edinburgh, 1 December 1788. See Macintyre, *Dugald Stewart*, p. 70, 281 n. 25. Guyot and Jefferson were elected as Foreign Members 26 January 1789. "Appendix," *Transactions of the Royal Society of Edinburgh* (1790), vol. 2: pp. 32-3.

⁶² Macintyre, *Dugald Stewart*, pp. 67-73.

⁶³ BCL MS 3219/4/44 26. J. Black (Edinburgh) to J. Watt, 6 June 1794.

⁶⁴ D. Stewart (Paris) to A. Alison, 17 September 1789. Stewart and Veitch, *The Collected Works*, p. cxxx.

parents. I find that for young men who want to apply themselves or when someone forces them to do so, *this University is the best school that I know.*⁶⁵ The following winter, the Delessert brothers were to take the second mathematics class. Guyot thought they were well prepared for it, and he was impressed by the offering of a summer physics course.⁶⁶

Stephen Delessert provided a detailed account of the content of their mathematics class to James Watt junior. This subject was their main focus and they had covered plane trigonometry, practical geometry, and the first six books of Euclid. In the second part they were to study algebra and conic sections.⁶⁷ In spite of a heavy load, and a strict tutor, they were pleased with Edinburgh and had made good friends among their schoolmates. The Delesserts' studies had not allowed them to travel. They had not yet visited Glasgow, nor "made any other excursion in the country," but hoped "to visit this summer some parts of Scotland and particularly of the highlands."⁶⁸ It is unclear if a full tour of Scotland formed part of their frequent travels in this period.

Stephen and Benjamin Delessert took a variety of classes at the University of Edinburgh, but one was of particular resonance.⁶⁹ Dugald Stewart's mathematics course was influential, as was chemistry with Dr Black, but a relatively new course had the most impact: natural history. It was established as a Regius chair at the university in 1767. The

⁶⁵ My emphasis. BCL MS 3219/4/98/3 A. Guyot à James Watt, 11 mai 1785.

⁶⁶ With the end of classes, they moved to the northern edge of New Town, where they were better placed and had an improved view of the River Forth and countryside. *Ibid.* After their initial slow, but pleasant, journey north Guyot and his pupils had boarded with an English widow in the southern part of the city. *Ibid.*, 3219/4/10/2 A. Guyot à J. Watt 4 novembre 1784.

⁶⁷ BCL MS 3219/6/2 D S. Delessert (Edinburgh) to James Watt jnr (Geneva), 11 June 1785.

⁶⁸ *Ibid.*

⁶⁹ The Matriculation Roll confirms the Delesserts' enrolment in Stewart's class in 1784-5. Their second year of mathematics was taught by John Playfair (1748-1819). Stewart held the Mathematics chair, following his father, from 1775-85. Playfair took it over in 1785, as Stewart occupied the Chair of Moral Philosophy vacated by Adam Ferguson (1723-1816), and held it until 1810. The Delesserts' classes in logic and *belles lettres* were taught respectively by John Bruce (1745-1826) and William Greenfield (1755-1827). Macintyre, *Dugald Stewart*, p. 281 n. 26. Morrell, "The University of Edinburgh," p. 162. BCL MS 3219/4/98/3 A. Guyot à J. Watt snr, 11 mai 1785.

physician Robert Ramsay (1735-78) was chosen for the first chair. Little is known about Ramsay, whose position was professor as well as the keeper of the Museum of Natural History for the university. It mattered little, Steve Shapin argues in his study of politics and patronage in the founding of the Royal Society of Edinburgh, that that the Museum remained “too meagre to be of any use in teaching” while Ramsay was chair, as he “never lectured, treating his post as a complete sinecure.”⁷⁰ The struggle to replace him began in 1775, when he became ill and became bellicose in 1778, with Ramsay’s death. Ultimately this led to the founding of the Royal Society of Edinburgh in 1783, yet the vacant chair causing the initial dispute had been filled in 1779. Rev. Dr John Walker (1731-1803) was named professor and keeper of the Museum. He had to fend off rivals, and try to secure a stable financial footing, by maintaining both a university and parish position. Therefore, he did not actually lecture until March 1782.⁷¹ As Shapin observes, “the University of Edinburgh had had a chair of natural history since 1767 but as yet not a single lecture on the subject had been delivered.”⁷² Despite conflicts and delays, Walker successfully taught a large and diverse group of students from 1782, until his death.⁷³

Walker kept relatively detailed class lists because, as with other professors at the medical school in Edinburgh, the students paid fees directly to the professor.⁷⁴ Organized collection of class-fees, like warding off competition, was crucial. Remuneration from the University was typically not high enough for medical and science professors to afford an

⁷⁰ Steven Shapin, “Property, Patronage, and the Politics of Science: The Founding of the Royal Society of Edinburgh,” *The British Journal for the History of Science* 7, no. 1 (1974), p. 11.

⁷¹ *Ibid.*, pp. 11-15.

⁷² *Ibid.*, p. 14.

⁷³ M. D. Eddy, “The University of Edinburgh natural history class lists 1782–1800,” *Archives of Natural History* 30, no. 1 (2003), pp. 97-117.

⁷⁴ *Ibid.*, p. 98.

easy living.⁷⁵ The makeup of Walker's students was diverse, as his students came from varied geographical backgrounds (throughout Britain, the Americas, and the Continent). They also came from all four faculties (medicine, law, divinity, and arts), as students could take courses outside their degree requirements. Yet, natural history was part of the medical faculty, and medical students made up half of the enrolment.⁷⁶

Walker's class included an impressive group of students in the 1780s, consisting of men who became leading European natural historians and physicians. Robert Waring Darwin (1766-1848) studied medicine at Edinburgh, as did his father Erasmus and son Charles. R. W. Darwin attended Walker's lectures with Guyot and the Delesserts in 1784-85 and later developed a lucrative medical practice.⁷⁷ Thomas Beddoes, also a medical student in Walker's class, connected even more closely with the Delesserts and later the Lunar Society. Before turning to him, however, two more of Walker's medical students must be noted: James Edward Smith and Robert Brown (1773-1858). They became prominent British botanists and tied to the botanical interests of the Delessert brothers. Indeed their attendance of Walker's natural history class, previously unrecognized, together with J.-J. Rousseau's early influence, was crucial to the brother's development as amateur natural historians. Besides the essential training and methods of practice they learned through Walker's lectures, they developed lasting links to British botanists.

Guyot formed lasting relationships while attending Walker's class. Thomas Beddoes attended lectures in 1784 and 1785, with the Delesserts and, like them, attended

⁷⁵ Shapin, "Property, Patronage, and the Politics," p. 19.

⁷⁶ *Ibid.*, p. 98. The natural history course existed for years before its first lecture. The museum of natural history languished for decades, and was further neglected when it was removed from the university. Walker began improving the collection before his lectures began. He was able to convert it into a valuable asset for both academic and public instruction. Shapin, "Property, Patronage, and the Politics of Science," pp. 21-2.

⁷⁷ M. D. Eddy, "The University of Edinburgh," pp. 99-109.

a subsequent course. Beddoes, though not listed as a medical student,⁷⁸ studied medicine and chemistry at Edinburgh, before returning to Oxford to complete his medical degree. He enjoyed enduring and intimate ties with members of the Lunar Society, including James Watt, R. L. Edgeworth, and Erasmus Darwin. Beddoes' Lunar links, revolving around chemistry and medicine, have been well documented.⁷⁹ While at Edinburgh, Beddoes admired Dr Joseph Black most among his professors.⁸⁰ Yet, Beddoes also had a passion for natural history, which has remained largely unexplored, as have his ties to Guyot. In 1786, Guyot contacted Beddoes, who was then president of the Natural History Society of Edinburgh. Guyot's elaborated on his chemical research on a Swiss mountain in 1778. He tested atmospheric composition later confirmed in the work of J.-A. Deluc.⁸¹ Beddoes also presented work to the Natural History Society in the 1780s, and translated and edited several significant works on medicine and natural history. Both Beddoes and Guyot stayed in contact with their former professor.⁸² It would be surprising, given a common interest and Guyot's familiarity with French chemistry, if Beddoes did not meet Guyot during a trip to France in 1787, as did both Dugald Stewart and J. E. Smith.

7.7. Physician Pierre Sylvestre and A Prelude of Persecution

Traffic moved rapidly through the Republic of Letters by something analogous to social contagion. Abraham Guyot only met James Watt in 1783, through J.-A. Deluc. However, once in Edinburgh Guyot provided peripatetic physicians with recommendations to Watt.

⁷⁸ *Ibid.*, p. 107.

⁷⁹ See, Stewart, "His Majesty's Subjects, pp. 231-245; Levere, "Dr Thomas Beddoes," pp. 209-226.

⁸⁰ *Ibid.*, p. 210.

⁸¹ EUL-L MS La. III 352/1 A. Guyot (Edinburgh) to T. Beddoes (President of the Natural History Society), 19 January 1786.

⁸² After returning to England, Beddoes wrote requesting Walker to give a mineralogy lecture to London friends visiting Edinburgh. M. D. Eddy, "The University of Edinburgh." p. 99, 107. In 1794, Guyot made contact with Walker, after returning to Edinburgh during the turmoil of the French Revolution. EUL-L MS La. III 352/1 166. A. Guyot (Edinburgh) to John Walker (Collington) 9 January 1794.

Like Guyot, little has been written on them. One of whom, Dr Pierre Sylvestre, attended Walker's lectures with Guyot and Beddoes in 1784.⁸³ In May 1785 Guyot informed Watt: "Dr. Sylvestre, part of the surge of Genevan malcontents who have established themselves in Ireland, must leave here next month for a voyage to his homeland. If he passes by Birmingham, like he desires, I will take the liberty to recommend him to your good opinion for certain introductions that he would take in your area."⁸⁴ Sylvestre left Edinburgh in June, making stops in Birmingham and London, on his way to Geneva.⁸⁵

Dr Joseph Black likewise recommended Dr Sylvestre to Watt, providing his old friend with Edinburgh's philosophical news. Black asked Watt's kind concern for Sylvestre who had spent two winters with them. Black added, "[Sylvestre] left Geneva in consequence of late Disturbances in that City and change of Government which followed but he proposes to revisit it this Summer and will see your Son [James]." Though Black claimed a dearth of news, he noted that James Hutton "read two papers in our Philosophical Society which are much taken notice of—The Subject is the formation of fossils and the changes which our Globe has undergone—I believe he will be persuaded to print them soon."⁸⁶ The 1780s were an exciting period for Enlightenment science.

Despite Guyot and Black's introductions and intentions, James Watt was away in London while Sylvestre arrived in Birmingham.⁸⁷ Yet, this did not stop him from joining the notable number of Swiss visitors to Boulton & Watt's Soho manufactory.⁸⁸ Watt's absence also preserved a telling account of Sylvestre's past. The failure to find Watt and

⁸³ Walker's class-list notes only Sylvestre's surname, profession, and nationality. Eddy, "The University of Edinburgh." p. 116.

⁸⁴ BCL MS 3219/4/98/3 A. Guyot à James Watt, Edinburgh, 11 mai 1785.

⁸⁵ *Ibid.* Guyot noted that Sylvestre could be trusted to send a report on James Watt junior's progress, and was eager to transmit any item Watt or Dr Joseph Priestley desired sent to their sons in Geneva.

⁸⁶ BCL MS 3219/4/44 42. J. Black (Edinburgh) to J. Watt snr, 10 June 1785.

⁸⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to William Reynolds, 19 July 1785.

⁸⁸ Jones, "Knowledge and Technology Transfer," pp. 39-41.

already desperate situation forced Sylvestre into directly contacting Watt. In light of high expectations raised by Guyot, Sylvestre sought to meet and profit from Watt's council. Sylvestre's intention was to establish a medical practice in England, but he required advice on how to accomplish this feat.⁸⁹

Sylvestre shared his account of political exile and medical accomplishments with Watt. This contrasted to the vitriol Sylvestre expressed against Geneva's ruling oligarchy. He had completed four years study at Montpellier, and a year's practice in Geneva.⁹⁰ It was, Sylvestre conceded, "not without success, till the change of Government drove me for ever [*sic*] from my native Country."⁹¹ The Swiss exile colony in Ireland led Sylvestre to Edinburgh. After two years he reached the limit of what he could add to his medical knowledge. Ireland was closed, as the colony scheme proved abortive, and Geneva remained undesirable. Sylvestre was returning only to sell his land to take up travelling.⁹²

Two members of the British-Franco-Swiss network who Sylvestre befriended in Edinburgh took up his cause. Beddoes and Guyot intervened before Sylvestre put his plan of nomadic life into action. Sylvestre informed Watt:

In the meanwhile Mr. Beddoes a fellow of Pembroke's College Oxf. [*sic*] Who has already distinguished himself by some translations of Spallanzani, Bergman & having honoured me with his friendship was moved by the singular distress of my unsettled situation, & suggested to me the idea of settling at Bradley in Shropshire, where [Beddoes] seemed to have a considerable influence which he promised me to exert out warmly in my favour.⁹³

⁸⁹ BCL MS 3219/4/98 5. P. Sylvestre (London, Holborn) to J. Watt (Birmingham), 14 Thursday July 1785.

⁹⁰ *Ibid.*

⁹¹ *Ibid.*

⁹² *Ibid.*

⁹³ *Ibid.*; Beddoes translated Lazzaro Spallanzani's (1729-99) *Dissertation relative to the natural history of animals and vegetables* (1784), Torbern Bergman's (1735-84) *A dissertation on elective attractions* (1785), and Carl Scheele's (1742-86) *Chemical essays* (1786). M. D. Eddy, "The University of Edinburgh." p. 99. Other members of the British-Franco-Swiss network translated works by Bergman and Scheele. See Bertel Linder and W. A. Smeaton, "Schwediauier, Bentham and Beddoes: Translators of Bergman and Scheele," *Annals of Science* 24, no. 4 (1968), pp. 259-67.

This report may represent the first account of Beddoes given to Watt, or any member of the Lunar Society.⁹⁴ Sylvestre also shared his plans with Guyot who recommend John Wilkinson (1728-1808), a leading ironmaster, with great influence in that part of Britain. Guyot directed Sylvestre to see the region on his Midlands trip, and above all, to call upon Watt.⁹⁵ Sylvestre's departure for Geneva was set for the beginning of August. He concluded to Watt: "I should be happy to be charged with some commission" for James Watt junior.⁹⁶ Watt did not know Sylvestre, but endeavoured to help the desperate fellow. It came from the duty Watt felt as a citizen of the Republic of Letters. Watt relied on others to assist James on the Continent. In exchange for aiding Sylvestre, Watt requested something he desperately desired: information on James's progress in Geneva.

Sylvestre, counselled to start a practice in Broseley, was recommended to John Wilkinson, Joseph Priestley's brother-in-law. With Wilkinson away, Watt appealed to another friend and Shropshire ironmaster, William Reynolds (1758-1803), for advice on Sylvestre's plan.⁹⁷ He learned from Reynolds and other sources that Broseley had a physician, but not sufficient gentry to support two doctors. Yet, Watt explored other options and found that the best was Shrewsbury. Watt advised Sylvestre to visit, become familiar with its residents, and promised to provide any help he could give. Ultimately, Watt learned that a doctor starting out in England was fortunate to "get his bread by his practice" in seven years. His commission for Sylvestre in Geneva, in turn, was "to enquire after [James] & if not too much trouble then you will write me how he behaves

⁹⁴ Levere notes that Beddoes and Erasmus Darwin began corresponding in 1787. By 1793 Beddoes and his work were known to Watt, James Keir, and Josiah Wedgwood. Levere, "Dr Thomas Beddoes," pp. 210-2.

⁹⁵ BCL MS 3219/4/98 5. P. Sylvestre to J. Watt snr, 14 July 1785.

⁹⁶ BCL MS 3219/4/98 5. P. Sylvestre to J. Watt, 14 July 1785.

⁹⁷ BCL MS 3219/4/123 J. Watt (Birmingham) to W. Reynolds, 19 July 1785.

and what progress he had made in his studies.”⁹⁸ Watt also asked Sylvestre to pass on his regards to several “Gentlemen at Geneva” for their kindness to James. They included Guillaume-Antoine Deluc (1729-1812), Dr Louis Odier, and M.-A. Pictet.⁹⁹ After finding a mixed response to his scheme in Britain, and an improved situation at home, Sylvestre stayed in Geneva. Yet, he did not avoid revolutionary violence. It erupted again, this time seemingly from a political rabble, in the turbulent 1790s.

Like many other Swiss, Dr Pierre Sylvestre left Geneva because of disdain for its government and political unrest. His politics had precluded advancement in Geneva. Yet, his proclivity for natural philosophy earned him sanctuary in Scotland. Beddoes and Guyot gave Sylvestre access to British contacts and assistance as he tried to establish a medical practice. Guyot’s own British connections resulted from the auspices of J.-A. Deluc, who left Geneva only a decade earlier and entered the orbit of the Lunar Society. Remarkably Sylvestre, Beddoes, and Guyot became friends in Edinburgh, to which none of them were native, as Sylvestre lived in political exile. It was a harbinger of things to come. Within a decade Beddoes and Guyot, like many other members of the British-Franco-Swiss network, faced political persecution. They suffered professional and personal losses during the turmoil of the revolutionary period.

7.8. Conclusion

Stephen and Benjamin Delessert’s British Grand Tour was, as their mother predicted, fundamental for their future success. Two of the family’s primary legacies were their contributions to French industry and European botany. The year that the brothers spent in Birmingham, and two years studying at the University of Edinburgh, shaped these

⁹⁸ BCL MS 3219/4/123 J. Watt (Birmingham) to P. Sylvestre, (Holborn), 24 July 1785.

⁹⁹ BCL MS 3219/4/123 J. Watt (Birmingham) to P. Sylvestre, (Holborn), 24 July 1785.

accomplishments. As wealthy bankers the Delesserts could afford to send their sons abroad to study, yet the British tour was a product of their cultural currency. They were participants in the Enlightenment, relying on connections through the Republic of Letters. Consequently, the Delesserts were cognisant of pioneering advancements across the Channel, and in a unique position to capitalize on this knowledge.

Dr Pierre Sylvestre's account of James Watt junior's progress in his education in Geneva does not seem to have survived. They did meet in Geneva, as Sylvestre delivered a letter from Stephen Delessert to James.¹⁰⁰ Sylvestre was an early, if obscure, traveller along the entirety of the British-Franco-Swiss network from Edinburgh to Geneva. Evidence of Guyot and his pupils' progress in Scotland has survived because Sylvestre carried letters from Edinburgh to Birmingham and Geneva. These manuscripts have been maintained in the Boulton and Watt archives, which also provide abundant information on the education of James Watt junior and Matthew Robinson Boulton on the Continent. The tours of Benjamin and Etienne were similar to those of the Rochefoucauld brothers, who kept journals of their English and Scottish tours, which were later found and published.¹⁰¹ Similarly, later tours in England and parts of France by members of the Delessert family were recorded in travel journals.¹⁰² Unfortunately, Benjamin and Stephen, like Matthew Robinson and James, did not record travel journals. The Boulton and Watt correspondence can be understood in relation to that of the Delesserts. Their role, in facilitating Continental connections for Watt and Boulton, will next be explored.

¹⁰⁰ BCL MS 3219/6/2 D. S. Delessert to J. Watt jnr, 11 June 1785.

¹⁰¹ La Rochefoucauld and La Rochefoucauld, *Innocent Espionage*; Alexandre de La Rochefoucauld, *To the Highlands in 1786*; La Rochefoucauld and Rochefoucauld, *A Frenchman's year in Suffolk*.

¹⁰² AP MS AFD V13S 5 Sophie Delessert (1796-1877), *Journal de voyage d'un séjour à Londres* (1826), pp. 1-89; *Ibid.*, 4. François Marie Delessert, *Journal de voyage aux Pyrénées en 1836*, pp. 1-35. 20 juillet-17 septembre 1836; *Ibid.*, 5 Sophie Gautier *Journal de voyage dans le midi et en France*, 1834, pp. 1-28. 25 août au 1 octobre 1834.

8. ‘That They may be Mutually Serviceable to one Another Through Life:’ James Watt junior’s Practical Education in Europe

Eighteenth-century England was a leader in industrial development, but lagged behind other countries in education. The deficiencies of English boarding schools, as well as its universities, led some parents to send their sons abroad. This included James Watt junior, who crossed the English Channel to Calais on 23 November 1784.¹ James made this inaugural crossing, to begin a practical education on the Continent, when he was fifteen-years-old. He reported to his father after landing in France: “We left Dover this morning about 5 O Clock and arrived here by 10, the wind being due North, the sea was very turbulent, and my stomach was not much better, for I was very sick at intervals during the whole voyage, as was also the Count Andreani.”² Paolo Andreani (1763-1823) of Milan, was one of James’ fellow travellers. The failed Genevan revolution of 1782, and 1783 Peace of Paris ending America’s revolutionary war, created a rush of traffic. The Watts were inadvertent beneficiaries of the Swiss diaspora, relying on *savants* from Geneva to Edinburgh to organize James’ instruction. Ultimately, the most important lesson Watt hoped to inculcate in James was their debt to the goodwill of this Enlightenment network.

8.1. James Watt Junior’s First Foray onto the Continent

James Watt junior’s two travelling companions were natural philosophers and aeronauts. Count Andreani made the first Italian hot-air balloon launch in 1784. Over the next few decades he continued to partake in Enlightenment traffic, travelling around Europe and making at least two tours in North America.³ A second travelling partner was naturalist

¹ BCL MS 3219/4/11/3 J. Watt jnr (Calais) to J. Watt snr (Birmingham), 23 November 1784.

² *Ibid.*

³ Paolo Andreani, *Along the Hudson and Mohawk: The 1790 Journey of Count Paolo Andreani*, ed. Cesare R. Marino and Karim M. Tiro (Philadelphia: University of Pennsylvania Press, 2006), pp. 1-7; G. Hubert Smith, “Count Andreani: A Forgotten Traveler,” *Minnesota History* 19, no. 1 (1938), pp. 34-42.

and geologist Barthélemy Faujas-de-Saint-Fond (1741-1819). He took part in the first hydrogen air balloon flight, by the *Académie française*, on 27 August 1783 in Paris.⁴

Saint-Fond's account of his own British Tour (recording customs, natural history, and industries) included a revealing section on Birmingham.⁵ Its industries were increasingly drawing welcome and unwelcome attention from foreign visitors.⁶ Saint-Fond recounted: "As we were preparing to leave Birmingham, Mr. Watt requested to know whether we could take under our care one of his sons, who was to go to Paris, and thence to Geneva."⁷ Their journey south took them to London. From there they set out for Paris, arriving five days later. The party then separated: Andreani prepared for his return to Milan, James left for Geneva, and Saint-Fond stayed in Paris. At least that is how Saint-Fond concluded the first volume of *Travels in England, Scotland, and the Hebrides* (1797).⁸ Yet this account concealed much of the story. The request to take James, and his addition to their party, did not occur until they all were in London. Furthermore, Watt did not make the request directly to Saint-Fond, but through a Swiss intermediary.

James Watt junior connected with Franco-Swiss *savants* upon arriving in Paris, through a burgeoning bourgeois network. He cited his obligation to Ami Argand for recommending him to Saint-Fond's care.⁹ Argand, a Swiss inventor, was part of the first hot-air balloon launch in Paris.¹⁰ This help to James was not free, as he fulfilled a vital Enlightenment function of transmitting letters, including ones for Argand and J.-A. Deluc

⁴ RSL MS CB/1/3/262 D47 Marguerite-Madeleine Delessert (Passy) to Charles Blagden, 31 August 1783. For early flights and Saint-Fond's role see Gillespie, "Ballooning in France and Britain," pp. 249-59.

⁵ Barthélemy Faujas-de-Saint-Fond, *Travels in England, Scotland, and the Hebrides: undertaken for the purpose of examining the state of the arts, the sciences, natural history and manners, in Great Britain* (London: James Ridgway, 1799), pp. 338-52.

⁶ Saint-Fond was also guilty on this score. See Harris, *Industrial Espionage*, pp. 530-1.

⁷ Faujas-de-Saint-Fond, *Travels in England*, p. 349, 352.

⁸ *Ibid.*, p. 352.

⁹ BCL MS 3219/4/11/4 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 27 November 1784.

¹⁰ Wolfe, *Brandy, Balloons & Lamps*, pp. 6-20.

to important *savants* in Geneva.¹¹ After arriving at Count Andreani's house James, on Argand's instructions, sought out Mme Delessert's brother-in-law: Guillaume Mallet (1747-1826).¹² Mallet, a banker in Paris and grandson of a Genevan bourgeois drawn to France,¹³ took James to Passy, a suburb of Paris, to meet the Delesserts.¹⁴ James stayed there for over a week, awaiting the departure of the diligence. In Lyon, James lodged at another house owned by Etienne Delessert, until passage was arranged to Geneva.¹⁵

8.2. James Watt's Early Dedication to his son's Early Education

Historians have examined important aspects of James Watt's concern for his eldest son's conduct and education,¹⁶ but not the role played by the Delessert family and Abraham Guyot. Watt was aware of the deficiencies in English schools and also abandoned plans of sending James to Scotland. After befriending J.-A. Deluc in 1782, and through him the Delesserts and Guyot in 1783 and Argand in 1784, Watt attained a critical mass of Swiss friends. This cross-Channel and unofficial exchange program led Watt to declare to Mme Delessert: "It will prove a very great satisfaction to me to find the friendship which has commenced between your sons and mine increases with their years and that they may be mutually serviceable to one another through life."¹⁷ Watt's comments were prescient. The friendships expanded to their families, and beyond, surviving war and revolution.

¹¹ BCL MS 3219/4/11/4 J. Watt jnr to J. Watt snr, 27 November 1784.

¹² *Ibid.*; BCL MS 3219/4/10/4 A. Argand (London) to J. Watt snr (Birmingham), 11 November 1784.

¹³ Mallet's grandfather, a Geneva *bourgeois*, established a banking house in Paris to in 1723, which Mallet took from his father. Like Delessert, Mallet married a daughter of Julie de Boy de la Tour, was arrested during the French Revolution, released with the fall of Maximillion Robespierre (1758-94), and took part in French banking for decades. André Encrevé, *Les Protestants* (Paris: Beauchesne, 1993), pp. 309-10.

¹⁴ BCL MS 3219/4/11/4, J. Watt jnr (Paris) to J. Watt snr (Birmingham), 27 November 1784. On Mallet and Delessert see Coninck, *Banquiers et philanthropes*, pp. 14-5; Herbert Lüthy, *La banque Protestante en France, de la Révocation de l'Édit de Nantes à la Révolution* (Paris: S. E. V. P. E. N, 1959), p. 259.

¹⁵ BCL MS 3219/411/6, J. Watt jnr (Passy) to J. Watt (Birmingham), 5 December 1784.

¹⁶ Jones, "Living the Enlightenment," pp. 165-8; Musson and Robinson, *Science and Technology*, pp. 200-12.

¹⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to M.-C. Delessert, 1 December 1784.

Watt was grooming James for a future career and, not wanting James' vocation to be as precarious as his own, insisted on training in multiple subjects.¹⁸ By 1781, James was boarding at the school in Winson Green, fulfilling orders to send home samples of his drawing, hoping they would meet Watt's approval. Watt worried about handwriting and drawing, but agonized most about his son's comportment. His master, Rev. Henry Pickering, sent word home that Watt's instructions would be followed.¹⁹ This no doubt asked strict attention for James' behaviour and study. In early 1782, James informed Watt of his good health and academic progress, from Soho where Matthew Boulton invited James to spend the rest of the holiday.²⁰ James was frequently absent from home.

The exact date of James' removal from Winson Green is unknown, but Watt made several attempts to transfer James to other boarding schools.²¹ In 1784, when James was fifteen-years old, Watt sent him to John Wilkinson in Bersham. Wilkinson, aside from being an important supplier for Boulton & Watt engines, was one of Britain's foremost ironmasters. Watt explained his choice to his Scottish cousin, May Curry, in response to her inquiry about establishing her son as an engineer:

I sent my son to Mr Wilkinson's Iron works at Bersham in Wales, where he is to study practical bookkeeping, geometry & algebra, at his leisure hours and three hours in the day he works in the carpenters shop, I intend he should stay there a year, what I shall do with him next I know not but I intend to fit him for some employment not so precarious as my own. He has not yet manifested any thing

¹⁸ BCL MS 3219/4/123 J. Watt snr (Birmingham) to May Curry, 30 May 1784.

¹⁹ BCL MS 3219/4/10/21 J. Watt jnr (Winson Green) to J. Watt snr (Cornwall), 19 September 1781.

²⁰ James studied Latin, Greek, algebra, and Euclidian geometry, which he worked on with a master as the other boys slept. BCL MS 2319/4/10/22 J. Watt jnr (Soho) to J. Watt snr (Cornwall), 6 January 1782.

²¹ Watt looked for a school to focus more on James' conduct, as Winson Green had too many pupils. Dr William Withering suggested Rev. Robert Deane's school at Shiffnall. Watt contacted Deane, noting James as a decent scholar for his age, who did well in writing, arithmetic, and Latin. Beyond further lessons in these areas, Watt wanted James taught Euclidian Geometry to prepare him for sciences. Watt also wanted "strict attention be paid to his manners and morals these being the most essential and also the prevailing reason with me to remove him from a public school." BCL MS JWP C1/27. J. Watt snr (Birmingham) to Robert Deane (Shiffnall), 2 November 1780. It does not appear that James attended Shiffnall, as Watt continued to inquire into others schools. Musson and Robinson, *Science and Technology*, pp. 202-2.

which may be called genius, but he has abilities to learn any thing. Draws tolerably, and writes a good letter in good stile [*sic*]: he is however a lad slower and rather indolent though he enjoys very good health.²²

Watt was less diplomatic with James, who often received reprimands about his conduct.

In April 1784, James arrived in Wales to begin practical training at Wilkinson's ironworks.²³ James' updates to Watt documented practical work, studies, and events at Bersham. Practical application included bookkeeping, copying business leases, and work in the carpenter's shop.²⁴ Nevertheless, Watt chastised James for not providing specifics on his studies or progress in carpentry, and improper grammar and economy in his letters. Watt also scolded James for providing too much information on Wilkinson's shipments of iron and other cargo to France.²⁵ Watt told James:

I hope you will consider that you are under very great obligation to Mr Wilkinson for permitting you to be instructed at his works and in great measure at his expense and that therefore it is your duty, to do him every service in your power, and to be as usefull as you can without being officious; such conduct is the sure way to be esteemed and in fact will prove the most usefull to yourself.²⁶

Watt endeavoured to both maintain business relationships and improve James' training.

The mixed results of James' instruction left Watt determined to send his son abroad. Watt had removed James from his English boarding school to send him to Wales. Practical instruction at Wilkinson's ironworks was valuable, but James needed further organized study. James was thus recalled from Bersham early, after only six months, instead of the intended year.²⁷ As Watt held English schools in low esteem, and partly

²² BCL MS 3219/4/123 J. Watt snr to May Curry, 30 May 1784.

²³ BCL MS 3219/4/10/23 J. Watt jnr (Bersham) to J. Watt snr (Birmingham), 2 May 1784.

²⁴ James' studied physics and optics, geometry, algebra, math, Greek, history, geography, and Latin. In the shop he used the gage, tenor, and mallet, helped put down a new floor, worked on a lathe, and had built a number of items. BCL MS 3219/4/10/24 J. Watt jnr (Bersham) to J. Watt snr, 10 May 1784.

²⁵ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 29 May 1784.

²⁶ *Ibid.*, James apologized for speaking about Wilkinson's business. Practical lessons at Bersham were not restricted to the carpenter's shop. BCL MS 3219/4/10/28 J. Watt jnr (Bersham) to J. Watt snr, 6 June 1784.

²⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr [Bersham] 17 October 1784.

responsible for James' poor conduct,²⁸ the options left were to send him north to Glasgow or south to the Continent. Sending James abroad provided an opportunity to complete his education as well as to expand Boulton & Watt's business.

8.3. The Dilemma of Glasgow or Geneva, and A Delineation of Tasks

James Watt's personal ties to Glasgow made Scotland both an attractive and problematic choice for his son's instruction. In August 1784, Watt consulted Gilbert Hamilton about his intentions for James' education in Scotland:

I have had my son Jimmy at Bersham his summer learning to work with his hands a little, and also getting some lessons in Algebra & geometry from a person who is clerk there, but as it is an improper place for him to stay long at and as I propose to give him a little more school learning I have some intention of sending him to Glasgow this winter if a proper place can be got to board him at, where his manners and education will be attended to, at an expense which I can afford. I thought of applying to my old friend G. Jardine, but am told he does not commonly take in boarders & in consequence his price would probably be high.²⁹

This was George Jardine. He had gone to France in 1771, as a travelling tutor for two young noblemen.³⁰ Tutoring, along with translating and journals, remained a popular method for young men to establish themselves throughout the Enlightenment.

Morality was the main factor in Watt's decision on where to send James for his education. Hamilton's response helped Watt decide, as he explained: "I was in some doubt whether I should send my son to Geneva or Glasgow, before I wrote to you, but your letter has now determined me for the former, not that the expense will be so little as you seem to imagine, but because his morals are in less danger of being corrupted

²⁸ BCL MS 3219/4/123 J. Watt snr (Birmingham) to L. Odier, 1 May 1785.

²⁹ BCL MS 3219/4/123 J. Watt (Birmingham) to G. Hamilton, 25 August 1784. Watt came to see Bersham as improper for James. The causes were James' injuries, illness, as well as a decline in his studies and letters. BCL MS 3214/4/10/39 Watt jnr (Bersham) to J. Watt snr (Birmingham), 19 September 1784.

³⁰ By the 1780s Jardine became Professor of Logic at Glasgow University. He had been a preferred student of Adam Smith, who helped arrange the tutorship. George Elder Davie, *The Democratic Intellect: Scotland and her Universities in the Nineteenth Century* (Edinburgh: Edinburgh University Press, 1999), p. 10.

there.”³¹ Watt was weary of the cost, but James’ behaviour concerned him most. In Geneva, Watt added, there was “the advantage of learning french; as to the danger of learning Scotch at Glasgow.” Watt also had concerns about Geneva, despite its benefits. He was uneasy about “the want of Good schools of Natural philosophy & Chemistry particularly the latter and the danger of meeting there with those English bucks which have corrupted almost all Europe.”³² Ultimately, Watt was able to rely on the British-Franco-Swiss network to isolate James from such threats.

In October 1784, Watt determined to send James to Geneva. Watt’s past services to this network enabled such patronage. In turn the network gave Watt confidence that James would be shielded from the negative influence of English rakes in Geneva. Watt explained to Hamilton: “However, I think that now I can take measures to prevent that and confine him to the company of Genevans which the connection I have formed with Mr De Luc & others will facilitate. I have therefore begged of that Gentleman to write about a proper place for him to be at & some proper person to take care of him.”³³ Watt called on Swiss friends in the order he had made their acquaintance. He delineated tasks clearly, repeating the maxim “too many cooks spoil the broth,” and sought assistance according to ability. The Deluc brothers were to arrange James’ Geneva lodging, Guyot was to attain introductions and information on education, Mme Delessert was to aid with lodging in Paris as well as passage to Geneva and recommendations, and Argand was to attain letters of credit and suitable passage for James from London to Paris. The banker William Matthews (d. 1792), the only British assistant, joined Argand in this task.

³¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 17 October 1784.

³² BCL MS 3219/4/123 J. Watt snr to G. Hamilton 17 October 1784.

³³ *Ibid.*

Deluc was Watt's primary link to Geneva and the first person he asked for help. Upon deciding against Glasgow, Watt reverted to his former plan of Geneva, and asked Deluc to contact his friends immediately to find a boarding house for James. Seeking to limit expenses Watt requested that it be lodging "not as Mi lord anglais, but as the son of a british artist."³⁴ Joseph Priestley junior lodged in Geneva for £36 a year. Watt was willing to let James stay a year if cheaper rent was found. James was to study chemistry and natural philosophy, if they were taught, as well as bookkeeping and drawing.³⁵ The most important requirement, Watt noted, was a tutor: "My son requires one who will both direct his attention to proper objects and compel him to follow them, he does want abilities and can apply when he finds he must do so." Watt also requested that James be introduced to "such men of science as can bear to be plagued with the occasional visits of a boy."³⁶ Watt wanted James to stay where his conduct would be supervised, as opposed to a preceptor, who would do so peripherally.³⁷

By late October, Watt located a residence for James in Geneva. Deluc secured the same pension he had found in 1783, for George Adams junior, a mathematical instrument maker.³⁸ His brother, Dudley Adams (1762-1830), lived there for two years, and later joined the family business.³⁹ He boarded with Antoine Du Villard (1760-1842), who also

³⁴ BCL MS 3219/4/123 J. Watt (Birmingham) to J.-A. Deluc, 17 October 1784.

³⁵ *Ibid.* James was adequate in Latin and familiar in Greek, drawing, geometry, and algebra. He did not speak French and would, Watt noted, have to learn by immersion as Frances Deluc did in Birmingham.

³⁶ *Ibid.*

³⁷ *Ibid.*

³⁸ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Argand, 31 October 1784.

³⁹ Millburn notes that Dudley lived in Geneva for two years, but not the exact date, positing three points: prior to 1777 when Dudley was a child, between his apprenticeship's end in 1784 and marriage in 1787, or after his 1817 bankruptcy. Millburn suspects the 1780s, but possessed no proof. Millburn, *Adams of Fleet Street*, p. 322. Watt's efforts to place James in Geneva prove this suspicion. G.-A. Deluc told Watt that he hoped to attain the same price for him as was given to "M^r. Adams a brother to your famous instrument-maker." BCL MS 3219/4/10/7 G.-A. Deluc (Genève) à J. Watt (Birmingham), 21 décembre 1784.

taught him mathematics.⁴⁰ Watt had Deluc tell Du Villard to prepare to receive James, and sought Matthews and Argand to find someone to take James to Paris or Geneva.⁴¹

The concern permeating Watt's preparations for James' education in Geneva was protection. The aim was to insulate James, on each part of his journey, from temptation and negative influences. Watt sought help from Argand:

Now my dear Sir, as it is of great consequence that a boy of 15 going into a foreign country where he does not understand the language nor manners of the people should have a prudent conductor who may keep him out of scrapes and keep him from being imposed upon. I will be much obliged to you to add your inquiries to those of Mr Matthews to see if you can find some person you know something about that is going and will take a little care of him I think that I can promise that he will not be very troublesome except in so far as may arise from his ignorance of his Language.⁴²

Watt's anxiety had him also enlist J.-H. Magellan to locate a traveller going to Geneva or Paris.⁴³ The Portuguese natural philosopher had a vast network of acquaintances. It was Watt's hope that Magellan, Matthews, or Argand would find a person they knew who was travelling to Geneva or Paris. Watt did not want to trust James fully to the care of people operating the stagecoaches.⁴⁴ Besides threats on route were those in each city.

Watt's relationship with Argand differed from that of other Swiss friends. Argand went to England to promote a lamp invention and to secure partners, manufacturers, and a patent.⁴⁵ Watt was a vital contact. Argand, surpassing Watt's wishes, tried to monopolize all aspects of James's education. For funds in Paris, Watt informed his banker Matthews,

⁴⁰ BCL MS 3219/4/123 J. Watt to A. Argand, 31 October 1784. Antoine DuVillard tutored pupils, rented lodging and board to foreign students, and taught at the college. In 1783 DuVillard became a regent at the *collège*. He became an adjunct professor of *belles lettres* at the *l'Académie de Genève* in 1797, and a full professor in 1798 until his retirement in 1829. Candolle, *Mémoires*, p. 67, n. 50.

⁴¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to W. Matthew, 31 October 1784; *Ibid.*, J. Watt to A. Argand, 31 October 1784.

⁴² *Ibid.*

⁴³ BCL MS 3219/4/123 J. Watt snr to Mr Matthews, 31 October 1784.

⁴⁴ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 2 November 1784.

⁴⁵ BCL MS 3219/4/10/4 A. Argand (Londres) à J. Watt snr (Birmingham), 11 novembre 1784. Wolfe, *Brandy, Balloons & Lamps*, pp. 12-20.

a “letter to the friend” James was staying with would “be sufficient, he being a banker of note (M^r Delessert).”⁴⁶ Argand tried to take over James’ banking needs, recommending his good friend Guillaume Mallet, who spoke English and was a main Paris banker.⁴⁷ Only later did Argand admit to Watt that Mallet was in fact Mme Delessert’s brother-in-law.⁴⁸ Watt relented to let Argand be James’ banker in Geneva, expressing uncertainty,⁴⁹ and left it to Matthews and Argand to figure out James’ credit for Paris.⁵⁰ Argand also proposed that James board with Mallet. Watt refused preferring to rely on the hospitality of Mme Delessert, who was under a like obligation to him, not that of Mallet, whom Watt did not know and whose kindness he may not be able to repay.⁵¹

An example of Argand’s effort to please Watt was with James’ boarding and education in Geneva. Argand was unfamiliar with the pension rented by Dudley Adams, promoting that of Gaspard Roman (1740-?). He was a regent at the *collège de Genève*, who could direct James’ education and teach him philosophy, math, and literature. This plan would allow James to take chemistry courses from Argand’s friend, Pierre-François Tingry (1743-1821), and public lectures from Horace-Bénédict de Saussure (1740-99). Argand argued that this would be a superior course of study.⁵² Watt was happy to have Argand provide James introductions for Mallet, Roman, Saussure, and Tingry. As to James’ lodging Watt concluded: “I have given the care of that to Mr Deluc at Geneva & will not interfere in it any further as too many cooks spoil the broth.”⁵³ Argand’s effort to

⁴⁶ BCL MS 3219/4/123 J. Watt to W. Matthews, 31 October 1784.

⁴⁷ BCL MS 3219/4/10/1 A. Argand (Londres) à J. Watt snr (Birmingham), 2 novembre 1784.

⁴⁸ BCL MS 3219/4/10/4 A. Argand to J. Watt snr, 11 November 1784.

⁴⁹ BCL MS 3219/4/123 J. Watt snr to W. Matthews, 13 November 1784.

⁵⁰ *Ibid.*

⁵¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Argand, 5 November 1784. *Ibid.*, J. Watt snr (Birmingham) to J.-A. Deluc, 4 November 1784.

⁵² BCL MS 3219/4/10/1 A. Argand à J. Watt snr, 2 novembre 1784.

⁵³ BCL MS 3219/4/123 J. Watt to A. Argand, 5 November 1784.

earn Watt's favour, by seeking to help in every aspect of James' tour, threatened to subvert Watt's plan. It required a clear division of labours to function properly.

8.4. Guyot's Advice on Geneva and An Insulated Engineer's Education

Many elements of James Watt junior's education remained in flux as his father agonized over its best course. The most consistent part was content. Watt senior was resolute on what James was to study, leading to clear inquiries for contacts. Geneva was the best location, Abraham Guyot noted, for James to learn French and sciences. The chemistry course had been established for several years, and Guyot thought mathematics was taught in French, with physics classes given in Latin. Guyot apologized for vague information on instruction in Geneva, fearing that it had changed considerably since his departure.⁵⁴

Guyot provided crucial introductions for James. One was to E.-S. Reybaz, a Genevan man of letters living in Paris who saw Mme Delessert often. Guyot promised to have them procure further information and letters, for Geneva, before James arrived in Paris. Another recommendation was Jean Senebier (1742-1809),⁵⁵ naturalist and librarian for Geneva,⁵⁶ who Guyot noted, "would surely take pleasure in being useful to a young traveller, and to facilitate his usage of the public library."⁵⁷ The Delesserts were in closer

⁵⁴ BCL MS 3219/4/10/2 A. Guyot (Édimbourg) à J. Watt (Birmingham), 4 novembre 1784.

⁵⁵ *Ibid.*

⁵⁶ Senebier participated in an exchange of works and description of experiments with Joseph Priestley. In 1783 Senebier sent his book, on experiments revealing the role of sunlight in changing fixed air through plants to pure air, to Priestley. The copies took almost a year to reach Priestley, finally being delivered by Senebier's relation, a London merchant, and Count Andreani of Milan. Priestley sent materials by his son Joseph and James Watt junior, as they each travelled to Geneva to study, and Argand lamps to Senebier. Priestley relied on Senebier as a liaison, as Joseph's uncle William Wilkinson transported him to and from Geneva, leaving Priestley few details of Joseph's arrangements. BGE Ms Suppl 1040 LJS f. 144-55; J. Priestley (Birmingham) to J. Senebier (Bibliothécaire à Genève), 24 November 1783 - 11 September 1785.

⁵⁷ BCL MS 3219/4/10/2 A. Guyot à J. Watt, 4 novembre 1784.

contact with Geneva. Therefore, Guyot encouraged Watt to seek their aid, as if he knew them personally.⁵⁸

Guyot improved the information he sent to Watt with the help of a fellow member of the Swiss diaspora: Dr Pierre Sylvester. With this input, Guyot stated that public students in Geneva learned in a similar manner as when he was there. The *Collège de Genève* taught basic classes in languages. Superior courses, *Auditoires*, were taught at the *l'Académie*. All courses were free and James would only have to pay a small amount to register and to use the library. The chemistry course offered by the *Société des arts* was public, but distinct from the *Académie*. The course was interrupted by Geneva's political troubles of 1782, but had likely been re-established. Physics was taught, though without experiments. H.-B. de Saussure had long since stopped giving courses, but showed some experiments near the end of his public courses. M.-A. Pictet, who alone possessed the necessary instruments, taught the course in experimental philosophy.⁵⁹ Guyot desired that James call on Pictet, a "physicist who is a man of great merit in all respects." If an introduction could not be had from the Delucs, Guyot concluded: "I myself will write to M^f Pictet; though I have not had the pleasure to see or to write to him in 20 years when chance found me as his preceptor for several months."⁶⁰ Pictet was a useful contact.

Watt's fixation on James' education came from a desire for his independence. An inability to afford gentlemanly instruction balanced with a concern for James' behaviour, which would become worse if he moved in genteel circles. Watt did not want James to

⁵⁸ *Ibid.*

⁵⁹ Students took the *Auditoires de belles lettres* for a year, but younger students who came from the *Collège* took them for two years. When students completed a year, they took courses in the philosophies, taught in three sections over two years. The professors taught logic and physics in Latin and mathematics in French. BCL MS 3219/4/10/3 A. Guyot (Édimbourg) à J. Watt (Birmingham), 7 novembre 1784.

⁶⁰ Guyot assured Watt that mathematics and language tutors were easily found at a reasonable price in Geneva, if they were not available in the pension where James lodged. *Ibid.*

become accustomed to affluent travel, as it would waste money and lead to dissipation.⁶¹ This is also why Watt chose the pension secured by the Delucs. Watt's plan and finances did not permit frivolity in James' education. Watt thought English youth as "generally too liberally supported with money to do much good." Conversely, Watt was giving James "a liberal Education but not that of an independent Gentleman, for he must work his way through the world."⁶² This regulated both the form and content of James' education.

Watt's orders displayed a duality faced by most Lunar men. They wanted their sons to have liberal but not libertine educations. James was to be exposed to the cultural elements of the Enlightenment, and practical training to groom him for a career and independence. Watt's intention was, he informed G.-A. Deluc, "to breed my son to be an Engineer/Mechanic. Therefore his studies should be directed principally to that end."⁶³ Watt wanted James to study four areas: French and drawing concurrently, general mathematics that focused on calculation and geometry, physics or natural philosophy focused on chemistry and mechanics at public lectures, and merchant accounts. If he struggled in these studies Watt concluded: "I must put him to some business where less science is required."⁶⁴ Watt was practical in parenting, as he was in science.

If a tutor was demanding, Watt assured G.-A. Deluc, then James would be obedient avoid indolence. Equal monitoring was needed for his behaviour and finances. James would have to support himself and Watt could not spend excessively on his education. Thus, he desired James only expend as much money as needed to attain

⁶¹ BCL MS 3219/4/123 J. Watt to W. Matthews, 31 October 1784.

⁶² BCL MS 3219/4/123 J. Watt to A. Argand, 5 November 1784. *Ibid.*, J. Watt to J.-A. Deluc, 4 November 1784.

⁶³ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G.-A. Deluc (Geneva), 14 November 1784.

⁶⁴ James was to first learn French so he could understand the content of the lectures in natural philosophy. *Ibid.*; BCL MS 3219/4/123 J. Watt to A. Argand, 14 November 1784.

necessary knowledge. To this end G.-A. Deluc was given full discretion in the management of James' finances, parental authority, and selection of a boarding house.⁶⁵

8.5. The Delessert Network Assists James Watt junior on the Continent

James' first impressions of France were adverse. He disliked Calais' narrow streets and old houses, but its ramparts impressed him. The depiction he sent Watt was similar to famous print by the popular English satirical artist William Hogarth (1697-1764): *The Gates of Calais, or O! The Roast Beef of Old England* (1748), complete with a visit by a Capuchin monk.⁶⁶ James was aware of the similarity, and made allusions to the print owned by Watt. The influence of Hogarth and nationalism, mixed with James' travel with a Frenchman and an Italian, shaped his first impressions. Saint-Fond and Count Andreani grumbled about English customs and "no good Roast Beef, no good potatoes." James thought their tastes opulent, and French cuisine opaque and distasteful.⁶⁷ As James departed Calais, however, Hogarth's anti-gallican spell was broken.⁶⁸ James' opinions of France and its people shifted as he drew closer to Paris.

James impressions of France improved markedly after he met the Delesserts. His travelling party reached Paris on 27 November.⁶⁹ After James met the rest of the family, having befriended Stephen and Benjamin in England, James told Watt:

M^{rs}. Delissaire is exceedingly like M^r. Stephen Delissaire in the face; there are three children at home besides Miss Delissaire two Boys and a Girl the eldest boy & girl are very much like their Brothers and have the same defect in their speech;

⁶⁵ *Ibid.*

⁶⁶ BCL MS 3219/4/11/3 J. Watt jnr (Calais) to J. Watt snr (Birmingham), 23 November 1784. Streets were empty save old women dressed like Tahitians and soldiers. A monk gave Andreani a note in English asking charity. *Ibid.* Hogarth's monk was a Franciscan. Peter Wagner, "The Artistic Framing of English Nationalism in Hogarth's *The Gates of Calais, or The Roast Beef of Old England*," *Better in France*, p. 73.

⁶⁷ BCL MS 3219/4/11/3 J. Watt jnr to J. Watt snr, 23 November 1784.

⁶⁸ Hogarth's famous print resulted from his own French tour, begun at Calais after the peace of Aix-la-Chapelle (1748), and his fervent Francophobia. See Wagner, "The Artistic Framing," pp. 71-87; Jenny Uglow, *Hogarth: A Life and a World* (London: Fabre and Faber, 1997), pp. 461-7.

⁶⁹ BCL MS 3219/4/11/5 J. Watt jnr (Passy) to J. Watt snr (Birmingham), November 1784.

but the youngest is more like Miss Delissaire and is about 5 years Old; Miss Delessaire speaks English pretty well, but not very well, which I suppose is for want of Practice.⁷⁰

Mme Delessert was very pleased to care for James while he was in Paris. She saw it as a chance to repay Watt for the kindness he had shown her sons in Britain. J.-A. Deluc and Guyot had insisted that Watt send James to Mme Delessert in Passy, and she was pleased they had. James conversed with Mlle Delessert, who practiced mediocre English as he struggled in beginning French, and played with her younger siblings.⁷¹

James passage from Paris to Lyon took six days. Etienne Delessert's cousin J.-F. d'Arnal received James, cared for his affairs, and brought him to Delessert's Lyon house, where James lodged until his departure for Geneva.⁷² D'Arnal gave James a tour of Lyon, including its principle manufactures, upon which James reflected to Watt, "it is very well situated for Commerce, at the confluence of the Saone and the Rhone."⁷³ Upon d'Arnal's insistence they also went the opera, as James had missed it in Paris.⁷⁴ Lyon, Delessert's native city, remained a strategic point for their network, and for French industry.

James arrived in the small republic of in Geneva on 17 December. During James' first days he was cared for by G.-A. Deluc as well as Charles and Jacques Auziere (1755-1819), brothers-in-law of Ami Argand.⁷⁵ James lodged at the boarding house of Antoine

⁷⁰ *Ibid.* James initially spelled their name phonetically 'Delessaire,' by its French pronunciation. The other children he listed to were Alexandre, Jeanne-Émilie, and François. The last child, Gabriel was not yet born. James' perceptively described Alexandre and Émilie as like Stephen and Benjamin, who were first educated by Pierre Prévost. François, who James correctly figures to be about five-years-old, was more like Marguerite-Madeleine Delessert. *Ibid.* She was most responsible of his education. NLI MS 10166/7 313. M. Edgeworth (Paris) to Mary Sneyd, 31 October 1802.

⁷¹ BCL MS 3219/4/10/5 M.-C. Delessert (Passy) to J. Watt snr (Birmingham), 1 December 1784; BCL MS 3219/4/10/5 M.-C. Delessert to J. Watt snr (Birmingham), 18 November 1784.

⁷² BCL MS 3219/4/11/7 J. Watt jnr (Lyons) to J. Watt snr (Birmingham), 13 December 1784.

⁷³ James noted that the primary product manufactured in Lyon was great amounts of silk. *Ibid.*

⁷⁴ *Ibid.*

⁷⁵ BCL MS 3219/4/11/7 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 17 December 1784. The Auziere brothers received shares and managing roles in Argand's lamp company, despite lacking business acumen. Wolfe, *Brandy, Balloons & Lamps*, pp. 119-20.

Du Villard, but complained of its high price compared to that paid by Joseph Priestley junior.⁷⁶ Deluc assumed guardianship over James and cared for him in times of need. The other primary friend to James was Dr Louis Odier, who invited James to a dinner the day after his arrival. There James met professor Pierre Prévost, for whom James had letters from Mme Delessert. Prévost suggested, having learned from Mme Delessert that James was to study natural philosophy and mathematics, that James attend professor M.-A. Pictet's lectures. Odier concurred and agreed to discuss it with Pictet.⁷⁷ These strategic connections helped James to quickly settle in Geneva.

M.-A. Pictet was another significant connection James made in Geneva. James had letters for Pictet from J.-A. Deluc. Ignorance of French made James hesitant to take Pictet's lectures. Odier assured him that they chiefly consisted of experiments, and would greatly assist James to learn French.⁷⁸ Pictet gave James several introductions to fellow Swiss men of science. These included Jean Senebier and H.-B. de Saussure, to whom James delivered letters and copies of James Watt's paper on dephlogisticated air.⁷⁹ This was an Enlightenment exchange, providing James currency within Genevan science.

During James' stay he and other young Britons benefited from immersion in the vibrant atmosphere of Genevan natural philosophy. Librarian and naturalist Jean Senebier received James and suggested he follow the example of Joseph Priestley junior, "a very

⁷⁶ Dudley Adams paid six *louis* per month and the German boarders each paid five. Deluc believed Du Villard would charge James five *louis*. BCL MS 3219/4/11/8. J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 25 December 1784.

⁷⁷ *Ibid.*; BCL MS 3219/4/10/3 A. Guyot to J. Watt, 7 November 1784; BCL MS 3219/4/11/17 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 2 May 1785.

⁷⁸ James obtained Deluc's permission and attended the first lecture on 24 December. This introduction was on geometry and descriptions of instruments for the first subject of astronomy. The lectures were three times per week for four months. *Ibid.* James discusses the course throughout his stay in Geneva.

⁷⁹ *Ibid.* These men had received James with kindness. Pictet and Senebier asked James to visit them, and Saussure showed him civility. James thought Saussure's wealth and power made him arrogant. *Ibid.*

worthy youth.”⁸⁰ Joseph and James studied French four times a week at the hospital, where lessons were held,⁸¹ and subscribed to the library.⁸² James complained of struggles in mathematics, as Du Villard did not speak English and much time passed between lessons. Yet, James started the first book of Willem Jacob ‘s Gravesande’s (1688-1742) *Mathematical Elements of Physics* (1720) over so he and Joseph could learn physics together.⁸³ Ultimately James profited, as his father wished, by Joseph’s influence. When James sought to make a brief tour, around Lake Geneva with two gentlemen from Geneva, he noted that Joseph and Dudley Adams had made a full tour of Switzerland.⁸⁴

Adams was another influence on James in Geneva. The young Britons formed a bond, as there were few of them. The reasons, James informed Watt, was climatic:

There are few Englishmen in the town at present not a dozen in all, but there are a great many at Lausanne in Switzerland which is not very far from here; the reason that so many englishmen come here in the summer is not on account of the town, but of its environs which at that season are delightful. It is not as cold here as it is some times in England, though it freezes hard.⁸⁵

Three boarders (two noblemen and a servant) at Du Villard’s pension were German. Thus linguistic and social barriers limited James’ interactions with all but Adams, whom James sometimes relied on to translate. A growing displeasure with the pension did not improve James’ relations.⁸⁶ Watt directed James to speak with the German boarders to begin learning the language, as he was to be sent to Germany after Geneva. Yet, their nobility also acted as a barrier. James instead conversed in German with their servant.⁸⁷

⁸⁰ BCL MS 3219/4/11/8 J. Watt jrn to J. Watt snr, 25 December 1784.

⁸¹ *Ibid.*

⁸² Du Villard had a good library, but was very reluctant to lend his books to James. BCL MS 3219/4/11/9 J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 7 January 1785.

⁸³ BCL MS 3219/4/11/11 J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 8 February 1785.

⁸⁴ BCL MS 3219/4/11/17 J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 27 September 1785.

⁸⁵ BCL MS 3219/4/11/9 J. Watt jrn to J. Watt snr, 7 January 1785.

⁸⁶ *Ibid.*; BCL 3219/4/11/12 J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 22 February 1785.

⁸⁷ BCL MS 3219/4/11/11 J. Watt jrn to J. Watt snr, 8 February 1785.

Adams was seven years older than James, but they shared remarkable similarities and formed a friendship. James found Adams pleasant and unassuming, despite having control of a considerable fortune.⁸⁸ It came from a very successful instrument business. Adams' father had apprenticed as mathematical instrument maker in London. George Adams senior's (1709-72) shop on Fleet Street became one of the greatest in the world. His death, when Dudley was young, had Dudley apprentice with his older brother George Adams junior. Their mother, Ann Dudley (1721/2-1809?), favoured Dudley and assisted him to open a rival shop. In 1796, Dudley took over the family business on Fleet Street, after he wrested it from his brother's widow. By 1817, Dudley was bankrupt, ending the famous and once thriving family industry.⁸⁹ James was Watt's eldest son and namesake, but James' father and stepmother favoured his brother Gregory. Watt did not intend for James to take over the family firm. In 1785, Watt determined that James did not possess the skill to be an engineer.⁹⁰ Yet, James did succeed Watt, and later expanded the firm.

A mutual interest united James and Adams in Geneva. In early 1785, James was invited to a dinner with Jean-Louis Labat (1753-1827), a wealthy Swiss merchant he met through Adams. Labat was planning a visit to England and expected to spend a month in Birmingham.⁹¹ He owned a Watt letter-copying machine, but its rolls were wooden and he wanted to replace them with metallic ones. Thus, Labat requested an introduction to Watt from James, who was eager to provide it. James identified Labat as brilliant, but suffering in Geneva, as there was nobody "to execute so well as he can invent."⁹² Watt

⁸⁸ BCL MS 3219/4/11/9 J. Watt jrn to J. Watt snr, 7 January 1785.

⁸⁹ Millburn, *Adams of Fleet Street*, pp. 10-20; 273-310.

⁹⁰ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 17 July 1785.

⁹¹ BCL MS 3219/4/11/10 J. Watt jrn to J. Watt snr, 24 January 1785.

⁹² Labat's workshop had tools for carpenters, watchmakers, and mathematicians. Adams was invited to use the workshop, at any time, but this invitation was not extended to James. *Ibid.*

fulfilled this request, but fellow manufacturers were less welcoming, as he explained: “I shall show M^r Labat every civility but I fear he will be disappointed but not seeing many of the manufactures here as the people are become extremely jealous & shut their doors against strangers of every denomination; however what depends upon me he shall see; or any other of your friends.”⁹³ Concerns over industrial espionage shuttered doors to foreigners who wished to tour Birmingham’s manufacturing wonders.⁹⁴

8.6. Connections to Genevan Science and Radicalism

James Watt junior strove to repay Swiss friends, as he was conscious of the trouble he caused them. It was a point that Watt often reiterated. The few services James could offer were gifts of his drawings, recommendations to his father’s goodwill, or requesting Watt share an explanation of the steam engine.⁹⁵ This request, to share the details of the family’s fame and fortune, was not something Watt was eager to relinquish.⁹⁶ He did though accept requests to assist new Genevan friends who visited England. James eagerly gave recommendations to Soho. The value of this gesture was in a steady rate of increase. Doors were becoming increasingly shuttered in Birmingham and other merchant cities.

Midlands’ manufacturers displayed great foresight, but it often did not translate into political acumen. The best example of international acclamation for Boulton & Watt was their official invitation to France in 1786. When they returned to England in 1787, neither man appreciated the nascent tempest brewing in French politics.⁹⁷ Had Boulton and Watt been cognisant, that the French Revolution was about to besiege the Continent,

⁹³ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 1 May 1785.

⁹⁴ For industrial espionage in Britain generally see Harris, *Industrial Espionage*, 453-506.

⁹⁵ BCL MS 3219/4/11/9 J. Watt jnr to J. Watt snr, 7 January 1785.

⁹⁶ J.-A. Deluc (Windsor) to M.-A. Pictet (Geneva), 20 June 1785. Pictet, *Correspondance*, 3: p. 248. Jones, “Knowledge and Technology Transfer,” p. 48.

⁹⁷ Jones, “Living the Enlightenment,” p. 165.

they would not have left their adolescent sons there to complete their education. Watt's inability to detect this conflict matched his unawareness of an earlier conflict, which was in many ways the French Revolution's antecedent. In sending James to Geneva, Watt was transmitting his son to live in a republic in the aftermath of its own truncated revolution.

Political conflict, like science and industry, expanded the Delesserts' network. They were linked to several rebels who took part in the Genevan revolution of 1782. This included Guyot's friend in Paris E.-S. Reybaz, who frequented the *hôtel Delessert*. David Chauvet, another rebel, was brother to Pierre Chauvet (1731-1800) who boarded James for his final six months in Geneva.⁹⁸ James was happier there than he had been at Du Villard's house. The Chauvets treated James as their own son, which he hoped would be reciprocated. They sent their son Jean-Jacques-André (1767-1803) to England, to live with his uncle David, where he was to learn English before apprenticing in commerce. James told Watt that Chauvet, once a religious minister in Geneva, was banished during the political troubles. He presently instructed ancient languages, physics, and history at his school for young Protestant men in England.⁹⁹ In an attempt to return their kindness James asked Watt: "If you pass by Kensington when you return to London perhaps you would not be upset to visit M^r. Chauvet the brother as he is a man who has much intellect, and I am sure that you will provide all the services that you have in your power to the son with great pleasure."¹⁰⁰ It is difficult to determine what influence such associations had on James' embrace of republicanism a few years later. His stay occurred shortly after

⁹⁸ BCL MS 3219/4/10/2 A. Guyot to J. Watt snr, 4 November 1784; BCL MS 3219/4/11/17 J. Watt jrn (Geneva) to J. Watt snr (Birmingham), 27 September 1785.

⁹⁹ BCL MS 3219/4/11/17 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 27 September 1785. Chauvet's son settled in London and began a family. Jacques Augustin Galiffe et al., *Notices généalogiques sur les familles genevoises, depuis les premiers temps jusqu'à nos jours* (Genève: J. Jullien, 1831), vol. 6: p. 215.

¹⁰⁰ BCL MS 3219/4/11/17 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 27 September 1785.

Geneva's political troubles, and he was surrounded by families who sympathized with the reformers' cause. In the 1790s, after returning home, James became an 'English Jacobin.' He support both republicanism and the French Revolution.¹⁰¹ Swiss republicans, sharing such sentiments, participated at a disproportionate rate in the Revolution.

8.7. Completion in Germany and a Host of Unforeseen Consequences

James Watt had a litany of reasons to remove James from Geneva to begin the final stage of his education. Any case to remain longer was not aided by James' failure to write to his father over several months. Mme Delessert helped re-establish contact between them, and provided Watt accounts praising James' conduct from Pierre Prévost and Dr Louis Odier. She also urged James to make progress with his French in his remaining time.¹⁰² One cause for James' long silence was an accident and minor injury, which Watt learned of through the Priestley family.¹⁰³ This was more of an annoyance for Watt than a cause to recall James. Watt remained determined to send James to Germany and continued to prepare this transfer despite a long silence.¹⁰⁴

Despite scepticism, Watt received numerous accounts on James' good behaviour. Watt consented to let James stay as long as the weather allowed for further progress in French,¹⁰⁵ but high costs in Geneva were a strong motivation for James to depart.¹⁰⁶

¹⁰¹ See Robinson, "An English Jacobin," pp. 349-55; Jones, "Living the Enlightenment," pp. 170-82.

¹⁰² BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 5 August 1785. BCL MS 3219/6/12. M.-C. Delessert (Passy) à J. Watt jnr (Geneva c/o M. Chauvet), 3 août 1785.

¹⁰³ Joseph Priestley junior reported this information weeks earlier to his mother, who shared it with Watt the previous Sunday, but Watt continued to question James on his absence of letters. BCL MS BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 5 August 1785.

¹⁰⁴ BCL MS BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 5 August 1785.

¹⁰⁵ BCL MS BCL MS 3219/4/123 J. Watt snr (Birmingham) to M.-C. Delessert, 31 July 1785.

¹⁰⁶ In late September James resumed contact with Watt, which included accounts of his spending. This was another reason for James' silence, as was his month-long tour around Lake Geneva. He noted that Priestley junior and Adams both made full tours of Switzerland and that he had permission from G.-A. Deluc. BCL MS 3219/4/11/17 J Watt jnr (Geneva) to J. Watt snr (Birmingham), n. d. [28 September 1785]. James' expenses far exceeded Watt's expectation, and went beyond what he noted he could afford whilst caring for the rest of the family. BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 13 November 1785.

Beyond the first stage of James' German studies, which Watt arranged through the connections of Charles Startin (*d.* 1799), Watt remained uncertain. Startin, a Birmingham merchant, had studied with a German reverend and tutor, F. H. Reinhard, at Stadtfeld. It was located close to Eisenach in Saxony, and James remained there eighteen months. Watt had James study with Reinhard to learn to speak German and its particular form of writing. James was also to study several other subjects to prepare him for the final stage of his education.¹⁰⁷ The problem left for Watt was to determine the career for which James should train. The difference between that of Startin (a merchant) and Watt (an engineer) epitomized Watt's conundrum regarding James' future.

Throughout the summer of 1785, James Watt struggled to determine if James' career should be engineering or manufacturing. Watt preferred to send him to a German university to learn practical science. He sought advice from the Deluc brothers on which universities were superior in terms of cost, scientific instruction, and student conduct.¹⁰⁸ The option of James training in a merchant accounting house in a German commercial town, however, briefly won out. Watt informed G.-A. Deluc: "I fear that too much of an Accademical education may render the less entertaining employments of a counting house disgusting to him. Science may be acquired at the leisure hours of his future life but application to business is best instilled in early life."¹⁰⁹ Watt excelled in science, but he knew the instability of an engineer's career compared to one in business.

¹⁰⁷ Reinhard was also to read French and Latin with James and teach Mathematics, bookkeeping, history (especially of mechanics), music, and geography. Dance and drawing would be studied nearby. Rent was much lower than Geneva. BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 2 September 1785.

¹⁰⁸ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 20 July 1785; *Ibid.*, J. Watt (Birmingham) to G.-A. Deluc, 24 July 1785.

¹⁰⁹ *Ibid.*

There were two connected reasons that Watt steered James to a career in business instead of science. Primarily, Watt feared James did not have sufficient mechanical skill:

You know my intentions has hitherto been to breed you to the business of an Engineer if you should prove fit for it; I have not been able to ascertain in what line your abilities principally be. I have however observed that you do not possess that ingenuity & attention to mechanical pursuits that I did at your time of life, and consequently that a business of that kind must be more uphill work to you then it was to me and I assure you I have found it hard enough.¹¹⁰

This second factor gave Watt the most pause, as personal struggles were central to his indecision on James' future. Watt worked for years to realize his improvement of the steam engine. This was followed by years of political effort, with Matthew Boulton, to protect Watt's invention. The result was a fifteen-year patent, which they had yet to profit from. Watt informed James that there was a sentiment in England against patents. They had feared being unjustly stripped of their patent before it expired. To demonstrate the insecurity they faced Watt referenced Richard Arkwright (1732-92),¹¹¹ an inventor of a cotton-spinning machinery, and manufacturer in Derbyshire. In the 1780s he was stripped of his carding machine patent. It was lost in court cases, as its terms were too vague and the machine unfinished. The precedent provoked fear and sympathy from Watt. He was uneasy with the precariousness of their own patent.¹¹² This caused uncertainty on James becoming, like Watt, an engineer. Watt consequently affirmed to James, giving more him more respect than before, that independence and diversity were crucial:

[W]hether without some such security as a patent the business of an Engineer is worth following is what I cannot determine but should rather think that it is not

¹¹⁰ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 17 July 1785.

¹¹¹ *Ibid.*

¹¹² Erasmus Darwin joined Watt in testifying in court on behalf of Arkwright. Darwin had elicited Watt to overcome past differences, see a common cause, and support Arkwright. Boulton was less sympathetic with Arkwright's plight and more confident in their own circumstances. David Philip Miller, "The Usefulness of Natural Philosophy: The Royal Society and the Culture of Practical Utility in the Later Eighteenth Century," *The British Journal for the History of Science* 32, no. 2 (1999), pp. 192-9; BCL MS 3219/4/123 J. Watt snr (Birmingham) to R. Arkwright, 26 October 1785.

very beneficial. I therefore wish your Education to be such as may qualify you for a manufacture as well as an Engineer so that your dependence may be on yourself and not on the caprices of Judges & Juries in case my reverse of fortune. This matter deserves serious consideration which I desire you would give it.¹¹³

There were unintended consequences from Watt's focus on James training to become independent.¹¹⁴ Mainly, James developed too strong an independence from his father.

In Germany, James' behaviour and learning improved, but his unbridled spending continued to unnerve his father. Watt sent James to Freiberg, after Stadtfeld, to attend a school instructing mathematics, mechanics, and metallurgy to miners.¹¹⁵ James managed, Watt later complained, to spend almost as much there as Matthew Robinson Boulton did at the French capital of Versailles. Matthew had been "employed from morning to night with his masters." Watt concluded pondering: "Which of you has made the best use of their time futurity must point out."¹¹⁶ Matters were compounded in the 1780s, as Watt was concerned both about his patent and the prospect that their operations in Cornwall would be unprofitable.¹¹⁷ Accordingly, Watt continued to complain of James's excess spending. Watt explained that James had to be independent on several scores:

I warn you again that though I can give you great assistance in entering the world I cannot make you rich nor leave you with a fortune on which you could possibly subsist. Your own exertion then will [*sic*] the principle thing you will have to trust to, and you will find the acquiring even a moderate income a difficult matter, without a strict attention to business & œconomy both of money and time.¹¹⁸

¹¹³ BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 17 July 1785.

¹¹⁴ James found confidence by going abroad. Watt found it disagreeable, and feared it would be more so to Genevan friends tied only by benevolence. BCL MS 3219/4/123 J. Watt snr to G.-A. Deluc, 24 July 1785.

¹¹⁵ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 12 August 1785.

¹¹⁶ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 22 July 1787.

¹¹⁷ Using steam engines to drain water from mines was a risky. Boulton & Watt dealt with mine owners who begrudged royalties and copper's unsteady price. Much profit was lost 1786 when a mine was stopped, jeopardizing the project. BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 30 May 1787.

¹¹⁸ *Ibid.*

Such concern was well placed. It took James almost a decade to pay off the expenses he accrued on his Continental tours between 1784 and 1792.¹¹⁹

James Watt had also sent James abroad in the prospect to expanding business further into Europe. Despite concerns, over James' lack of economy, Watt let him extend his stay at Freiberg.¹²⁰ Yet, Watt's health also raised regrets. He told James: "I had many reasons for wishing you to be at home in summer, among the rest my own precarious health, which almost interdicts application to Business & makes me wish to have it in my power to give you some instructions in the knowledge which is peculiar to me before it is too late."¹²¹ Not being able to pass on trade secrets now outweighed prospects of increasing business abroad. Both were complicated by Watt's ill health. In 1794 the Boulton & Watt Company was reformed to include their three sons. However, a decade later Gregory Watt died of pulmonary consumption. Matthew Robinson Boulton also soon began to limit his role. James undertook central management, maintaining and increasing the steam engine business, and expanding into other ventures.¹²² This was a product of his independence, which he developed through his journey on the Continent. In the interim, however, such independence created unforeseen consequences.

8.8. Conclusion

In the late eighteenth century members of the Lunar Society stood at a crossroads. They wanted Britain to move past monopolies and guild systems that inhibited commercial exchange. Birmingham's population consisted of many Dissenters and champions of parliamentary reform. There was a desire for more rights, and more power for Midlands'

¹¹⁹ Jones, "Living the Enlightenment," p. 167.

¹²⁰ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 30 April 1787; *Ibid.*, 9 April 1787.

¹²¹ *Ibid.*

¹²² BCL MS 3219/6/12 10. Press copy letter, J. Watt jnr (Soho) to B. Delessert (Paris), 3 June 1814. Jones, "Living the Enlightenment," p. 179.

manufacturers, against the landed interest. Watt, a participant in the Enlightenment, was a proponent of cosmopolitanism. He aided foreigners who showed up in Birmingham, and shared scientific information with contacts on both sides of the Channel. However, Watt was also happy that fellow manufacturers shut their doors, to foreign and native strangers, to protect interests. The steam-engine patent gave Boulton & Watt a monopoly for decades, allowing them to cautiously guard the invention. Finally, though it was undoubtedly unintentional Watt was acquainted with many liberal and even radical thinkers, and intended James to have a liberal, but not genteel, education. This prepared James for his eventual career, but it also meant that revolutionary thinkers surrounded him, both at home and abroad.

9. ‘I do not send him to Paris to go to Operas Balls & Places of dissipation:’ The Floundering Education of Matthew Robinson Boulton

Matthew Boulton decisively shaped Britain’s success in the early Industrial Revolution, which led to grand expectations and mixed results for his son’s education. Boulton, ever one to merge tasks, used a state invitation to France to escort Matthew there for the final stage of his education. Matthew Robinson’s trip to the Continent began on 15 November 1786, when he crossed from Dover to Boulogne.¹ Boulton senior reported to his daughter Anne (1768-1829): “I was as usual very sick puking all the way, & so was Mr Watt & Matt likewise, but not quite so bad.”² Beyond the inability to attain sea legs, Matthew’s crossing contrasted with that of Boulton, two decades earlier, or that of James Watt junior two years previous. Matthew travelled with Boulton, James Watt, as well as Josiah Wedgwood’s son and nephew. The Bouldons enjoyed more domestic accord than the Watts, and Boulton a more relaxed demeanour than Watt. There was less urgency to send Matthew abroad, but he was aimless in England, as James established himself in Geneva. Several involved parties expected them to travel together, which did not transpire. James was a trailblazer, and made his way through France to Geneva, and then Germany to complete his education. Matthew, brought to France by Boulton, was later sent to Germany on the path forged by James. Ultimately, James Watt and the Delessert family helped to focus Matthew’s floundering education.

In 1786, the Delesserts welcomed Boulton and Watt upon their arrival in Paris. Boulton, despite this reception, did not initially use Mme Delessert to arrange his son’s instruction. Yet, when problems arose with Matthew’s tutor, in Versailles, Boulton had the Delesserts arrange Matthews’s move to Paris, as well as his education, lodging, and

¹ BCL MS 3782/14/76/12 M. Boulton (Paris) to Anne Boulton (Birmingham), 18 November 1786.

² *Ibid.*

finances. Their involvement strengthened British-Franco-Swiss cross-Channel links, and revealed what Boulton thought necessary to train his son to be a captain of industry.

9.1. Matthew Robinson Boulton's Sporadic Early Education

Matthew Boulton, like James Watt, showed commitment for his son's proper instruction.³ A factor to receive little notice is the roles played by the Delesserts and Abraham Guyot. As Matthew's early schooling finished Boulton faced a conflict. England lacked proper instruction and Boulton weighted sending his son to Scotland or on the Continent.

The notoriously hospitable Boulton welcomed many British and foreign visitors to Soho. He was in early contact with J.-A. Deluc, of service to Guyot and his pupils while they were in Birmingham, and entered into business with Ami Argand. Boulton and Watt shared many Franco-Swiss friends, but Watt became their main point of contact. Visitors to Birmingham often looked to Watt for introductions, and help finding boarding houses. This may have resulted from Boulton being a less consistent correspondent.⁴ His indirect method of relying on Watt and the British-Franco-Swiss network fell through in 1784. James Watt junior was suddenly sent to Geneva. Two years passed before Boulton followed Watt's lead and send Matthew abroad. As Boulton dithered over where to send his son, Matthew's education floundered in England.

Matthew Boulton received early warnings about threats to his son's character in Birmingham. Matthew, though a year younger than James Watt junior, preceded him at Rev. Henry Pickering's school. In 1777 Matthew attended the school at Winson Green,

³ See Jones, "Living the Enlightenment, pp. 165-8; Musson and Robinson, *Science and Technology*, pp. 200-12; Mason, *The Hardware Man's Daughter*, pp. 34-45, 54-5, 70-85.

⁴ This was a Boulton family trait. *Ibid.*, p. 39, 79. Watt explained to Deluc that Boulton's forgetfulness also made him a poor person by which to send letters. BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 24 September 1783; *Ibid.*, J. Watt snr (Birmingham) to J.-A. Deluc, January 1784.

close to Birmingham's limits, as a day student.⁵ By 1779, Pickering had urged Boulton to have Matthew board there to avoid acquiring "a vicious pronunciation & vulgar dialect." Pickering did not believe his school could finish Matthews's education according to the "liberal & genteel Plan" Boulton desired, but it was as suited for standard development as any school.⁶ Advice from James Keir, Boulton's Lunar friend, was very prescient. Kier suggested that Matthew required greater application and removal from home:

I do not think that the time which Matt has lost hitherto of much consequenc[e] because he has time enough to acquire useful kn[ow]lege wherever he is taught by proper discipl[in]e to] acquire the habit of application. But in order to acquire this habit, and in general to acquire a manly character, he must be removed more than a hundred miles from Soho. His dispositions and also his apprehension are good. Nature has done her part.⁷

Seven years passed before Keir's warning was heeded. By then it was too late.

Boulton was even more indecisive about his son's education than Watt. As a consequence, Matthew attended schools in Birmingham and London.⁸ Each month he sent home examples of writing, a ritual practiced by James Watt junior, as their fathers insisted that their sons develop proper handwriting for business.⁹ Boulton fussed over writing, but less so over his son's comportment. Boulton's dithering impeded his concern over finding schools that taught proper instruction. His frequent business travel, and the poor health of Boulton's children, led to them often being absent and transferred among numerous schools.¹⁰ Therefore Mathew's education encountered lulls from 1776 to 1786.

⁵ Musson and Robinson, *Science and Technology*, p. 201.

⁶ Rev. Henry Pickering to Matthew Boulton, 5 December 1779. Quoted in *Ibid.*, p. 201.

⁷ BCL MS 3782/12/65/44 49. J. Kier (Soho) to M. Boulton (Chacewater), 11 December 1779.

⁸ This included two stints at Winson Green. In 1778 Boulton sent Matthew to a boarding school in Twickenham, near London, where he returned in 1780. Mason, *The Hardware Man's Daughter*, p. 36, 47.

⁹ Musson and Robinson, *Science and Technology*, pp. 201-2.

¹⁰ Boulton moved his children between Birmingham and London for school, and to Southampton to take healing baths. See Mason, *The Hardware Man's Daughter*, pp. 36-50.

Boulton's wanted Matthew to have a genteel liberal education, and ultimately to travel abroad. This plan became undone when Watt sent James away abruptly to pursue a practical liberal education in Geneva. Evidence of Boulton's hope for the two boys to go abroad together emerged from their early correspondence. After James' arrival in Geneva he contacted Matthew in 1785. Matthew expressed gratitude on hearing from his friend, declaring: "I was sorry that your departure from England was so sudden, because If my Father had known your intention of going to Geneva I fancy I should have accompanied you which you would have given me much pleasure, but I believe he has now totally given up his intention of sending me abroad."¹¹ This was not the case, but Matthew could be forgiven his confusion, given his father's irresolution.

9.2. Floundering in Birmingham, London, and Cornwall

Matthew Boulton's indecision over Matthew's education led to him accompanying his father throughout England, and sporadic instruction. In 1784, James Watt sent James to Wales for practical training at John Wilkinson's ironworks. During this period Matthew joined his father for four months in Cornwall. Watt reported to James, in Wales, in July: "Matt. Boulton is gone to Cornwall to his papa, he is become a very modest sensible Lad & applyd every class in the Country house while he was here."¹² Matthew's sister Anne remained at Soho with Dr William Withering and his family.¹³

¹¹ BCL MS JWP Muirhead IV box 1. M. R. Boulton (Stoke) to J. Watt jnr (Geneva), 7 May 1785.

¹² BCL MS 3219/4/123. J. Watt snr (Birmingham) to J. Watt jnr, 13 July 1784.

¹³ *Ibid.* Such support was required because Boulton's second wife Anne died unexpectedly in 1783. Their daughter Anne was afflicted by a physical impairment for life, as her left leg was shorter than the right. Her father's connections provided access to top English physicians: Lunar doctors Withering, William Small, and Erasmus Darwin, and John Hunter, a leading surgeon. Boulton relied on friends as he tried to arrange education for his children. It was less expected that Anne receive one, but Boulton was influenced by Lunar friends. Darwin and Keir each wrote works on female education for their daughters. In 1775 Boulton asked John Whitehurst's advice on a girls school that Josiah Wedgwood's eldest daughter attended. Whitehurst thought it fine, but advised educating Anne with a tutor at home. He and Thomas Day made a plan and sent it to Boulton. Mason, *The Hardware Man's Daughter*, pp. 19-22; 32-4, 60-1.

The influence of Lunar men, such as Drs Withering and Erasmus Darwin, inspired a passion for natural history in Boulton's children. This included fossil collecting and botanizing.¹⁴ Matthew gloomily predicted, to James in Geneva, that he would "remain in Old England," but he enjoyed his time in Cornwall. It was a part of England that Matthew believed would much please James, as it teemed with attractions. Matthew explained: "I collected a few fossils which I mean to arrange by some treatise of Mineralogy. I also went down a min[e] called Wheal virgin where many curiosities are to be seen."¹⁵ Lunar families were part of a growing movement of amateur natural history.¹⁶ Yet, adventures in Cornwall were no match for travels abroad. Matthew asked James to give his respects to Joseph Priestley junior, under whose influence James was benefitting in Geneva. Such a high opinion was not given to the friends Matthew surrounded himself with in England.

There were unsavoury influences on Matthew Robinson in Birmingham. By early 1785, James Watt's opinion of Matthew's character declined considerably. The changed sentiment came as Watt witnessed Matthew's idleness in Cornwall, Birmingham, and London. This was further compounded as John Fothergill and George Mynd (1764-1813), Matthew's cousin, led him astray. Boulton had given Mynd a job at Soho and sponsored his instruction at the Winson Green school. Yet, in 1781 Boulton fired Mynd because of his behaviour at Soho house and manufactory. Boulton declared, in dismissing Mynd,

¹⁴ In 1780, Erasmus Darwin junior (1759-99) went to Cornwall with Boulton, who worked in the mines as Darwin amassed minerals and fossils for his father's collection. Boulton and Matthew toured Derbyshire in 1781. They acquiring fossils and visited Erasmus Darwin, who had moved from Litchfield, and toured the cotton mills of Richard Arkwright. In 1784, Withering instructed Anne in botany. *Ibid.*, p. 48, 55, 64-6.

¹⁵ BCL MS JWP Muirhead IV 1. M. R. Boulton to J. Watt jnr, 7 May 1785. Wheal Virgin was a Cornish mine where Boulton and Watt were paid to erect steam engines. Its old engines could no longer remove water. BCL MS 3219/4/12. 12. J. Watt snr (Chacewater) to J. Black (Edinburgh), 2 December 1779.

¹⁶ On the popularity of natural history see Alix Cooper, *Inventing the Indigenous: Local Knowledge and Natural History in Early Modern Europe* (Cambridge: Cambridge University Press, 2007), pp. 51-86.

that his “conduct in general is so bad and so wicked that some” of Boulton’s friends would not let their sons visit Soho.¹⁷ Watt sent similar accounts to James in Geneva:

I understand from M^r Boulton that you had written a letter to Matt. Which was proper. I am sorry to say that M. is not so pleasing a lad as he was, by his long stay in Cornwall & here unemployed and the bad example of G. Mynd & J[oh]n Fothergill, he is become very idle & assuming. He was a long time in the house with me in London but I never saw him apply to any thing except some times Arithmatick for which he seems to have a turn. It is right that you maintain an intercourse of civility with him by letters now & then but they need not be frequent.¹⁸

The failure to send Matthew abroad with James Watt junior was a missed opportunity.

9.3. Boulton’s Dilemma of Sending Matthew to Edinburgh or the Continent

James Watt junior believed that, as their fathers were partners, an official connection should exist between the sons. He tried to impress his father, taking the initiative and setting a good example, by writing to Matthew in Birmingham. Likewise James asked Watt to tell him of what he knew “of Mr. Boultons [*sic*] intentions with regard to his son and whether he intends sending him [to Geneva] or not.”¹⁹ James and Matthew were not the only ones who believed that they would be sent abroad together for their studies.

In 1784 the Delessert family extended their hospitality to Matthew, as Watt made preparations for James to stay in Paris. From Edinburgh, Guyot assured Watt that it would give Mme Delessert great pleasure to receive James in Paris and on his return to England. The invitation extended to Matthew, if he travelled with James. She would also direct them on the passage from Paris, and provide recommendations for Geneva.²⁰

¹⁷ M. Boulton to George Mynd, 15 August 1781. Mason, *The Hardware Man's Daughter*, p. 45.

¹⁸ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 1 May 1785.

¹⁹ BCL MS 3219/4/11/9 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 7 January 1785.

²⁰ BCL MS 3219/4/10/2 A. Guyot (Edinburgh) à J. Watt snr (Birmingham), 4 novembre 1784. *Ibid.*, 5. M.-C. Delessert (Paris) à J. Watt snr (Birmingham), 18 novembre 1784.

Matthew did not go to Geneva, or travel with James, and did not profit from Mme Delessert's standing invitation until 1786, when he was finally sent to the Continent.

The missed opportunity of sending Matthew with James led Boulton to consider Scotland. It was the more conventional choice for Lunar men and their sons. In 1784, Watt informed Guyot in Edinburgh that Boulton had planned to send Matthew there. Yet, Boulton changed his mind and instead was proposing to take a tutor in at Soho to instruct Matthew in Latin, and was supposed to have sought Guyot's advice on the matter.²¹

Boulton continued to consider academic opportunities for his son until they went abroad. In 1785, Matthew was sent to Suffolk to study Latin,²² one of the longest and most constant spans in his education. However, in August Boulton had John Whitehurst (1713-88) contact Dr Charles Hutton (1737-1823) about boarding Matthew.²³ Whitehurst was a founding member of the Lunar Society, and a clockmaker, scientific instrument maker, builder, and amateur geologist. In 1775 Whitehurst, appointed 'Stamper of the Money Weights,' moved from Derby to London. Yet he stayed in contact with, and visited, his friends in the Midlands, becoming a vital link for Lunar men to both London and the Royal Society.²⁴ Boulton's request to Hutton was ostensibly for Matthew to attend the Royal Military Academy. Hutton informed Whitehurst that he did not usually take boarders, but agreed in this case, to "oblige so worthy a friend" as Boulton.²⁵

²¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Guyot, 5 December 1784.

²² BCL MS JWP Muirhead IV 1. M. R. Boulton to J. Watt jnr, 7 May 1785. He was to study for two years with Rev. Samuel Parlby. Boulton sent an Argand lamp as a gift, but a later a stern letter, telling Parlby to follow Locke on education and of Matthew's removal. Mason, *The Hardware Man's Daughter*, pp. 67-74.

²³ Hutton informed Whitehurst that board would be 100 guineas per annum, and discussed Whitehurst's measure of a standard based on the length of pendulums. Whitehurst sent this letter on to Boulton. BCL MS 3782/12/31 305. Dr Charles Hutton (Shooter's Hill) to John Whitehurst (Fleet Street), 16 August 1786.

²⁴ Whitehurst helped Wedgwood construct his Etruria pottery works, and Boulton with the productions of Soho. Schofield, "The Lunar Society of Birmingham," pp. 147-55. *Ibid.*, *The Lunar Society*, pp. 128-9.

²⁵ BCL MS 3782/12/31 305. C. Hutton to J. Whitehurst, 16 August 1786. Boulton did not take up the offer to his request. It would not have been for long, as Matthew accompanied his father to Paris in November.

The request for Charles Hutton to take on a boarder arrived soon after a scientific schism. Hutton was from Newcastle and had been Professor of Mathematics at the Royal Military Academy for over a decade. He was also, until about a year before the inquiry from Boulton, Foreign Secretary of the Royal Society of London. Joseph Banks, its domineering president, accused Hutton of shirking his responsibilities, creating a conflict and a fracture within the Society.²⁶ Tension had been building since 1778, when Banks was elected president. Fellows divided between those identified as the ‘Men of Science’ and those referred to as ‘Macaronis.’ Charles Blagden predictably took Banks’ side in the charges against Hutton.²⁷ Edwin Danson describes the conflict’s outcome:

The acrimonious dispute dragged into early 1785 and resulted in the principled resignation of Hutton and other distinguished academics. The immensely shy and retiring Henry Cavendish was so affronted that he proposed a vote of confidence in Banks. When an opportunity arose to elect a new secretary, the mathematicians’ man was Charles Hutton and the macaronis’ candidate was Charles Blagden; Hutton lost.²⁸

The Lunar Society’s diversity insured they maintained links to both sides of this conflict. This was so in other scientific disputes of the period. Boulton appears to have wanted Matthew to study mathematics with Hutton. Even Watt grudgingly acknowledged that Matthew had “some genius for mathematical study.”²⁹ It was another false start, though, as Boulton soon had a convenient opportunity to establish Matthew abroad.³⁰

²⁶ Larry Stewart, “Putting on Airs: Science, Medicine and Polity in the Late Eighteenth-Century,” in *Discussing Chemistry and Steam the Minutes of a Coffee House Philosophical Society, 1780-1787*, eds. Trevor Harvey Levere and G. L'Estrange Turner (Oxford: Oxford University Press, 2002), p. 218.

²⁷ Edwin Danson, *Weighing the World: The Quest to Measure the Earth* (Auckland: Oxford University Press, 2006), p. 185.

²⁸ *Ibid.*

²⁹ BCL MS 3219/4/123. J. Watt snr (Birmingham) to F. H. Reinhard, 22 July 1787. Watt also noted Matthew’s arithmetic abilities to James. *Ibid.*, J. Watt snr (Birmingham) to J. Watt jnr, 1 May 1785.

³⁰ Matthew left Palbry’s school after summer term in 1786. By September he was in Cornwall with Boulton and in October they returned home to prepare for Versailles. Mason, *The Hardware Man's Daughter*, p. 76.

9.4. The Establishment of Matthew Robinson Boulton in France

The impetus that finally saw Matthew Boulton establish his son on the Continent was an official invitation to France. Boulton harboured desires to send Matthew abroad as early as 1779.³¹ Inaction and missed opportunities prevented its realization. The major reason Matthew crossed the English Channel in 1786, was Boulton's business interests. Boulton and Watt were invited by the French ministry to provide expert opinion on Versailles' aging *Machine de Marly*.³² It did not take long for Matthew to become acclimatized and comfortable in France. Boulton informed his daughter: "I actually did not know Matt this morn when I first met him after his Hair was dressd [*sic*] a le Francois Youl [*sic*] be astonished at y^e alteration. We dined today at M^r DeLasserts who live magnificently in a palace."³³ This was one of many evenings that Boulton's party was hosted at the *hôtel Delessert*.³⁴ These visits, like the links to Versailles, occurred because Boulton had more significant French connections than he did on his first visit to France in 1765. Boulton was a celebrated manufacturer and the state invitation secured access to leading officials.

During Matthew's first week in Paris he was introduced to its attractions, which his father would later caution him against. Matthew visited the shops of the *Palais Royal* with Boulton and Watt, and attended the *Comédie* with John Wedgwood (1766-1844).³⁵ Matthew was provided the height of French culture and fashion. However, Boulton could only give his daughter accounts of their activities, as he promised to do until his return.³⁶

³¹ In 1779 Boulton visited Holland to extend one of his many loans. He visited Rotterdam's clean orderly houses, and described the industrious qualities of the Dutch. Boulton suggested Leyden and its university were preferable to Oxford. Leyden had less temptations and distractions, student manners were studious, and they learned living as well as dead languages. Yet, German schools taught French. *Ibid.*, p. 39.

³² BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 22 October 1786.

³³ BCL MS 3782/14/76/12 M. Boulton (Paris) to A. Boulton (Birmingham), 18 November 1786.

³⁴ BCL MS 3782/12/107/14 M. Boulton's Diary, 1786; *Ibid.*, 17 M. Boulton's Diary, 1787.

³⁵ BCL MS 3782/14/76/13 M. Boulton (Paris) to A. Boulton, 26 November 1786.

³⁶ *Ibid.*

The Boultons did not become Francophiles like other Lunar Society members. However, Boulton and his son remained enamoured with the country and many things French.³⁷

Matthew Boulton's initial intention was to use his connections within the British-Franco-Swiss network to procure a preceptor for his son. The two men that he called on for help in 1786, were Abraham Guyot and Pierre-François Prévost (1755-1810). Prévost was a Genevan pastor at the French Protestant Carré Church in London's Soho district.³⁸ Prévost and Guyot shared much in common. They both trained as ministers, but each left Geneva to find employment. This brought Guyot to France where he was hired as a tutor. In 1783, his post led him to London, where Prévost preached. When a proper opportunity arose Prévost too was willing to tutor. Furthermore, Guyot and Prévost were tertiary figures, who helped to disseminate Enlightenment science throughout Europe.

Prévost and Guyot's service to Enlightenment science related to their peripatetic lifestyles. Guyot served as a vital intermediary between Continental and British natural philosophers, especially in chemistry. He had tutored M.-A. Pictet in Geneva and later encouraged Watt to have James attend Pictet's chemistry lectures. The primary service of P.-F. Prévost to science was as a point of contact for the Pictets' journal. Soon after its establishment in 1796, M.-A. Pictet informed John Playfair at Edinburgh:

I am now employed in the composition of a periodical work under the title of *Bibliothèque britannique*, part of which is destined to scientific communications the origins of which be exclusively out of the three Kingdoms, and the whole exclusively of English [language] origin... This work seems to be in progressive favour with the public. We shall take the care to have it forwarded to you, Sir, begging for kind acceptance of it, and you would very materially contribute to its improvement if you could communicate to us through the channel of the Rev. Mr Prevost... our correspondent in London, such scientific discoveries and

³⁷ *Ibid.*

³⁸ Pictet, *Correspondance*, ed. René Sigrist, vol. 1: p. 21 n.5. He was a paternal cousin to R.-J.-G. Prévost-Dassier (1749-1816) and Pierre Prévost. Galiffe, *Notices généalogiques*, vol. 2: pp. 607-9.

productions of your learned University, as you think deserving to be known at large throughout the Continent.³⁹

The Pictets could not have disseminated their periodical to such extent if not for agents, like the Delesserts in Paris and Prévost in London, sending English materials to Geneva. Prévost and Guyot not only offered their services as tutors, but also as transmitters.

F.-P. Prévost tried to attach himself to Matthew Boulton's benevolence a decade before serving the *Bibliothèque britannique*. They had met in London to discuss finding a tutor for Matthew. Subsequently, Prévost informed Boulton: "The gentleman's intentions whom I have spoken of with you are quite alter'd [*sic*] & he does not propose to send his son to Paris."⁴⁰ Prévost tried to gain Boulton's protection and patronage, by offering himself as tutor, explaining: "I will esteem myself happy in being thought worthy to be instrust'd [*sic*] with this education: Zeal & utmost attention will supply to the talents that may be wanting in me."⁴¹ Nevertheless, Boulton did not take up Prévost's offer.

Ami Argand, a Genevan with close ties to Boulton, provided an endorsement for F.-P. Prévost, and may have introduced them. Argand was ever looking for methods to impress Boulton & Watt. Anticipating their forthcoming visit to Paris, and being away in *Pays de Gex*, Argand told Boulton that a note would insure his quick return.⁴² Argand's purpose there was his lamp manufactory. A false start in Soho, partnering with Boulton, led Argand to his French establishment near Geneva's border, which had support from the monarchy.⁴³ In promoting Prévost to Boulton, Argand noted: "I hope when you come to Paris that you shall have your son along with you together with Mr. Prevost whom I

³⁹ M.-A. Pictet (Geneva) to John Playfair, 20 December [17]96. Pictet, *Correspondance*, vol. 3: p. 464.

⁴⁰ BCL MS 3783/12/31 171. F.-P. Prevost (Meard's Street) to M. Boulton (Birmingham), 5 October 1786.

⁴¹ *Ibid.*

⁴² BCL MS 3783/12/31 158. A. Argand (Paris) to M. Boulton (Cornwall), 13 September 1786.

⁴³ Argand secretly used English goods to make lamps. Jones, "Knowledge and Technology Transfer," p. 50.

insist upon Saying is the person best fitted to your purpose and who will give you satisfaction.”⁴⁴ Boulton did not take Argand’s advice or Prévost’s offer, which did not create resentment. Prévost asked to see Boulton in London and bid them a pleasant journey. To help make it so, Prévost told Boulton: “I send you a Swiss Servant speaking french & English acquaint’d with travelling faithful, honest, not too young which I hope & I am almost sure will suit you very well; he is known by many persons in England, whom you may have his caracter [*sic*] from.”⁴⁵ As with his nameless servant, Prévost was a tertiary figure working to be of service to Boulton, whose star was rising.

9.5. Curricular and Extracurricular Activities at Versailles

Matthew Robinson Boulton’s study at Versailles was arranged by Boulton’s connections in France. Specifically Edmond Charles Genet (1763-1834), an official in the department of foreign affairs, organized the tutor, H. Bourdon.⁴⁶ Genet’s acquaintance with Boulton and Watt predated this visit. In 1784 Genet joined a French state visit to England through his official status and connections. He acted as a secretary, but he also received a private directive to investigate British manufactories.⁴⁷ In *Vindication of Mr. E.C. Genet’s Memorial on the Upward Forces of Fluids*, Genet discussed his time in Birmingham and service to Matthew. Though Genet likely exaggerated his role in bringing Boulton and Watt to France, and in Matthew’s education, he played a central role in both.⁴⁸

⁴⁴ BCL MS 3783/12/31 158. A. Argand (Paris) to M. Boulton (Cornwall), 13 September 1786.

⁴⁵ BCL MS 3782/12/31 172. P.-F. Prevost (Meard’s Street) to M. Boulton (at M^r. Matthews Green Lettuce Lane Canon Street), 8 November 1786. Boulton sought Guyot’s help to arrange Matthew’s tutor. A failure to find one, who accorded with Boulton’s views for Matthew’s education, led Guyot to suggest it would be easier to do so after they arrived in Paris. If this was untenable they could bring P.-F. Prévost from England or send Matthew to him in London. BCL MS 3782/12/31 279. A. Guyot à M. Boulton, 30 octobre 1786.

⁴⁶ BCL MS 3782/12/31 162. E.-C. Genet à M. Boulton (rue Coqheron [Paris]), 8 décembre 1786.

⁴⁷ Edmond Charles Genet and Benjamin Silliman, *Vindication of Mr. E.C. Genet’s Memorial on the Upward Forces of Fluid* (New Haven: T.G. Woodward, 1827), pp. 16-7.

⁴⁸ Genet’s letters from Versailles to Boulton in Paris demonstrate his function as an intermediary between Boulton and Bourdon, as well as among Boulton, Watt, and numerous officials at Versailles. BCL MS

Genet's facilitation of Mathew's education was no doubt a pretext in the French ministry's aims to foster relations with Boulton & Watt. Their invitation, linked to French patents and constructing steam engines, was itself a ploy to encourage French industry.⁴⁹ Boulton left Matthew, Genet noted, under his "care to learn the French language, and to partake in the exercises of the young nobility, at Versailles."⁵⁰ In the end neither party came away satisfied. Boulton and Watt did not attain their French privilege. French industries did not have enough time, with the onset of great political upheaval, to gain much benefit from the influence of British ingenuity.⁵¹ Conversely, Boulton thought that Matthew's progress in learning French was insufficient. As a consequence Boulton called on the Delesserts to find a new tutor, and to help in the move to Paris. In the Republic of Letters trade based on benevolence, rather than material benefit, proved more rewarding.

Matthew's education at Versailles was quite different than that of James Watt junior's in Geneva. The first item Bourdon confirmed to Boulton was his request for a dancing master.⁵² Bourdon also arranged masters for instruction, Matthew's pension and its particulars, for a domestic, and a plan of study.⁵³ The first plan Bourdon put forth had instruction in mathematics in the morning, the systematic study of French, and Latin if Boulton desire it, after dinner.⁵⁴ The books suggested for instruction and translation

3782/12/31162. E. C. Genet à M. Boulton, 8 décembre 1786; *Ibid.*, 161. E.-C. Genet (Versailles) à M. Boulton and J. Watt, 25 novembre 1786.

⁴⁹ Genet acknowledges this in his discussion of steam engines. Genet and Silliman, *Vindication*, p. 17.

⁵⁰ *Ibid.*

⁵¹ Harris, *Industrial Espionage*, pp. 501-3.

⁵² The dancing master arranged by Bourdon, M. Jullien, was the master for the pages of the *Chambre du Roi*. BCL MS 3782/12/31 222/132. H. Bourdon (Versailles) à E. C. Genet, 28 novembre 1786.

⁵³ BCL MS 3782/12/31 133. H. Bourdon (Versailles) à E.C. Genet, 1 décembre 1786; *Ibid.*, 134. H. Bourdon (Versailles) à E.C. Genet, 6 décembre 1786.

⁵⁴ BCL MS 3782/12/31 133. H. Bourdon à E.C. Genet, 1 décembre 1786.

included a venerable list of classic and modern authors.⁵⁵ Additions suggested by a liberal Boulton included *Evelina* by Frances Burney (1752-1840) and *Telemachus*.⁵⁶ This was to a list already more tolerant than James Watt junior's curriculum.

Mathew's weekly routine was not strenuous. It began Monday mornings with a visit from the hairdresser. This was followed by literature and translating text into French, work with his fencing master, drawing, more language work with Bourdon, and preparation for mathematics. Much of Matthew's time was spent at meals, walks, or "other amusements."⁵⁷ Watt did permit James to take fencing lessons with Joseph Priestley junior in Geneva,⁵⁸ but there was no talk of hairdressers or dancing masters. Nevertheless, there was much grumbling from Watt about expenses. Boulton worried much less about money. He had intentionally requested the more genteel attributes of his son's courtly education in Versailles.

In January 1787, Boulton and Watt returned to England after an eventful visit to France.⁵⁹ The partners remained in France just over a fortnight after establishing Matthew at Versailles.⁶⁰ He stayed mostly in Versailles for eleven months following Boulton's departure, but maintained links with Paris, especially with the Delesserts and Guyot.

⁵⁵ Boulton suggested Tacitus's *History of Britain* and Livy's *Roman History* in Latin. Bourdon advised *les Oeuvres de Voltaire* (at least his histories), J.-F. Marmontel's *Contes moraux* (and modern comedies), the Abbé Raynal's *l'Histoire philosophique et politique*, works by Jacques-Bénigne Bossuet, Stéphanie-Félicité de Genlis' *Théâtre d'éducation* (and its English translation), and Jean de La Bruyère's *Les Caractères*. BCL MS 3782/12/31 135. H. Bourdon (Versailles) à M. Boulton, 29 décembre 1786.

⁵⁶ Musson and Robinson, *Science and Technology*, p. 209. Bourdon initially included *Les Voyages de Télémaque* by Fénelon, but scratched it out. BCL MS 3782/12/31 135. H. Bourdon (Versailles) à M. Boulton, 29 décembre 1786. Boulton wanted it returned to the list, and sent *Evelina* to Mlle Delessert, which she found to be a charming novel. BCL MS 3782/12/32 236. M.-M. Delessert (Paris) to M. Boulton, 22 October 1787. Anne Boulton had sent the book to Mlle Delessert. Boulton enjoyed reading it and advised Matthew to borrow it from her. Mason, *The Hardware Man's Daughter*, p. 81.

⁵⁷ M. R. Boulton to M. Boulton, 20 March 1787. Quoted in *Ibid.*, p. 208.

⁵⁸ Watt likely found out about Joseph's fencing lessons from Dr Priestley. James was permitted to join in because of the physical strength and grace it would bring, if the cost was not excessive. *Ibid.*, p. 206.

⁵⁹ BCL MS 3782/12/107/17 M. Boulton's Diary, 1787.

⁶⁰ BCL MS 3782/12/107/17 M. Boulton's Diary, 1786.

Officially the Delesserts acted as Matthew's banker in France but they also served many social functions. The Delessert and Boulton families' relationship was not simply a financial one. Stephen transmitted numerous social invitations to Matthew along with the bills of exchange. The family was eager to learn of his health and progress at Versailles. Indeed only business affairs, and Stephen's parents, stopped him from travelling to hand-deliver bills of exchange to Versailles. In February, the Delesserts invited Matthew to join them for *Carnival*.⁶¹ Matthew spent three days at Passy and had, as he told his father, "an invitation to spend the Sunday every fortnight with them."⁶² The Delesserts served as a surrogate family for Matthew in France. They visited him at Versailles, and asked to be kept informed of his situation there and notified if they could give any assistance.⁶³

The traffic on the roads to Versailles, as with that of the Enlightenment generally, flowed in multiple directions. Throughout the spring of 1787 Matthew had visits from people connected to the British-Franco-Swiss network. He sent his father news on French political developments, attending *Carnival*, and of visits from Ami Argand and Guyot.⁶⁴ It was not only Swiss friends who called on Matthew at Versailles. In June, Charles Startin and Mme Delessert visited Matthew. He had dined with Startin on May 27, at the *hôtel Delessert*. Startin gave Matthew two swords that were transported for Boulton from Birmingham. They were to be gifts for people in France but Boulton, ever willing to please his son, allowed him to keep one.⁶⁵ This was not Startin's first visit to France. He was an intermediary between the Birmingham Commercial Committee and William Eden

⁶¹ BCL MS 3782/13/12/1 1. S. Delessert to M. R. Boulton, 11 February 1787.

⁶² M. R. Boulton (Versailles) to M. Boulton, 25 February 1787. Quoted in BCL M. R. Boulton Itineraries (1) 1780-1813.

⁶³ BCL MS 3782/12/32 231. S. Delessert to M. R. Boulton, 6 April 1787. [Misdated as 6 April 1786].

⁶⁴ M. R. Boulton (Versailles) to M. Boulton, 10 March 1787 and A. Guyot to M. Boulton, 19 May 1787 in BCL M. R. Boulton Itineraries (1) 1780-1813.

⁶⁵ M. R. Boulton (Versailles) to M. Boulton, 27 May 1787. *Ibid.*; Mason, *The Hardware Man's Daughter*, pp. 80-2.

(1744-1814) in 1786. Eden was in Paris negotiating the Treaty of Commerce with France. The committee's leaders, Boulton and Samuel Garbett (1717-1803), told Eden that Startin was a merchant well informed on manufacturing in Birmingham and its environs.⁶⁶ Thus, Startin would have been a welcome guest at both the *hôtel Delessert* and at Versailles.

In anticipation of increased Franco-British trade Matthew had visitors from Soho at Versailles. They were James Pearson, cashier at the Boulton & Watt firm, and Andrew Collins, its foreign agent. Subsequently, Abraham Guyot invited Collins and Matthew to dine with the Delesserts at Passy.⁶⁷ Collins returned the favour of this introduction on another business trip to the Continent in 1788, taking Matthew to Germany to finish his education. Before leaving London, Collins bought one of Joseph Priestley's publications from which, Collins promised Boulton, Matthew would profit on their journey.⁶⁸ Collins did not specify which book this was but, given Boulton's interest in chemistry and desire that Matthew study it, the publication may have been the sixth volume of *Experiments and Observations on Different Kinds of Airs* (1786).⁶⁹ During the Applied Enlightenment there were many intersections among science, education, and industry.

9.6. Problems at Versailles and Fears of Paris

In the spring of 1787, Matthew Boulton worked to counter the deficiencies in his son's education at Versailles. Matthew's tutor Bourdon kept a regular correspondence. He gave Boulton glowing accounts, including that Matthew impressed his mathematics tutor, "one of the most celebrated in France," with his "intelligence and shrewdness." This was also

⁶⁶ BCL MS MBP Birmingham Commercial Committee 9. M. Boulton and S. Garbett to Rt. Hon. W. Eden Esq. (Paris), May 1786.

⁶⁷ BCL MS 3782/12/32 18. A. Collins (rue Montmartre [Paris]) to M. R. Boulton, 8 June 1787. Pearson was head cashier and bookkeeper for Boulton & Watt's steam engine business. Guyot told Boulton that Pearson saw Matthew "very well at Versailles a few days ago, and will give you fresher news of him." *Ibid.*, 3147/3/286-404 71. A. Guyot (Paris) to M. Boulton (Soho), 16 May 1787.

⁶⁸ BCL MS 3782/12/32 19. A. Collins (Ostend) to M. Boulton (Birmingham), 28 August 1788.

⁶⁹ On the Boultons and chemistry, see Musson and Robinson, *Science and Technology*, pp. 210-4.

true for his masters of dancing and drawing.⁷⁰ Yet, Bourdon's veneer had begun to wear thin. In June, Boulton finally attempted to assert some patriarchal authority, declaring:

Your Elogue of my son cannot fail but be very agreeable to me inasmuch as it is an acquittal of all improper conduct in him & though I am very partial to him & in some degree blinded with affection yet I am not totally insensible of his alloys pray tell him that I should be more satisfy'd sensible of the progress he makes in the french Language if he would be write to me in a french letter every week for I will not allow that he understands that language untill he can write it correctly which requires close application & industry.⁷¹

Indeed Boulton at times sounded like Watt in his attempt to affirm a stricter regiment. He acknowledged Bourdon's friendship and tutorship, and that Bourdon's own son was a positive influence on Matthew. Yet Boulton asserted, again resembling Watt's stern tone: "The principle thing I have to request of you is to let him be constantly employd [*sic*] & to cultivate principle [*sic*] of Honor strongly in his disposition." Boulton's own inability to communicate French led him to write primarily in English to Bourdon. As a substitute Boulton expressed "full confidence in my good friend M^r Guyot," and requested Bourdon "apply to him in my name to translate this letter as I am very desirous that you should perfectly understand me."⁷² Despite a proactive approach this advice went unheeded.

In the autumn of 1787 Boulton finally overcame his reservations and relented to Matthew's desire to relocate to Paris. Boulton was not won over by Bourdon's apologies and excuses, the involvement of E.-C. Genet, nor Argand's invitation to take Matthew to Geneva.⁷³ There was also no action on Guyot's more implicit suggestion, for Matthew to be relocated to Lyon, where Guyot had found a tutor for the son of a Scottish friend.⁷⁴

⁷⁰ Bourdon noted the difficulties in learning a foreign language and that Matthew was yet not advanced in speaking French. However, Bourdon affirmed that Matthew was progressing very well. BCL MS 3782/12/32 136. H. Bourdon (Versailles) à M. Boulton, 29 avril 1787.

⁷¹ BCL MS 3782/12/32 138. M. Boulton "D[raft] of my Letter to M^r Bourdon June 1787."

⁷² *Ibid.*

⁷³ BCL MS 3782/12/32 139. H. Bourdon (Versailles) à M. Boulton (Birmingham), 9 juillet 1787; *Ibid.*, 140. H. Bourdon (Versailles) to M. Boulton (Birmingham), 12 September 1787; *Ibid.*, 163. E.-C. Genet to

Boulton instead settled on Paris and sought assistance from Mme Delessert and her circle. He requested her great amiability to improve Matthew's education, which languished in Versailles. However, Boulton feared the dangers of Paris and explained:

Know that I have never been content with the situation of my son since I quitted France because I am persuaded the person he resides with pays very little time & attention to his instruction & as the sadd person hath an impediment in his speech there is some danger of my son contracting a vitiated pronunciation of the French Language. Moreover I do not think he is in a train of gaining knowledge or improvement in that degree I am desirous he should. The only circumstance that hath reconciled me to his residence at Versailles is the idea of his being less exposed to improper company & the Dangers of a great & dissipated City than is the bad resided of Paris.⁷⁵

Boulton possessed more faith in Matthew's character than Watt did in James, but he still feared for it. In Boulton's view Matthew was naturally decent and well disposed. These traits were, Boulton informed Mme Delessert, needed for Matthew to attain "happiness, fortitude, & every manly Virtue."⁷⁶ Parents legitimately feared the threats to young men visiting cities like Paris. These reservations persisted throughout the Enlightenment.

Boulton called on Mme Delessert, as he believed her expertise in education would improve Matthew's instruction, and shield him from depravity. Though Mme Delessert lived in Paris, Boulton thought she was not fully aware of the threats it posed to a young

M. R. Boulton (Versailles), 3 June 1787. Argand, besides sending another Swiss friend to Birmingham and setting up a lamp manufactory, made frequent inquiries to Matthew at Versailles. Argand lamented Boulton and Watt's failure to visit Geneva, with its many *savants* and wonders. Their names were often stated, at Argand's dinners, and on account of Pictet's letters from England. Pictet was well received at Soho, a result of his reputation, and kindness to James Watt junior. Argand left him with accounts of horrible actions and arrests of wild young Englishman then swarming Geneva. *Ibid.*, 160. A. Argand (à Versoix près de Genève Pays de Gex) to M. Boulton (Birmingham), 27 July 1787.

⁷⁴ This was Sir William Forbes (1739-1809), an Edinburgh banker. He, like Boulton, had Guyot look for a place in Paris for his son. Guyot continued to find a dearth of preceptors in the city, and advised that Forbes send his son to Benjamin-Sigismund Frossard (1754-1830) in Lyon. Frossard was a Protestant minister, very knowledgeable in literature and philosophy, kept a small number of borders, and paid close attention to their studies and behaviour. This was passed on to Boulton, Guyot noted, "only as a memorandum in case there might be found hereafter some reasons to remove your son from Versailles." BCL MS 3147/3/286-404 71. A. Guyot (Paris) to M. Boulton (Soho), 16 May 1787.

⁷⁵ BCL MS 3782/12/32/166 235. M. Boulton "Rough Sketch of my Letter to Madame DeLassert [*sic*] of Paris," October 1787.

⁷⁶ *Ibid.*

man lacking a proper companion. Her circle of affable and reputable friends insulated her. As a consequence, Boulton asked her help, “by your enquiries amongst your friends to find out a proper Tutor, friend, & companion for my Son, one that would devote a greater part of his time instructing him in Language & accompanying him through the paths of Natural Philosophy.”⁷⁷ Boulton desired a tutor as ideal as Guyot. As this was unlikely, Boulton requested Mme Delessert’s aid and council to settle Matthew in Paris for six months. He was to attend various lectures of natural philosophy, and learn written and spoken French. Finally, Boulton implored Mme Delessert: “Expense is not so much an object with me as the satisfaction of knowing that my son was advancing in knowledge & shielded from the dangers of a great & dissipated City.”⁷⁸ Cost remained immaterial for Boulton, who learned the hard way that practical connections in Paris were more reliable than courtly ones of Versailles. James Watt patronized less costly, but more dependable, Enlightenment goodwill from the outset, and ultimately had greater results.

A high opinion of Mme Delessert allowed Boulton to overcome fears of Paris that had prevented Matthew’s transfer. Boulton provided a clear explanation to his daughter:

I wrote last post a long letter to Matt & another to Madam deLassert in his favour. He seems to think he could improve faster at paris in various ways and I also am of his opinion but I dare not trust him there without a faithful Mentor by his side: although I have a high opinion of Matt’s discession, honour & virtue. I have referd him to Madam deLassert who is one of the most clever & sensible Womⁿ. I know.⁷⁹

Several factors influenced Boulton to let Matthew move to Paris. One was displeasure with instruction affairs in Versailles. A second was that plans for Matthew’s German tour had begun. Most important was Boulton’s trust in the Delesserts’ benevolence in Paris.

⁷⁷ *Ibid.*

⁷⁸ *Ibid.*

⁷⁹ BCL MS 3782/14/76/20 M. Boulton to A. Boulton, 5 October 1787.

9.7. The Delesserts' Assistance in Matthew Robinson's Transfer to Paris

The Delesserts and Abraham Guyot worked together in Matthew Robinson Boulton's transfer to Paris. Stephen contacted Matthew to organize his accounts, lectures, and travel.⁸⁰ Etienne delivered funds and helped Matthew settle his accounts at Versailles. Guyot kept Boulton informed, and communicated the plan for Matthew's education to the new tutor.⁸¹ Boulton's initial commission to find a tutor, however, was undertaken by Madeleine Delessert and her mother. Their friend, Suzanne-Elisabeth Tourton (*née* Ravel), employed Louis-Pierre Manuel (1751-93), with whom she was pleased, to tutor her son for two years.⁸² This tutor and aspiring *philosophe*, who later came to prominence as a leader of the Paris Commune during the French Revolution, had humble origins.

Manuel was a qualified tutor and recommended by a prosperous banking family. He received a good education though born to a family of modest means in Montargis, south of Paris. After completing a degree Manuel moved to Paris, working as a college usher, before taking a more advantageous post as tutor to the son of Louis Tourton (1720-86), a Parisian banker.⁸³ As was common Manuel's work as an educator supported his writing. He published *Essai historiques, critiques, littéraires et philosophiques* (1783),⁸⁴ which was poorly received by French officials. Manuel was imprisoned for three months

⁸⁰ BCL MS 3782/13/12/2 3. S. Delessert (Passy) to M. R. Boulton "chez Monsieur Bourdon" (Versailles), 9 November 1787.

⁸¹ BCL MS 3782/12/32 280. A. Guyot (Passy) to M. Boulton (Birmingham), 11 November 1787.

⁸² BCL MS 3782/12/32 236. M.-M. Delessert (Paris) à M. Boulton, 22 octobre 1787. Jean Bouchary, *Les manieurs d'argent à Paris à la fin du XVIIIe siècle* (Paris: Librairie des sciences politiques et sociales, M. Rivière et cie., 1943), vol. 3: p.70.

⁸³ Tourton gave Manuel a pension. Alph. de Beauchamp et al., *Biographie moderne. Lives of Remarkable Characters, who Have Distinguished Themselves from the Commencement of the French Revolution to the Present Time* (London: Longman, Hurst, Rees, Orme, and Brown, 1811), p. 345; Johann Friedrich Reichardt, *Un hiver à Paris sous le consulat: 1802-1803*, ed. A. Laquante (Paris: Plon, 1896), p. 101.

⁸⁴ Louis-Pierre Manuel, *Essais historiques, critiques, littéraires et philosophiques* (Genève, 1783).

in the infamous Bastille.⁸⁵ Nevertheless, the Tourtons were happy with his work leading to a second appointment, through the Delesserts, to tutor Matthew Boulton's son.⁸⁶

The Delesserts made the arrangements for Mathew and Manuel, as he was best suited to oversee Matthew for this short period. The family found Matthew an apartment near that of Manuel. They saw Matthew often, expected to see much more of him, and would consider him part of their family. Madeleine noted that Mathew was "speaking French very well at present,"⁸⁷ but Boulton's uncertainty about Matthew's written French led him to solicit their aid. Boulton, pleased with their commission, made Mlle Delessert director of Matthew's education.⁸⁸ Etienne arranged the financial matters, about which Boulton was unclear.⁸⁹ Boulton's lackadaisical habit with money, and in disciplining his children, led to shortcomings with Matthew's training at Versailles. Thus, Boulton sought help to assert greater patriarchal authority over that in Paris. Boulton instructed Manuel to closely supervise Matthew's activities, to work on writing French with proper grammar, especially for written correspondence, and to escort Matthew to public lectures on natural philosophy, chemistry, and mineralogy. They were to discuss the content after each lecture and seek Guyot's council on selecting lectures.⁹⁰

Boulton took a patently aggressive stance on what he wanted Matthew to avoid in Paris. Besides fears over the city's fanciful attractions, was a concern of Matthew being led astray by its nefarious characters. Therefore, Boulton made it clear to Mlle Delessert:

⁸⁵ Beauchamp et al., *Biographie moderne*, pp. 345-6.

⁸⁶ BCL MS 3782/12/32 236. M.-M. Delessert à M. Boulton, 22 octobre 1787.

⁸⁷ BCL MS 3782/12/32 236. M.-M. Delessert (Paris) à M. Boulton, 22 octobre 1787.

⁸⁸ BCL MS 3782/12/32/169 237. M. Boulton Sketch of letter "To Miss De Lessert," 2 November 1787.

⁸⁹ Boulton had Delessert provide Matthew funds to settle the old account and to pay Manuel, Matthew's board, and other costs in Paris. A sojourn in Cornwall and absences from Soho left Boulton unaware of the state of his account with Delessert's bank, and he sent money as a credit towards his account *Ibid.*

⁹⁰ *Ibid.*

I beg M^r Manuel as well as my son will consider that I do not send him to Paris to go to Operas Balls & Places of dissipation not to contract habits of indolence but on the contrary I am desirous he should be incessantly employd in gaining knowledge or healthily or Strength & that he should not find one idle Moment in the course of the day. But above all I must request of M^r Manuel to absolutely prevent him for forming any improper acquaintance or keeping any improper Company particularly the Company of Young English puppys, fops, Bucks, & Rakes.⁹¹

Boulton's own penchant for pomp and circumstance inspired these attractions in his son. He had finally come to realize that Matthew required less indolence and more industry. Accordingly, he prescribed a curriculum that would leave Matthew little idle time, and a prescription for his tutor to keep him focused. This meant keeping Matthew clear of the young English 'gentlemen' spreading their wealth, depravity, and seed on the Continent.

9.8. Conclusion

Children's education was important to Matthew Boulton, as it was for fellow Lunar men. Boulton and Watt's practical and industrial concerns left little time for reflection. They did not pen texts on children's education, as did several of their Lunar brethren, but their concerns manifested through actions. Boulton knew his son could not receive complete training, to be a captain of industry, in England. Domestic factors delayed Boulton from sending Matthew abroad. Commercial concerns created further distractions, but also presented Boulton the opportunity to establish Matthew in France, in 1786. Boulton's desire for Matthew to have a genteel education led to his time at Versailles. However, Boulton's contacts there were more concerned with British industrial prowess, and France's deficiency, than Matthew's education. Therefore, Boulton depended on the Delesserts to arrange a tutor and establish Matthew in Paris. Enlightenment benevolence enabled this to occur, but not to overcome the indolence Matthew had already developed.

⁹¹ *Ibid.*

10. Enlightenment Benevolence: The Network Facilitates Scientific Exchange and James Watt's Philosophy of Social Harmony

There is no published record of James Watt's Enlightenment philosophy. His great works were his celebrated mechanical improvements and inventions. Yet he shared a philosophy on civil society that was akin to fellow Scotsman Adam Smith. The two men worked at the University of Glasgow together and had been acquainted since 1757. Smith was a subscriber to Watt's letter copying machine,¹ and advice Watt gave to his son James was similar to parts of Smith's *A Theory of Moral Sentiment*.² Watt's guidance reveals how he thought his son must behave to properly contribute to the ties binding the Republic of Letters. These views also demonstrate why Watt was often compelled to assist the people who arrived at his doorstep in Birmingham.

The Watts attempted to repay the kindness they owed to the wider Enlightenment network. This included sending gifts through James, such as Watt's scientific papers and mechanical productions from Soho. Interchanges within the network allowed transmitting not only scientific papers, but also methods of experiment. Benjamin Thompson, Count Rumford (1753-1814) replicated experiments on cold reflection, which M.-A. Pictet had made in Geneva around 1790, with Scottish *savants* in Edinburgh in 1800. Connections facilitated visits to sites of industrial production, and diffusion of material for scientific experiments. Matthew Robison Boulton's stay in Paris, and return to Soho, exposed his ongoing indolence, and intriguing intricacies in nascent chemistry. Watt organized the final stage of Matthew's education in Germany. Matthew's floundering in England,

¹ 207. A. Smith (Edinburgh) to [William Strahan], 26 October 1780. Adam Smith, *The Correspondence of Adam Smith*, ed. Ernest Campbell Mossner and Ian Simpson Ross (Oxford: Clarendon, 1977), pp. 248-9 and n. 1.

² Watt's advice share several similarities with Smith's section on "Self-Love." Adam Smith, *The Theory of Moral Sentiments*, ed. Knud Haakonssen, (Cambridge: Cambridge University Press, 2002), pp. 358-65.

which continued in France, exposed Watt's Enlightenment philosophy. The loss of austerity and discipline, arising from increased luxury and sociability, meant less devotion to parental instruction. Therefore, forging of links with *savant-fabricants* like the Delesserts became paramount.

10.1. James Watt's Philosophy of Social Harmony: Repaying Bonds

James Watt's Enlightenment philosophy is revealed through his instructions to his eldest son, as James left for the Continent. A neglect to write home earned James a stern lecture, unleashing Watt's apprehension about James' conduct as he departed England. Watt wanted him to realize how much they owed their contacts along the British-Franco-Swiss network for facilitating the enterprise. Disregard of family and friends, Watt suggested, showed neglect of one's duty, inexcusable idleness, or a dearth of the "natural affections which forms the sweetest & firmness bond of Society." Such people had an excess of self-love, which led them to neglect the concerns of other people, unless it directly benefitted them.³ Watt explained that this conduct was unpleasant for all:

[F]or the man who has no pleasure except from this good which happens to himself must have much less happiness than him who enjoys a real pleasures from the welfare [*sic*] and happiness of his friends and it is impolitick [*sic*] because making in general, sooner or latter discover the motives of their neighbours conduct and he that cares for nobody, nobody will care for him he lives for himself and can have no friends, because friendship cannot subsist without mutual affection & good office.⁴

The advice was standard instruction by a father to a son, but connoted a wider resonance.

People depended heavily on mutual dependence.

³ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 15 November 1784. James did write before he left London, but missed chances to send word home. BCL MS 3219/4/11/1. J. Watt jnr (London) to J. Watt snr (Birmingham), 16 November 1784.

⁴ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 15 November 1784.

Watt implored James to recognize their debt and develop an equivalent concern.

This guidance was most pertinent for James, as Watt instructed:

Benevolence to all & affection and attention to your friends is therefore what I must strongly inculcate to you, and I hope thus your heart is not naturally so bad, but that upon due consideration of the many benefits you have received from others you will be excited to make them such returns as may be in your power, which at present can consist only in your taking care to keep up a grateful sense of their kindness in your own mind and in such attention or little services as you know will be pleasing to them.⁵

James was being cared for by people who did so out from no other motivation than natural goodwill, or out of the respect they had for friends who had recommended him. Furthermore, it placed Watt in the unenviable state of obligation, as in some cases he may not be able to return this kindness. He advised James to reflect on these instructions, be aware of his most common transgressions, and above all be a reliable correspondent. Watt supported what he referred to as “natural Benevolence” during his preparations to send James to Geneva,⁶ as he had before he started the process. This full devotion to moral sentiment, which Watt showed by his help to the Delucs, Ami Argand, and the Delesserts, was repaid as James crossed the English Channel to the Continent.

10.2. Lost and Found in Transmission: Watt on Water and Pictet on Ice

In the eighteenth century item such as books routinely went missing in their transmission across Europe. It was less common for there to be an orchestrated cover-up to conceal such an oversight. The text in question was a copy of James Watt’s 1784 paper on his experiments on the component parts of water and dephlogisticated air.⁷ Diffusing the publication was one of the first acts to demonstrate Watt’s priority in discovering that

⁵ *Ibid.*

⁶ *Ibid.*

⁷ James Watt, “Thoughts on the Constituent Parts of Water and of Dephlogisticated Air; With an Account of Some Experiments on That Subject. In a Letter from Mr. James Watt, Engineer, to Mr. De Luc, F. R. S.,” *Philosophical Transactions of the Royal Society of London* 74 (1784), pp. 329-53.

water was a compound, not an element.⁸ Watt informed his friend Joseph Fry (1728-87), a Bristol Quaker and chocolate manufacturer, that his ideas had been “pirated Soon after I wrote my first paper on the subject.”⁹ Charles Blagden explained Watt’s theory to Antoine Lavoisier in Paris, who presented a paper on his own theory to the *Académie des sciences*. Subsequently, Henry Cavendish read a paper on the matter before the Royal Society. They did not credit Watt’s work, which he saw as having been appropriated by more wealthy and powerful men.¹⁰ In 1784-5, James Watt junior inadvertently stymied Watt’s early attempts to disseminate his work to a French-language audience.

Watt’s Enlightenment exchanges expanded his scientific contacts. Initially Watt asked Richard Kirwan, who was in contact with many leading chemists, to forward copies of the paper to friends on the Continent. A misunderstanding at the printer initially held up the text. In October, Watt informed Kirwan that he only had fifty copies. Watt included a list of foreign *savants* to whom he wanted copies sent so Kirwan could decide whom to contact. The list, a venerable register of eighteenth-century natural philosophers, included Lorenz Friedrich Crell (1744-1816), P.-S. Laplace, Antoine Lavoisier, Guyton de Morveau (1737-1816), and Alessandro Volta (1745-1827).¹¹ By November the list had doubled. Besides those sent by Kirwan, Watt gave James copies for Mme Delessert, Jean Senebier, H.-B. de Saussure, and E.-C. Genet. The expanded list depleted Watt’s supply of copies. He assured J.-A. Deluc that he would receive copies for his friends abroad, but any more would cause embarrassment by depriving British friends.¹² Most of the copies

⁸ On the long, complex, and contested history of this discovery see Miller, *Discovering Water*, pp. 27-81.

⁹ BCL MS 3219/123 J. Watt (Birmingham) to Joseph Fry, 15 May 1784.

¹⁰ *Ibid.*

¹¹ BCL MS 3219/123 J. Watt to R. Kirwan, October 1784.

¹² BCL MS 3219/4/123 J. Watt (Birmingham) to J.-A. Deluc, 2 November 1784. The other recipients listed by Watt were: Lois Bénigne François Berthier de Sauvigny (1737-89) the Intendant of Paris, Johann Carl

transmitted but Watt made it to their respective recipients, thereby contributing to the clamour around the conversion of water. However, at least one was delivered very late.

James Watt junior, often chastised by his father for carelessness, was imprudent with Watt senior's paper on dephlogisticated air intended for Mme Delessert. Her family received James in Paris in 1784, and housed him in Lyon, but he failed to deliver Watt's gift. Madeleine Delessert informed James in early 1785: "My mother was sorry a little you forgot to deliver her your Father's book, however She will not mention this at Birmingham." Mlle Delessert conveyed their urgency, as her mother required the text and utmost regretted "being deprived of it."¹³ There was cause for Mme Delessert's rush and secrecy. By May Watt's paper finally reached Guyot in Edinburgh. He thanked Watt and noted that there was a long delay with that intended for Mme Delessert. She had forbid Guyot, who arranged for Watt's paper to be translated for the *Journal de Physique*, from telling Watt. The delay made Mme Delessert late with its delivery, leaving Guyot unsure if a translation was made.¹⁴ The journal's main editor, Jean Claude de la Métherie (1743-1817), was a friend of Guyot and of the Delesserts.¹⁵ It appears that the journal did not publish a translation of Watt's paper, but it did publish one of a paper by his counter claimant Henry Cavendish.¹⁶ James' lapse with his father's paper was unfortunate. The Delesserts, usually a major conduit between Birmingham and Geneva, acted as a filter to

Wilcke (1732-96), Franz Karl Achard (1753-1821), Felice Fontana (1730-1805), Dr Pierre Marie Auguste Broussonet (1761-1807), and Marie Joseph Louis d'Albert d'Ailly, Duc De Chaulnes (1741-92).

¹³ James was to send it with the brother of Geneva's apothecary, who was travelling to Paris. BCL MS 3219/6 12 M.-M. Delessert (Paris) to J. Watt jnr. (Geneva), 4 February 1785.

¹⁴ BCL MS 3219/4/98/3 A. Guyot (Édinbourg) à J. Watt (Birmingham), 11 mai 1785.

¹⁵ BCL MS 3782/12/32 282. A. Guyot (Passy) to M. Boulton (Birmingham), 28 April 1788.

¹⁶ Henry Cavendish, "Suite des experiences sur les airs," trans. Bertrand Pelletier *Journal de physique* vol. 26 (1785), pp. 38-51.

protect this oversight. In the nineteenth century, James led efforts to defend Watt's role in the discovery of water's composition and compound nature, and his overall image.¹⁷

The Delesserts played a critical role in establishing James Watt junior in Geneva's vibrant atmosphere of science. Besides recommendations to Pierre Prévost and Dr Louis Odier, who helped James attend Pictet's natural history course, Etienne Delessert gave James letters for other natural philosophers. One was to Louis de Végobre (1752-1840).¹⁸ In 1785, James took Végobre as a tutor, on Georges Le Sage's (1724-1803) advice. James informed Watt that Végobre was one of Geneva's best mathematicians.¹⁹ Végobre was a lawyer by profession, but the overlap between science and society was as present in Swiss states, as in other parts of the Enlightenment world. This became abundantly clear in the controversy created by 'Pictet's experiment' between 1790 and 1804.

The experiment performed by Pictet was actually the inversion of a conventional but celebrated demonstration. It used heat reflected between two concave mirrors, set at a distance apart, causing the temperature of a thermometer in the reflection of the second mirror to rise. H.-B. Saussure and Pictet had performed the experiment together, as Pictet alone had the proper instruments. They published their results in respective works on natural philosophy. On the suggestion of Louis Bertrand (1731-1812) Pictet later inverted the experiment. It involved reflecting a concentrated cold emanation between two curved

¹⁷ On James Watt junior's role in the debate over the discovery see Miller, *Discovering Water*, pp. 83-104.

¹⁸ BCL MS 3219/4/11/8 J. Watt jnr, (Geneva) to J. Watt snr (Birmingham), 24 December 1784.

¹⁹ BCL MS 3219/4/11/15 J. Watt jnr, [Geneva] to J. Watt snr (Birmingham), [16 April 1785]. Le Sage, too reclusive to try for a college chair in Geneva, survived by teaching mathematics and living frugally. Much of his life was dedicated to using fluid particle theory to explain gravity mathematically. He published little, as he was too scattered to write in a neat format. Le Sage's work became widely known by correspondence with prominent *savants*, and the work of fellow Genevans. After his death Prévost, a student and disciple, created a readable version of Le Sage's theory from his many papers. Prévost added it to his own work, published as *Deux traités de physique mécanique* and wrote the biography *Notice de la vie et des écrits de George-Louis Le Sage de Genève* (1805). James Evans and Brian Popp, "Pictet's Experiment: The Apparent Radiation and Reflection of Cold," *American Journal of Physics* 53 (1985), p. 752, n. 38. Prévost transformed an unorganized mass of notes into a readable text for a wide audience.

mirrors to cause a drop in the temperature of a thermometer. Pictet's theory to explain the result was published in *Essay sur le feu* in 1790.²⁰ James Hutton established a fault in the theory, which was published in Scotland in 1794. In Geneva, Pictet's friend Végobre cited another problem.²¹ Végobre studied law, as did Pictet and Prévost, but only Végobre went on to practice. Prévost solved the problem identified by Végobre, as the three men also shared a passion for natural philosophy.²² Hasak Chang notes:

Végobre shared his criticism of Pictet's theory with Prevost, thereby stimulating the latter into developing his innovative and influential theory of radiant heat. As in the case of Bertrand urging Pictet to experiment on the radiation of cold, Végobre's role in motivating Prevost's [*sic*] work illustrates the importance of informal personal interaction in the close-knit Genevan scientific community at the time.²³

By using the work of Le Sage, on mechanical gravitational attraction, Prévost created a theory to challenge Pictet's static one. In 1791, Prévost published a paper in the *Journal de Physique* on his caloric theory on dynamic equilibrium of bodies. It was widely, but not universally, accepted. Experiments and challenges were communicated in public journals, including Pictet's *Bibliothèque britannique*, and private correspondence.²⁴ The British-Franco-Swiss network acted like the mirrors in Pictet's experiment. Intimate scientific interchanges in Geneva were reflected to receptors throughout Europe.

Count Rumford reignited the debate on Pictet's theory in 1800, by replicating his experiment on cold. This occurred during Rumford's months in Edinburgh with several university professors, including John Playfair, Dugald Stewart, and Thomas Hope (1766-

²⁰ Saussure described experiments on heat in the second volume of *Voyage dans les Alpes* (1779-96). Hutton's challenge appeared in *Dissertation upon the Philosophy of Light, Heat, and Fire* (1794). Evans and Popp, "Pictet's experiment." pp. 737-51.

²¹ Hasok Chang, "Rumford and the Reflection of Radiant Cold: Historical Reflections and Metaphysical Reflexes," *Physics in Perspective* 4 (2002), p. 139.

²² Evans and Popp, "Pictet's experiment." pp. 740-6.

²³ Chang, "Rumford and the Reflection of Radiant Cold," p. 139.

²⁴ *Ibid.*, pp. 138-52.

1844), who succeeded Joseph Black as the chair of chemistry.²⁵ Rumford reported to Pictet: “We repeated your interesting experiment on the reflection of cold, two day ago, at Dr Hope’s house, and with complete success. I am now convinced that light is not an *emanation*. The slow vibrations of ice in the bottle cause the thermometer to sing a lower note.”²⁶ Rumford employed his findings on cold reflection to defend his views on radiant heat. He challenged Prévost and the caloric theory generally. The dispute endured for years with many experiments performed in Geneva and Paris. In the short term Prévost and the caloric theorists won the day, only to be dismissed later in the century. Their victory stemmed from cultural factors more than scientific ones.²⁷ Ultimately, each side was off the mark, but the exchange reveals a larger significance. Common bonds in Enlightenment science relied on international collaboration and communication.

The Republic of Letters spread the experiments of Watt on water and Pictet on ice. Those on water, whose priority remains in dispute, were assigned major significance in the development of modern chemistry. The priority of experiments on ice belonged to Pictet, but its meaning and significance was less clear. A common bond in these disputes was Lavoisier. By 1789, he had effectively explained discoveries by British chemists, on the composition of water, using the new French chemical nomenclature. Within a decade it supplanted the phlogiston theory favoured in Britain. Beyond the Chemical Revolution, however, disputes over Pictet’s experiments with ice exposed problems with Lavoisier’s caloric theory. It viewed caloric, a simple substance causing forms of heat, as attracted to

²⁵ *Ibid.*, pp. 139-43. Rumford’s travels in Britain and Europe slowed his experimental work on reflection. He had only learned of Pictet’s work in the mid 1790s. Evans and Popp, “Pictet’s experiment,” p. 742.

²⁶ Author’s emphasis. 51) Count Rumford (Edinburgh) to M.-A. Pictet, 18 October 1800. Pictet, *Correspondance*, vol. 3: p. 565.

²⁷ Chang, “Rumford and the Reflection of Radiant Cold,” pp. 140-62.

other materials, by rates of affinity, tending toward states of equilibrium.²⁸ Ultimately, disputes on ice and water engendered protracted scientific controversy. In the interim they were emblematic of the benevolence of Enlightenment science, which experienced resurgence in 1801-2. Rumford and Pictet had corresponded for years, but first met in London in 1801. They travelled to France together, joining traffic over the English Channel anticipating the Peace of Amiens. In Paris, they connected with the Delesserts' British-Franco-Swiss network, and Rumford introduced James Watt's son Gregory to several scientific luminaries. It was a culmination of links formed in the 1780s.

10.3. The Watts Repayment of Services

James Watt junior was impulsive in recommending Swiss friends to his father and Soho, one of the few habits to escape criticism. Their hospitality was extended to Louis Odier's son Jacques-Louis (1782-1843) and nephew, Pierre Chauvet's son Jean-Jacques-André (1767-1803), and Jean-Louis Labat. Watt was eager to be of service out of his obligation for their kindness to James in Geneva, and from his own sense of general goodwill.

The participation in wider Enlightenment culture by James Watt, and his eldest son, created more Swiss traffic to Soho. James, soon after arriving in Geneva, was invited to dine with Odier, to whom he was firmly recommended by Etienne Delessert.²⁹ Odier wanted to send his eldest son to study in England. James extended Watt's assistance to be useful to his hosts.³⁰ Watt confirmed the offer, assuring Odier that his son would be cared

²⁸ *Ibid.*, p. 136; Marco Beretta, "Lavoisier and his Last Printed Work: *Mémoires de physique et chimie* (1805)," *Annals of Science* 58, no. 4 (2001), pp. 328-50; Miller, *Discovering Water*, pp. 30-3.

²⁹ BCL MS 3219/4/11/8 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 25 December 1784.

³⁰ James found Odier informed in medicine, and all subjects, and his wife Suzanne well versed in natural philosophy. Odier planned to send the eldest of three children, a son aged four, to England in four years for school. James encouraged this with glowing accounts of his boarding school, and assurance that Watt would greatly assist Odier's son in his education. BCL MS 3219/4/11/12 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 22 February 1785. Watt did not approve of James' old school, but assured Odier that his son would be well cared for. BCL MS 3219/4/123 J. Watt snr (Birmingham) to L. Odier, 1 May 1785.

for, as if he was Watt's own son. Aside from his obligation to Odier, Watt was compelled by the confidence Odier placed in him.³¹ Yet, Watt dampened James' approval of English schools. Their decaying state led Watt to send James to Geneva to improve his morals.³² Watt's frank appraisal must have dissuaded Odier from sending his son. Odier's personal knowledge and admiration of Britain insured his determination. In 1785 Oider asked Watt for hospitality, explaining: "my nephew who proposes to make a sojourn of several weeks in England where he will have the honour to see you in Birmingham whose famous manufactories will naturally attract his attention & pique his curiosity."³³ Odier took the liberty to introduce his nephew, requesting Watt to help him maximize his trip to Birmingham and other northern-England factory towns he planned to visit.³⁴ England's boarding schools were in a steady state of decline, but its Midland's manufactories were the envy of the world. This created industrial espionage, which was counteracted by a shuttering of factory doors to foreigners. Thus, the value of membership in the British-Franco-Swiss network increased and links to Boulton & Watt at Soho were strengthened.

A visit to Soho was not the only means Watt had to repay the civility shown to his son in Geneva. Ultimately the reason that so many foreign travellers wanted to visit the Midlands' manufactories was the tangible and coveted products they produced. Therefore to repay Dr Odier for taking James in, as he waited to move into Chauvet's pension, Watt determined to send fruits of Birmingham's labour. Initially he wanted to send one of their copying machines, but feared Odier would pay too much in duty. A second consideration

³¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to L. Odier, 1 May 1785.

³² *Ibid.*; BCL MS 3219/4/11/12 J. Watt jnr to J. Watt snr, 22 February 1785.

³³ BCL MS 3219/4/10/11 L. Odier (Genève) à J. Watt (Birmingham [*sic*]), 22 octobre 1785.

³⁴ *Ibid.* Odier does not identify his nephew.

was to send pairs of plated candlesticks.³⁵ In the end, Watt sent one of their “Birmingham manufactures” with a Swiss connection: an Ami Argand’s plated lamp. Watt described it to Odier as “a philosophical improvement on an useful utensil, and as an invention of a lantern of Geneva.”³⁶ Watt saw this gift as the only method of freeing himself from the obligation he was under. Odier would not accept money.³⁷

Another extension James Watt junior made of Watt’s hospitality was more direct. Jean-Louis Labat and Dudley Adams visited Soho in September 1785, with introductions from James. Watt developed a favourable opinion of Labat, but not Adams.³⁸ This was inevitable, as Watt had already uncovered unflattering accounts. They came while he was in London, inquiring into James’ behaviour in Geneva. Watt learned from several sources that Adams was “a very dissipated and rakish young man.”³⁹ After their encounter, Watt described Adams as having “the look of an idle debauchee & appears to be very ignorant considering the opportunities he has lost.” Adams’ lack of prudence supposedly led him to travel on foot from Geneva to Paris. Watt understood, he informed James, that unless Adams began to practice “œconomy more than he has done [he] will soon dissipate the small fortune left him by his father.”⁴⁰ Such accounts reveal how Adams bankrupted his family’s formerly prominent mathematical instrument business in 1817.⁴¹ The relation of Adams’ failures was also another warning to James, on the company he kept and his own conduct. Watt did not allow a low opinion of Adams impact his hospitality. Adams and

³⁵ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J.-A. Deluc, 10 April 1785.

³⁶ Watt described Argand’s lamp as plated with two lights or burners. BCL MS 3219/4/123 J. Watt snr (Birmingham) to L. Odier, 10 October 1785.

³⁷ Watt also send Soho button for James to repay kindness, including pairs for G.-A. Deluc, M.-A. Pictet, and Argand’s in-laws the Auzieres. BCL MS 3219/4/123 J. Watt snr to James Watt jnr, 5 June 1785.

³⁸ BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 10 September 1786.

³⁹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 13 February 1786.

⁴⁰ BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 10 September 1786.

⁴¹ Millburn, *Adams of Fleet Street*, pp. 307-17.

Labat were joined by an acquaintance of Joseph Priestley junior, likely Nicolas Paul (1763-1806). On their visit to Soho Watt extended every courtesy he could on James' behalf.⁴² The purpose of their visit was industrial interest, not espionage, but all three visitors later became involved in science and industry. Enlightenment benevolence led inevitably from educational exchanges to industrial and scientific ones. This development further strengthened Birmingham's bonds to Geneva and Passy.

10.4. The Delesserts' Network and Matthew R. Boulton's Return to Soho

The Delesserts served as a nexus in their British-Franco-Swiss network. They received British youth improving their education, as well as superior and scarce British industrial material and technology, to improve Continental industry and science. Boulton and Watt in turn sent British books, materials, and information. This included metals for Etienne Delessert's ventures and minerals for Abraham Guyot's chemistry experiments. In 1787, Guyot willingly received the mineral wolfram that was hard to obtain in France. Boulton sent it for Guyot and Charles André Hector Grossart de Virly (1754-1805),⁴³ *président* of a Dijon law court and member of its *Parlement*. De Virly was well-travelled, had studied chemistry at Uppsala with Torbern Bergman, visited Soho in 1787 on an British tour, and flew in a hot-air balloon with Guyton de Morveau, fellow chemist and member of Dijon's *Académie*.⁴⁴ Guyot and the Delesserts acted as liaisons for many of their acquaintances.

⁴² BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 10 September 1786.

⁴³ BCL MS 3782/12/32 280. A. Guyot (Passy) to M. Boulton (Birmingham), 11 November 1787. Guyot asked Boulton to send tungsten or wolfram. The request was for Guyot and president de Virly on behalf of Boulton's "philosophical or semi-philosophical friends" in Paris, which including Guyot and his pupils. A supply was sought from Boulton & Watt's Cornwall ventures. The Continental chemists also asked why these minerals were had to obtain, considering their abundance in Britain. The sample was to be distributed according to Boulton's wishes. BCL MS 3147/3/286-404 71. A. Guyot to M. Boulton, 16 May 1787.

⁴⁴ Jones, *Industrial Enlightenment*, p. 79, 81, 88; Trevor H Levere, "Public and Private Science at Home and Abroad: Networks Among Chemists, Physicians and Industrialists in the 1780s," *Endeavour* 26, no. 3 (2002), p. 111. Stewart, "Putting on Airs," p. 218; W. A. Smeaton, "Louis Bernard Guyton de Morveau,

The Delesserts' aid to the Boulton family continued throughout Matthew's stay in Paris, and after his departure from France. However, the families were, along with Guyot and L.-P. Manuel, somewhat hamstrung. Six months was not a sufficient period to correct the deficiencies Matthew acquired while taught in Britain and Versailles. In March 1788, Guyot informed Boulton that Matthew had generally shown good conduct, was attentive to his studies and exercises, and made improvements in speaking French.⁴⁵ Despite the ability, to speak and comprehend French, Matthew could not be made to write regularly to master it.⁴⁶ The charge made against Matthew in Paris was the same as that made by his father and Watt in Birmingham. Guyot noted: "His indolent dispositions only prevented his proficiency from being greater: It is the sole fault M^r. Manuel ever found with him; and all the means by which he endeavoured to conquer that disposition of his pupil's met with M^{rs} deLessert [*sic*] approbation and mine."⁴⁷ Matthew's indolence was not solved in this brief period, despite much effort. The consensus in Paris was that things would grow worse. Only two weeks of natural philosophy lectures remained, and Matthew appeared determined to make little benefit of the month and a half he believed he had left. It was feared that indolence would turn to idleness, once lectures concluded, and Matthew may make unsavoury friends as he drew away from Manuel. Guyot thus recommended, after consulting Mme Delessert, that Boulton recall his son early. If he was unable to do this, then Guyot requested to be notified before Matthew in order to work with Manuel to make the remaining time as safe and productive as possible.⁴⁸

F.R.S. (1737-1816) and His Relations with British Scientists," *Notes and Records of the Royal Society of London* 22, no. 1/2 (1967), pp. 115-9.

⁴⁵ BCL MS 3782/12/32 281. A. Guyot (Paris) to M. Boulton (Birmingham), 31 March 1788.

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

⁴⁸ *Ibid.*

Matthew Boulton did not begin the process to recall his son until April, despite the discretion and candour of their friends in Paris. Boulton did attempt, by covert means, to uncover how his son was behaving in Paris. He sought the identity of the two young English gentlemen with whom Matthew attended the Opera Ball during the *Carnival*.⁴⁹ Ultimately, it was not reports from acquaintances in Paris about indolence, or dangerous friends that led Boulton to recall his son. Instead it was so Matthew could have a break to see his family and friends at Soho, before being sent to Germany. Boulton suggested that Matthew travel from Paris to Birmingham with Jean-Pierre Droz (1746-1823),⁵⁰ a Swiss engraver and artist hired by Boulton to work at the Soho Mint. Boulton established it in this period to employ steam-powered machinery to produce coins.⁵¹ Droz travelled and settled in Birmingham, but Matthew did not travel with him. After Matthew missed chances to travel home Boulton gave him an ultimatum. Boulton insisted that if Matthew did not leave Paris by the middle of May he would have to travel directly to Germany. He had to depart Birmingham by the end of May to secure his place with F. H. Reinhard. On 12 May, Matthew finally told Boulton that Guyot had organized his return to England.⁵²

⁴⁹ BCL MS 3782/12/32 110. M. Boulton Draft Letter to unidentified correspondent [mislabelled Manuel]. [n.d. misfiled as December 1788]. Boulton identified the correspondent only as “C,” addressing the draft to J.-P. Droz in Paris. Matthew and Manuel were not to know its contents, as Boulton assured its recipient that the letter was in confidence. It was undated but from late February or March, as it was after *Carnival*, but before April, when planning Matthew’s recall began. “C” may have been Soho’s agent Andrew Collins.

⁵⁰ M. Boulton to M. R. Boulton, 3 April 1788. Quoted in BCL M. R. Boulton Itineraries (1) 1780-1813.

⁵¹ BL Add. MSS 38421 f. 271. M. Boulton (Soho) to Robert Jenkins, Second Earl of Liverpool, 16 October 1788. Droz settled in Birmingham, attaining high praise from Boulton, but they had a falling-out. Droz’s refused to return a coining punch or agree to maintain industrial secrets, and threatened to set up a rival coining operation in Birmingham. Samuel Garbett called Droz “an idle, foolish, & unprincipled Fellow.” BL Add. MSS 38421 f. 121. S. Garbett (Birmingham) to Liverpool, 12 April 1790.

⁵² Matthew informed Boulton that Guyot secured a place in the diligence from Paris to Calais. M. Boulton to M. R. Boulton, 12 May 1788. BCL M. R. Boulton Itineraries (1) 1780-1813. Matthew confused this detail. Two days after his letter Guyot provided La Méthrie a letter of introduction to Boulton, in case La Méthrie did not travel with Matthew all the way to Birmingham, nor see Matthew on their intended visit to Soho. BCL MS MBP 235 Letter box G 283. A. Guyot (Paris) to M. Boulton (Birmingham), 14 May 1788. La Méthrie toured the Soho manufactory in May 1788. Peter Jones, “‘Commerce des Lumières’: The International Trade in Technology, 1763-1815,” *Quaderns d’Història de l’Enginyeria X* (2009), p. 74.

The opportunity arranged by Guyot had Matthew return to England as James Watt junior departed it: in the company of two travelling natural philosophers. Guyot learned through Manuel of Boulton's desire to recall his son for May 1788. Accordingly, Guyot informed Boulton that J. C. de la Métherie, who Boulton had met at Delessert's house in Passy, and Friedrich Wolff (1766-1845), who Guyot cited as "the celebrated Chymist [*sic*]," were "to set out in company for London toward the 15th of May."⁵³ La Métherie agreed to have Matthew join their party. Guyot sought to arrange the return with them, inquiring into Boulton's intentions, as it was a well-timed prospect.⁵⁴ The opportunity to travel with this party was also timely on several other significant counts.

Matthew's travelling partners were an odd couple, as they supported opposing sides emerging at the dawn of the Chemical Revolution. La Métherie and Wolff joined the *savants* caught up in the Franco-British chemical war waged over phlogiston. Guyot was likely a supporter of phlogiston given his connections to, and study in, Birmingham and Edinburgh. It is thus ironic that Guyot announced the death of phlogiston. De Virly was to send James Watt the latest news on natural philosophy. However, it was Guyot who reported to Watt that the *Académie française* had printed some of "the new chemical nomenclature," and were at work on the remainder that would form a volume with eight codas of "French chemistry, and would at the same time be the funeral oration for the poor phlogiston."⁵⁵ Guyot added that Guyton de Morveau in Dijon had fully abandoned phlogiston.⁵⁶ Finally, Guyot was the bearer of like news to Joseph Black in Edinburgh.⁵⁷

⁵³ BCL MS 3782/12/32 282. A. Guyot (Passy) to M. Boulton (Birmingham), 28 April 1788.

⁵⁴ *Ibid.*

⁵⁵ BCL MS 3219/4/98. A. Guyot (Paris) to J. Watt (Birmingham), 24 May 1787.

⁵⁶ *Ibid.*

⁵⁷ To Watt, Robinson recalled that he and Dr Hutton had encouraged Dr Black to defend their position and create a superior nomenclature. This was "when the French Chymists made the great Revolution and M^r Guyots letter in 1787 (wc [*sic*] the dr showed me) announced their new Nomenclature, so full of barbarisms

Another link supporting Guyot's ties to phlogiston was La Métherie. They were friends and Guyot contributed to La Métherie's periodical, *Journal de physique*, which he began editing in 1785. La Métherie was unique in France in his dedication to phlogiston. In the 1780s most French chemists adopted the new chemistry of Antoine Lavoisier. Yet, La Métherie still supported phlogiston during the Napoleonic era, when the dispute had been long decided by French chemists.⁵⁸ Like Guyot, La Métherie shared links to the Lunar Society,⁵⁹ and interest in various branches of natural philosophy: mineralogy, geology, chemistry, physics, and natural history. Unfortunately, a longstanding devotion to phlogiston made La Métherie an outcast in the powerful world of French science.⁶⁰

Considering La Métherie's enduring devotion to the phlogiston theory it is quite astounding that he travelled to London with Friedrich Wolff. He was from Berlin and an early and vocal supporter of Lavoisier, whereas most German chemists opposed French chemistry in favour of phlogiston. Wolff's work and translations of foreign chemistry texts into German united him with others in Berlin, including Alexander von Humboldt. They were cosmopolitans working to spread Lavoisier's revolution in French chemistry. It would, Wolff predicted in 1790, have as a revolutionary effect on natural philosophy as France's political revolution would for humanity. The German group's conversion to the

in Language, and deficient in justness of Conception, saying that their great object was to give the Coup de Grace a la pauvre phlogyston, and to make us forget every thing, even that there had been known such things as Fixed Air, Vitriol Acid." BCL MS 3219/6/17 25. J. Robinson (Edinburgh) to J. Watt snr (Birmingham), 25 February 1800; James Watt and Joseph Black, *Partners in Science: Letters of James Watt & Joseph Black*, ed. Eric Robinson and Douglas McKie (London: Constable, 1970), p. 334.

⁵⁸ The journal's title before 1793 was *Observations sur la physique*. Crosland notes that it was speculated that de la Méthrie's opposition to French chemistry led Lavoisier and his supporters to establish *Annales de chimie* in 1789. Maurice Crosland, "Humphry Davy: An Alleged Case of Suppressed Publication," *The British Journal for the History of Science* 6, no. 3 (1973), p. 308, n. 20 and 21.

⁵⁹ La Méthrie, one of the foreign *savants* mentioned in letters or works by Lunar men, like Richard Kirwan noted the Society by name and sent it information on new findings. Schofield, "The Lunar Society," p. 156.

⁶⁰ La Métherie edited his journal and was named to a meagre position as mineralogy teacher at the *Collège de France*. He was disappointed, as honours and appointments were given to peers in Revolutionary and Napoleonic France who adopted Lavoisier's chemistry. Lacking their fortune in politics La Métherie went to prison during the Revolution and lost later appointments. Crosland, "Humphry Davy," pp. 308-9.

new chemistry occurred from 1789 to 1792, with Wolff's by 1790.⁶¹ This was two years after he and La Méthrie went to England. They formed an acquaintance despite a pending divergence over phlogiston. M. R. Boulton had an alluring chance to return home with two cosmopolitan and connected natural philosophers. After three months at Soho, M. R. Boulton was sent to Eisenach to study where James Watt junior had a year before. These young men were sent to mainland Europe, which was on the verge of political revolution.

Mme Delessert assured Boulton that her family and Guyot would support Matthew in Paris. The visit by he and James Watt junior further bound them to Stephen and Benjamin Delessert. Mme Delessert declared: "We are very pleased to see a relationship established between our 4 [*sic*] young men which cemented by time and a mutual respect will be more and more assured. And will be one of the joys of their life."⁶² James Watt shared this sentiment that, beyond hyperbole and sentimentality, proved true.

10.5. Anne Boulton's Missing French Tour: Soho's French and Swiss Visitors

Anne Boulton was unable to undertake a French Tour and had to instead experience the Continent through visitors to Soho. Indeed the parade of guests to Boulton's house and manufactory must have been a welcome distraction for Anne. She finished her schooling in London by 1784, and had a subdued life in Birmingham as her brother and James Watt junior expanded their prospects. In 1786, Anne stayed in Birmingham with Anne Watt, as Boulton, Matthew, and Watt senior left for France.⁶³ After Boulton arrived in Paris, he

⁶¹ Karl Hufbauer, *The Formation of the German Chemical Community, 1720-1795* (Berkeley: University of California Press, 1982), 98-117, 130-2.

⁶² BCL MS 3782/12/32 238. M.-C. Delessert (Paris) à M. Boulton, 25 novembre 1787.

⁶³ Mason, *The Hardware Man's Daughter*, pp. 68-79.

implored his daughter and Anne Watt to master French.⁶⁴ Circumstances did not permit Anne Boulton to visit France, but she had many chances to practice French at Soho.

Throughout late the Enlightenment there were many French and Swiss visitors to the Boulton household and manufactory. The Swiss made up a disproportionate amount of the guests who passed through Soho's gates. Visitors also came from many other parts of Europe and beyond.⁶⁵ Boulton and Mlle Delessert rehashed the promises they made to visit each other, while he was in Passy in 1786, in discussions organizing Matthew's education.⁶⁶ Boulton did not forget his promise to return to France, but he also noticed unnerving political changes. Watt and Boulton had not detected anything afoot in 1786, despite their time and connections at court, and left their sons on the Continent. The passing of a year, receiving steady news from France, transformed their view. In unusually ominous and poetic tones, Boulton told Mlle Delessert: "Things are strangely changd [*sic*] since I was at Paris Great Men are become little, & little men great. The smiling mask of peace is now Changed [*sic*] to the grim Vissage of War & the water of the Sein [*sic*] rises sluggishly o'er the Hills of Marls."⁶⁷ These words proved prophetic.

Soho's onslaught of visitors was mostly in the eighteenth century and it consisted primarily of male visitors. However, women were also amongst the guests who continued making pilgrimages to Birmingham into the nineteenth century. Frances Deluc of course made frequent and prolonged visits. Mlle Delessert, after marrying Jean-Antoine Gautier (1756-1800) in 1789, finally sojourned there with her husband in September 1800.⁶⁸

⁶⁴ BCL MS 3782/14/76/13 M. Boulton to A. Boulton, 26 November 1786.

⁶⁵ Jones, "Knowledge and Technology Transfer," pp. 37-53.

⁶⁶ BCL MS 3782/12/32 236. M.-M. Delessert to M. Boulton, 22 October 1787.

⁶⁷ Marl may have referred to the Seine's earthy clay banks, the 'Hill of Mars' in Athens named for the Roman god of war, or in a supreme vein of wit Boulton may have cleverly played on both meanings. BCL MS 3782/12/32/169 237. M. Boulton Sketch of letter "To Miss De Lessert," 2 November 1787.

⁶⁸ BCL MS MBP 228 301. F. Deluc (Windsor) to M. Boulton (Birmingham), 7 September 1800.

Boulton did not keep his part of the bargain and take Anne to Passy. It was through foreign visitors to Soho that Anne experienced the Continent. In this manner she became acquainted with Mme Gautier and many of the Delesserts. Besides the year Benjamin and Stephen spent with Guyot in Birmingham in 1784, Mme Gautier and her husband stayed for a prolonged period in England Guyot and Stephen sought refuge there after the political turmoil in 1792, François took advantage of the Peace of Amiens in 1802 to visit, and Mme Gautier's son Etienne (1792-1843) visited Soho with the return of peace in 1816.⁶⁹ Astoundingly, these bonds survived the turmoil of the revolutionary period.

James Watt's family was, like the Delesserts, able to remain participants in late Enlightenment traffic. Unlike the Boultons, who remained in Britain after Boulton and Matthew's travels in the 1780s, the Watts made several trips abroad. From 1792-4 James Watt junior toured throughout the Continent, Gregory retraced his steps in 1801-2, and in 1802 their parents crossed the English Channel. Anne Watt, unlike Anne Boulton, was able to see France, Paris, and the Delesserts as part of the rush of traffic in 1802. There was more motivation for her to travel during this peace, as opposed to that of 1783. She and Watt travelled to meet her ailing and beloved son Gregory then on the Continent, but not James Watt junior, the rebellious stepson with whom she quarrelled.⁷⁰

10.6. Watt's Enlightenment Philosophy and Support of Matthew R. Boulton

Matthew Robinson Boulton crossed the English Channel for a final stint on the Continent on 27-8 August 1788.⁷¹ Efforts to bring him to Germany began in July 1787, instigated

⁶⁹ BCL MS MBP 234 Letter Box G1 119. M.-M. Gautier (Londres 31) à M. Boulton (Soho), 27 octobre 1800. BCL MS 3219/6/2 D. J.-E. Delessert (Liverpool) to J. Watt jnr (London), 1 March 1794. BCL MS 3219/4/53 33. B. Delessert (Paris) to J. Watt jnr (Birmingham), 27 August 1816.

⁷⁰ They missed Gregory in the Low Countries and went to Paris. BCL MS JWP C2/10. G. Watt (Dresden) to J. Watt jnr (Birmingham), 18 September 1802 *Ibid.*, G. Watt (London) to J. Watt jnr, 19 October 1802.

⁷¹ He was escorted by Soho agent Andrew Collins. They took a packet ship from Dover to the Flemish port of Ostend. BCL MS 3782/12/32 19. A. Collins (Ostend) to M. Boulton (Birmingham), 28 August 1788.

by James Watt. On Boulton's behalf Watt asked F. H. Reinhard, James Watt junior's German tutor, if he would also help improve Matthew's behaviour.⁷² Matthew began his education in Germany in a similar manner as he had in Britain and France. His father's heavy use of intermediaries, indecision, and fixation with business led to delays as well as haphazard arrangements.⁷³ Nonetheless, strict instruction in Germany was beneficial for Matthew's character, as it had been for James Watt junior.⁷⁴

James Watt maintained a wavering opinion toward his business partner's only son.⁷⁵ Watt believed that Matthew had natural talents, but lacked a dedicated work ethic. This was stated plainly to Reinhard, as Watt explained that Matthew was "a very good Young man, but rather indolent & has been perhaps too delicately [*sic*] brought up being an only son."⁷⁶ This captured Matthew's primary shortcoming and its cause. Watt recognized Matthew's aptitude for mathematics. It had, however, only reached limited levels when Watt last saw him in France. Watt suspected Reinhard would be pleased taking Matthew, so long as Versailles had not been too corruptive.⁷⁷ Germany was somewhat a last resort for both Boulton and Watt.⁷⁸ Watt believed Matthew would

⁷² BCL MS 3219/4/123 J. Watt snr (Birmingham) to F. H. Reinhard, 22 July 1787.

⁷³ BCL MS 3219/4/123 J. Watt snr (Birmingham) to F. H. Reinhard, 3 October 1787; M. Boulton to M. R. Boulton, April 1788. BCL M. R. Boulton Itineraries (1) 1780-1813; BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 10 September 1788;

⁷⁴ By 1790, James and Matthew's education was complete, yet Boulton still had grand plans. Matthew was to follow a basic introduction at the Soho firm and a term at Edinburgh University. He was to attend Joseph Black's class, to have a course in chemistry in English, and one with John Robinson in experimental, mechanical, and natural philosophy. Boulton also suggested rhetoric and *belles lettres*, as being "essential embellishments to the Character of a Gentleman." This was to be followed by more initiation in the firm and a German Tour. As with previous plans, these finishing elements failed to materialize. M. Boulton to M. R. Boulton, 8 March 1790. Quoted in Musson and Robinson, *Science and Technology*, p. 214.

⁷⁵ Watt reversed his earlier position and recommended that James write to Matthew at Versailles. BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 9 April 1787.

⁷⁶ BCL MS 3219/4/123 J. Watt snr (Birmingham) to F. H. Reinhard, 22 July 1787.

⁷⁷ *Ibid.*

⁷⁸ Matthew advanced well in his studies and German under Reinhard, where he learned faster than James. He also studied mineralogy, but Reinhard sent him away after deeming Matthew's romantic liaison with a young baroness dangerous. Matthew wanted to end his time Freiburg, as had James, to learn under the great mineralogist Abraham Werner (1749-1817). Boulton decided against it, as failing Cornish mines made

improve, as he revealed to Gilbert Hamilton, whose son was likewise sent to Germany to study.⁷⁹ Yet, Watt disagreed with Boulton's choice to let his son remain longer in France, informing Reinhard: "I think there is something infectious in the air of France something against the habits of business & against morals."⁸⁰ Aside from perceiving the shifting affairs in France, Watt was aware of larger cultural changes.

Watt's understanding of pressure and movement over time was not restricted to his expertise in the science of chemistry and steam. He perceived cultural shifts and realignments in European society with the near precision of J.-J. Rousseau or Adam Smith. Evidence of this emerged in Watt's discussion on the decline in English education with F. H. Reinhard. However, Watt argued that the failing was not restricted to England, as France seemed more offensive and all other countries appeared to be following its lead.⁸¹ Referring to the cause of declining education Watt declared:

Mankind at the same time that they become more polite & social grows more & more relaxed. The seriousness & austerity of our fathers are laid aside, people mix more together, & by dividing their fund of attachment diminish the affection for their nearer connections. Luxury & the unavoidable expenses of living oblige us to be more eager in the search of money & leave us less time to fulfil [*sic*] our duties as parents & tutors, & the mode of Education in Boarding schools, which Oeconomy renders necessary abstracts the children from their parents eyes & is the source of many evils which in this country could only be remedied by a heavy tax on these seminaries & the encouragement of Day schools.⁸²

mineralogy less essential. Instead Matthew studied chemistry in Langensalza with Johann Christian Wiegleb (1732-1800). Musson and Robinson, *Science and Technology*, p. 213.

⁷⁹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 4 February 1787; *Ibid.*, J. Watt snr (Birmingham) to G. Hamilton, 10 September 1788; *Ibid.*, J. Watt snr (Birmingham) to G. Hamilton, 29 October 1788.

⁸⁰ BCL MS 3219/4/123. J. Watt snr (Birmingham) to Rev. M. Reinhard, 3 October 1787.

⁸¹ BCL MS 3219/4/123. J. Watt snr (Birmingham) to F. H. Reinhard, 22 July 1787.

⁸² *Ibid.*

Eighteenth-century commerce produced greater civility and luxury. This came at the expense of austerity and discipline.⁸³ Ultimately, well-off parents depended on others to care for their children. Watt saw this as a problem and English boarding schools were in no way the solution. Hence, Watt came to rely on the British-Franco-Swiss network.

10.7. Conclusion

The harsh treatment James Watt demonstrated toward James Watt junior and English boarding schools did not simply stem from a cruel disposition. It was instead an attempt to counteract cultural shifts. James Watt junior, despite the problems with his parents, ultimately took over the steam-engine business. Originally, the partnership was expanded to include Gregory Watt and Mathew Robinson Boulton. However, Gregory died young in 1804, and Matthew's health saw him take little part in the business by 1814. James was by this point in full management of the firm, which he expanded by directing the building of the Soho Foundry (1795-6). With the peace in 1814, James used renewed traffic to the Continent to reconnect with Benjamin Delessert. James' loyalty to Soho had stopped him from moving to America in 1794, along with Stephen Delessert and other friends, but James did not remain forever Britain-bound. He again crossed the Channel in 1816, and made later trips, including one of the first channel-crossings by steamship to expand the family business into new technologies and industries. Before James' success as a *savant-fabricant* he had a difficult and rebellious adolescence, as an alleged 'English Jacobin' during the French Revolution. James, like Joseph Priestley and Thomas Paine (1737-1809) was denounced by Edmund Burke (1729-97), for his politics, not his character.

⁸³ On the growth of consumer culture and luxury in Britain see Neil McKendrick, John Brewer, and John Harold Plumb, *The Birth of a Consumer Society: The Commercialization of Eighteenth-Century England* (Bloomington: Europa Publications, 1982), pp.1-33; 265-313; Maxine Berg, *Luxury and Pleasure in Eighteenth-century Britain* (New York: Oxford University Press, 2007), pp. 1-45.

**PART IV: PRACTICAL REFORM AND INDUSTRIAL EXCHANGE
(1786-92)**

11. Practical Reform before the Republican Storm: The British-Franco-Swiss Network Mobilizes for Trade

British and French bourgeois faced a distinct set of challenges in the 1780s, but shared a desire for expanded trade and reduced aristocratic power. These factors converged during Matthew Boulton and James Watt's trip to France, which began on 15 November 1786.¹ Unlike Boulton's visit to Paris in 1765, when he was young and unknown, he returned to France with an official invitation.² He and Watt were invited as celebrated industrialists by a country playing catch-up with Britain. The two countries signed a commercial treaty in 1786, which Boulton and Watt supported. William Eden, its British negotiator, sent Boulton intimate details soon after it was signed, and they met with him in Paris. Their travelling party also included the son and nephew of famous British potter Josiah Wedgwood, whose purpose in France was to expand Wedgwood's extensive commercial interests. The trip represented something of a victory for the Midlands manufacturers.

In the 1760s, Midlands manufacturers had unified to encourage canal expansion, which increased their links to one another, markets beyond England, and independence from London. This unity was tested in the 1780s, as British officials sought a commercial treaty with Ireland. English manufacturers united in their opposition in the belief that the Irish would pay lower duties and gain an unfair advantage. Wedgwood, Boulton, and Watt partook in the commercial committees formed to counter this policy. In the end, the manufacturers were able to block the bill. In 1785, a second battle emerged, as Britain and France negotiated a commercial treaty. The unity among manufacturers fractured. Boulton, Watt, and Wedgwood were among those desiring a commercial treaty to expand markets. The commercial organization formed to represent manufacturers' interests

¹ BCL MS 3782/14/76/12 M. Boulton (Paris) to A. Boulton, (Birmingham), 18 November 1786.

² BCL MS JWP Box IV 82. J. Watt snr to M. Boulton, 3 October 1786.

divided over the treaty. Manufactures tied to the Lunar Society succeeded in lobbying Eden. Boulton and Watt's invitation to France was a culmination of these efforts. In France the bourgeois attempting reform, including Etienne Delessert and Etienne Clavière, also encountered opposition. Factions linked to the monarchy and landed interests opposed such reforms. Advocates of free trade used speculation and pamphlet campaigns to promote open markets. *Savant-fabricants* throughout the British-Franco-Swiss network promoted commercial reform in the calm before the revolutionary storm. Ultimately, liberal bourgeois in France and Britain believed that maintaining peace would allow for greater commerce, thereby increasing the wealth of both nations.

11.1. British Bourgeois Battles against the Old Regime

Champions of economic reform in Britain faced an entirely different set of obstacles than their French counterparts. British manufacturers were highly sought after by members of the French ministry. However, British *fabricants* were often underappreciated at home.

James Watt explored the state of British commerce in letters on the education of young men. He shared his frustration over British politics with his brother-in-law Gilbert Hamilton in Scotland. Displaying more liberalism and passion on politics, than usual, Watt objected to the undo burden on manufactures and their importance to Britain:

There seems in the landed interest a determined resolution to lay every burthen on trade and manufactures & to keep it off every thing which has the most distant relations to their land & rents. But these people have ceased to be so powerful as they have been. The Ministry knows that the existence of the nation as a great people depends on the commercial and manufacture. The power of the landed aristocracy depends on the commerce and manufacturing Interest being ignorant of their own weight in the state at least on their not asserting it; for lately when the people spoke loud the corrupt majority in the house were obliged to give way, and to drop their claim to sovereignty. *The thing wanted is a union of sentiment which if persevered in must produce a Reform of Parliament.*³

³ My emphasis. BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton, 7 September 1784.

Watt proposed taxes to be removed from manufacturing and commerce, as well as reduction of duties on foreign goods. The timing was auspicious. Many of Britain's commercial treaties had expired or soon would. As a consequence the public was ready for reform.⁴ Such sentiments did not garner universal public endorsement, but the organizing of manufacturers led to a number of policies in their favour. Paramount among these was the Anglo-French Commercial Treaty of 1786.

Watt did not restrict sharing such passionate and politically inflammatory sentiments to old Scottish friends. Similar views were expressed to a new Genevan acquaintance: Dr Louis Odier. As part of an interchange on educational advice, Watt remarked on the impasse between the landed political class and manufactures:

This country has at present got into a political struggle that may have bad consequences. It originates from a mistaken policy in our ministers in laying oppressive excise taxes upon manufactures, which abridge the natural liberty of the Artist, by cramping him in his operations, & subjecting him to penal laws, and at the same time hurt his sales by enhancing the price of his commodities. This has been borne indignantly for a long time, but last year some of them taxes were increased and the objects of them multiplied in such a manner as to be more generally and more severely felt.⁵

Watt informed Odier that the outcome of these objections was that the Britain's main manufacturers united to raise protests with Parliament and the ministry. They claimed that if excise taxes were not removed, and if the treaty with Irish manufacturers passed on its proposed terms, then manufacturers would be forced to leave England for Ireland.⁶ This was an extreme recourse, but revealed manufacturers' desperation and frustration.

These conflicts arose at a sensitive time. Britain and France were in early stages of negotiating an unprecedented commercial treaty. Bourgeois factions, in both countries,

⁴ *Ibid.*

⁵ BCL MS BCL MS 3219/4/123 J. Watt snr (Birmingham) to L. Odier, 1 May 1785.

⁶ *Ibid.*

sought to reform roadblocks to commerce imposed by the land-owning aristocracy. There were also official French efforts to entice British manufacturers to France to stimulate industry.⁷ Members of the Delessert network participated in these developments.

11.2. Lobbying and the Proposed Anglo-Irish Commercial Treaty

In the 1760s and 1770s the West Midlands witnessed a great increase in the number of canals and turnpikes. These developments were significant for autonomy in the region. “Quite apart from the material benefits conferred by the canals themselves,” John Money notes, “their building exerted a major influence on the developing self-consciousness of the region.”⁸ Infrastructure resulted from organized cooperation of area manufacturers. The developments improved commercial exchange, communication in the region and beyond England’s borders, as well as independence from officials in London.

By the 1780s manufacturers were growing frustrated over taxes and policies that hindered business. They also recognized the growing importance of commercial trade for the national economy.⁹ The Birmingham Commercial Committee formed in August 1783, out of concerns over monopolies, taxes, and changes to overseas duties.¹⁰ By September it had a hundred members, including very prominent businessmen.¹¹ Their aim was to examine burdens on exported goods to Europe and to focus on Birmingham’s commercial interests.¹² Predictably the committee opposed the Irish policy, stating that its members were very knowledgeable about exchange and which laws injured commerce. The

⁷ Harris, *Industrial Espionage*, pp. 8-27, 176-220, 242-83, 297-322, 363- 418, 544-65.

⁸ John Money, *Experience and Identity: Birmingham and the West Midlands, 1760-1800* (Manchester: Manchester University Press, 1977), p. 24.

⁹ BCL MS 3219/4/123 J. Watt snr to G. Hamilton, 25 August 1784.

¹⁰ Committees formed in other Lowland and Midland cities. Money, *Experience and Identity*, pp. 34-5.

¹¹ This included Boulton, Garbett, Charles Startin, Lloyd bankers, and Galton gunmakers. BCL MS MBP Birmingham Commercial Committee 3. “A List of the Commercial Committee,” 19 September 1783.

¹² *Ibid.*

committee warned Parliament that the policy would damage Britain's manufacturers and merchants, especially around Birmingham, and endanger Britain's "internal Peace."¹³

The Irish Proposals were also a point of division within the Lunar Society. Josiah Wedgwood, Matthew Boulton, and James Watt worked to have the policy defeated. Their actions upset R. L. Edgeworth who, like many Irish, believed a commercial treaty would improve their ties to England. Edgeworth explained to Wedgwood that Ireland was a nation of soldiers, sailors, and workers who would not suddenly become traders. Other than weaving and agriculture, Edgeworth concluded, the Irish "will not manufacture for their own consumption during our life time."¹⁴ The fear for Lunar men of industry, and other English manufacturers, was that a majority of potential Irish manufacturers that were pushing for a treaty were in fact English gentleman-manufacturers. Critics of the Irish policy identified the government's underlying motivations as supporting industries of noble Englishman, not indigenous Irish industries.¹⁵

The manufacturers objecting to the Irish Proposals did not limit their opposition to local committees and petitions. This policy was the last in a series of commercial affairs neglected by London. By early 1785, sufficient antipathy among manufacturers existed for the establishment of the General Chamber of Manufacturers of Great Britain. It was led by Josiah Wedgwood and Samuel Garbett, and objected to the Irish commercial treaty proposed by William Pitt (1759-1806), Britain's young Prime Minister.¹⁶ Garbett worked

¹³ BCL MS MBP BCC 8. "Petition to House of Lords against the Irish Resolutions, which the Commercial Committee adopted," 7 June 1785. The committee wanted equal duties for both countries on materials imported for manufacturing, and for the hardware trade to be consider "an Object of National Importance." Their petition wanted the motion to be delayed until Parliament's next session, to allow more time to study potential consequences, and for the adoption of measures to protect manufacturers, commerce, and peace.

¹⁴ Schofield, *The Lunar Society*, p. 354; R. L. Edgeworth to J. Wedgwood, 20 March 1786. *Ibid.*, p. 355.

¹⁵ Witt Bowden, *Industrial Society in England Towards the End of the Eighteenth Century* (London: Frank Cass, 1965), pp. 172-7.

¹⁶ Money, *Experience and Identity*, p. 33.

tirelessly on the local provincial level, struggling to attain consensus and send petitions. Wedgwood worked mostly in London. In spring 1785 a division arose over strategy. Manchester manufacturers and Wedgwood wanted to align with opposition officials and clearly present their views before the House of Commons. Garbett and other Midlands manufacturers instead preferred quiet and direct contact with government. Early on Garbett favoured vocal opposition, but Wedgwood preached prudence. By May 1785 their positions shifted. Wedgwood became concerned about the General Chamber's authority, and divisions within it. The resistance to the Irish Proposals was ultimately successful. Pitt was forced to make so many changes to the Irish Resolution that it was defeated in Dublin.¹⁷ The entire 1785 episode was marred by complications, contradictions, and lessons for the pending commercial treaty with France.

11.3. Lobbying, William Eden, and the Anglo-French Commercial Treaty

Anglo-Irish historical relations were much different than Anglo-French ones, but motivations and particulars of the two commercial alignments were rather similar. In both cases William Pitt wanted to stabilize England's politics and economy by mitigating threats from foreign sources. Pitt ultimately favoured the new ideas promoting the liberalization of trade among countries. They had influenced his intention toward Ireland but it was an inauspicious beginning.¹⁸ In the treaty with France Pitt avoided similar mistakes. This was clear in his choice of William Eden as an agent, the consultation of prominent manufacturers, and ultimately the successful completion of the treaty.

An unlikely amalgamation of political, economic, and ideological forces led to the creation of the Anglo-French Commercial Treaty of 1786. The impetus to negotiate a

¹⁷ *Ibid.*, pp. 35-40.

¹⁸ *Ibid.*; Bowden, *Industrial Society in England*, p. 175; Witt Bowden, "The English Manufacturers and the Commercial Treaty of 1786 with France," *The American Historical Review* 25, no. 1 (1919), p. 19.

new treaty, to update the Treaty of Utrecht that regulated Anglo-French commerce since 1713, was manifold. Their recent wars resulted in lost overseas possessions and excessive debts for both countries. There were also influential philosophic movements among Physiocrats and adherents of Adam Smith that championed expanding trade. A growing chorus, on both sides of the Channel, viewed a commercial alliance as the best way to end the ongoing Franco-British military rivalry. Financial instability in France led its leaders to relax restrictions on British imports, and to push for negotiations. Political instability in Britain led to delays, and a failure to reciprocate. France made the initial overtures for negotiating the treaty, but Britain was the greater benefactor.¹⁹

English manufacturers did not universally welcome closer commercial relations with France. The championing of the French treaty by men like Josiah Wedgwood and William Eden was consistent with their ideological interests. The manufacturers of newer industries (iron, cotton, and pottery) mainly supported the treaty, as their growing outputs required new foreign markets. Older manufacturers (silk-goods, paper, clocks, ribbon, leather, and glass) opposed the treaty. They feared not being able to contend with foreign competitors. The older manufacturers wanted to maintain large import duties to protect domestic industries.²⁰ This divide surfaced in the General Chamber of Manufacturers.

The General Chamber of Manufacturers was born of the need for an organization to represent manufacturers' interests, and died from their inability to cooperate. After its initial success, in the defeat of the Irish Proposals in 1785, the group came out in favour of the commercial treaty with France in December 1786. Accordingly, as president Josiah

¹⁹ *Ibid.*, pp. 18-20; W. O. Henderson, "The Anglo-French Commercial Treaty of 1786," *The Economic History Review* 10, no. 1 (1957), pp. 104-10; Holland J. Rose, "The Franco-British Commercial Treaty of 1786," *The English Historical Review* 23, no. 92 (1908), pp. 709-20.

²⁰ Arthur Redford, *Manchester Merchants and Foreign Trade* (Manchester: Manchester University Press, 1973), vol. 1: p. 11; Money, *Experience and Identity*, p. 43.

Wedgwood reported to public newspapers, the Chamber resolved “that a commercial intercourse between Great Britain and France, legalized and established upon liberal and equitable principles, promises to be advantageous to their manufacturing and commercial interests, by opening a new source of fair trade to both nations.”²¹ Their resolutions used parlance of economic liberalism to affirm the treaty’s benefits for all, extending them past the commercial realm. Wedgwood declared:

And it is with particular satisfaction the Committee look forward to the beneficial effects which must flow from a commercial arrangement on these principles; as they are persuaded that a Treaty so formed will be the means of securing a continuance of peace and good offices between two great and neighboring nations, so advantageously situated for availing themselves of the blessings of peace and an extended commerce.²²

The reporting the Chamber’s business in public papers was a result of dissent among manufacturers. Divisions between the newer and older manufacturers led to power shifts, contradictory positions, damage to the Chamber’s reputation, and finally dissolution.²³

Dissatisfaction with the General Chamber’s ineffectiveness led many, from William Pitt to James Watt, to rely on alternative modes of communication. For a second time Pitt neglected the chamber, but he remained in contact with the manufacturers who led it during treaty negotiations. This proved a to be novel method to solve problems.²⁴ Watt and Matthew Boulton assisted the General Chamber from the outset, supporting

²¹ The resolutions passed unanimously at a Chamber committee meeting, 9 December 1786. Wedgwood published his speech from the 17 February 1787 meeting. It detailed Chamber activities and meetings about the French treaty, as misrepresentations had been made against their proceedings. Josiah Wedgwood, *Gazetteer and New Daily Advertiser* (London, England), Wednesday, 21 February 1787; Issue 18 159.

²² *Ibid.*; This argument tied into a wider Enlightenment sentiment. See Hont, *Jealousy of Trade*, pp. 6-76.

²³ Critics of the treaty suggested that the Manchester, Birmingham, and Staffordshire manufacturers who controlled the General Chamber had misrepresented them. Opposing manufacturers, of older protectionist trades, seized power and passed resolutions against the treaty. They asked the House of Commons to stay ratification to permit more study. It was of little consequence, as supporters of the treaty regained power, and it was passed. Bowden, “The English Manufacturers,” pp. 21-3; Money, *Experience and Identity*, 43-6.

²⁴ *Ibid.*, pp. 43-4.

Garbett and Wedgwood in and around Birmingham, and in London.²⁵ In the ensuing months Watt attended private meetings as a member of the Birmingham Commercial Committee. It united against acts passed by the older manufactures who briefly controlled the General Chamber. Watt's advice, after attacks on the treaty, was that they quit and found an alternative body.²⁶ An alternative organization did not materialize.²⁷ However, manufacturers like Boulton continued encouraging local commercial interests, through the Birmingham committee, into the nineteenth century.²⁸

The Midlands manufacturers' profitable lobbying of the 1786 treaty resulted from Pitt's choice of William Eden as negotiator. Eden, an experienced diplomat, sympathized with newer manufacturers, and had allied with them in 1785. They were, understandably, elated that he was chosen to replace the original negotiator who had worked to delay the treaty more than to negotiate it. Eden was appointed in December 1785, only weeks before negotiations were supposed to have been finished.²⁹ In early 1786, Wedgwood informed Eden that most of the manufacturers he heard from shared his joy on Eden's selection for a task so vital to Britain's interests.³⁰ Boulton had reported to Wedgwood:

If Government had left the appointment of a commission to settle a Treaty of Commerce to me, I should have fixed upon Mr. Eden, feeling myself, as a member of the General Chamber, as a manufacturer, and as a man who despises party. Great pains have been taken by little-minded men, to clothe the

²⁵ Boulton transmitted papers and petitions. Garbett, Watt, and John Wilkinson had ironmasters from West Bromwich sign a petition. *Ibid.*, pp. 34-44. Watt also found a cheaper meeting room for the General Chamber in London. BCL 3219/4/123 J. Watt snr (Birmingham) to J. Wedgwood, 14 July 1785.

²⁶ Watt noted that Garbett was much queried about when ports would open for trade. Thomas S. Ashton, *Iron and Steel in the Industrial Revolution* (Manchester: Manchester University Press, 1968), pp. 172-3.

²⁷ *Ibid.*, pp. 173-4; Redford, *Manchester Merchants*, p. 13.

²⁸ Boulton served the body despite old age and illness. The secretary (of what became the Commercial Society) asked Boulton, on behalf of the chairman, John Grundy, if Soho could be used for their meeting on foreign trade. BCL MS MBP BCC 17. John Bird, Secretary to M. Boulton (Birmingham), 19 October 1801.

²⁹ Bowden, "The English Manufacturers," pp. 18-21; Henderson "The Anglo-French Commercial Treaty," pp. 104-8.

³⁰ J. Wedgwood (Etruria) to William Eden, 5 January 1786. William Eden Auckland, *The Journal and Correspondence of William, Lord of Auckland* (London: R. Bentley, 1861), vol. 1: p. 92.

manufacturers with party-coloured robes; but I am persuaded no reflections they can make will change the true blue that is dyed in grain.³¹

These men consistently supported liberal exchange that was beneficial to both parties.

Manufacturers from the Midlands were uneasy and inexperienced in the politics of Westminster, but this did not preclude them from attempting to influence it. Trading and canals linked them with the rest of Europe and the world beyond. They knew of matters related to industry before the capital was even aware of them.³² With the French treaty Boulton and Samuel Garbett insured that Eden had direct accounts of their views. They contacted Charles Startin in Brussels, likely there for his own merchant business, requesting that he visit Eden in Paris.³³ Boulton and Garbett explained to Eden:

We are desired by the Commercial Committee of this Place to introduce to you the Bearer Mr. Charles Startin, one of its respectable Members & a Merchant well informed as to the State of the Manufactures of this Town & Neighborhood & who will faithfully give you information respecting them or endeavour to procure such other in Paris ones you may think proper. We therefore take the liberty of recommending him to your Attention.³⁴

Commercial connections permitted direct political influence. Boulton and Wedgwood, however, were also in personal contact with Eden throughout the process.³⁵

Manufacturers from the Midlands had their interests reflected in the treaty with France. Eden personally sent news of success to Boulton, stating: “I have the pleasure to inform You that the Treaty of Commerce & Navigation was signed Yesterday by me at Versailles. I hope and trust that it is on Principles solidly advantageous to both Nations

³¹ Wedgwood, having just received Boulton’s letter, quoted this section directly to Eden. *Ibid.*, pp. 92-3.

³² Money, *Experience and Identity*, p. 33; BCL MS MBP BCC 6. “Proceedings of the Commercial Committee, in Birmingham, On Tuesday, 25 January; and Tuesday, 1 February 1785.”

³³ They assured Startin that they would pay his expenses. BCL MS MBP BCC 9. M. Boulton and S. Garbett to Charles Startin (Brussels), May 1786.

³⁴ BCL MS MBP BCC 9. M. Boulton and S. Garbett to Rt. Hon. William Eden Esq. (Paris), May 1786.

³⁵ On Wedgwood and Eden see Auckland, *The Journal and Correspondence*, 1: pp. 92-3, 133-6, 427-9.

and well calculated for their Prosperity & Peace.”³⁶ Furthermore, Eden transcribed what he believed to be of immediate interests to Boulton, pertaining to hardware and cutlery, as well as other metal and finished goods.³⁷ England was far superior to France in making these goods. A reciprocal agreement of modest export duties greatly advantaged England, to French detriment.³⁸ Therefore, French opponents of the treaty argued that importing Britain’s fabricated products would virtually destroy manufacturing in France.³⁹ French liberal bourgeois, who championed greater exchange, did not share this view.

The Anglo-French treaty was well received by bourgeois on both sides of the Channel. After it was signed Eden and Boulton remained in contact. In late 1786, they met and dined together in Paris. Watt and Boulton were invited to advise French officials on technical matters, one of many outcomes of the expanded commercial relationship.⁴⁰ In the months after Boulton and Watt returned home, great expectation for the treaty arose in Birmingham. Soho steam-engine sales for mills were on the rise, but those for mines had almost stopped. Unsteady copper prices and disputes with mine owners had made the Cornwall venture unprofitable in 1786.⁴¹ Watt reported to his oldest son, in Freiberg: “Great benefits are expected to arise to the trade of this town from the Treaty with France, and all my Townsmen are exceedingly active in seeking out customers &

³⁶ BCL MS 3782/12/31 247. W. Eden (Paris) to M. Boulton, 27 September 1786.

³⁷ This was in French and near verbatim of the finished treaty: “That the Duties of Hardware, Cutlery (in English Hardware, Cutlery, Cabinet Ware & Turnery), and on all the works heavy & light of iron, steel, cooper, and brass shall be classed; and the highest duty shall not exceed ten per cent of the value.” *Ibid.*

³⁸ Jacques-Antoine Mourgue, *Observations Sur Le Traité De Navigation Et De Commerce Entre La France Et La Grande Bretagne: Signé à Versailles, le 26 septembre 1786* (Paris: Desenne, n. d.), pp. 14-5.

³⁹ The controversy around one article has skewed historical account of Anglo-French treaty negotiations. Much attention has focused on the 1786 commercial treaty, Article VI, and how it advanced British trade. See Marie Donaghay, “The Maréchal De Castries and the Anglo-French Commercial Negotiations of 1786–1787,” *The Historical Journal* 22, no. 02 (1979), pp. 296-312.

⁴⁰ They dined on 29 December 29 1786. It was one of Boulton and Watt’s many meetings with officials in Paris. BCL MS 3782/12/107/14 M. Boulton’s Diary. Eden also asked Boulton for a morning meeting. BCL MS 3782/12/31 245. W. Eden to M. Boulton (Hotel de Parliament d’Angelterre [Paris]), 1786.

⁴¹ BCL MS 3219/4/123 J. Watt snr (Birmingham) to J. Watt jnr, 30 May 1787.

preparing goods.”⁴² Eden expressed even greater hopes on his brief return to Britain, in the summer of 1787. His schedule did not permit a visit to Soho, but Eden answered Boulton’s missive on the treaty, declaring: “The commercial Treaty of which You make such obliging mention seems to be going forwards in the best manner possible: & if the blessings of Peace are long maintain’d between the two Countries; the advantages of their mutual commerce must generally increase to a great extent.”⁴³ It was a sentiment shared by many members of the British-Franco-Swiss network. This support and the work of compatible officials, like Eden in Britain and Pierre-Samuel du Pont for France, allowed for a landmark Anglo-French commercial treaty in 1786. Du Pont did not partake in direct negotiations, but laid its foundations. He did so epistemologically, as a leading Physiocrat, and politically, as the main promoter of free trade in the French ministry.⁴⁴ This was part of a wider effort to break monopolies and extended commercial alliances.

The Anglo-French Treaty of Commerce did expand commerce in both countries. A brief period of peace also resulted, despite a potential for war during the Dutch crisis of 1787.⁴⁵ However, neither the peace nor the treaty lasted beyond the early 1790s. French eagerness to enter a commercial treaty was a symptom of underlying economic maladies. If the stimulative effects of increased exchange with its British rival were a cure, it was administered too late. France’s financial state and its bargaining position declined. It was in the end, but one more attempt to use new liberal reforms to resuscitate the ailing body

⁴² *Ibid.*

⁴³ BCL MS 3782/12/31 246. W. Eden (London) to M. Boulton (Birmingham), 24 July 1787.

⁴⁴ Du Pont had a significant but neglected role as a politician, adviser to the French ministry, prominent Physiocrat economic theorist, and through polemics. See Orville T. Murphy, “DuPont de Nemours and the Anglo-French Commercial Treaty of 1786,” *The Economic History Review* 19, no. 3 (1966), pp. 569-80.

⁴⁵ Rose, “The Franco-British Commercial Treaty,” p. 724.

of France's *Ancien régime*. Nevertheless, the treaty briefly facilitated the importation of superior British manufactured goods, and the invitation of Boulton and Watt, to France.

11.4. Boulton & Watt's Invitation to France and the Antics of E.-C. Genet

In the 1780s British trade policies created alienation and division amongst manufacturers. As commercial treaties neared expiration James Watt and fellow manufacturers worked for Parliamentary reform, suggesting that they and the "common people" could be driven from England by excess taxes and commercial stagnation.⁴⁶ Meanwhile French officials, who were attempting to determine how far its industries lagged behind those of Britain, tried to entice British manufactures to boost French production. Under these conditions Watt and Matthew Boulton met E.-C. Genet, an official in France's department of foreign affairs.⁴⁷ Genet played a crucial role in Boulton and Watt's invitation to France in 1786.

In 1784, E.-C. had Genet travelled to England in preparation for approaching negotiations for the Anglo-French commercial treaty. He was young and talented. With his father's death in 1781,⁴⁸ Genet was appointed the Chief of the Bureau of Interpretation (*Premier commis à des Affaires Étrangères*).⁴⁹ The English trip resulted from this post and from Genet's status a corresponding member of the *Académie des sciences*. Genet acted as secretary to Elénore-François-Elie comte de Moustier (1751-1817), minister of the mission. The ministry gave Genet a private directive to report on British industries. Genet received letters from Antoine Lavoisier and other French *savants*. This secured introductions to Fellows of the Royal Society of London, and other promoters of the

⁴⁶ BCL MS 3219/4/123 J. Watt to G. Hamilton, 25 August 1784; *Ibid.*, J. Watt to L. Odier, 1 May 1785.

⁴⁷ BCL MS 3782/12/31 162. E.-C. Genet à M. Boulton [Passy], 8 décembre 1786.

⁴⁸ Harry Ammon, *The Genet Mission* (New York: Norton, 1973), pp. 3-5.

⁴⁹ BCL MS 3782/12/31 161. E.-C. Genet (Versailles) à M. Boulton and J. Watt, 25 novembre 1786.

“useful arts,” such as the Society of Antiquaries.⁵⁰ Therefore, Genet was recommended to Boulton & Watt at Soho and other manufactories. Fortunately Josiah Wedgwood, who detected motives beyond scientific curiosity, forewarned Soho about Genet’s arrival.

British manufacturers who led the charge for a French commercial treaty were wary of industrial espionage, and aware of the Enlightenment dilemma this exposed. One of E.-C. Genet’s recommendations to Boulton came from Wedgwood, then in London. He asked Boulton’s consideration and courtesy for Genet, “a Correspondent of the Academy of Science at Paris and a Gentleman of distinguished Merit.”⁵¹ However, before Genet’s arrival, Wedgwood also sent a warning to Soho, as well as one for his celebrated Etruria pottery manufactory. Wedgwood informed Boulton:

I know that your reception of him will be french as to impress him with the most favorable sentiments of the hospitality and politeness of your countrymen; but I think it necessary to acquaint you that I mean to give direction at my own manufactory that he shall not be introduced to any parts of it that I deem essentially necessary to conceal from intelligent Foreigners.⁵²

The predicament for manufacturers of the Industrial Enlightenment is clear. They desired to participate in the cosmopolitan culture of the Republic of Letters. Yet, there was also a need to protect their established interests from nefarious infringement.⁵³ Wedgwood thus lamented to Boulton: “This is a jealousy which I have always though the interest of my country required of me though it has sometimes run counter to the inclinations I have felt for a free and open communication with ingenious men of another nation.”⁵⁴ Boulton & Watt returned the favour in 1784.⁵⁵ The British manufacturers were wise to be wary.

⁵⁰ *Genet and Silliman, Vindication*, pp. 16-7.

⁵¹ BCL MS LSC 16. J. Wedgwood (London) to M. Boulton (Birmingham), 15 March 1783.

⁵² BCL MS LSC 15. J. Wedgwood (London) to M. Boulton (Birmingham), 15 March 1783.

⁵³ Jones, *Industrial Enlightenment*, pp. 139-60; Harris, *Industrial Espionage*, pp. 478-506.

⁵⁴ BCL MS LSC 15. J. Wedgwood (London) to M. Boulton (Birmingham), 15 March 1783.

⁵⁵ BCL MS 3219/6/36 36. J. Watt snr (Birmingham) to J. Wedgwood, 6 February 1784.

Genet, beyond beholding steam power in England's mecca of industry, observed chemical experiments. He later wrote, in *Vindication of Mr. E.C. Genet's Memorial on the Upward Forces of Fluids*, on seeing the wonders of Soho: "The famous steam mills and other machines moved by the power of steam, did not escape my close attention, and anxious to see the place, where these wonderful machines had been invented, perfected and manufactured, I went to Birmingham, strongly recommended to Dr. Priestly [*sic*], and to Messrs. Watt and Bolton [*sic*]." ⁵⁶ In Priestley's laboratory, whom Genet called "the father of pneumatic philosophy," he beheld fascinating experiments. Lavoisier and other chemists, Genet noted, later enhanced these experiments to advance the knowledge of humanity. ⁵⁷ Genet sought to take secrets on British steam power back to Paris, as well as to share details on pneumatic experiments. ⁵⁸ This interest was not solely for his political advancement. Genet returned to mechanics and science after his diplomatic career failed, as a result of his intrigue as foreign minister to America during the French Revolution. His embrace of republicanism saved his political career, but instability in France forced Genet to settle in America in 1793. ⁵⁹

E.-C. Genet completed his very successful mission in Britain a decade before the disastrous one in America. It was a result of the first mission, at least according to Genet, that Boulton and Watt were invited to France in 1786. Genet noted: "My acquaintance with Mr. Bolton [*sic*] was not limited to my stay at Birmingham. On my return from

⁵⁶ Genet and Benjamin Silliman, *Vindication of Mr. E.C. Genet's Memorial*, p. 17.

⁵⁷ *Ibid.*, p. 18.

⁵⁸ Genet, like Charles Blagden, provided information to French chemists. Ralph E. Oesper, "Priestley, Lavoisier, and Trudaine de Montigny," *Journal of Chemical Education* 13, no. 9 (1936), p. 407; C. E. Perrin, "Lavoisier, Monge, and the Synthesis of Water, a Case of Pure Coincidence?," *The British Journal for the History of Science* 6, no. 04 (1973), pp. 426-8; Fauque, "An Englishman Abroad," p. 375.

⁵⁹ Genet was young but a skilled linguist and experienced diplomat, travelling to Berlin, Vienna, and St. Petersburg in the 1780s. Ammon, *The Genet Mission*, pp. 1-10, 178-9; Genet and Silliman, *Vindication*, pp. 3-34; Edmond Charles Genet, *Memorial on the Upward Forces of Fluids, and Their Applicability to Several Arts, Sciences and Public Improvements* (Albany: Packard & Van Benthuyzen, 1825), pp. 3-110.

England, I reported to the ministers, and particularly to those of the finances and of the navy, all the wonder I had seen in that astonishing country.”⁶⁰ French officials keenly appreciated that the treaty exposed a trade imbalance between the countries. However, they also hoped that the treaty, and manufacturers from Birmingham and other British cities, could potentially help France overcome this disparity. Genet declared:

[M]y apprehension, that the admirable machines, the large capitals, the extensive credits, and the superior mercantile knowledge of the English nation, would render very hazardous the liberal treaty of commerce, which the French economists were then urging with that country, unless immediate measures were taken to improve several very backward branches of industry in France. I was directed accordingly, to invite Mr. Bolton [*sic*], or Mr. Watt to repair to Versailles, and to hold up to them great encouragements for their patents and their manufacturing of steam-engines.⁶¹

In the 1780s, French officials, playing catch-up with Britain, extended state invitations to British captains of industry. Yet, Britain’s government was also aggravating its bourgeois manufacturers. It threatened to force leading manufacturers into the welcoming arms of France, Britain’s primary commercial and military rival. French officials enticed foreign manufactures, even as corrupt patronage policies stagnated domestic industry. This subsequently agitated bourgeois reformers, including Etienne Clavière and J.-P. Brissot, who became leading voices during the French Revolution.

11.5. French Bourgeois Battles against the *Ancien Régime*

Etienne Delessert, like James Watt, was a relatively unknown but significant player in the reform battles of the 1780s. Boulton & Watt had some success in attaining patents and navigating the British parliamentary system. This was not a simple process, and British liberal bourgeois struggled against the interest of aristocratic privilege. In France the situation was far more precarious. Political corruption and stagnation stymied bourgeois

⁶⁰ *Ibid*, p. 17, n.

⁶¹ *Ibid*.

initiatives. Delessert's request to use Watt's steam-engine technology, in the competing company against Jacques-Constantin P rier (1742-1818), was a product of this conflict. Delessert, like Boulton and Watt, was a moderate interested in gradual reform and insuring stability for business. However, as with Delessert's Soho friends, these interests created connections to radical political reformers.

Delessert's measures advocating French economic reform brought him in contact with leading political reformers. These connections came through his longstanding friend Etienne Clavi re. He was from Geneva and started out as a partner in a merchant banking house, *Cazenove, Clavi re et fils*, with his family members. They dealt in many products including wine, silk, and grains, and ultimately in commercial investing.⁶² The firm had a business relationship with *Delessert & fils* by at least 1758.⁶³ In Clavi re's capacity as an investor he became further linked to Delessert's firm in Lyon in 1774. Clavi re continued his speculative investments with intensity. In 1778 he had Delessert, by then established in Paris, buy shares for him in the *Caisse d'escompte*.⁶⁴ Clavi re was perpetually exiled from Geneva for helping lead the revolution in 1782. Thereafter he spent years moving among Brussels, Paris, Neuch tel, Waterford and Dublin in Ireland, and London. Nevertheless, Clavi re continued his speculative investing through Delessert in Paris and Lyon, and friends in other financial centres. Over the next few years he collaborated with Delessert in several speculative ventures aimed at reforming the French financial system.

Etienne Delessert drew connections through Etienne Clavi re to men who sought not only commercial reforms, but also radical political change. During Clavi re's exile,

⁶² Jean Bouchary, "Un manieur d'argent avant la r volution Fran ais:  tienne Clavi re d'apr s sa correspondance financi re et politique," *Revue d'histoire  conomique et sociale* XXIV (1938), pp. 133-61.

⁶³ AML MS 1 II 477. "Journal brouillard de Nous Delessert & fils," Lyon, 19 octobre 1758   22 juin 1761.

⁶⁴ Bouchary, "Un manieur d'argent," pp. 133-61.

he became acquainted with the Comte de Mirabeau in Neuchâtel. This was a propitious encounter. Several exiles later formed Mirabeau's Genevan workshop, including J.-A. Du Roveray, Clavière, Etienne Dumont, and E.-S. Reybaz.⁶⁵ In 1782, they enlisted Mirabeau and J.-P. Brissot in their political struggle. The two gifted polemicists publicized the plight of Geneva, and the excess of the French ministry. This did not alter the course of the aristocratic powers. In 1789, the exiles reunited in Paris with Mirabeau and Brissot, playing a major part in the French Revolution.⁶⁶ Between the spates of polemics aimed at reforming Genevan and French politics, there were ones aimed at economic reform.

On a practical level efforts aimed at economic reform consisted of measures that countered official corruption. This included creating joint-stock companies to challenge monopolies, and publishing polemics to devalue the worth of royal corporations. In the 1780s, Clavière relied on financial management by Delessert and other bankers, as well as bellicose tracts from Brissot and Mirabeau, to profit from attacks against established corporations. For Clavière the desire for profit and reform were inseparable. Aside from pamphlets against the *Banque de Saint-Charles* and *Nouvelle Compagnie des Indes*, the Clavière faction reacted by creating competing companies. They attacked the Périer brothers' *Compagnie des Eaux de Paris* in 1785. Clavière wrote to Delessert and other friends warning them to sell their shares in the company, before Mirabeau's pamphlet appeared critiquing its practices. This led to a vast drop in the company's value. Clavière, who established a competing company to supply water to Paris, continued the assault.⁶⁷ The scheme had support from powerful backers and was bold enough to be considered by the ministry at Versailles. Yet Charles Alexandre de Calonne (1734-1802), the *contrôleur*

⁶⁵ Whatmore, *Against War and Empire*, p. 14.

⁶⁶ *Ibid.*, pp. 14-5.

⁶⁷ Bouchary, "Un manieur d'argent avant la révolution Française," pp. 245-73.

général and a financial backer of Périer's company, defeated it. In response Clavière had Brissot produce more attacks on the *Compagnie des Eaux*,⁶⁸ and further battles ensued.

Clavière and the banker Isaac Panchaud (1726-89) led the two factions that emerged from the fight over water. Delessert informed Watt, in 1784, that work on the *Machine de Marly* would likely be awarded to the Calonne-Panchaud-Périer faction.⁶⁹ Périer's underhanded methods against Soho allied Watt with Delessert and Clavière's competing company.⁷⁰ It lost in the water scheme, but won ensuing battles. In 1786, the Panchaud faction created the *Chambre d'assurances contre les incendies* to sell fire insurance. Clavière countered with *Compagnie d'assurances contre les incendies*, supported by Delessert and other rich bankers. This faction won royal ascent over Panchaud's group, and did so again in 1787, by founding a life insurance company. After these victories Clavière became the general manager of *Compagnie d'assurances sur la vie*.⁷¹ He continued speculating and his good fortune, along with that of Brissot and Mirabeau, thrived into the early 1790s.

The struggles between Clavière and Panchaud were not simply conflicts between factions competing for royal patronage. They were ideological ones based in contrasting economic philosophies. Henry Heller explains:

According to Clavière and his apologists Brissot and Mirabeau, the shares in companies whose valuation they had sought to undermine, were all integrated into the corrupt financial system of the monarchical state. The value of these companies were all being manipulated by the government for political purposes. Instead, they demanded a new commercial and financial order that was freed from political manipulation. Commercial relations based on virtue were necessary to

⁶⁸ George V. Taylor, "The Paris Bourse on the Eve of the Revolution, 1781-1789," *The American Historical Review* 67, no. 4 (1962), pp. 972-3.

⁶⁹ BCL MS 3219/4/98/1. a) A. Guyot to J. Watt, 14 February 1784.

⁷⁰ BCL MS 3147 3/388 26. E. Delessert (Paris) to J. Watt snr (Birmingham), 18 May 1785; BCL MS 3147 3/388 27. E. Delessert à J. Watt snr. 17 juin 1785.

⁷¹ Taylor, "The Paris Bourse," pp. 972-7.

economic development and social stability. Political interferences by overly powerful government ministers, nobles, and financiers were the greatest obstacle to the establishment of this new financial and economic order. They identified this new regime with the free market.⁷²

Thus, this was part of a pre-revolutionary struggle seeking to reform the *Ancien régime*.

There was also a more ideological attempt by members of this group to attain economic reform. In 1790, there were two independent translations of Jeremy Bentham's *Defence of Usury* (1787), the first by Etienne Delessert.⁷³ In an unpublished preface to its second edition, Bentham called Delessert an "intelligent Frenchman" who several months earlier published, "a translation he had made for his own amusement, a considerable time before the commencement of the Revolution, he says, not long after the work found its way to France." Yet, as Bentham explained, Delessert "kept back the translation, thinking the country not ripe for it. The general slaughter that has been made of all sorts of prejudices in that country may now, he thinks, have opened the way for it."⁷⁴ If this was first required, Bentham wondered when the same would be true for England.⁷⁵ Conditions were indeed ripe in France. A second translation, likely by Clavière, appeared earlier in 1790. It was promoted in Mirabeau's journal, *Courier de Provence*, and stemmed from debates in the *Assemblée nationale* in October 1789. They focused on reforming France's economic system, and discussed regulating interest rates.⁷⁶ Mirabeau was not even aware

⁷² Henry Heller, *The Bourgeois Revolution in France, 1789-1815* (New York: Berghahn, 2006), p. 78.

⁷³ Jeremy Bentham, *Lettres sur la liberté du taux de l'intérêt de l'argent*, trans. Etienne Delessert (Paris: Chez Grégoire, 1790).

⁷⁴ Jeremy Bentham, *Jeremy Bentham's Economic Writings*, ed. Werner Stark (London: Allen & Unwin, 1952), p. 191. Delessert may have obtained a copy from his friend and neighbour Abbé Morellet, who had two copies of it, or from Samuel Romilly, a mutual friend of Bentham and Delessert. 663. J. Bentham (Hendon) to E. Dumont (Paris), 9 June 1789. Jeremy Bentham, *The Correspondence of Jeremy Bentham*, ed. Timothy L. S Sprigge (London: Athlone Press, 1988), vol. 4: pp. 69-71.

⁷⁵ Bentham, *Jeremy Bentham's Economic Writings*, p. 191.

⁷⁶ A footnote in Mirabeau's journal, *Courier de Provence*, stated that the matter was recently written about in England, and its French translation would soon be available. Bentham initially believed that Mirabeau had made the translation, but was mistaken. *Ibid.*, pp. 28-29 and n. 3.

of Bentham's book,⁷⁷ and it appears that Clavière and Delessert did not know of the other's translation. This can be forgiven, given the confusion of the revolutionary tumult.

11.6. Conclusion

Etienne Delessert did less speculating on the Paris Bourse than Etienne Clavière,⁷⁸ and did not hold political office during the French Revolution. The Genevan exiles supported Mirabeau and Brissot, while Delessert kept a cautious distance. As with Mme Delessert, compared to other Rousseauist educators, or James Watt, compared with radical members of the Lunar Society, Delessert remained moderate. He was jailed in 1793 but survived the Revolution, unlike Clavière, Brissot, and Mirabeau. Delessert, as a Huguenot banker, would have welcomed religious and economic freedoms. However, the Delesserts did not become possessed with political reform, as did friends who became revolutionary leaders. Watt and Boulton also wanted limited reform but, unlike English republicans, were not willing to upset the political order. Bourgeois reformers gained some ground against the landed interest in the 1780s, especially through the 1786 commercial treaty. After 1789, however, economic reforms were increasingly subverted by political reforms.

⁷⁷ J. Bentham to E. Dumont, 9 June 1789. Bentham, *The Correspondence*, p. 70.

⁷⁸ On Clavière and Delessert's speculation see Taylor, "The Paris Bourse," pp. 952-76.

12. From Educational to Industrial Exchange: Lunar Technology Diffused Throughout the British-Franco-Swiss Network

Savant-fabricants had sons educated abroad in long-range aims to expand industries, yet Enlightenment culture created immediate, and even unexpected, exchange. Desires by British manufacturers to expand markets, and those of Franco-Swiss *savant-fabricants* to improve methods, created common ground. The British-Franco-Swiss network served as a channel for these interests to converge. A preliminary example was R. L. Edgeworth's visit to France in 1771-2. He crossed the Channel with his son Richard, Richard's tutor, and Thomas Day. Edgeworth and Day were motivated by respective troubles with women, an intense admiration for J.-J. Rousseau, and eccentric educational experiments. The only lasting achievement from this visit was the unexpected project Edgeworth became involved with in Lyon. He lent his mechanical genius to the diversion of the Rhône River. The project sought to expand Lyon's size, successful industries, and commercial capacity. Edgeworth's visit forged the first link between the Delesserts and the Lunar Society. They met in Lyon where Edgeworth's experiment in educational engineering was diverted by his role in a vast project of mechanical engineering. This was one of many attempts to diffuse Lunar technological innovation on the Continent.

In the 1780s, Lyon was again the object of collaboration in the British-Franco-Swiss network. Etienne Delessert negotiated collaborative ventures with James Watt to employ steam-power in Lyon and Paris. There were also several Genevan *savants* who attempted to become *fabricants*. Links to Lunar men influenced the growth of industries in Geneva. These were established to varying degrees of success, but suffered from a lack of local infrastructure and craftsmen. Abraham Guyot and the Delesserts partnered with Matthew Boulton and Watt in more than educational exchanges. They shared industrial

secrets and scientific information. The Delesserts aided the expansion of Lunar interests on the Continent, were vital proponents of the early Industrial Revolution in France, and benefited from ties to Soho. This came from tides of Enlightenment traffic that intensified in times of peace, but differed from that of the early eighteenth century. Exchange in this network was a form of international diffusion of technology based on mutual dependence, rather than cold commercial exchange, or the underhanded theft of industrial secrets.

12.1. R. L. Edgeworth's Mechanical Engineering

R. L. Edgeworth's aims in France, other than avoiding infidelity in England, were his son's Rousseauist education and cultivating Thomas Day's manners. Both endeavours ultimately failed, yet Edgeworth did join one venture in Lyon that was very successful.

The great project Edgeworth joined in Lyon was the diversion of the Rhône River. It was the realization of a long-standing desire. A proposal to build a canal and divert the river to expand the city was read at a meeting of Lyon's *Académie* in 1765. There was a need for more land in Lyon, and to expand and improve flourmills.¹ Part of Lyon was hemmed-in by the Saône River on the west, tall hills with the fast-moving Rhône at their foot on the east, and the rivers met at a right angle at Lyon's base. The plan to redirect the Rhône's course involved constructing a channel for it to meet the Saône almost a mile downstream. Once the riverbed was empty it was to be filled by Lyon's refuse and built upon.² It was by chance that the diversion was underway when Edgeworth lived in Lyon.

Edgeworth lent his mechanical aptitude and practical ingenuity to the project. An architect from Lyon, Antoine Michel Perrache (1726-79), headed the diversion. After

¹ NLI MS 11132 (3): RLE Diversion of R. Rhône. "Project for mills on Rhône" No author is listed, but the title page states: "L'extrait d'un projet de moulins lu a l'académie dans une des séances de l'année 1765." Its inclusion in Edgeworth's papers is logical, given his role in the diversion and plans for flourmills.

² *Ibid.*; Edgeworth and Edgeworth, *Memoirs*, vol. 1: pp. 266-7.

Edgeworth pointed out some of its logistical weaknesses he was given a meeting with Perrache. This led to Edgeworth directing a section of the project, and with success even more responsibility.³ He agreed in a contract with Perrache to move “five-thousand cubic *toises* of ground in the space of five months.”⁴ To accelerate the process Edgeworth, a mechanical engineer, constructed an apparatus. It worked by employing an existing roped ferryboat system that used the current, instead of labour, to cross the river. Edgeworth radically reduced the cumbersome manual labour by constructing a mobile platform system. This mechanical method, and the other innovations that Edgeworth designed, proved much more efficient than the former labour-intensive system.⁵

Edgeworth’s role in the Rhône’s diversion led to an extended residence in Lyon. He had his young wife join him in France, but Anna Maria did not enjoy French society or Lyon. She stayed long enough to become pregnant, with her fifth child, which only intensified her desire to return to England. The pregnancy resulted in the birth of Anna Maria in March, the death Edgeworth’s first wife, and his early return home.⁶ Winter suspended the Rhône diversion and Edgeworth had begun, as he later noted, “drawing plans, and trying experiments, preparatory to building flour-mills.”⁷ The group funding the diversion had already gained land through the project, but depended on profits from

³ *Ibid.*, p. 266.

⁴ NLI MS 11132 (3): RLE Diversion of R. Rhône. A 1772 signed seven-part contract between Edgeworth and A.-M. Perrache. A *toise* was a standard unit of length in eighteenth-century France. One *toise* equalled approximately 6.4 feet. Larrie D. Ferreiro, *Measure of the Earth: The Enlightenment Expedition That Reshaped Our World* (New York: Basic Books, 2011), p. 51. This district of Lyon was named for Perrache.

⁵ It moved a cart filled with dirt up a gangway and emptied it into the boat, which had a second platform. The boat was sailed to the earthen dam to empty its load. Men on shore filled the cart before the boat’s return, instead of waiting on land to fill or unload it. Edgeworth and Edgeworth, *Memoirs*, pp. 268-71.

⁶ *Ibid.*, pp. 272-3, 321.

⁷ *Ibid.*, p. 321.

future flourmills for a return on their investment. Therefore, Edgeworth sent the company an essay he had written on flourmill construction, along with his explanation for leaving.⁸

Edgeworth's dedication to work for the company in Lyon was well compensated. In 1773, "in consideration of his gratuitous services as an Engineer in the great work of changing the course of the Rhone to enlarge the city of Lyons," Edgeworth explained in a petition, he was "presented by the company of undertakers incorporated for that project with 4000 feet of ground in the new lots near the ramparts."⁹ They sent him a deed for the parcel of newly claimed land. Yet, under contemporary French law Edgeworth, as a foreigner, could not own this land. Aimé-Julien Rigaud de Terrebase (*d.* 1793) acted as trustee to manage the land. The agreement did not survive the French Revolution, which Edgeworth noted, "swept away the family of Terrebase, and the remembrance of me and my services."¹⁰ Nonetheless, Edgeworth's role in mechanical engineering in Lyon ended better than his experiment in the educational engineering of his first son Richard.

During Edgeworth's stay in Lyon in 1772, the first connection was made between the Delessert family and the Lunar Society.¹¹ Etienne Delessert was a banker in the city operating a firm, which he took over after his father's death. Edgeworth and Delessert were then young men with expanding families. Their acquaintance stemmed from shared interests in agriculture, mechanics, industry, and science. In 1802, Edgeworth returned to France with his family. Their families formed instant bonds on the basis of such common affinities. Thirty years separated Edgeworth and Delessert's introduction in Lyon and their reacquaintance in Paris. In that time their respective interests in science and industry

⁸ *Ibid.*, pp. 320-1.

⁹ NLI MS 11132 (3): RLE Diversion of R. Rhône. "1773 – Agreement – M de Terrebase? Petition by RLE maintaining right to 4000ft of ground."

¹⁰ Edgeworth and Edgeworth, *Memoirs*, pp. 321-2.

¹¹ [R. L. Edgeworth to M.-A. Pictet], 19 March 1802. Häusermann, *The Genevese Background*, p. 64.

expanded, and the Delesserts became attached to more members of the Lunar Society. Primarily this was to James Watt and Matthew Boulton. Consequently, Edgeworth's experiments in Lyon were not the only ones witnessing an overlap between education and industry. The Delesserts links to Soho began with the unofficial exchange program for the educations of their sons. It soon expanded into other areas. Abraham Guyot and the Delesserts supplied Boulton & Watt information on French infringements of its engine, and advice on becoming involved with repairing the *Machine de Marly*, to improve Versailles' water supply. Exchanging information led to the sharing of secrets.

12.2. Educational and Industrial Overlap: Innocent and Intended Espionage

During the Enlightenment scientific, industrial, and educational matters were regularly combined. M. R. Boulton thus accompanied his father, James Watt, and John Wedgwood on their industrial visit to France. There were unique protocols for such visits and sharing of information, which was also part of the training for future *savant-fabricants*. Watt chastised his son James for not giving enough detail about his training, but rebuked him for sharing industrial secrets. While James was in Wales he was warned that sharing information could damage Soho's domestic business relations. When James went abroad to finish his education, though, he was asked to report home on rival French operations.

James Watt junior's indiscretion of sharing British industrial information was a case of 'innocent espionage.'¹² In an attempt to please his father, by sending news about John Wilkinson's operations at Bersham, James inadvertently provided too much detail on sensitive industrial secrets. Before Watt's warnings against the practice arrived James shared accounts on Wilkinson's movements in England, as well as shipments of large

¹² Scarfe uses this term. Rochefoucauld and Rochefoucauld, *Innocent Espionage*, ed. Scarfe, pp. xvii-xx.

quantities of pig iron, iron cylinders, and brick to France.¹³ The cylinders, which could only be fabricated by Wilkinson, were essential for Boulton & Watt steam engines.¹⁴ It is understandable that James was confused over which topics were appropriate to discuss. Wilkinson had made a request, that Watt promptly send a sketch of the Blackfriars engine for the ironworks to organize a parts shipment, through James.¹⁵ Their Albion Flourmills engine at Blackfriars, London, was the second one built that employed Watt's rotative improvement. The first was established in Bradley at Wilkinson's ironworks.¹⁶ This was a beneficial relationship, which Watt did not want to jeopardize.

In Watt's attempt to avoid domestic conflict he stopped James' reconnaissance gathering. Watt advised to his son not to report on Wilkinson's business. These actions could be seen as improper and brand James a "telltale."¹⁷ They were obliged to Wilkinson for James training at Bresham, and for the ironworks' vital supply of parts to Soho. Watt advised James, seeking to remain on good terms with Wilkinson:

Continue to write to me as usual, and you may advise of any occurrences which happen wherein you may think that Mr Wilkinsons interest and ours do not come in competition those of this latter description I do no wish to learn from you, nor any thing in his business, which you may conceived he would not wish to be told to strangers.¹⁸

Such regard was not always reciprocated. In 1777, Wilkinson refused a request from J.-C. P erier for help to pirate Boulton & Watt engines. Yet, Wilkinson supplied P erier iron pipes for his engines, after he pirated the engines by other means.¹⁹ Both men had

¹³ BCL MS 3219/4/10/26 J. Watt jnr (Bersham) to J. Watt snr (Birmingham) May 23, 1784; BCL MS 3219/4/10/23 J. Watt jnr (Bersham) to J. Watt snr (Birmingham) 2 May 1784.

¹⁴ Harris, *Industrial Espionage*, p. 243, 320.

¹⁵ It was likely to ship cylinders. BCL MS 3219/4/10/27 J. Watt jnr (Bersham) to J. Watt snr, 30 May 1784.

¹⁶ Crowther, *Scientists of the Industrial Revolution*, pp. 163-5. Dickinson, *James Watt*, pp. 141-50.

¹⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to James Watt jr, 29 May 1784.

¹⁸ *Ibid.*

¹⁹ Harris, *Industrial Espionage*, pp. 298-300; BCL MS 3147 3/388 27. E. Delessert (Paris)   J. Watt snr (Birmingham), 17 juin 1785.

purchased and pirated engines from Soho. Wilkinson's piracy was clear by 1790, as Watt informed Joseph Black: "We are going on well enough in our business, but are attacked on many hands, and among the rest of our invaders are our good friends John Wilkinson & William Reynolds. The former acts avowedly for his own interest, the latter from a purer motive, the good of the public, and the preventing our being paid for our merit more than we deserve."²⁰ Watt remained passive about 'friendly' domestic piracy, but became proactive in his efforts to protect Soho from foreign espionage.

After sending James abroad, Watt requested information on French espionage against the Boulton & Watt partnership. Watt sent orders for James to report on what he observed.²¹ One object was emphasized in particular: "among other things you should see the machine of Mon^r Perier and send me some account of it."²² Watt's directions only reached James in Lyon, yet he saw P erier's engine, which was on the road to Paris from Passy. James passed P erier's operations at Chaillot on many trips to *h tel Delessert*. Despite Watt's delayed request, and many reprimands of James' carelessness, James inspected the engine of his own volition.²³ James informed his father:

I had but a very short view of it for I was then with M Boussieux tutor for the young Delesserts and as he was in a hurry to get to town I did but just look in, it was not going then but the men were employed in building another engine in the same house, the boiler, cylinder & beam of which were all in their places; I did not then know enough of french to ask the men many questions, but however I found that they did not know there was such a person in the world as you but ascribed the honour of the invention to Mr. Perry.²⁴

²⁰ BCL MS 3219/4/39 J. Watt snr (Birmingham) to J. Black, 5 December 1790.

²¹ These were among Watt's many instructions, including reprimands for a lack of detail, punctuality, and orderliness of James' letters. BCL 3219/4/123 J. Watt snr to J. Watt jnr, 1 December 1784.

²² *Ibid.*

²³ P erier's works were located by Paris' gates, near the Tuileries Gardens and the Champs-Ellys es, on the banks of the Seine. BCL 3219/4/11/10 J Watt jnr (Geneva) to J Watt snr (Birmingham), 24 January 1785.

²⁴ *Ibid.*

James, a fortnight from his sixteenth-birthday, knew enough of his father's business and invention to provide this detailed account on its piracy.

There was practice as well as theory involved in James' s Continental education. It was not restricted to books and lecture halls. He learned languages and techniques that later helped James expand the family business. Beyond reporting on the fruits of Périer's espionage, against Soho, James passed on honest requests for information. Shortly after arriving in Geneva, James dined at Dr Louis Odier's house with M.-A. Pictet and Pierre Prévost. Pictet invited James to attend his lectures on natural philosophy.²⁵ A fortnight later, while dining at Pictet's, James learned that Pictet had asked J.-A. Deluc to attain an explanation of Watt's steam engine, but only if it was not secret and did not harm Watt. James believed that Pictet's purpose was to build a steam engine to furnish Geneva with water and that Pictet could be a useful friend.²⁶ James concluded that Pictet would not be offended if Watt declined, in order to protect his interests. Yet, James had no reservations sharing Watt's trade secrets with these new Genevan friends.²⁷ Watt was likely elated that James was at last considering the welfare of fellow citizens of the Republic of Letters, but he was still naïve about industrial diffusion. It was considerably easier to transfer British students to Geneva than it was British technical innovations.

12.3. Lost in Translation: Swiss Struggles to Transfer Technology

The Swiss constituted one of the largest blocks of foreign visitors to Soho.²⁸ Many of these tours resulted from connections made through the British-Franco-Swiss network.

This was a further overlap between education and industry. Certain visitors sought

²⁵ BCL MS 3219/4/11/8 J. Watt jnr (Geneva) to J. Watt snr (Chaillot), 25 December 1784. Mme Delessert gave James an introduction for Odier and Prévost, and J.-A. Deluc provided one for Pictet.

²⁶ BCL MS 3219/4/11/9 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 7 January 1785.

²⁷ Watt was not to write Pictet in French, as he knew more English than "any foreigner" James met. *Ibid.*

²⁸ Jones, "Knowledge and Technology Transfer," pp. 39-41.

admittance to the mechanical wonders of Birmingham simply out of curiosity. Other *savants* versed in Enlightenment science and education went to Soho because of these interests. Yet, there was a concerted effort to benefit from these tours. In the 1790s several attempts were made, in Geneva and its environs, to move from theoretical scientific knowledge to direct application of British methods.

The visit of James Watt junior's Genevan friends to Soho was ostensibly one of curiosity. It is difficult to gauge how much influence their visit directly impacted later pursuits. J.-L. Labat explained, before Watt sent warnings of factories being barred to foreigners, that his reason to see Birmingham's manufactories was curiosity. James informed Watt that Labat insisted his visit was "not by the design to profit from what he sees, to establish a manufactory in Geneva," and he would be most obliged if Watt "could recommend him to artisans of your acquaintance."²⁹ Nevertheless, James' friends became involved in industrial pursuits that had been pioneered by members of the Lunar Society.

Nicolas Paul participated in Genevan science and the British-Franco-Swiss network. It appears that Paul visited Soho in 1786 with Labat and Dudley Adams. James Watt identified him as "M^r Pol an acquaintance of M^r Priestley's."³⁰ Joseph Priestley junior studied in Geneva in 1784-5. He likely had a similar acquaintance with Paul, as James Watt junior did with Adams. The four young men had much in common given the interests of their fathers.³¹ Adams and Paul were both sons of famous scientific

²⁹ Labat left Geneva with James' recommendation for to Soho, and hoped for more elusive ones to Watt's fellow industrialists. BCL MS 3219/4/11/14 J. Watt jnr to J. Watt snr, 24 March 1785. Soho was likely the only manufactory that Labat's party saw. They only spent a day in Birmingham and other manufacturers feared strangers. BCL MS 3219/4/123 J. Watt snr to J. Watt jnr, 10 September 1786.

³⁰ *Ibid.*

³¹ Joseph was a year older than James and Dudley Adams a year older than Paul. They were all born in the 1760s to men linked to scientific instruments. Paul met Joseph as he studied in Geneva.

instrument makers, and eventually took up the family trade.³² Paul made a brief venture in hot-air ballooning with Henri-Albert Gosse. Each man descended from Huguenots who fled religious persecution, and benefitted France's neighbours.³³ In 1784 Paul and Gosse designed an aerostatic balloon, and were permitted to collect subscriptions in Geneva to build it.³⁴ M.-A. Pictet requested several subscriptions from Gosse,³⁵ who asked advice on their plan from H.-B. Saussure.³⁶ It was likely for this launch that Pictet requested Saussure's help: "If you are free Sunday and you would find pleasure to assist in a trial of a balloon that Paul *le fils* has constructed and which he adapted to direct by means of the principle of the reaction produced by the escape of hot air combined with the shape of the balloon, you will be received with much enthusiasm."³⁷ Ballooning again led to more ventures. Gosse and Paul's passion for science led to a practical collaboration in 1788.

Paul and his partners profited from Priestley's 1767 discovery of carbon dioxide (fixed air),³⁸ and established a carbonated water industry. The Pauls, father and son, and Gosse partnered with Jean-Jacob Schweppe (1740-1821) to manufacture artificial mineral water in 1790. Schweppe, a German jeweller, began making mineral water for Genevan physicians in 1780. The firm combined Schweppe's experience, Paul's mechanical and engineering genius, and Gosse's skill as a chemist and pharmacist. With initial prosperity they expanded to other cities. Yet, the company disbanded with Jaques Paul's (1733-96)

³² Millburn, *Adams of Fleet Street*, pp. 307-31; Paul Schulé, "Une dynastie de «mécaniciens» et d'inventeurs: «les Paul»," *Genève* 29, (1981), pp. 146-7.

³³ Paul descended from Michel Paul, a Huguenot, who fled Bordeaux for Geneva. *Ibid.*, p. 139. Gosse's father Jean fled France in 1685 to The Hague. He became a bookseller with a shop in London and Geneva. Häusermann, *The Genevese Background*, p. 158.

³⁴ *Ibid.*, p. 147.

³⁵ BGE Ms. 2628. f. 247-8. PHAG. M.-A. Pictet (Cartigny) à H.-A. Gosse (Genève), 19 octobre 1784.

³⁶ BGE Ms. 2628. f. 363. H.-B. Saussure (Genève) à H.-A. Gosse, 18 mars 1784.

³⁷ 63) M.-A. Pictet (Cartigny) à H.-B. Saussure, s.d. [1785?]. Pictet, *Correspondance*, vol. 1. p. 639.

³⁸ For Priestley's discovery, see Joseph Priestley, *Directions for Impregnating Water with Fixed Air in Order to Communicate to It the Peculiar Spirit and Virtues of Pyrmont Water, and Other Mineral Waters of a Similar Nature* (London: J. Johnson, 1772), pp. 1-22.

death. Paul *filis* and Gosse kept the Geneva manufactory and Scheweppe the one in London.³⁹ Nicolas Paul had returned to partner with his father after an initial expansion beyond Geneva. This partnership included an instrument workshop and supervising the hydraulic machine. It supplied Geneva with water raised from the Rhône River. In 1796 Paul succeeded his father in its management. He also carried on his father's trade of making machines and scientific instruments for Geneva's *savants* and *fabricants*.⁴⁰

English markets attracted Scheweppe and Paul, as their product attracted the notice of Lunar men. Matthew Boulton, a loyal customer, informed Erasmus Darwin in 1794: "In reply to your question M^r J: Scheweppe (N^o 141) Drury Lane preparer of Mineral Waters, is the person whom you have heard me speak of who impregnates it so highly with fixable air as to exceed in appearance, Champagne & all other Bottled Liquors."⁴¹ Darwin and other British physicians valued the medical properties of waters, be they natural or artificial. In 1792 Josiah Wedgwood affirmed to R. L. Edgeworth: "that the properties of the Clifton waters might be heightened by the execution of your very igneous thought of filling them with a quantity of fixed air."⁴² Such ideas distracted Edgeworth, marooned for two years in Clifton, as Lovell was treated at the Hotwells resort. This was the location Thomas Beddoes "fixed upon as the most proper place to erect the necessary apparatus" to work on pneumatic medicine, he told Darwin in 1793, as the resort appeared to be the best situated to provide patients in the various stages of

³⁹ Noel G. Coley, "The Preparation and Uses of Artificial Mineral Waters (ca. 1680-1825)," *Ambix* 31, no. 1 (1784), pp. 41-2; Schulé, "Une dynastie," pp. 147-8.

⁴⁰ Jaques Paul, a celebrated instrument maker, fashioned scientific apparatus for M.-A. Pictet, J.-A. Deluc, and H.-B. de Saussure. Schulé, "Une dynastie de «mécaniciens,»" pp. 145-8.

⁴¹ BCL MS LSC 43. M. Boulton (Soho) to E. Darwin [Derby], 12 October 1794.

⁴² J. Wedgwood (Etruria) to R. L. Edgeworth [Bristol], 24 October 1792. Edgeworth and Edgeworth, *Memoirs*, vol. 2: p. 145.

pulmonary consumption.⁴³ There was also an effort to have Schweppe produce artificial mineral waters in Bristol in this period. The plan was to impregnate and sell Hotwells water. By 1803, the *Schweppes Co.* had a presence in Bristol, though Schwepes had sold the company and moved back to Geneva. Beddoes had by then established his Pneumatic Institute, with support from members of the Lunar Society. He partnered with Boulton & Watt in 1794, as Watt had created an apparatus for patients to breath gasses.⁴⁴ A 1798 report on Beddoes' research, in the *Bibliothèque britannique*, reported that Paul had improved upon Watt's design. Geneva's *Société des arts* had Paul construct a great machine for breathing various gasses, to be employed by physicians.⁴⁵

In the 1790s, scientific and medical exchanges were slowed by revolution, but continued to circulate through the British-Franco-Swiss network. Dr Pierre Sylvestre, seeking sanctuary as revolution returned to Geneva in 1794, tried to contact Thomas Beddoes. Sylvestre asked Etienne Dumont to reach Beddoes through booksellers or by his recently published ingenious book on pulmonary consumption. Sylvestre noted that if he were to stay in Geneva he would ask Dumont to send him the book.⁴⁶ Beddoes's book also impressed the energetic physician Louis Odier. It was likely Odier who requested that Paul build the pneumatic apparatus. Odier was then a leading member of the *Société des arts* and medical editor for Pictet's journal.⁴⁷ In 1797, Odier contacted Beddoes to compliment him on his book, and work "on the medical use of factitious airs." Odier had

⁴³ Beddoes, *A Letter to Erasmus Darwin*, p. 40.

⁴⁴ F. W. Gibbs, "Priestley's Airs and Waters," *Journal of the Royal Institute of Chemistry* 86, (1962), p. 10.

⁴⁵ "Médecine," *Bibliothèque britannique*, (*Sciences et arts*) eds. Marc-Auguste Pictet, Charles Pictet de Rochemont, and Frédéric Guillaume Maurice 7, (1798), pp. 309-10.

⁴⁶ BGE Ms Dumont N° 33 IV. 317. P. Sylvestre (Genève) à E. Dumont (London), 22^e juillet 1794. Violence made Sylvestre consider escape to New Geneva colonies in Europe or America, or even the distant British convict colony of Botany Bay. *Ibid.*, 321. P. Sylvestre (Genève) à E. Dumont, 30 juillet 1794.

⁴⁷ Odier served the society as treasurer and then as vice-president. 2. L. Odier à M.-A. Pictet, 22 novembre 1799. Pictet, *Correspondance*, vol. 1: pp. 461, n. 7. Müllener, "Six Geneva Physicians," p. 23.

learned of the airs years before but conceded, “in this part of the world we cannot easily get a speedy sight of English books.”⁴⁸ Though Odier was not familiar with pneumatic medicine he offered a medical exchange, sharing with Beddoes different trials in Geneva with natural airs, similar to Beddoes experiments with oiled silk bags. Odier discussed uses of water in Geneva and his own remedies.⁴⁹ Finally, he informed Beddoes about the waters of Paul and Grosse: “We have in this town a very good Manufacture of factitious waters in which a single machine not very bulky can easily make 1000 quart bottles of very strong Seltzer water in a day. It is employed with success in all catarrhal complaints.”⁵⁰ English pneumatic medicine drew the interests of Odier, as English markets enticed Paul to London.

Paul had success selling artificial waters on the Continent, but London remained a target. In 1790, the Anglophile M.-A. Pictet, on behalf of Schweppe and Paul, contacted the Francophile Charles Blagden, inquiring about the state of mineral waters in London. Blagden’s response was frank. He explained that no one held a patent to make mineral waters, it was not a common method in England, and a patent would require a specific construction of apparatus. There was a chance that Schweppes and Paul’s project would succeed and they could find support from younger physicians. Yet, Blagden warned that there would much expense to establish themselves and a factory in London, and cunning Englishmen might find a way to elude a patent.⁵¹ Schweppe had relocated to London by 1792. The partners also looked to expand to Paris around 1790, as H.-A. Gosse contacted

⁴⁸ BCL MS 3219/4/29 21. L. Odier (Geneva) to T. Beddoes, 3 September 1797 [Copy]. The book by Beddoes and James Watt was *Considerations on the Medicinal Use of Factitious Airs* (1794).

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*

⁵¹ 18. C. Blagden (Percy Street) to M.-A. Pictet (Genève), 21 September 1790. 15. C. Blagden to M.-A. Pictet, 22 June 1790. Pictet, *Correspondance*, vol. 3: pp. 86-90.

Antoine-François de Fourcroy (1755-1809) inquiring about establishing a manufactory. He encouraged the venture and promised to assist them. Gosse stayed in Geneva, but his partners set up the works in Paris, on *rue Montmartre*, and London, on Drury Lane. After their company's break up in 1796, Schweppe had success in London, as Paul maintained factories in Geneva, Paris, and Lyon.⁵² The *Institut nationale de France* commissioned a report on Paul's product and works in 1799. The inspectors, prominent French chemists including Fourcroy, reported favourably on Paul's operation. Despite this success Paul relocated to London. In 1802 he translated the French report, along with other favourable evidence from Paris and Geneva, into English. The text was dedicated to Count Rumford, who visited Paul's Paris works in 1801.⁵³ Paul intended the translation to elicit support for his "laboratory, or manufacture of artificial mineral waters, upon the new plan, and with the several improvements which I have introduced abroad into that department of practical chemistry."⁵⁴ Success in London was fleeting. By 1803, Paul had given up on artificial mineral waters and was working on lamp production.⁵⁵ Paul, a skilled mechanic, discovered it was not easy to import his invention to Britain. Fellow Genevans found out that it could be equally challenging to import British industry to Geneva.

The manufactory J.-L. Labat invested in near Geneva attempted to produce pottery using Josiah Wedgwood's methods. The pottery factory at the Pâquis was the brainchild of Charles and M.-A. Pictet. In 1787, Abraham Guyot provided the brothers

⁵² Coley, "The Preparation and Uses," p. 41; Gibbs, "Priestley's Airs and Waters," p. 9.

⁵³ Nicholas Paul and Académie des sciences: Institut de France, "Critical Retrospect of Medical and Physical Literature," Review of Nicholas Paul and Académie des sciences (France); Institut de France, *The Report made to the National Institute of France in the month of December 1799, by citizens Portal, Pelletan, Fourcroy, Chaptal, and Vauquelin respecting the artificial mineral waters prepared at Paris* (London: G. Woodfall, 1802), pp. 64." *The Medical and Physical Journal* 8 (1802): pp. 86-88.

⁵⁴ *Ibid.*

⁵⁵ 24. Alexandre Marcet à M.-A. Pictet, 1 janvier 1803. Pictet, *Correspondance*, vol. 3: p. 358.

introductions to Watt and Boulton at Soho.⁵⁶ This was on the Pictet's Grand Tour of England with René-Guillaume-Jean Prevost-Dassier (1749-1816), brother of Pierre Prévost. They visited Soho, three years after Labat, but this was not their only stop. They also toured other manufacturing towns in Northern England and the Midlands.

The Pictets' Midlands tour inspired two ventures between 1788 and 1800. After acquiring parcels of land near Geneva, the brothers harvested peat from their marshlands for industrial production. They had seen the process at Blackstone Edge near Manchester. Their visit to Josiah Wedgwood's Etruria pottery manufactory made the greatest impact. In 1787 the pottery factory at the Pâquis, north of Geneva, had lost its master craftsman and business. The Pictets and H.-A. Gosse partnered with Pierre Verni De Villar to revive the factory. He was English, a workman in the failed business, and directed production in the new one. Local materials were available and the Pictets' peat was burned in its kilns. Yet, the business suffered and De Villar's temper became a problem. In 1789, an attempt was made to replace him with Tom Wedgwood (1771-1805).⁵⁷ Tom and his father had showed the Pictets around Etruria, and Tom studied in Geneva in 1788. The Pictets suggested that the Pâquis establishment could be an expansion of Etruria.⁵⁸ Tom declined the offer and De Villars deserted, leaving the partners void of English ingenuity. Pictet tried to solve technical problems with glazes, clays, and compositions using laboratory experiments. Gosse assumed many practical duties, but problems persisted.⁵⁹ In 1791, a

⁵⁶ Guyot recommended them on behalf of Mme Delessert. Prevost-Dassier had asked her but she had given one to Mr Archard, a friend and merchant from Rouen, several months earlier. Boulton met Prévost at the Delessert's house. BCL MS 3782/12/32 280. A. Guyot (Passy) to M. Boulton (Birmingham), 11 November 1787. Guyot gave the Pictets a recommendation for Soho. BCL MS 3219/4/98 14. A. Guyot to J. Watt, 24 May 1787. Mme Delessert's letter proved fruitful, as the companies conducted trade. BCL MS 3219/4/98 M.-C. Delessert (Paris) to J. Watt, 28 April 1787. Introducing Mess^r. Achard Brothers & C^o. in Rouen.

⁵⁷ Bickerton, *Marc-Auguste and Charles Pictet*, pp. 107-9.

⁵⁸ a) M.-A. Pictet à Thomas Wedgewood, 15 mai 1789. Pictet, *Correspondance*, 3: pp. 617-9.

Bickerton, *Marc-Auguste and Charles Pictet*, pp. 109-10. Gosse and his brother-in-law became directors.

public company was formed, introducing much needed capital and Jean-Louis Labat as a financier. He bought a number of shares, as did the old partners and a several others.⁶⁰ Nevertheless, these and other measures failed to overcome the shortcomings, and Europe's general economic malaise of the 1790s.⁶¹

Mechanical knowledge was transferred rapidly through Enlightenment networks, but was more difficult to replicate the further it was diffused from Britain. Nicolas Paul and his father built scientific instruments for Pictet, Deluc, and Saussure in Geneva, as the Adams did on Fleet Street for British *savants*. Yet, the Pauls had difficulty in efforts to import improvements for the hydraulic machine supplying Geneva with water. It was built in 1708, by an engineer who worked on the *Machine de Marly* at Versailles, and like it was in a state of decline.⁶² Thus, James Watt's skills were requested. In 1785 Pictet, using the channels of J.-A. Deluc and James Watt junior, sought a steam-engine design to improve Geneva's water supply.⁶³ Deluc told Pictet that the theory itself was not enough:

The theory in this regard would be no more practical than a book on watchmaking would help to make watches in Tahiti. Following a very exact and very detailed description, it is necessary to have the furnaces to cast iron and the refineries that we have here in this country, all the workshops and the many machines that experience has accumulated at Soho, and all the workers that Messrs Watt and Boulton have taught.⁶⁴

The Delessert network furnished critical links, friendships, introductions, and access to coveted sites of mechanical innovation. These bonds alone, however, could not overcome economic and infrastructural shortcomings or an absence of a trained workforce.⁶⁵

⁶⁰ 39) M.-A Pictet to H.-A Gosse, n. d. [15 May 1791] in Pictet, *Correspondance*, 3: pp. 266-7, n. 129-30. The new company was divided into 72 "actions" or shares. Pictet took 14, Labat 12, Gosse 12, Charles Pictet de Rochemont 12 with others buying the remainder. *Ibid.*

⁶¹ Bickerton, *Marc-Auguste and Charles Pictet*, pp. 110-11.

⁶² Schulé, "Une dynastie," p. 145.

⁶³ BCL MS 3219/4/11/9 J. Watt jnr (Geneva) to J. Watt snr (Birmingham), 7 January 1785.

⁶⁴ J.-A. Deluc (Windsor) to M.-A. Pictet (Geneva), 20 June 1785. Pictet, *Correspondance*, 3: p. 248.

⁶⁵ Jones, "Knowledge and Technology Transfer," p. 48.

12.4. From Educational to Industrial Exchange: Water Raising

The impetus behind the Watts and Delesserts' friendship was education. James Watt's connection to J.-A. Deluc allowed Etienne and Madeleine-Catherine Delessert to have their eldest sons educated in Britain. Once they and Abraham Guyot were established, in Birmingham, Watt used their ties to the Continent to assist with industrial matters. By the late 1770s Watt knew of efforts by Frenchmen to infringe on his steam-engine invention, and the need to reconstruct the *Machine de Marly* at Versailles.⁶⁶ As a consequence, Watt enlisted the Delesserts to help him gain valuable information on these matters. They both related to the necessity of water and the challenge of supplying it to French subjects.

Eighteenth-century Europe's thirst for drinking water spurred the development of mineral water, natural and artificial, and mechanical raising machines. The Paris suburb of Passy became known for its water. Louis-Guillaume Le Veillard (1733-94) and his wife, Geneviève-Elizabeth Bellamy, were friends and neighbours of Benjamin Franklin and the Delesserts. Le Veillard, Passy's first mayor, was purveyor of its famous mineral waters and spa. Through this he became allied to Franklin. In 1785 Le Veillard travelled with Franklin to England for his return to America, stayed in correspondence for years, and was one of three men to whom Franklin sent copies of his autobiography in 1789.⁶⁷

Referring to the friendship's origin Claude-Anne Lopez states:

If Franklin and Le Veillard did share a drink when they first met in 1777, they may well have filled their glasses with mineral water. Because of his stone, the Doctor had to consume quantities of it; and Le Veillard was the owner-manager of Les Nouvelles Eaux de Passy – his wife's dowry and a great source of wealth at a time when supplying 650,000 Parisians with sanitary drinking water was no small task. To be sure, a few aqueducts kept the fountains of the capital flowing, but they were inadequate. The Seine could supply unlimited amounts of water; all the

⁶⁶ Harris, *Industrial Espionage*, pp. 298-322.

⁶⁷ Claude Anne Lopez, *Mon Cher Papa: Franklin and the Ladies of Paris* (New Haven: Yale University Press, 1966), pp. 138-49.

sewers of its environs, however, plus many unsavory kinds of refuse, emptied into it.⁶⁸

Much energy was used to successfully pump water from the middle of the Seine, instead of its edges. Hydraulic pump machines were used; the biggest was that on the *Ile de St. Louis*. Water was ostensibly purified by sedimentation in large glass vessels, and for a fee many distributors delivered it to Parisians' doors. Despite this process Seine water was cloudy and purgative. People who could afford mineral water chose this safer option.⁶⁹

In the mineral water fights among Passy purveyors each sought experts to confirm their superiority. Springs in Passy's scenic hills became popular through the patronage of both the crown and even J.-J. Rousseau.⁷⁰ In 1752 Rousseau visited Passy, as a guest at the country house of his Swiss friend François Mussard (1691-1755). Mussard invited Rousseau there to drink mineral waters to help his urinary condition.⁷¹ Le Veillard's *Les Nouvelles Eaux de Passy* was one of many suppliers of mineral water. In 1764 he attained a medical degree, from the minor and provincial *Université de Reims*, to make his water company more competitive. Beyond his scientific credentials, Le Veillard's promotions included paths, a pavilion, and terraces. The spa's most critical addition was Benjamin Franklin.⁷² Rivalries and attempts to attract scientific authority, present in bottling from natural springs, also persisted in efforts to mechanically raise water.

The Delesserts, valuable Paris contacts for James Watt, were privy to industrial developments but not dependent on the government. In February 1784, Abraham Guyot

⁶⁸ *Ibid.*, p. 141.

⁶⁹ *Ibid.*

⁷⁰ *Ibid.*

⁷¹ Mussard was a wealthy retired jeweller who Rousseau identified as his relative and a philosopher. In Paris, Rousseau studied shells with Mussard and attended his salon. Rousseau, *The Confessions*, pp. 348-9.

⁷² Lopez, *Mon Cher Papa*, pp. 141-2; 815. L.-G. Le Veillard (Passy) à B. Franklin, 10 octobre 1785. Calude Adrien Helvétius, *Correspondance générale d'Helvétius: 1774-1800/Lettres 721-866*, eds. Peter Allan et al. (Toronto: University of Toronto Press, 1998), pp. 141-2, n. 1.

relayed a message from Mme Delessert to Watt. She explained that Etienne had been very eager in “searching for means to obtain information concerning the reconstruction of the *Machine de Marly*.”⁷³ Delessert followed up on Watt’s request about how Soho could become involved, and supplied details on key officials involved with the reconstruction.⁷⁴

J.-C. Périer was an enduring irritant for Boulton & Watt. They had obtained a French *privilège* in 1778, to protect their steam engine, similar to their British patent that protected them for twenty-five years. The *privilège* was not fully put into effect, as they were unable to demonstrate a priority in France. Thus, Périer managed to infringe upon it.⁷⁵ He travelled to England in 1784, with several French engineers and iron masters. They hoped to learn how to build steam engines from Boulton & Watt at Soho and, Watt informed Josiah Wedgwood, to find “benevolent people” to provide instructions on better methods to cast Iron.⁷⁶ Watt warned Wedgwood:

We treated them with all manner of civility but took care to show them nothing but what they knew before several of the Birmingham people shut their doors against them and I am persuaded M^r. Wilkinson to whom they are gone will not be very communicative – We gave warning of their approach to all with whom we had any connection – I believe they do not intend [to] visit the pottery but if they do you are warned that they are clever scientific people and one of them M^r Perier an excellent mechanic.⁷⁷

Watt was mistaken about John Wilkinson being uncooperative, but correct about Périer’s abilities and the threat he posed. Despite precautions Périer began manufacturing his own engines near Paris after, J. R. Harris notes, obtaining “the secret to Watt’s double-acting

⁷³ BCL MS 3219/4/98/1 a) A. Guyot (Birmingham) à J. Watt (Harper’s Hill), 14 février 1784.

⁷⁴ *Ibid.*

⁷⁵ Harris, *Industrial Espionage*, pp. 297-8.

⁷⁶ BCL MS 3219/6/36 36. J. Watt snr (Birmingham) to J. Wedgwood, 6 February 1784. The warning to Wedgwood repayed the favour for his alert to Soho about E.-C. Genet in 1783.

⁷⁷ *Ibid.*

engine from a Spanish engineer who had gained it by blatant industrial espionage.”⁷⁸

One element missing in the discussion of espionage is the role Guyot and the Delesserts played in counteracting it.

In 1785, Etienne Delessert gathered information on P erier and the introduction of steam engines into France. Delessert informed Watt that P erier’s water establishment at Chaillot, powered by steam engine (Delessert it called a “Fire’s Pump”) had adequate financing to cover its debts. There were numerous speculators who believed that it would be profitable. They had secured a majority stake of subscriptions, which had more than doubled in value.⁷⁹ Delessert concluded that, because there was a rapid increase in the project’s worth, conditions were also ripe for competition:

So that it will have much to gain, and it is a very propitious moment, to establish a like Fire’s Pump, in another part of this Town, and together with some friends of my own, I could think to this undertaking, if I could know what means are necessary to take, to make it Succeed, with less expence, than Mr Perrier’s. as this appears possible.⁸⁰

Delessert inquired about Watt’s own knowledge of P erier’s operations at Chaillot, if he could share details about it, and how much Boulton & Watt would charge, “to furnish a like establishment?”⁸¹ Finally Delessert alluded to advancements in France’s industrial development. The majority of both the body and channels of P erier’s engine had to be imported from England. However, these parts could now be manufactured in France,

⁷⁸ Harris, *Industrial Espionage*, p. 298. P erier likely had a plan to supply Paris water by 1775, with support from powerful patrons: the house of Orl ans. Initially it involved Newcomen engines, as Boulton and Watt only partnered in 1774. Wilkinson, who provided their cylinders, did not have fully-functioning engines at his ironworks until 1776. In 1777 P erier’s waterworks attained a royal *privil ge* in 1777. He later travelled to England and met Wilkinson, who supplied iron pipes, but would construct an engine for P erier without involving Boulton & Watt. P erier received authority to arrange a purchase of two engines from Soho. This did not end his antics, as P erier profited from the espionage of Watt’s improvements. *Ibid.*, pp. 298-300.

⁷⁹ BCL MS 3147 3/388 26. E. Delessert (Paris) to J. Watt snr (Birmingham), 18 May 1785. This is one of the few English letters Delessert wrote to Watt.

⁸⁰ *Ibid.*

⁸¹ *Ibid.*

making a competing operation less difficult.⁸² Delessert also sent Watt information on Périer's *privilèges*, challenges to them, his time in England, and operations in France.⁸³

12.5. From Educational to Industrial Exchange: Cotton Spinning

James Watt's steam engine was not the only British industrial innovation imported into France. Information about other sought-after inventions, such as cotton mills, surfaced in James Watt and Etienne Delessert's earliest exchanges.

As Delessert conducted affairs in Lyon he also collected reconnaissance for Watt on the development of cotton mills. Abraham Guyot remitted this intelligence to Watt, shortly before departing Birmingham for Edinburgh, reporting that there were a number of cotton mills in France employing spinning-machine technology from Manchester. This included the mill at Neuville, near Lyon, which was established by James Milne (d. 1816) and his father John Milne (c. 1722-1804). It had lost much money, which was in part because of the considerable cost of its establishment.⁸⁴ The Milnes pirated cotton-carding machines from Richard Arkwright, were instrumental in introducing the improvements to France, and left the Neuville partnership before its collapse. J.-C. Périer, again profiting from espionage against British industry, was part of the firm to take over the mill.⁸⁵ In

⁸² *Ibid.*

⁸³ BCL MS 3147 3/388 27. E. Delessert à J. Watt snr. 17 juin 1785. Delessert's reconnaissance covered details on Périer's fifteen-year *privilège* to supply Paris with water, his profits, and that Périer had promised to pay Watt 1000 *livres* sterling tacitly recognizing Watt's right to an exclusive *privilège*. Delessert also uncovered a vital provision. According to Périer's *privilège*, a competing establishment was permitted to form if distribution did not reach sufficient limits within a few years. In this way Delessert's group sought to challenge the monopoly, in combination with help from Watt. Delessert told Watt that if his *privilège* to establish steam engines in France was in order then it would be easy to use it against Périer. At this time Périer was occupied trying to establish an engine at the mine of Montcenisin in Bourgogne. The pipes and cylinders for this engine had been forged by Wilkinson in Wales, and were then passing through Paris. *Ibid.*

⁸⁴ BCL MS 3219/4/48 14. A. Guyot (Birmingham) à J. Watt snr (Londres), 8 octobre 1784.

⁸⁵ In 1779 James Milne, a Manchester mechanic, arrived in France to sell cotton carding machines. The family was in touch with the French government before this point. Milne built a number of machines and offered to build various other textile machines for the ministry. It refused to pay the excessive fees Milne asked, but gave him a pension. Milne's father and brother joined him in France, after the cotton mill they were directing in England failed. They became involved with various measures to establish mills and

1780, James Milne had requested a meeting with Benjamin Franklin at Passy, “to solicit [Franklin’s] attention upon objects which concern America.”⁸⁶ Within seven years Milne was in Georgia, encouraging and educating planters in cotton production.⁸⁷ George Washington (1732-99), believing that cotton fabrics would be of the greatest immediate utility for America, reported to Thomas Jefferson in 1789:

Mr Milne, an English Gentleman, who has been many years introducing those manufactures into France, and whose father is now carrying them on (under the protection of government) at the Royal Chateau of Muette in Passy, was at my House this Week & is of the opinion that they may be prosecuted in America to greater advantage than in France & England.⁸⁸

Expectations were also high in France. Guyot predicted that the other merchants who had made cotton-spinning machines, like the Milnes, would make great profits. Delessert also inquired into the state of cotton mills in Rouen for Watt.⁸⁹ This research into the French cotton industry constituted another mutual exchange of industrial intelligence.

It took two decades before the Delesserts’ interest in cotton was translated into industry. Cotton was one of several manufactures that Benjamin Delessert initiated in the early nineteenth century. In 1801, Delessert had a five-story sugar refinery constructed, powered by a steam engine, at Passy.⁹⁰ Two years later he established a mechanized cotton mill, the first French mill to employ Watt’s steam-engine technology. Delessert converted it into a continuous spinning mill in 1805, and hired Thomas Ferguson, the

introduce improved British cotton manufacturing methods to France. Despite enjoying French patronage over decades the Milnes were each insolvent at death. Harris, *Industrial Espionage*, pp. 363- 418.

⁸⁶ James Milne (Paris) to Benjamin Franklin (Passy) 19 May 1780. Benjamin Franklin, *The Papers of Benjamin Franklin*, ed. Barbara B. Oberg (New Haven: Yale University Press, 1996), vol 32: pp. 395-6.

⁸⁷ G. Washington (Mount Vernon) to T. Jefferson, 13 February 1789. George Washington *The Papers of George Washington*, ed. Dorothy Twohig (Charlottesville: University Press of Virginia, 1987), vol. 1: pp. 299-303.

⁸⁸ *Ibid.*, p. 300.

⁸⁹ BCL MS 3219/4/48 14. A. Guyot à J. Watt snr, 8 octobre 1784.

⁹⁰ Delessert partnered in the refinery project with Jean-Baptiste Quérueil (1779-1845). AP V.N4 183. Actes notaries concernant la raffinerie de sucre (1847, 1859).

previous foreman for Liévin Bauwens (1769-1822), as its director.⁹¹ Bauwens had established a textile mill at Passy in 1798, after a trip to England to carry out substantial industrial espionage. Ferguson was also a demonstrator and director in the school of spinning at the *Conservatoire des arts et métiers*. By 1806, James Milne replaced Ferguson in this role. This institution, and its British instructors, helped French cotton manufactures become competitive.⁹² The French Revolution eliminated many factors hindering industry, and the cotton industry especially underwent changes. Much changed between Watt's visit to France in 1786, and his return in 1802. A constant was French efforts to compete with British industry. Louis Bergeron asserts:

Cotton spinning entered massively on the way to mechanization between the end of the Directory and the years 1810-1812. It was at first a largely spontaneous movement, carried on by bold entrepreneurs who, from before 1800, hoped to make use of British technical inventions to establish in France an industry which, on the return of peace, would be strong enough to resist renewed imports from the British Isles.⁹³

The Delesserts and other cotton manufacturers profited from their links to Britain.

Cotton printing was a primary French industry early in the nineteenth century notably after 1802, with the renewed peace and importation of foreign raw material. The industry faced obstacles from the importation of foreign finished cotton, and the French silk and woollen producers. Cotton spinners and merchant-manufactures had, by 1806, asserted sufficient influence on Napoleon's government to improve their lot. In February a decree put high tariffs on unprocessed yarn and cotton. The importation of muslins and

⁹¹ Coninck, *Banquiers et philanthropes*, p. 58, 67-8. On Bauwens see Pollard, *Peaceful Conquest*, p. 91.

⁹² Bauwens, a Belgian of a noble family that prospered in commerce and tanning, apprenticed in England. He returned often, at times as an industrial spy, and established large tanneries in Paris and Ghent. On two final English trips in 1798 Bauwens concealed espionage with merchant activities, including the purchase of a Boulton & Watt engine. However, the smuggling of workers and machines was detected, leading to fines and imprisonment of agents. Nevertheless, Bauwens was able to establish large cotton mills in Passy and Ghent. Coninck, *Banquiers et philanthropes*, pp. 67-8; Harris, *Industrial Espionage*, pp. 396-418.

⁹³ Louis Bergeron, *France Under Napoleon* (Princeton: Princeton University Press, 1981), p. 175.

finished cottons was also barred. Consequently spinners had to spend more for their raw material, but their finished goods were more competitive against British and other foreign products.⁹⁴ Six days after the decree the *Spinners of the department of the Seine and its environs*, of which Benjamin Delessert and La Rochefoucault-Liancourt were leading members, addressed Napoleon. They expressed their gratitude and belief that this would improve French industry.⁹⁵ The measure increased cotton production, the mechanization of spinning mills, and inducted a number of new centres of industrial development.⁹⁶ As Bergeron asserts: “Neither business audacity nor technical knowledge, spreading notably from Paris, were lacking in France; nor was capital. The slow pace of industrialization could not be attributed to any basic incapacity in the national temperament.”⁹⁷ By 1806, the Delesserts were leading members of France’s much delayed cotton spinning industry. It was only able to gain traction after great battles had been fought, by the bourgeois of Etienne Delessert’s generation, against the nepotism of factions tied to the *Ancien régime*.

12.6. The Plan for a Projected Watt-Delessert Partnership in Lyon

France offered better prospects for cross-Channel industrial collaborations than did Geneva, but political and economic volatility still impeded such ventures. Manufacturers in Britain, including Boulton & Watt, often incurred the great burden and expense at the outset of their endeavours. This was the case for Soho’s steam engines and mint. Thus, they were eager to expand British and foreign markets to attain better return on their investment. On both sides of the Channel government regulations and patronage made this difficult. Nevertheless, technical infrastructure could be replicated in countries like

⁹⁴ *Ibid.*

⁹⁵ *Ibid.* p. 176; AP AFD V13S 3. Join-Lambert, *Benjamin Delessert*, p. 103.

⁹⁶ Bergeron, *France Under Napoleon*, p. 176.

⁹⁷ *Ibid.*

France. Boulton & Watt, as a consequence their Albion Mill in London, sought help from Etienne Delessert to form a like company in Lyon.⁹⁸ This was a significant example of cross-Channel collaboration and trust in a period rife with industrial espionage.

A formidable connection and industrial exchange between the Delesserts and Boulton & Watt predated their visit of 1786-7. Soon after Etienne Delessert sent two sons to Birmingham, he and Watt began discussing collaborating to establish steam engines in Lyon. In August 1785, Delessert contacted Watt about the project to use steam engines in flourmills, which depended on inconstant river power, and a plan to find out about J.-C. Périer's actions to set up an engine to supply water to Lyon.⁹⁹ Périer secured the royal *privilège*, but he had not been to Lyon, and work would not start until he had enough subscribers to pay the cost. Conversely, Delessert suggested that he and Watt seek a *privilège* to supply steam engine to flourmills for several years. Delessert believed that general methods could be improved and that Lyonnais millers lagged behind those of Paris. Hence, Delessert sent Watt a detailed account of the consumption, production, and labour of Lyon's thirty flourmills. Lyon's mills were located in between its two rivers,¹⁰⁰ on land won in 1772 by the project involving R. L. Edgeworth. After Delessert returned to Paris, he asked Watt about the suitability of steam-powered flourmills. Delessert also conceded that this enterprise could be united with Périer's water establishment, creating sufficient returns for all to profit.¹⁰¹ These collaborations did not move beyond preliminary stages, as they were ultimately interrupted by France's political crisis.

⁹⁸ BCL MS LSC JW Box IV 40. J. Watt (Birmingham) to M. Boulton (London), 8 November 1785.

⁹⁹ BCL MS 3147 3/388 29. E. Delessert (Paris) à J. Watt snr, 1 août 1785.

¹⁰⁰ BCL MS 3147 3/388 30. E. Delessert (Lyon) à J. Watt snr (Birmingham), 14 octobre 1785.

¹⁰¹ BCL MS 3147 3/388 31. E. Delessert (Paris) à J. Watt snr (Birmingham), 20 octobre 1785.

Watt's desired collaborations with Delessert, in Lyon's mills, related to Boulton & Watt's celebrated undertaking at the Albion Mills. Watt provided Delessert a detailed comparison to the English situation, based on his Lyon figures. 'Mealmen,' middlemen controlling English trade, bought vast amounts of corn from rural markets, shipped it to larger centres, had it ground into flour, and sold to bakers. Watt figured that Mealmen made modest profits on each delivery, but it was very profitable for those processing large amounts and versed in the business. This potential was the impetus for Boulton & Watt's involvement of with the Albion Mills, as well as for Watt's inquiries to Delessert regarding the situation in Lyon. Watt explained: "It was on the idea of carrying on the Business of Mealmen & Millers, that the new Company at the Albion Mill, Blackfryars [*sic*] bridge London, have begun so extensive an undertaking, and it was on this idea of raising a similar company at Lyons that I proceeded in what I have had the honour to write to you, Sir, upon this subject."¹⁰² The caution that Boulton & Watt had begun to practice, to protect their patents from industrial spies,¹⁰³ was in marked contrast to the confidence Watt demonstrated in sharing information with Delessert.

Watt's desire to establish a company with Delessert insured a forthright sharing of details on Boulton & Watt operations. With typical caution Watt avoided calculations using French figures, until they could determine what size of engine to erect in Lyon.¹⁰⁴ Watt instead based estimates on the engines they were raising at the Albion Mill. Each mill could continually rotate six pair of millstones, which by design worked in pairs, with two pair for relief when the others needed dressing. Each millstone pair could easily grind

¹⁰² BCL MS 3147 3/388 32. J. Watt (Birmingham) to E. Delessert (Paris). 6 November 1785. "M^r Delessert, Draft of Letter to him on the Subject of corn mills at Lyons – This Letter was not sent but an abstract of it."

¹⁰³ It was often French espionage used against Boulton & Watt. Harris, *Industrial Espionage*, pp. 297-322.

¹⁰⁴ BCL MS 3147 3/388 32. J. Watt to E. Delessert. 6 November 1785. "Draft of Letter."

eight bushels per hour. Using these figures Watt provided Delessert calculations of an engine's output by hour, day, week, and year. Watt also supplied full details of the mill's cost including buildings, workers, fuel, patent charges, materials, and repairs.¹⁰⁵

Watt believed that the proper course was to form a company to both raise Lyon's water supply and control milling operations. Though each function required a distinct engine, as one could not simultaneously grind corn and raise water. Watt explained that his figures would be more precise once their Albion Mill engine had been operating for a sufficient time, at which point Watt promised to send Delessert better estimates.¹⁰⁶ The two men had only a brief acquaintance, but their common interests quickly solidified a bond between them, and their entire families.

The subject of the corn mill company in Lyon remained open until 1791. Abraham Guyot informed Watt: "I have not seen Mr. Delessert for but an instant since the arrival of your letter; and all that I can say today on the Mills of Lyon; is that this project will be amongst those completely set aside."¹⁰⁷ The project was one of many terminated by the French Revolution. Watt's inquiry to Guyot appears to have been an effort to enter into trade with the new political reality in France, as Boulton was doing with the Soho mint, which was part of a wider expansion of Soho's interests.¹⁰⁸ Unfortunately the privileges, which blocked collaboration and progress in French industry, were replaced in the 1790s by delays and disarray within the new revolutionary government.

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.*, Boulton & Watt charged £300 annually to the use their invention. They estimated it for a third of the savings that would be made by their engines in fuel costs. Watt explained that engines of typical build used three times as much coal than Boulton & Watt engines in performing the same work.

¹⁰⁷ BCL MS 3147/3/391 74. A. Guyot (Paris) à J. Watt, (Heathfield) 8 mars 1791.

¹⁰⁸ On their expansion see Jennifer Tann, "Marketing Methods in the International Steam Engine Market: The Case of Boulton and Watt," *The Journal of Economic History* 38, no. 02 (1978), pp. 379-82.

12.7. Conclusion

It is no wonder that Britain enjoyed such a disproportionate industrial advantage over its Continental neighbours. France's religious persecution of the 1680s, had expelled thousands of productive Huguenots. Britain and Geneva were both beneficiaries of this exodus. As numerous eighteenth-century attempts reveal, Geneva did not possess the economic or industrial infrastructure to buoy large-scale manufacturing. The Pictets' business ventures between 1788-1796 were failures. They shared this in common with Ami Argand's lamps and several other Genevans who attempted to marry science and industry. Furthermore, both Geneva and France suffered political revolution in the 1780s. Political instability and hostility on the Continent, in the 1790s, led numerous Genevans to consider fleeing to America. In 1796, after order was restored, the Pictets brothers began a successful venture. This was not another manufactory, but a periodical journal. If industries thrived in Britain, and struggled on the Continent, perhaps the solution was a greater focus on Britain. As with earlier periods of the Enlightenment Britain became a model of stability. The Pictets used contacts, formed through the British-Franco-Swiss network, to produce the *Bibliothèque britannique* to spread British science across Europe.

The Swiss traffic created near the end of the eighteenth century had stemmed from political divisions. This was to be followed in the 1790s by French traffic. Not only did the Genevan conflict highlight and distort major Enlightenment themes, it also involved many disputes that would erupt a decade later in the French Revolution. Several Genevan exiles embraced the Revolution as a means to liberate Geneva. Many French moderates, however, were forced to flee the violence. For moderate *savants* it resulted in disillusionment with the Rousseauist philosophy perverted by the Jacobins.

13. 'The mechanical wonders of Birmingham:' Interchange among Lunar and Franco-Swiss *Savant-Fabricants*

The Applied Enlightenment witnessed an international diffusion of technology. It was often, though not exclusively, a dispersal of British mechanical knowledge across the English Channel, Atlantic Ocean, and beyond. Two very common forms of transfer were demonstrated by the transmission of Britain's crowning achievement in industry: the Boulton & Watt steam engine. It became an object of international interest given its seminal impact on Britain's industry. The main method of diffusion was orders for engines through the Boulton & Watt partnership.¹ A second but more nefarious form of transfer was in incidents of industrial espionage. These plagued Boulton & Watt, as well as fellow captains of industry.² There was also a third method far more intimate in practice. This was free sharing of technology practiced by select *savant-fabricants*, including the Delesserts of Paris.

The reception of Matthew Boulton and James Watt's travelling party in Paris in 1786, exposed the contrasts of transfer. They were invited to consult on the *Machine de Marly* by the French government. Yet, it was the Delesserts, Abraham Guyot, and the Argand brothers who met Boulton and Watt upon their arrival in Paris. They spend much time with the likeminded *savant-fabricants*,³ finding this company more comfortable than the pomp and circumstance at court. Etienne Delessert tried to purchase a large order of coin from Boulton's Soho Mint steam press for France's new revolutionary government. Guyot was a liaison between Watt and the Frenchmen who sought to employ steam

¹ Jennifer Tann and M. J. Breckin, "The International Diffusion of the Watt Engine, 1775-1825," *The Economic History Review* 31, no. 4 (1978), pp. 541-64. Tann, "Marketing Method," pp. 363-91; Pollard, *Peaceful Conquest*, pp. 142-8.

² For the espionage against Watt's engine in particular, see Harris, *Industrial Espionage*, 297-322.

³ BCL MS 3782/12/31 279. A. Guyot (Passy près de Paris) à M. Boulton (Birmingham), 30 octobre 1786; BCL MS 3782/14/76/12 M. Boulton (Paris) to A. Boulton (Birmingham), 18 November 1786.

engines for Caribbean sugar mills. Stephen Delessert, even after he fled France in 1792, continued to give friends recommendations to the ‘mechanical wonders of Birmingham.’ This industrial exchange was pursued in the 1790s, despite the French Revolution.

13.1. Boulton & Watt’s Visit to France

Matthew Boulton and James Watt’s official purpose for crossing of the English Channel, on 15 November 1786, was business. They were invited by the French government to consult on the aging *Machine de Marly*, which furnished Versailles with water.⁴ Yet this was but a pretext, as larger forces were at play. France and Britain were at peace, in the midst of concluding a landmark commercial treaty, but still competed in industrial development. Britain was even further ahead of France on the factory-floor, than it was on the battlefield and high seas. Boulton and Watt’s invitation to visit, or even settle in France was influenced by this deficit. In proper Enlightenment fashion the Midlands’ *savant-fabricants* amalgamated manifold interests throughout France, cultivating business, scientific, industrial, educational, and cultural relations.

After landing at Boulogne, and taking three largely leisurely days to reach Paris, the travelling party got to work immediately upon their arrival.⁵ The party consisted of James Watt, Matthew Boulton and his son, Josiah Wedgwood’s nephew and business partner Tom Byerley (1747-1810), and Wedgwood’s eldest son John.⁶ It did not take long for either Boulton senior or junior to become acclimatized and enamoured with France. This was facilitated by Boulton’s significant French connections, which had expanded considerably since his first visit in 1765. In the interim he had become an internationally

⁴ BCL MS 3219/4/123 J. Watt snr to J.-A. Deluc, 22 October 1786; *Ibid.*, J. Watt snr to John Roebuck, 3 February 1787; BCL MS JWP Muirhead IV. J. Watt snr (Paris) to J. Watt jnr, 7 December 1786.

⁵ BCL MS 3782/14/76/12 . M. Boulton to A. Boulton, 18 November 1786.

⁶ They went to find French agents for Wedgwood pottery. Mason, *The Hardware Man's Daughter*, p. 77.

renowned manufacturer. Boulton and Watt's state invitation provided links to some of the most influential officials in France. Yet, they had more in common with, and displayed more trust in, fellow *savant-fabricants* like the Delesserts and the Argand brothers.⁷

Boulton and Watt were forced out of their comfort zones, as their first week in France was monopolized by visits to Versailles. They filled their first day at Marly with a full inspection of "its stupendous Machine." In the following days the industrial partners were less in their element. They waited on French officials, delivered letters, and attended ceremonial meetings. Finally, Boulton and Watt were invited to spend the night at Versailles to meet the Comte de Vergennes, who Boulton identified as "the prime Minister of France," and political powers within the palace, having already inspected the mechanics powering it from below.⁸ After excessive ceremony, admiring the statues and fountains at court, Boulton and Watt returned to Paris. They were invited to a meeting of the *Académie française* and met many of its celebrated members, a number of whom they then joined for tea at Madame de Lavoisier's salon.⁹ Late-Enlightenment mixing of formal and informal science with industry would continue into the nineteenth century.

Watt and Boulton productively mixed British mechanical prowess with French sociability. A hectic agenda insured that the partners felt at home. During their second week they visited shops and attractions at the *Palais Royal*, attended dinners at the *hôtel Delessert*, and worked on an inquiry from Versailles.¹⁰ Boulton informed his daughter Anne of their activities and of his desire to return home soon, explaining: "in spite of all

⁷ BCL MS 3782/14/76/12 . M. Boulton to A. Boulton, 18 November 1786; BCL MS 3782/12/107/14 M. Boulton's Diary, 1786 ; BCL MS 3782/12/107/17 M. Boulton's Diary, 1787.

⁸ They had mass in Louis XIV's chapel and met his brother, Louis-Stanislas-Xavier Comte de Provence (1755-1824). BCL MS 3782/14/76/13 M. Boulton (Paris) to A. Boulton, 26 November 1786.

⁹ *Ibid.* Mme Lavoisier (1758-1836) was born Marie-Anne-Pierrette Paulze.

¹⁰ BCL MS 3782/14/76/13 M. Boulton to A. Boulton, 26 November 1786.

the Grandure & politeness of this Country my affections can never be lessend for Old England.”¹¹ As with Boulton’s first trip to France, he marvelled at French grandeur, opulence and culture. Yet, he was far too tied to England to consider living elsewhere.¹² Neither he nor Watt became a Francophile, as did several other Lunar men. Boulton and Watt sustained a practical appraisal of their neighbour across the Channel.¹³ They sent their sons to the Continent to learn French, and made visits to encourage exchange and industry, but did not enthusiastically embrace the French Revolution.

13.2. Franco-British Exchange, Espionage, Benevolence, and Blockage

Britain’s monarchy did not respond, to Boulton and Watt’s French visit, by inviting the Montgolfier brothers to display their invention with hot-air balloon launches at court. The reasons for this were threefold. Firstly, the science was relatively easy to replicate and aeronauts had already made several ascents over London. Secondly, a lack of apparent utility meant ballooning, beyond public spectacle, did not warrant such an invitation.¹⁴ Finally, Britain did not need visits by famous French inventors to encourage industry. In 1785, Joseph Montgolfier made an English tour of his own volition. Fears of foreign espionage had run so high that his party was blocked at John Wilkinson’s ironworks in Bradley. They were also turned away at Soho, usually a welcoming place.¹⁵ “Though I was sorry for M^f Montgolfier’s sake;” Watt informed J.-A. Deluc, “yet I cannot help approving of the strictness with which the Birm^m: manufactures now refuse to show their

¹¹ *Ibid.*

¹² BCL MS 3782/14/76/13 M. Boulton to A. Boulton, 26 November 1786.

¹³ Jones, “Living the Enlightenment, p. 163.

¹⁴ For an account of the London launches, interest in them by the British royal family, and the debate by British *savants* over utility, see Gillespie, “Ballooning in France and Britain,” pp. 261-8.

¹⁵ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Argand, 9 December 1785, *Ibid.*, J. Watt snr (Birmingham) to Jean-Baptiste Réveillon, 9 December 1785. Wilkinson had, Watt noted, admitted Périér but not Montgolfier’s party. It included Argand and J.-B. Réveillon (1725-1811), a prosperous wallpaper manufacturer. BCL MS 3219/4/123 J. Watt to J.-A. Deluc, 11 December 1785.

works to foreigners & even to strangers of this nation.”¹⁶ Watt tried to repair the insult, by offering to show Montgolfier’s party the steam engine, but they would not return.¹⁷ The predicament between exchange and protection persisted. Introductions secured through the British-Franco-Swiss network insured that members were typically not, like poor Montgolfier, turned away from cities like Soho. There was an underpinning desire by Britons to export fabrications, and by Franco-Swiss to import both products and processes. Consequently, there were efforts by *savant-fabricants* in Geneva, Paris, and Lyon to employ British ingenuity. Ultimately, these endeavours met with mixed results.

The peaceful climate after 1783 increased commercial interchange. The rapid diffusion of mechanical knowledge meant the Montgolfier brothers could not maintain a monopoly on their invention.¹⁸ However, the English Channel’s traffic flowed in multiple directions. Boulton & Watt did not have to introduce their steam-engine technology to France. It was already present from legal purchases, as well as the disreputable theft of secrets. Their invitation to France was instead a desperate measure, to entice British manufacturers, by welcoming two of the most celebrated men of the age.¹⁹ The influx of British ingenuity was expected to help France overcome a trade deficit, along with the Anglo-French Commercial Treaty, and improve industrial development generally.

Watt and Boulton tried to serve all interests in Paris without becoming embroiled in its politics. They inspected, besides the *Machine de Marly*, the machines of *Pont Neuf* and *Notre Dame* at the request of minister L.-C.-A. le Tonnelier, baron de Breteuil (1730-

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ Charles Blagden informed Joseph Banks of Montgolfier’s attempt to keep the composition of gas for his balloon secret. The intelligence came from Abraham Guyot, newly arrived in London. [375] C. Blagden to J. Banks, 23 August [1783]. Banks, *Scientific Correspondence*, vol. 2: pp. 124-5. Jacques Charles (1746-1823) was also protective, refusing to let Montgolfier near his balloon before the first Paris launch at the Champs-de-Mars, 27 August 1783. RSL MS CB/1/3/262 M.-M. Delessert to C. Blagden, 31 August [1783].

¹⁹ Harris, *Industrial Espionage*, pp. 287-322, 501-2; Pollard, *Peaceful Conquest*, pp. 142-8.

1807). This was to determine if there was a superior method to provide Paris with water. Breteuil, Watt informed J.-C. Périer, “doth not approve of so important a Necessary of Life being Monopolized.” From Watt and Boulton’s inspections they believed that the machines could be reconstructed to at least double their current capacity. Several schemes had been publically proposed as competitors to supply water to Paris, including using the Yvette River.²⁰ Etienne Delessert’s group, led by Etienne Clavière, had the plan to divert the Yvette River in Paris. They sought to undermine the faction backing Périer’s *Compagnie des Eaux de Paris*.²¹ Watt explained the dilemma to Périer:

We wish to serve the publick to the best of our power, & we wish to serve the Water C^o (at least avoid doing it any injury) so far as is consistant with our duty to our Employers & to our own Character as honest Men. But we find our selves in a disagreeable predicament. We find our friends of different opinions & different parties. It is true We can easily demonstrate that this City can be amply, uniformly, & certainly supplyd by fire Engines without any other Machines or aquaducts whatsoever.²²

Watt, seeking to extinguish and not kindle fires sparked between competing parties in Paris, gave Périer two suggestions. First, that Périer’s company could agree to sell water at a moderate price, and allay all fears of a monopoly. The second suggestion was that if a company found a cheaper method than Périer’s company, then the two parties should be united. Ultimately, Boulton & Watt sought to serve all parties.²³ In discussing a mill, in Lyon with Watt, Delessert had suggested a similar union of companies with Périer.²⁴

The neutral approach by Boulton and Watt in Paris kept business channels open, but political volatility threatened closure. Watt inspected Périer’s Chaillot works in 1786,

²⁰ BCL MS 3782/12/36 206. J. Watt and M. Boulton, “Heads of conversation wth M^r Perrier of Paris 1786.”

²¹ Bouchary, “Un manieur d’argent,” pp. 254-73. BCL MS 3147 3/388 26. E. Delessert to J. Watt snr, 18 May 1785. Taylor, “The Paris Bourse on the Eve of the Revolution, 1781-1789,” pp. 972-3.

²² BCL MS 3782/12/36 206. J. Watt and M. Boulton, “Heads of conversation.”

²³ *Ibid.*

²⁴ BCL MS 3147 3/388 31. E. Delessert à J. Watt snr, 20 octobre 1785.

and praised P erier as an engineer instead of attacking him as a thief. Boulton & Watt avoided conflict, possibly in the event that P erier’s monopoly was maintained. P erier was not, however, informed of Soho’s direct-action steam-engine improvements, and he only discovered it through further espionage.²⁵ Boulton & Watt may have been, as J. R. Harris suggests, trying to maintain good relations with minister Calonne in hope of reviving their moribund French privilege. However, Calonne fell from power in 1787, the P erier brothers were expelled from the *Compagnie des Eaux de Paris* in 1788, and the company was absorbed by the state.²⁶ Such precariousness did not inspire confidence at Soho. Watt explained their concern to Abraham Guyot: “We have not relinquished all projects in France but we wait with patience the establishment of the government & the Ministry on a solid footing before we tie ourselves to them or engage our time and our money in their service.”²⁷ The official invitation of Boulton and Watt to France ultimately had mixed outcomes. *Savant-fabricants* on each side of the English Channel were interested in exchange, but it was often stymied by uncertainty within the *Ancien r gime*. Nonetheless, industrial exchange continued even as the old French order disintegrated.

13.3. The Business Dealings of *Delessert & Cie* and Boulton’s Soho Mint

Etienne Delessert and Jean-Pierre Du Roveray led protracted efforts to collaborate with Matthew Boulton to mint French coins. It was an alluring prospect for Delessert, a French banker, and Du Roveray, a London merchant focused on foreign trade. Negotiations held promise given the connections among the men, but the French government delayed their plans. The glacial pace of the old bureaucracy, and the disorganization of that which

²⁵ Harris, *Industrial Espionage*, p. 502.

²⁶ On P erier’s fall from favour, and relationship with Soho, see *Ibid.*, pp. 502-3.

²⁷ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Guyot, 7 December 1788.

dismantled and replaced it, prevented partnerships. As the French Revolution turned violent, turmoil threatened bankruptcies and ruin on both sides of the Channel.

Historians have explored Boulton's struggles to establish the Soho Mint and to mint French coins,²⁸ but they have neglected Boulton's negotiations with *Delessert & cie*. The significance of these negotiations lies not in their success, but in the circumstances surrounding their failure. In the end, none of Boulton's agents in France were able to arrange a deal for the Soho Mint to make official French coins. The Monneron brothers, the agents Boulton briefly partnered with to mint tokens, were not the obvious choice. They were, like Delessert's faction, closely tied to officials in Paris and well connected to French banking. However, unlike Delessert and Du Roveray, the Monnerons did not have a pre-existing friendship and business relationship with Boulton. Ultimately, the selection of this faction was ostensibly based on their willingness to take on risk.

Late eighteenth-century coin minting advances involved a rare example of Britons importing Franco-Swiss improvements. James Watt and Boulton were invited to France to spur innovation there. Yet, Boulton took advantage of the visit to wrest, from France, improvements for his mint and a gifted Swiss engraver J.-P. Droz. Boulton sent examples of French crowns for inspection by members of Britain's Privy Council Committee on Coin, which he explained: "I struck with my own Hand in the Hotel de Monnaie at Paris. The late changes in the Government of France, and the Opposition to all innovations from the offices of the Hotel de Monnaie prevented Mr Droz's improved Machinery from

²⁸ Richard Margolis, "Matthew Boulton's French Ventures of 1791 and 1792: Tokens for the Monneron Frères of Paris and Isle de France," *British Numismatic Journal* 58 (1988), pp. 102-9; Peter Jones, "'England Expects...': Trading in Liberty in the Age of Trafalgar," in *Enlightenment and Revolution: Essays in Honour of Norman Hampson*, ed. Norman Hampson et al. (Aldershot: Ashgate, 2004), pp. 187-203; John Graham Pollard, "Matthew Boulton and J.-P. Droz," *The Numismatic Chronicle* 8 (1968), pp. 241-265. George Selgin, "Steam, Hot Air, and Small Change: Matthew Boulton and the Reform of Britain's Coinage," *Economic History Review* 56 (2003), pp. 478-509.

being adopted.”²⁹ Droz’s six-*livre* piece was also unable to enter circulation. These changes did not stop Boulton from taking advantage, as he attained Droz’s improvements and combined them with his own of steam-powered presses, “which increased the Power and Celerity of the Operations in a very great degree.”³⁰ Boulton attempted to convince the Lords of the Committee on Coin of his project by appealing to them as a metallurgist, a manufacturer, a mechanic, and an engineer. As a manufacturer Boulton knew “that great quantities of any Article may be manufactured cheaper, than small quantities.”³¹ By applying this to minting coin, Boulton argued, the British government would save money:

And on that Ground, allow me to ask, whether it would not be most satisfactory, and most oeconomical, to contract with some Person of Property, and Character, who is possess’d of Mills for Rolling Furnaces for Melting the Scissel [scrap metal], and all other necessary apparatus situated about the middle of the Kingdom, and thereby much Expence of Coinage and recoinage may be saved.³²

Naturally, Boulton would fill this role, which would benefit both he and Britain.

The drive to attain official contracts for the Soho Mint was urgent, as Boulton had much to lose. In 1786, he began negotiating with British officials to use steam technology at the Royal Mint to prevent counterfeiting. Boulton needed contracts after expending almost £4000, preparing dyes, buying costly tools, hiring engravers, building machinery, replying to officials’ queries, and neglecting other affairs for years.³³ He noted that his new techniques and machines would curb counterfeiting, mint coins more expeditiously than the Royal Mint, and cost less by employing fewer workmen. Boulton claimed that his motive was “the public good, More than to promote my private Interest.”³⁴ Yet, for

²⁹ BL MS Add. 38, 421 5. M. Boulton “To the Right Honourable,” 16 December 1787, f. 178.

³⁰ *Ibid.*; Droz made improvement in dies, punches, and collars. Pollard, “Matthew Boulton,” pp. 242-65.

³¹ BL MS Add. 38, 421 5. M. Boulton “To the Right Honourable,” 16 December 1787, f. 178.

³² BL MS Add. 38, 421 5. M. Boulton (Soho) “To the Right Honourable the Lords of his Majesties most Honourable Privy Council” 17 December 1787, f. 181.

³³ BL MS Add. 38, 422 5. M. Boulton (Soho) to the Right Honourable Lord Hawkesbury, 6 February 1789.

³⁴ BL MS Add. 38, 421 5. M. Boulton “To the Right Honourable,” 16 December 1787, f. 179.

Boulton, as Jennifer Tann and J. R. Harris have shown, self-interest eclipsed patriotism.³⁵ Boulton thinly veiled this, conceding his interests in many Cornish copper mines. Instead of concentrating on vested interest Boulton focused on his knowledge of production, stating that for a decade copper mines saw increased production, and costs grew as mines went deeper, leading to a large fall in copper's price. Therefore, many mines had closed, many more would follow, copper's price would increase, and coin counterfeiting would expand.³⁶ Boulton argued that his minting of large quantities of coin "would greatly relieve the distress of the Cornish Miners," and "effectively put an end to Counterfeiting half-pence."³⁷ Boulton & Watt, suppliers of steam engines to Cornwall mines, owned shares and were owed royalties from the mines. Hence, Boulton's concern was not solely for the miners. Soho Mint was also, as Richard Margolis has argued, Boulton's first solo venture as he had partners in past endeavours. The mint was an attempt to leave a legacy as an independent entrepreneur.³⁸ Despite Boulton's great personal expense, vested interests, patriotic arguments, and feigned altruism, he only secured a contract for royal British coins in 1798.³⁹ As an alternative he looked to minting French coin.

The first three years of the French Revolution presented a flurry of commercial opportunities. Boulton partook in this fertile atmosphere by selling metal to France,⁴⁰ as did Du Roveray, Delessert, and their competitors. Boulton's interest in coining extended back to the 1770s, and that of France at least to his visit in 1786.⁴¹ By 1791, Boulton was

³⁵ Harris, *Industrial Espionage*, pp. 498-504; Tann, "Marketing Methods," pp. 377-83.

³⁶ BL MS Add. 38, 421 5. M. Boulton "To the Right Honourable," 16 December 1787, f. 178-9.

³⁷ BL MS Add. 38, 421 5. M. Boulton "To the Right Honourable," 17 December 1787, f. 181.

Margolis, "Matthew Boulton's French Ventures," p. 103.

³⁹ BL MS Add. 38, 423 97. M. Boulton (Soho) to the Earl of Liverpool, 18 February 1798; *Ibid.*, 379 and 383. "Thoughts on (o+) Coin, Papers received from Mr. Boulton No. 1.) and (No. 2), 1 November 1798.

⁴⁰ Wedgwood also sold goods with revolutionary themes to France. Jones, "England Expects," pp. 188-93.

⁴¹ Garbett wrote to Boulton about coinage throughout his time in Paris. In particular the state of their efforts mint British coins, as well as that of French coinage. This was from Jacques Necker's *Treatise on the*

discussing supplying France with new coins with Delessert and Du Roveray. Boulton told Du Roveray, when they met in London, that he was prepared to supply their desired amount of French penny (*sou*) to be struck at the Soho Mint. This was prevented, as the *Assemblée nationale* decreed that French money could only be minted at the *Hôtel des monnaies*.⁴² The dire need for a large amount of coins meant, Du Roveray noted, “that what may not be strictly legal might perhaps be tolerated. I have here insinuated to our friends Mess^{rs}. Delessert & Co. that perhaps you might be able to provide for this Nation a very large quantity of french sou sooner than any body else provided one might be sure of obtaining either a leave or a toleration for their being admitted.”⁴³ It was a course similar to this that Boulton later pursued. Du Roveray asked Boulton how much coin could be shipped to London for Du Roveray’s merchant house to arrange passage to Calais.⁴⁴ The coins were to be punched with an effigy of Louis XVI, and on the other side with a symbol of the Revolution.⁴⁵ This was emblematic of general sentiments of the Delesserts network. Many members were Huguenots or Dissenters who did not favour absolute monarchy, but very few of them supported completely doing away with kings.

Primary coinage negotiations occurred between Delessert and Boulton, with Du Roveray acting as liaison. In May, Delessert asked Boulton to send £350-400 sterling of copper flans from Soho that were fully cut, rounded, and ready to punch. Delessert based figures on estimates from the *Romilly* manufactory, but he believed the Soho Mint had far

Administration of the Finances of France (1786). Garbett sent Boulton his summary of it, observations on the gold and silver coins minted in France, and comparisons between them and English coin. BCL MS MBP 309 36. S. Garbett (Birmingham) to M. Boulton (Delessert Rue Coqheron, Paris), 19 November 1786, *Ibid.*, 38. S. Garbett (Birmingham) to M. Boulton (Delessert Rue Coqheron, Paris), 25 November 1786, *Ibid.*, 39. S. Garbett (Birmingham) to M. Boulton (Delessert Rue Coqheron, Paris), 4 December 1786.

⁴² BCL MS 3782/12/36 332. J.-P. Du Roveray (London) to M. Boulton (Birmingham), 13 May 1791.

⁴³ *Ibid.*

⁴⁴ *Ibid.* Boulton’s reply was to be sent to Delessert. He added a note to the bottom of Du Roveray’s letter indicating he was ready to receive French coins and that Boulton could be confident in terms of payment.

⁴⁵ *Ibid.*; BCL MS 3782/12/36 246. E. Delessert (Paris) à M. Boulton (Birmingham), 16 mai 1791.

better craftsmanship.⁴⁶ The *Romilly-sur-Andelle* works, established near Rouen in 1782, primarily rolled sheet copper for France's navy ships. It was founded by Le Camus de Limare (b. 1736) and expanded to blank copper coins after the war.⁴⁷ Yet, Delessert and Du Roveray preferred dealing with Soho. Boulton accepted their offer, proposing to send them pieces struck with the engraving of their choice. The dies and engraving punch were to be approved in Paris, and sent to Boulton by the London diligence, but he preferred they send the engraver to Soho.⁴⁸ The Soho Mint was ever looking for new French or Swiss engravers,⁴⁹ one of the few areas where the Continent led Britain. Delessert was offered various stylistic options, and their order would start after selections were made. Otherwise it might monopolize the cutters and delay other orders like that of the East India Company. Boulton sought to coin 2-3 million pieces a week for Delessert and Du Roveray. Though Boulton promised to send samples, Delessert was also directed to view ones held by Dr François-Xavier Swediaur (1748-1824), lodged in Paris near Delessert.⁵⁰

Swediaur, who began acting as Boulton's coining agent in Paris in 1791, united distinct European sciences.⁵¹ Abraham Guyot had met Swediaur at Joseph Black's house in Edinburgh the 1780s.⁵² Swediaur had collaborated with Thomas Beddoes and Jeremy Bentham to translate practical chemistry texts of Bergman and Scheele into English.

Bentham, not often noted for his interest in science, performed chemistry experiments

⁴⁶ Delessert noted that the rate was to be based on the current exchange rate between London and Paris, that duties would be charged to Boulton, and explained the pertinent weights of coin. BCL MS 3782/12/36 247. E. Delessert (Paris) à M. Boulton (Birmingham), 19 mai 1791.

⁴⁷ Le Camus used labour and industrial espionage from England. Harris, *Industrial Espionage*, pp. 268-83.

⁴⁸ The engraver was to take the die to Soho so a better punch could be made. Boulton, requiring help with a coining machine, offered to pay for travel, and noted that the engraver could stay on at Soho. BCL MS 3782/12/36 248. M. Boulton (London) "Copy sent to Mr. De Lessert Banker paris [*sic*]," 24 May 1791.

⁴⁹ See Margolis, "Matthew Boulton's French Ventures," p. 105; Jones, "England Expects," p. 192.

⁵⁰ BCL MS 3782/12/36 248. M. Boulton "Copy sent to Mr. De Lessert," 24 May 1791.

⁵¹ Swediaur (or Schwediauer), an Austrian chemist and botanists, studied medicine in Vienna. His ties to British science began in the 1770s, and linked him with London, Edinburgh, and the Lunar Society. Jones, *Industrial Enlightenment*, pp. 104-6, 205-7; Margolis, "Matthew Boulton's French Ventures," pp. 104-6.

⁵² BCL MS 3147/3/391 73. A. Guyot (Paris) à J. Watt, (Heathfield) 21 février 1791.

and corresponded with Joseph Priestley.⁵³ Bentham also envisioned industries resulting from his Panopticon project, which shared fascinating similarities with Boulton's Soho Mint project.⁵⁴ The Delesserts, enjoying enduring links with both men, promoted the Soho Mint to reform French coins and the Panopticon model to reform the royal library. However, the family was unable to win over government officials in either case.⁵⁵

Delessert was prevented from completing a coining deal with Boulton by delays from the French government. The first two years of the Revolution brought much change, but Delessert was again prevented from collaborating with Boulton and Watt. In June 1791, Delessert informed Boulton that he did not have a definitive answer, as coining was being reviewed by the *Comité des monnaies*. French money was charged to, and supplied by, the *Caisses patriotique*. Delessert awaited instructions from both agencies, which he promised to pass on to Boulton.⁵⁶ Du Roveray had a meeting at the *Comité des monnaies* but he and Delessert could not speak to the pertinent official in the *Assemblée nationale*. The government desired producing the necessary copper from its ample metal supply of church bells, from confiscated church property, not to buy it from foreign sources.⁵⁷

⁵³ Linder and Smeaton, "Schweddiauer, Bentham and Beddoes," pp. 259-73.

⁵⁴ Bentham conceived of his project in Russia in 1786 after his brother, Samuel Bentham (1757-1831), had invited him there. Samuel was there by request of Catherine the Great (1729-96). Bentham was taken with Samuel's panopticon idea. It solidified all Bentham's past thoughts on criminal law reform, was promoted to improve Britain's convict problem, and dominated the rest of his life. Boulton, on official visit to Paris in 1786, learned of Droz's coining improvements. They, and Soho's steam advances, solidified Boulton's past manufacturing work. Boulton's Mint, promoted to solve Britain's counterfeit problems, dominated his last years. He and Bentham each mixed new scientific techniques of time and space management to improve on methods and institutions traditionally handled by the government, made offers to the French Republic after rebuffs in Britain, and had forms of their project realized in Russia. Mary Peter Mack, *Jeremy Bentham: An Odyssey of Ideas, 1748-1792* (London: Heinemann, 1963), pp. 21-442; Simon Werrett, "Potemkin and the Panopticon: Samuel Bentham and the Architecture of Absolutism in Eighteenth Century Russia," *Journal of Bentham Studies* 2 (1999): 1-25. pp. 1-24; Pollard, "Matthew Boulton," pp. 241-65.

⁵⁵ Benjamin Delessert, *Mémoire sur la Bibliothèque royale, où l'on indique les mesures à prendre pour la transférer dans un bâtiment circulaire*, 1835, pp. 3-14.

⁵⁶ BCL MS 3782/12/36 249. E. Delessert (Paris) to M. Boulton (London), 2 June 1791.

⁵⁷ *Ibid.*, On attempts to convert bell-metal to use at Romilly see Jones, *Industrial Enlightenment*, pp. 223-4.

The continued frustrations with government led to the belief in some circles that Delessert abandoned the venture. James Watt informed Boulton that Delessert had given up “his coining scheme,” but Watt misunderstood the intelligence.⁵⁸ Guyot indicated that the matter was not going well, but did not go so far as to say Delessert was done with it. If a deal was reached, Guyot assured Watt, then Boulton could rely on affairs being personally handled by Delessert, and the solid state of his company.⁵⁹ Delessert continued acting as a liaison between Boulton and French officials, however, the French government remained determined to work on obtaining copper from domestic sources.⁶⁰

Du Roveray and Delessert reacted to French opposition to importing British-made coins by trying to secure raw materials, and industrial secrets from Boulton. They hoped to receive privileged, or at least equal, consideration given the many orders they would make, which included a request for large amounts copper.⁶¹ After Boulton had dissuaded them from buying ‘tile copper,’ not suited for fabricating coins, Du Roveray asked for a different type of copper that could be mixed with bell metal and rolled. Du Roveray also expected large orders for this copper, help from Boulton to produce it, samples, figures, and prices, as well as information to undo “the mixture of Copper & Bell metal.”⁶² In a struggle to enter the coining scheme Du Roveray appealed to Boulton’s friendship to obtain trade secrets. Boulton’s own struggle to take part saw him employ various agents.

13.4. Competing over Coins: Currying Favour with the Soho Mint

Matthew Boulton was known for having many irons in the fire at once, and this was how he pursued his interest in French coining. A failure to procure a contract with the British

⁵⁸ BCL MS LSC JW Letterbox IV. 194. J. Watt (Soho) to M. Boulton (London), 8 June 1791.

⁵⁹ BCL MS 3147/3/391 75. A. Guyot (Paris) à J. Watt, (Birmingham) 2 juin 1791.

⁶⁰ BCL MS 3782/12/36 251. E. Delessert (Paris) à M. Boulton (Birmingham), 30 juin 1791.

⁶¹ BCL MS 3782/12/36 334. J.-P. Du Roveray (London) to M. Boulton (Birmingham), 17 August 1791.

⁶² BCL MS 3782/12/36 335. J.-P. Du Roveray (London) to M. Boulton (Birmingham), 5 September 1791.

government made his situation that much more desperate. In remote negotiations from Soho for French coining Boulton entrusted several agents. First among them was Dr F.-X. Swediaur.⁶³ Etienne Delessert's silence, according to J.-P. Du Roveray, resulted from a desire to not interfere with Boulton's intentions or Swediaur's instructions:

We have the greater relavance in your friendship as we can assure you that our M^r. D[elessert] has given himself a great deal of trouble at Paris, without your Knowledge to make you succeed in the object you had in view, and that he has ceased taking any further steps in the business, only in order that he might not oppose the person, in whom you had confided your Interests.⁶⁴

Delessert reported that Swediaur had also been unable to secure a contract for Boulton. If a deal was attained, however, Du Roveray argued that it would be unfair for others to profit from the work done by he and Delessert. Du Roveray used a much more aggressive manner than Delessert to depict the great effort Delessert undertook on Boulton's behalf. Like Abraham Guyot, Du Roveray was sure that had Boulton entrusted Delessert "with the affair we would have succeeded fully to your satisfaction; altho' he did not think fit to continue such measures, as might have injured in any ways the proceedings of your Agent at Paris."⁶⁵ Swediaur was an apt choice, but he faced a challenging task.

Political uncertainty in Paris led Boulton's agents to exploit various methods and connections. Boulton authorized Swediaur to attain a contract for Soho supply currency in France, or an agreement for Boulton to outfit one of its mints with his equipment. One tactic promoted by Swediaur was to bribe the Comte de Mirabeau, author of tracts on the need to re-establish French coinage, who became *directeur* of the Paris Mint in 1791.⁶⁶ Du Roveray's brother, J.-A. Du Roveray, was a close advisor to Mirabeau. Delessert was

⁶³ Margolis, "Matthew Boulton's French Ventures," pp. 104-5; Jones, "'England Expects,'" pp. 193-5.

⁶⁴ BCL MS 3782/12/36 335. J.-P. Du Roveray to M. Boulton, 5 September 1791.

⁶⁵ *Ibid.*

⁶⁶ Jones, "'England Expects,'" pp. 193-5.

not averse to offering financial incentives to the Genevans supporting Mirabeau's work,⁶⁷ and had a business friendship Etienne Clavière since at least the late 1750s.⁶⁸ Clavière, besides being an important influence on monetary issues for Mirabeau, served as France finance minister (*ministre de contributions*) in 1792 and 1793. Yet, Delesserts' party was unable to fully exploit these connections and was loathe accepting great risk. In the end Boulton chose a competing Parisian banking family and London commercial firm.

Several factions lined up to either compete for Boulton's business, or to compete against him. Boulton's British competitors, the Anglesey Cooper Mines Company under the direction of the domineering Thomas Williams (1737-1802), had tried to hire J.-P. Droz in 1787. The company also had an agent in Paris in 1791, to purchase bell metal for coining.⁶⁹ By 1790, Boulton and Droz were on bad terms. The embittered engraver seems to have joined forces with the Périer brothers. Swediaur informed Boulton that Droz was using coins likely made at Soho to promote his own skills. Delessert was more familiar with Paris but Swediaur was more versed intrigue, and used invisible ink in letters to Boulton. Yet, the wily methods Swediaur employed to court officials, to gain Boulton a contract to furnish France with coins or even an entire mint, were also futile. Officials determined that one mint in Paris, no matter how advanced, could not supply all France.⁷⁰

The Monneron brothers replaced Swediaur as Boulton's primary agents in Paris by spring 1792. They were a large banking family from southern France, who grew rich by working in French colonies. Their link to Boulton likely came through Bourdieu,

⁶⁷ In 1789 Delessert, acting on behalf of several bankers, asked J.-A. Du Roveray if he and Etienne Dumont to accept a cash gift for their work writing Mirabeau's speeches, to great acclaim, which supported Jacques Necker's plan to avoid national bankruptcy. Etienne Dumont, *Recollections of Mirabeau: And of the Two First Legislative Assemblies of France* (London: E. Bull, 1832), pp. 152-8.

⁶⁸ AML MS 1 II 477. "Journal brouillard," Lyon, 1758 à 1761.

⁶⁹ BCL MS 3782/12/36 150. J.-B. Pradeaux (Paris) à M. Boulton (Birmingham) 9 juillet 1787, *Ibid.*, 151. J.-B. Pradeaux (Paris) à M. Boulton (Birmingham) 29 juillet 1787. Jones, "England Expects," pp. 193-4.

⁷⁰ *Ibid.*, pp. 194-5.

Chollet, & Bourdieu, a London trading firm tied to the Monnerons by marriage.⁷¹ Du Roveray was in direct competition with them for bulk copper orders. In 1791 he asked Boulton's aid in procuring hundreds of tons of copper, quickly and at a good price, to gain preference over this firm.⁷² Yet, Boulton chose the Monneron faction. Three of the brothers served as deputies in the *Assemblée nationale constituante*. They understood that the government had far greater concerns than coinage, but also suffered a shortage of small coins. Therefore, the Monnerons partnered with Boulton, along the lines proposed by Du Roveray and Delessert, for unofficial copper tokens struck at Soho. There was a series of problems on both sides of the Channel, but Boulton supplied tens of thousands of tokens to France. They appeared with different symbols of the Revolution in various weights. The partnership was brief but fruitful, as there was great demand for the tokens. It was a victory for the Soho Mint, but could not endure the Revolution's instability.⁷³

The friendship between Boulton and Delessert endured even though a partnership did not materialize. In April, Delessert broke his silence, out of concern for Boulton, and explained that the Monneron brothers had recently stopped payments on their accounts.⁷⁴ Boulton soon had further details. James Watt junior, again in Paris, reported to Boulton that the Monneron house failed because of the bankruptcies of two large banking houses. More bankruptcies were expected to follow. Like Delessert, James was concerned for Boulton and informed him as early as possible, hoping that Boulton had but limited and

⁷¹ *Ibid.*, p. 195. The partners included Samuel Chollet (1757-1838), James Bourdieu (1715-1804), and his son James Bourdieu (1758-1843). See Jacob M. Price, *France and the Chesapeake: A History of the French Monopoly, 1674-1791, and Its Relationship to the British and American Tobacco Trades* (Ann Arbor: University of Michigan Press, 1973), vol. 2: pp. 687-95, 738-41 799-800, 834-6, 1066-8.

⁷² BCL MS 3782/12/36 336. J.-P. Du Roveray (London) to M. Boulton (Soho), 8 September 1791.

⁷³ Jones, "“England Expects,”” pp. 195-7; Margolis, “Matthew Boulton's French ventures,” pp. 105-7.

⁷⁴ BCL MS 3782/12/36 252. E. Delessert (Paris) à M. Boulton (Birmingham), 2 avril 1792.

protected assets with the Monnerons.⁷⁵ They were more amenable to risk and aggressive tactics than Delessert. Consequently, Guyot and Du Roveray believed that Boulton would have been safe if Delessert's bank had handled the coinage project.

The phase of enthusiasm for business prospects in revolutionary France ended in 1792. James Watt junior suggested to Boulton that the Monneron bankruptcy was tied to instability on the Paris Bourse. There were reports that they had made poor speculations on a Paris theatre, establishing an expensive snuff manufactory, and the coinage project. Boulton would have been wise to not accept all James' account as fact, as he passed on an erroneous report that Pierre-Antoine Monneron (1747-1801) committed suicide.⁷⁶ The brothers had taken on too much risk. P.-A. Monneron believed that he and Boulton were at fault, and only threatened to take his own life. The youngest brother, Joseph-François-Augustin (1756-1826), averted bankruptcy. He continued to deal with Boulton, who helped the firm survive, possibly out of a concern for his own affairs. Hope for a French coining contract effectively ended on 20 June 1792, as Etienne Clavière was dismissed as finance minister. Boulton dealt in metal tokens with Augustin Monneron until laws were passed banning their circulation, following the 10 August 1792 attack on the monarchy. Augustin was briefly imprisoned in late August. Soon after the *Assemblée nationale* passed decrees banning the import of metal. Boulton also, like all Britons trading with republican France, had cause for concern. On 14 March 1793, the *Morning Chronicle* reported an "unprecedented attachment" by the Attorney General for the sum of £100,000 sterling in the Bank of England, against Bourdieu & Chollet "on the supposition of the

⁷⁵ BLC MS LSC JWJ Box 1 10. J. Watt jnr (Paris) to M. Boulton (Birmingham), 2 April 1792.

⁷⁶ James' fanciful report had Pierre running off to the woods with an Indian servant, and drowning himself in the Seine. His brother, upset by losing his brother and business, supposedly resigned from the *Assemblée nationale*. BLC MS LSC JWJ Box 1 11. J. Watt jnr (Paris) to M. Boulton (Birmingham), 4 April 1792.

money being the property of the French government.”⁷⁷ Seizing the assets of English merchants from a sacred deposit, in retaliation for France capturing English ships, was historic and shocking to men of commerce. The *Morning Chronicle* article declared:

It is well known that the house of Messieurs BORDIEU and CHOLLET was employed by persons in France, to furnish various articles of the produce and manufacturers of England, which, which highly to the advantage of our trade, they fulfilled to a great extent. These goods might or might not be for the use of the Republic: in all time under the old despotism, as well as under the new order of things, this has been done to the benefit of our artizans and the extension of our commerce.⁷⁸

The Revolution’s violent turn disrupted cross-Channel trade. Boulton continued minting British tokens, often ones with patriotic themes, and later coins for the home market.⁷⁹

13.5. Guyot, Watt, and Steam Engines to Power Caribbean Sugar Mills

The plans for collaborations between the *hôtel Delessert* and Soho continued through the 1790s, despite the outbreak of the French Revolution. Indeed, it was not the events in Paris in 1789 that disrupted the British-Franco-Swiss network, but those that took place in 1791-2. Abraham Guyot acted as an intermediary, between James Watt and André-Daniel Laffon de Ladebat (1746-1829), in the early phase of the Revolution.

Ladebat was from Bordeaux and shared significant links with members of the Delessert network. He came from a Huguenot family in Bordeaux that had escaped France with Revocation of the Edict de Nantes in 1685, by fleeing to Holland. In 1744, Ladebat’s grandfather returned to France. His family became a prosperous merchant family whose fortune developed from trading in slaves, banking, colonial shipping, and wine. Ladebat was tutored in Bordeaux, but finished his education at a Dutch university

⁷⁷ *The Morning Chronicle* (London), “Attachment of Money in the Bank of England,” Thursday, 14 March 1793; Issue 7418; BCL MS 3219/4/124 J. Watt snr (Heathfield) to G. Hamilton 16 March 1793.

⁷⁸ The news article viewed the attachment as harmful, as Britain heavily depended on clear conduct on credit and countries could lose “confidence in the sacredness of property deposited in England.” *Ibid.*

⁷⁹ Jones, “‘England Expects,’” pp. 196-201.

and as an apprentice to an English merchant in London. After Ladebat returned home his father determined that he would take over the commercial house. His brother, Philippe-Auguste Laffon de Ladebat (1758-1840), was sent to Saint-Domingue with an uncle to start a sugar plantation. Yet, Ladebat had adopted liberal ideas through his education,⁸⁰ and he became a vocal opponent of slavery. Ladebat also espoused agriculture reform, and was a member of Bordeaux's *Académie royale des sciences, belles lettres et arts*.⁸¹

Laffon de Ladebat and Guyot's friendship formed through science and expanded to industry. They likely met through Bordeaux's *Académie*. Guyot was a corresponding member and lived there for years. He conducted meteorological research (1775-77) for the *Académie*, which it continued even after his departure.⁸² In 1791, Ladebat was named as a deputy to the *Assemblée nationale* for Saint-Domingue, the same year he had Guyot contact Watt in Soho. This request led to collaborations to establish Soho steam engines at Saint-Domingue sugar mills. Guyot served as a liaison between Ladebat and Watt for over a year. Ladebat knew that Watt had been in contact with Jean-Baptiste Pradeaux, who had previously made similar inquiries on behalf of Saint-Domingue planters.⁸³

Pradeaux acted as a contact between Soho and France in several capacities. He served as consul for Spain to France,⁸⁴ a merchant or factor in Paris, and had a variety of dealings with Matthew Boulton over several years.⁸⁵ They were in contact since at least

⁸⁰ André-Daniel Laffon de Ladebat, *Journal de déportation et discours politiques* ed. Philippe de Ladebat, (Paris: Edilivre, 2009), pp. 11-15.

⁸¹ *Ibid.*, *Discours sur la nécessité et les moyens de détruire l'esclavage dans les colonies : lu à la séance publique de l'Académie royale des sciences, belles lettres et arts de Bordeaux, le 25 août 1788* (Bordeaux: M. Racli, 1788), pp. 1-42. Ladebat was a correspondent of the *Société royale d'agriculture de Paris* and director of the *Académie de peinture, de sculpture et d'architecture civile et navale de Bordeaux*.

⁸² Cotte, *Mémoires Sur La Météorologie*, vol. 2: pp. 269-72.

⁸³ Guyot wrote and sent Ladebat's inquiries to Watt and offered to translate his replies, to spare the burden of writing in French. BCL MS 3147/3/391 72a. A. Guyot (Paris) à J. Watt, (Birmingham) 30 janvier 1791.

⁸⁴ BCL MS 3782/12/32 326. Augustin Durpé (N^o 2 Queen Street Soho) to M. Boulton, [n.d. August 1787].

⁸⁵ BCL MS 3219/4/123 191. J. Watt snr (Birmingham) to G. Hamilton, 8 February 1787.

1784. Pradeaux, in London on business, sent Boulton news on the *Machine de Marly* and gifts of new publications on hot-air ballooning.⁸⁶ Boulton and Watt met with Pradeaux on their visit to Paris in 1786. Watt, on behalf of Gilbert Hamilton, arranged for Pradeaux to act as an agent for Delftfield Pottery of Glasgow. Subsequently, Watt urged Hamilton to have his patterns and wares ready, in anticipation of the Anglo-French treaty, as Pradeaux had customers and people to sell the pottery in Paris.⁸⁷ Watt long held an interest in this pottery works. It was not only Josiah Wedgwood who prepared to sell British pottery in France.⁸⁸ Pradeaux also aided Boulton's solo business interests.⁸⁹

Over several years Pradeaux took a concerned interest in Soho's foreign ventures and steam engines. On a 1786 trip to London he regretted missing Boulton and a chance to see their engine at the Albion Blackfriars mill. Pradeaux, upon returning to Paris, met with the Comte d'Angiviller (1730-1810), Louis XVI's *directeur général des bâtiments*. D'Angiviller informed Pradeaux that no one had yet been able to repair the *Machine de Marly*. Pradeaux asked Boulton to send a short memorandum on the costs for the engine and the amount of water needed to supply Versailles.⁹⁰ In turn, Pradeaux sent Boulton a memoir on behalf of inhabitants of Saint-Domingue. It was filled with practical inquiries on technical aspects and tangible costs to fit sugar mills with steam engines.⁹¹ Therefore,

⁸⁶ They included Saint-Fond's first two volumes of *Description des expériences de la machine aérostatique de MM. de Montgolfier* (1784). Pradeaux noted they still had preference for the *Marly* because of their great advances with steam, and Périer was still struggling with engines. BCL MS 3147/3/398 35c.

Translation of letter (press copy). J.-B. Pradeaux (Paris) to M. Boulton [Soho]. 30 July 1784. [1786/?]

⁸⁷ BCL MS 3219/4/123 191. J. Watt snr to G. Hamilton, 8 February 1787; BCL MS 3219/4/123 196. J. Watt (Birmingham) to G. Hamilton, 19 March 1787.

⁸⁸ See Richard Hills, "James Watt and the Delftfield Pottery, Glasgow," *Proceeding of the Society of Antiquaries of Scotland* 131 (2001), pp. 375-412.

⁸⁹ Pradeaux, who went to London in 1787 to establish his son for his education, kept Boulton informed about the actions of J.-P. Droz BCL MS 3782/12/36 151. J.-B. Pradeaux (Paris) à M. Boulton (Birmingham) 29 juillet 1787, BCL MS 3782/12/36 153 J.-B. Pradeaux (Paris) à 29 novembre 1797.

⁹⁰ BCL MS 3147/3/398 35a. J.-B. Pradeaux (Paris) à M. Boulton, [Soho] 13 juillet 1786.

⁹¹ BCL MS 3147/3/398 35b. "Demander relatives aux moyens d'appliquer le mécanisme des pompes à feu aux moulins à Sucre," J.-B. Pradeaux (Paris) à M. Boulton, [Soho] 13 juillet 1786.

by 1786, there were agents seeking to employ Soho steam-engine technology at the very heart of the French empire, and at its furthest extremities.

Interest in acquiring steam engines for the French Caribbean was revived in the 1790s. Boulton & Watt had responded to Pradeaux's inquiries in 1786. Yet, no advance was made until 1791, when the inquiring *habitant* of Saint-Domingue returned to France. He was a close friend of Ladebat, sought a steam engine for his sugar mill, and inquired if Soho engines were in use on any English Caribbean island. This author of the *Mémoire* of 1786, desired an engine of about fifteen-horsepower. But, it could only be purchased if the *Assemblée nationale* granted a *privilège* to Boulton & Watt, to supply engines in all French colonies. At the time, there were about 600 mule-powered sugar mills on Saint-Domingue. Ladebat's friend predicted many mills would adopt steam power over the next decade, once early ones were established. Thus, he requested details on applying steam to the needs of his mill, and if engines could be transported directly from Britain.⁹²

In Soho the greatest concern with diffusing steam-engine technology to Saint-Domingue were technical difficulties. Boulton & Watt could make and sell the engines, but that was only part of the process. James Watt explained to F.-X. Swediaur:

I shall write M^f Guyot soon, but have thought of little except the Albion Mill lately. We hold ourselves much obliged to your offers of speaking to the planters, but there are difficulties in the application of Engines to that business which are not easily remedied being of the [plu]ral kind. We can readily make the Engines, but where are men to be found to erect them & take care of them? We have none of either sort to spare & they do not grow in every soil.⁹³

Transmitting engines to the Caribbean faced the same challenges as sharing know-how with Genevan *savants*. Both lacked local infrastructure and skilled technicians. Swediaur

⁹² BCL MS 3147/3/391 72b. A. Guyot (Paris), Note pour A.-D. Laffon de Ladebat, à J. Watt, (Birmingham) 30 janvier 1791.

⁹³ BCL MS 3219/4/124. 46. J. Watt snr (Heathfield) to F.-X. Swediaur, 12 April 1791.

tried to involve himself with engines for sugar planters, as he had with the Soho Mint. Watt maintained Guyot, however, as his main contact. Boulton & Watt were preoccupied with their own Albion Mill, and Watt was becoming generally annoyed with the business practices of foreigners. Nevertheless, Soho remained interested in Saint-Domingue. Watt believed that if one or two planters acquired skilled employees and established an engine, then this could lead to more workers and “multiply the Engines by degrees.” Boulton & Watt were to consider this subject, and would ask Guyot to share their response with Swediaur.⁹⁴ However, this practical approach was complicated by affairs in Paris.

Ladebat struggled to procure a Soho engine while France grew more Anglophobe and republican. A competing option for French planters was to purchase steam engines from the Pèrier brothers. Ladebat met with them, but he preferred to deal with Boulton & Watt. Guyot inquired if he and Ladebat should visit England, and if an engine could be shipped to France by May 1791. Ladebat wanted it for his plantation but orders of other planters were uncertain, as the *Assemblée nationale* had not yet granted a *privilège*. Boulton & Watt were not allowed to compete for it, leading Guyot to question how a *privilège* could be given to someone who had no part in the invention. Ladebat lobbied the *Assemblée coloniale* against this decision, and for permission to acquire a Soho engine.⁹⁵ Ultimately the project fell through. Guyot informed Watt that a deal could not be completed. After the option to purchase engines from Soho closed planters remained uncertain if they would find a suitable French supplier.⁹⁶ Referring to France’s industrial

⁹⁴ *Ibid.*

⁹⁵ Ladebat was close to gaining permission, from the *Ministre de la commission*, to visit England to see Boulton & Watt’s sugar-mill steam engine, and negotiate for a several other planters. The government was to pay expenses if engines could be quickly had, but Swediaur informed Ladebat and Guyot that Soho was inundated with orders. BCL MS 3147/3/391 73. A. Guyot (Paris) à J. Watt, (Heathfield) 21 février 1791.

⁹⁶ Guyot learned that the author of a tract on sugar mills, which he had sent Watt, proposed using fire from steam-engines to heat sugar stoves. The minister and planters in Paris approved of this suggestion. Guyot

and political schemes Guyot declared to Watt: “The Country seems inevitably to be given over to Chimeras of all kinds.”⁹⁷ Guyot managed to return to Birmingham in 1793, as a result of French chimeras of the political form, not Enlightenment industrial exchange.

The spread of revolutionary violence defeated Ladebat’s quest for a steam engine. In spring 1792, he was still cooperating with several planters to purchase Boulton & Watt steam engines. The matter was finally left to Saint-Domingue colonists to determine. No progress was made in obtaining alternative French engines, as Watt predicted, despite a desire by the government for swiftness. Ladebat left France for Saint-Domingue to amass necessary funds to purchase Soho engines. Such measures were becoming increasingly important, as slavery was challenged on the island.⁹⁸ A large slave revolt occurred in August 1791, on the northern part of the island. Debate raged in France over the place of slaves, freed people of colour, and mulattoes. In 1792 rebellions continued on Saint-Domingue. On 20 June 1793 Cap François, the major port city, was destroyed.⁹⁹ By then Guyot had fled France for Neuchâtel, and later to Britain, for his safety. Ladebat, heavily involved with revolutionary politics in Paris, was imprisoned several times. His brother P.-A. de Ladebat, along with thousands of other white colonists, fled Saint-Domingue for America. By July 1794 he settled in Baltimore, from where he contacted Stephen Delessert with news on events in Saint-Domingue.¹⁰⁰ America became a haven for both men and other exiles fleeing the revolutionary violence of France and its colonies.

questioned, though, who in France could judge if it was even executable, and if so, who had enough skill to execute it? BCL MS 3147/3/391 76. A. Guyot (Paris) à J. Watt, (Birmingham) 25 novembre 1791.

⁹⁷ *Ibid.*

⁹⁸ BCL MS 3147/3/391 77. A. Guyot (Paris) à J. Watt, (Birmingham) 8 mars 1792.

⁹⁹ Loft, *Passion, Politics, and Philosophie*, pp. 200-18; Ammon, *The Genet Mission*, pp. 121-3.

¹⁰⁰ AP MS AFD V13S 2. P.-A. Ladebat (Baltimore) à S. Delessert (New York), 31 juillet 1794. Laffon de Ladebat served as President of the *Assemblée législative* and defended the monarchy in a June 1792 attack on the *Tuileries Palace*. His loyalty remained, but the *législative* lost power to the Paris Commune in August, and Ladebat was imprisoned. Ladébat, *Journal de déportation*, pp. 18-9.

A growing French abolitionist movement was a factor in the adoption of steam engines, as was the case in Britain. On the diffusion of the steam engine in the Caribbean, Jennifer Tann explains: “It was in 1789 that a clear connection was drawn between the anti-slavery movement and steam engines.” Prominent abolitionists made inquiries to Boulton & Watt, Tann adds, as there was “a belief that the diffusion of steam power to the West Indies might contribute to the abolition of slavery.”¹⁰¹ Sugar mills deployed a relatively small number of slaves, but alternatives were being sought through industry.¹⁰²

13.6. Stephen Delessert and The Mechanical Wonders of Birmingham

Enlightenment traffic continued despite disruptions in lives of members of the British-Franco-Swiss network. A telling example comes from Stephen Delessert in 1793. He recommended Caspar Voght (1752-1839), a friend whom Stephen described as “a very eminent Merchant in the foreign trade of Hamburg.”¹⁰³ Voght was more than just a merchant. He was also a *savant*. The combination drove him to Britain and above all to Birmingham.¹⁰⁴ Stephen notified Boulton that Voght “wishes y^e personal acquaintance of the benevolent conjurer who has transformed a desert in a town, a heath into Soho.”¹⁰⁵ Such praise was not reserved for Boulton alone. It was Watt, the engineer, who helped transform Soho from a manufactory producing metal goods, to one selling the power that ‘all the world desired.’¹⁰⁶ Therefore, Stephen thought Watt, the *savant-fabricant*, would

¹⁰¹ Jennifer Tann, “Steam and Sugar: The Diffusion of the Stationary Steam Engine to the Caribbean Sugar Industry 1770-1840,” *History of Technology* 19 (1997), p. 69.

¹⁰² Interests in Soho steam engines for British Caribbean colonies began in the 1770s, but the first engine was not ordered until 1803. *Ibid.*, pp. 67-75.

¹⁰³ BCL MS 3782/12/32 254. J.E. Delessert (Hamburgh) to M. Boulton (Soho), 15 October 1793.

¹⁰⁴ Stephen told Watt that Voght united commercial knowledge with “the accomplishments of a cultivated and philosophical mind,” and he visited England desirous to examine “its many perfections.” BCL MS 3147/3/388/ 33. J.E. Delessert (Hamburgh) to J. Watt (Soho), 15 October 1793. [Delivered 11 July 1794].

¹⁰⁵ BCL MS 3782/12/32 254. J.E. Delessert to M. Boulton, 15 October 1793.

¹⁰⁶ Boulton apparently remarked to James Boswell, on a visit with Samuel Johnson to Soho in March 1776, that he sold “what all the world desires to have – POWER.” Boswell, *Life of Johnson*, vol. 3: p. 299.

be best to show Voght, the *savant-négociant*, around Soho. Stephen concluded: “The mechanical wonders of Birmingham will gratify much his curiosity and no body is more capable of being useful to him in this respect than you are.”¹⁰⁷ Stephen was in Hamburg to avoid arrest and the guillotine in Paris. That he was still providing recommendations to Soho is a testament to both the British-Franco-Swiss network’s disarray and duration.

13.7. Conclusion

Moderate members of the British-Franco-Swiss network, who were eager to trade in the Revolution’s early years, suffered in the mid 1790s. Those furthest from France, such as James Watt and Matthew Boulton, were somewhat insulated. Yet, British banking and merchant firms suffered bankruptcies because of banks lacking funds, encouragement of speculation, the collapse of manufacturers, and the loss of business with continental partners.¹⁰⁸ Middle-placed traders like J.-P. Du Roveray, who relied more on foreign markets, were in a far more precarious position. He suffered his own bankruptcy in June 1792.¹⁰⁹ Etienne Delessert avoided both excessive speculation and bankruptcy during the Revolution. But he did not evade arrest and was imprisoned on 11 *frimaire l’An 2* (1 December 1793).¹¹⁰ French officials like Etienne Clavière and J.-P. Brissot met worse fates during in the 1790s. The French Revolution almost fractured the British-Franco-Swiss network, by scattering its proponents. In the end, however, it was the network that sustained those who were torn from their families and countries.

¹⁰⁷ BCL MS 3147/3/388/ 33. J.E. Delessert to J. Watt, 15 October 1793. Voght’s stay in Britain lasted two years. Stephen Delessert may have also provided recommendations for Edinburgh. C. Voght, *Account of the Management of the Poor in Hamburg, Since the Year 1788 In a Letter to Some friends of the Poor in Great Britain* (Edinburgh: s.n., 1795), pp. 1-61; Smith, *Memoir and Correspondence*, pp. 71-6.

¹⁰⁸ BCL MS 3219/4/124 J. Watt snr (Birmingham) to W. Withering 29 April 1793; BCL MS 3219/4/124 J. Watt snr (Heathfield) to G. Hamilton 6 March 1793. See also Jones, *Industrial Enlightenment*, p. 208-9.

¹⁰⁹ Weinglass notes that Du Roveray’s bankruptcy was caused, in part, by a great philanthropic effort he undertook to supply flour to the hungry of Paris in the 1790s. Weinglass, “F.I. Du Roveray,” pp. 4-5.

¹¹⁰ AP MS AFD V13S 1. “Convention Nationale Du L’an second de la République française une & Indivisible – Extrait de motif de l’arrestation du Cit. Delessert,” Copie. [n.d.]

**PART V: REVOLUTIONARY DETOURS AND NETWORK
RECONNECTIONS (1788-1850)**

14. Tale of Two Mobs: Transmissions Interrupted as the French Revolution Tears the British-Franco-Swiss Network Asunder

In 1789 members of the British-Franco-Swiss network enthusiastically greeted the French Revolution. As the Revolution endured, reformers on both sides of the English Channel splintered over its direction. Members of the expanding network joined various political societies, indicating a spectrum of support. This was not the first eighteenth-century revolution to send an influx of traffic into the network. A failed Geneva revolution in 1782, saw its aristocracy retain power and a phalanx of republicans forced into exile. Ultimately, they joined similar causes in other parts of Europe. In 1783, the American Revolutionary War ended in victory of the rebels over the forces of monarchy, which precipitated the exile of many Loyalists to Britain and its colonies. Benjamin Thompson (later Count Rumford) was among this group. A fickle Loyalist, Rumford divided his time pursuing patronage, science, and reform in Britain and Bavaria before meeting the Delesserts in Paris in 1801. The two revolutions of the early 1780s were crucial for the expansion of the Delesserts' network and were preludes for the events of the 1790s.

Moderates like James Watt, Matthew Boulton, and Etienne Delessert welcomed business opportunities, created by a new political reality, but were certainly not ardent revolutionaries. They supported reform, but were less inclined than family and friends to join political or constitutional societies. Such prudence was well placed. In July 1791, 'Church and King' mobs destroyed the property of Joseph Priestley, and targeted that of other Lunar Society members. French members of the network were threatened by an antiroyalist mob on 10 August 1792. Stephen Delessert and several other prominent moderates defended the monarchy. Afterward they went into hiding, some fled across the Channel or Atlantic Ocean, and others were imprisoned. This diaspora did not deter

elements of fervent republicanism in the network. Several of these republicans died in the 1790s beholden to their principles. The Delessert family and the Lunar Society were, in spite of initial support for the French Revolution, dispersed by it. However, the network's resilience maintained its members through a decade of revolution and war.

14.1. The Fickle Loyalist: Benjamin Thompson Escapes a Republican Mob

Benjamin Thompson, Count Rumford, was the first member of the Delessert network to become a victim of revolutionary mob violence. Rumford, a Loyalist, contrasted with the Delesserts' republican friends who were exiled for briefly overthrowing the aristocracy in Geneva. He was a staunch supporter of the British monarchy. His loyalty included spying and soldering for the Crown. Naturally it led to Rumford being harried, and ultimately driven out of his homeland by American revolutionaries. Rumford's exile proved to be one of the most fortuitous events in his life. However, his loyalty was fleeting. The fickle Rumford was something of a mercenary *savant*, selling his services and skills to British, German, and French backers. Consequently, Rumford was a significant actor in the science, industry, and philanthropy practiced by the British-Franco-Swiss network.

Thompson's formative years occurred in a land that was growing independent in politics, trade, and science. He was born on 28 March 1753 in Woburn, in the province of Massachusetts Bay in New England. Thompson progressed in local schools and studied science, geometry, mathematics, and astronomy with a minister.¹ In the 1760s Thompson apprenticed with a merchant in Salem, taught in a school, and worked as a merchant in Boston. Consequently, Thompson witnessed and was affected by the repeal of the 1765

¹ MHS MS PFC: CRP 1/1/18. Josiah Pierce [Rumford's half-brother], "An Outline of the Family – Infancy – and Childhood of Benjamin Thompson, Count of Rumford," [n.d.]. Simonds' married Josiah Pierce Jr. in March 1756. This created Thompson's bonds to the Pierce family, and his presence in their family papers. Sanborn C Brown, *Benjamin Thompson, Count Rumford* (Cambridge: MIT Press, 1979), pp. 1-2.

Stamp Act (17 March), the non-importation agreements (1769), and the fervour around the 'Boston Massacre' (March 1770). Thompson, beyond witnessing major political events, became immersed in America's nascent science. He and his friend Loammi Baldwin (1740-1807) attended lectures at Harvard in Cambridge, as they expanded their understanding of chemistry and natural philosophy.² Thompson's move to Concord New Hampshire, formerly called Rumford, in 1770 started his path to wealth and title.³ In 1772 he married Sarah Rolf (1739-92), a rich widow almost twice his age, and parlayed her connections into a militia command. However, Thompson's intimacy with British officers in Boston was unpopular in colonies that were growing increasingly anti-British.⁴

Thompson actively countered the cause of American liberty, and as it grew his security diminished. In 1774, he was called before a correspondence committee, as his aid to Britain attracted suspicion. His father-in-law's house was surrounded by a mob of men concealed in fanciful outfits, and dressed as Natives, seeking to tar and feather Thompson and send him packing. This was common in revolutionary America. Ever wily, Thompson evaded the mob and fled to Boston.⁵ He remained there for the winter of 1775, drawing closer to the Loyalist cause.⁶ Thompson, as a native very familiar with the region, was a valuable British spy.⁷ He relied on friends and family for asylum in

² They practiced science modeled on Benjamin Franklin's club. Thompson briefly attended lectures, by John Winthrop (1714-79), before apprenticing in medicine with Woburn physician John Hay. Two papers sent by Thompson to the American Philosophical Society were not published. Baldwin became a leading engineer. Brown, *Benjamin Thompson*, pp. 8-13; James Delbourgo, *A Most Amazing Scene of Wonders: Electricity and Enlightenment in Early America* (London: Harvard University Press, 2006), pp. 1-4, 60-5.

³ Penacook plantation became the town of Rumford in 1733. Thompson later used the name for a title as a German Count. Many inhabitants still considered it as part of Massachusetts, but New Hampshire claimed the land for the town of Bow, which received Royal ascent in 1762. The town was renamed Concord in an euphemistic attempt to surpass the lingering border dispute. Brown, *Benjamin Thompson*, p. 15.

⁴ MHS MS PFC: CRP 1/1/18. J. Pierce, "An Outline." The marriage created scandal in the town.

⁵ Brown, *Benjamin Thompson*, pp. 30-3.

⁶ MHS MS PFC: CRP 1/1/1. B. Thompson to Rev. Samuel Parker (Boston), 1 October 1775.

⁷ Thompson was also having an affair with Isaiah Thomas' (1749-1831) wife Mary. Thomas, a prominent revolutionary publisher, held meetings at his house. Brown, *Benjamin Thompson*, pp. 34-6.

Woburn, after being blocked from returning to Boston with the events at Lexington (19 April 1775). The clash between British troops and American militia marked the start of America's revolution, and increased danger for Thompson.⁸ Yet, he continued to spy for the British. Thompson and Loammi Baldwin, a patriot and major under General George Washington, exchanged espionage.⁹ In 1775, Thompson was detained in Woburn, which he saw as a result of his help returning four British deserters to the army, sending supplies to Boston, and communicating with the royal governor John Wentworth (1737-1820).¹⁰ Insufficient evidence, and a fixation by the Provincial Congress on a building war against Britain, deferred a verdict. After a few weeks Thompson was released and prepared his escape to Britain.¹¹ Thompson used friendships and guile to avoid pitfalls that plagued other traitors, and excelled in obtaining valuable information and powerful connections.¹²

After Thompson arrived in Europe he established a pattern that dominated the rest of his life. He quickly cultivated influential friends and lovers. Such connections, and his limitless self-promotion, brought rapid advance. Thompson thus secured illustrious titles and prominent appointments. This included a Fellowship in the Royal Society of London, knighthood in Britain, and being named Count of the Holy Roman Empire. Other than

⁸ This led to his urgent requests to friends to recover a trunk of incriminating papers. MHS MS PFC: CRP 1/1/1. B. Thompson to Rev. S. Parker, 1 October 1775. The house of Thompson's mother was surrounded by men armed with muskets and clubs, demanding to see Thompson. Loammi Baldwin came and defended Thompson's character, citing their long friendship. MHS MS PFC: CRP 1/1/18. J. Pierce, "An Outline."

⁹ Baldwin shared information on the British, revealed by Thompson, to American superiors. Thompson met Washington commanding forces at Cambridge and visited Baldwin often at Chelsea, to collect espionage. It was sent to British General Thomas Gage (1719-87) in Boston. Thompson applied chemistry and used invisible ink, the first known usage in the war, to avoid detection. Brown, *Benjamin Thompson*, pp. 34-7.

¹⁰ In May 1775 Thompson was confined by the Committee of Correspondence of Concord, "upon Suspicion of being Enemical [*sic*] to the Liberties of this Country." MHS MS PFC: CRP 1/1/6. [B. Thompson], "Major Ben. Thompson of Concord," draft prepared for the Committee of Correspondence for the Town of Concord, [May 1775]; *Ibid.*, [B. Thompson], draft prepared for Committee of Correspondence for the Town of Woburn, [May 1775].

¹¹ Brown, *Benjamin Thompson*, pp. 36-46. Thompson sold his land to Cyrus Baldwin, a Boston merchant and Loammi Baldwin's brother. MHS MS PFC: CRP 1/1/1. B. Thompson, "Agreement between Cyrus Baldwin & Benjamin Thompson," 21 June 1775. Cyrus Baldwin Papers.

¹² After leaving Thompson kept supporting Britain's war. See Brown, *Benjamin Thompson*, pp. 46-89.

court intrigues Thompson regularly pursued his passion for experiment. This resulted in scientific, philanthropic, and reformist contributions as well as inventions. Rapid advance came at a high price. Sir Thompson Count Rumford often overstayed his welcome, and was forced to seek new prospects and places to call home.¹³ In 1801, Rumford at last went to Paris, and found solace in the Delesserts' diverse British-Franco-Swiss network.

14.2. *Savant-Fabricants* Occupy French and British Political Societies

The spectrum of support for the French Revolution in the Delessert network is revealed by membership in societies. Etienne Delessert and his son-in-law, J.-A. Gautier, belonged to *club de Valois* in Paris. It was diverse, comprising of nobles and *haute bourgeois*, and beholden to no single ideology.¹⁴ The club, as Augustin Challamel remarks, consisted of “men of letters or savants,” a majority of whom “followed the philosophic and scientific movement of the late eighteenth century.”¹⁵ The *club de Valois* represented a bridge between literary societies and political clubs. After the Revolution turned violent many members emigrated, were imprisoned as suspects and conspirators, or were victims to the guillotine. Gautier also belonged to the *Club de monarchique*, *Club des feuillants*, and the *Société de 1789*. The former as its name implies was firmly loyal to crown.¹⁶ A club more emblematic of the splintering that took hold at this time was the *feuillants*. They began as a united group of reformers, but fractured as more radical Jacobin factions broke away.¹⁷ Gautier was joined in the *Société de 1789* by one of Delessert's sons (likely Stephen) and

¹³ On Rumford's eventful pursuits of fame, title, reform, and science in Europe see *Ibid.*, pp. 67-306.

¹⁴ This club, established in 1789, met at the *Palais-Royal*. Augustin Challamel, *Les Clubs Contre-Révolutionnaires, Cercles, Comités, Sociétés, Salons, Réunions, Cafés, Restaurants Et Librairies* (Paris: L. Cerf, 1895), pp. 31-54.

¹⁵ *Ibid.*, p. 32.

¹⁶ *Ibid.*, pp. 31-2, 127-9, 157, 307, 406.

¹⁷ *Ibid.*, pp. 377-82. In 1791 the club split in two, dividing between the *feuillants* and more leftist Jacobins. After the violence of August and September 1792, the formerly united Jacobins split further into *Girondins* and the radical *Montagnards*. Patrice L. R Higonnet, *Goodness Beyond Virtue: Jacobins During the French Revolution* (Cambridge: Harvard University Press, 1998), pp. 35-8.

prominent moderates like Antoine Lavoisier, Du Pont de Nemours and his sons, and François de Liancourt.¹⁸ The society's aim was to maintain the gains made in 1789.¹⁹ Moderates supported early reforms, such as the constitution and constitutional monarchy, but did not want to see France disintegrate into full-blown republicanism and regicide.

In England support for clubs and constitutional societies was also diverse. James Watt declined Joseph Priestley's invitation to the Warwickshire Constitutional Society in June 1791. Priestley hoped that Watt, who he called "a friend of liberty," would join. The society was to be similar to Manchester's Constitutional Society.²⁰ Yet Priestley was after the wrong Watt. In response Watt declared that he would not join the society, as he could not abide by all of its principles. Watt advised Priestley that a more effective approach was to establish a society that focused on a single objective, such as the need to reform Parliament, as this would attract more supporters than a society fixed on numerous principles.²¹ Watt faced a dilemma as he desired some political reform, but not if it meant upsetting Britain's precarious peace and order. Therefore, he concluded: "while Great Britain enjoys an unprecedented degree of prosperity it ought to be seriously considered whether it is prudent during the present effervescence in other countries to risk the raising a spirit in this Country that may in the end overturn all good government, & may not

¹⁸ Other members included Etienne Clavière, J. P. Brissot, J.-B.-A. Suard, Condorcet, Mirabeau, La Fayette, and Talleyrand. Challamel, *Les Clubs Contre-Révolutionnaires*, pp. 405-9.

¹⁹ *Ibid.*, pp. 391-400. For recent scholarship on the *Société de 1789*, see Mark Olsen, "The Language of Enlightened Politics: The Société de 1789 in the French Revolution," *Computers and the Humanities* 23, no. 4-5 (1989) pp. 357-64; Mark Olsen, "Enlightened Nationalism in the Early Revolution: The 'Nation' in the Language of the 'Société de 1789'," *Canadian Journal of History* 29, no. 1 (1994), pp. 23-50.

²⁰ Priestley enclosed a list of principles, which included reformist democratic sentiments and goals, to help persuade Watt. BCL MS JWP C1/18 J. Priestley (Birmingham) to J. Watt, 27 June 1791.

²¹ Watt affirmed his agreement with principle I, that a government's only concern was the interests of its people, and confirmed that he also agreed in part on principle V, reforming the House of Commons. BCL MS JWP C1/20 J. Watt "Copy Letter to Dr. Priestley on the constitutional Society," 8 July 1791.

subside in the short period of our lives.”²² Nevertheless, some of Watt’s friends, and his son James, held far more liberal political views and did not share his reservations.

In the years before James Watt junior embraced republicanism his relationship with Watt senior remained on good terms. James had returned from a long tour abroad in October 1787. His relations with his father improved considerably, but those with his stepmother remained strained.²³ Watt tried to keep the peace between his second wife and his first son. Initially Watt had James working hard to arrange his own accounts, which had grown considerable from his tour, as well as to learn the engine business.²⁴ But by autumn 1788, Watt concluded that James did not have “a proper genius for” it.²⁵ James was sent to Manchester to improve domestic accord and to learn a new trade. On learning of James’ move Stephen Delessert noted it would have been pleasing, “if it had not made me acquainted with the sad consequences of your leaving Birmingham.”²⁶ Watt told the Delesserts about the move, but not the rupture.²⁷ James apprenticed in Manchester with Taylor & Maxwell, fustian dyers and printers, whose business Watt hoped would benefit from James’ knowledge of foreign languages and chemistry. Watt was disappointed that James could not do the same in Soho but believed it would add to James’ independence.²⁸

In 1791, James Watt junior and Joseph Priestley junior each struggled to become established in Manchester. James considered various schemes,²⁹ including an undefined

²² Watt thought single aims, like reducing the title or reforming parliament, attracted more supporters. *Ibid.*

²³ Jones, “Living the Enlightenment,” p. 168.

²⁴ BCL MS 3219/4/123 J. Watt snr (Birmingham) to A. Watt, 22 November 1787.

²⁵ BCL MS 3219/4/123 J. Watt (Birmingham) to A. Guyot, 7 December 1788.

²⁶ BCL MS 3219/6/2 D S. Delessert (Paris) to J. Watt jnr (Manchester), 11 May 1789.

²⁷ The Delesserts learned James was happy in Manchester, as Charles Taylor (*d.* 1816) visited Paris. *Ibid.*

²⁸ BCL MS 3219/4/123 J. Watt (Birmingham) to G. Hamilton, 29 October 1788. Watt found the terms high, but the best offer for James’ independence. *Ibid.*, J. Watt (Birmingham) to W. Matthews, 29 October 1788.

²⁹ This included attaining aid from his father and the banker William Matthews to buy into an established firm, and a trip to France with Josiah Wedgwood junior (1769-1843). BCL MS 3219/4/13/8 J. Watt jnr (Manchester) to J. Watt snr (Birmingham), 3 March 1791; Jones, “Living the Enlightenment,” p. 171.

partnership with Joseph.³⁰ Since 1784, Joseph had joined his uncle William Wilkinson on a trip to the French state ironworks at Montcenis,³¹ studied in Geneva, and apprenticed at his uncle John Wilkinson's ironworks in Britain. As Wilkinson had no heirs, Priestley hoped to establish his sons in the iron industry. This was jeopardized as the Wilkinsons fell out in 1787, ended their partnership in 1790, and Joseph's term ended in conflict.³² In 1791, Priestley asked Watt to help repair the bond with John Wilkinson, or in establishing Joseph in Manchester.³³ Priestley was won over by Watt's arguments against Joseph and James starting a new firm, conceded that James had superior prospects, and asked Watt to advise them on Joseph's future.³⁴ Watt thought young men should take a lowly post in an established merchant house instead of being a principal in a new firm. By July, Priestley had, after much exertion and calling on his friends, raised £3000 capital for Joseph to start out. Watt recognized Joseph's frugality, but thought the sum imprudent.³⁵ It helped Joseph buy into in a Manchester mercantile firm, but this quickly fell through after the Birmingham riots.³⁶ James took an offer from the Thomas & Richard Walker textile firm to act as a travelling agent in France, Italy, and Germany. It was an ideal prospect, as James desired to travel a year or two on the Continent before joining a permanent

³⁰ BCL MS 3219/4/13/17 J. Watt jnr (Manchester) to J. Watt snr (Birmingham), 7 July 1791

³¹ No. 31. J. Priestley (Birmingham) to W. Wilkinson (Montcenis), 16 June 1784. Priestley, *Scientific Correspondence*, pp. 71-3. William Wilkinson was a pupil of Priestley in the 1760s. Priestley married William's sister Mary Wilkinson (1742-96) in 1762. In 1776-7 Wilkinson relocated to France to work filling various roles in the state ironworks. W. H. Chaloner, "Dr. Joseph Priestley, John Wilkinson and the French Revolution, 1789-1802," *Transactions of the Royal Historical Society* 8 (1958), p. 23.

³² Joseph apprenticed as an ironmaster for almost four years, but left in 1790 over his wish to marry. *Ibid.*, p. 24; Schofield, *The Enlightened Joseph Priestley*, p. 315.

³³ BCL MS JWP W/13 11. J. Priestley snr (Birmingham) to J. Watt snr (Heathfield), 6 January 1791. The preference was still a post with Wilkinson. Priestley, vexed by the ordeal, aimed to at least remain friends with Wilkinson. BCL MS JWP W/13 8. Priestley snr (Fairhill) to J. Watt snr (Soho), 2 February 1791.

³⁴ BCL MS JWP W/13 7. J. Priestley snr (Fairhill) to J. Watt snr, [4] February 1791.

³⁵ It was far more than the £500 Watt was willing to give James. Any further sums depended on his conduct and Watt's own circumstances. BCL MS 3219/4/124 J. Watt snr (Heathfield) to W. Matthews, 3 July 1791.

³⁶ Joseph joined the cloth business of a Mr Ashworth. Schofield, *The Enlightened Joseph Priestley*, p. 404.

partnership in Manchester.³⁷ James' actions in Manchester led him to suggest, rather prematurely, that he had attained financial self-sufficiency from his father.³⁸ Along with this ostensible fiscal independence, however, came a tangible political autonomy.

By placing James in Manchester, Watt inadvertently implanted him in ground that was as fertile with republicanism as Geneva or Birmingham. James' ties with the Walker brothers involved more than just business matters. He joined their circle uniting young men from the town's merchant trades that included Joseph Priestley junior and Thomas Cooper (1759-1839). Through them, James began attending meetings of Manchester's Literary and Philosophical Society. In 1788, James became a member and in 1789, he was named a secretary.³⁹ Thomas Walker (1749-1817) came to national prominence in 1785, by defending textile interests and helping to defeat William Pitt's fustian tax and Irish Proposals. Walker, an Anglican, became linked to leading Whigs and parliamentary reform. In 1787, he became chairman of Manchester's society to abolish slavery and in 1788, he was elected to the Society of Constitutional Information. From 1789 to 1790, Walker pursued reform by lobbying for the repeal of the Test and Corporation Act, becoming borough reeve of Manchester, helping found the Manchester Constitutional Society, befriending Thomas Paine, and supporting the French Revolution.⁴⁰ Through Walker and Cooper's auspices James joined the Manchester Constitutional Society.⁴¹

³⁷ BCL MS 3219/4/13/18 J. Watt jnr (Manchester) to J. Watt snr (Birmingham), 14 August 1791.

³⁸ James met Thomas Walker by proposing to enter into the dying business with him, but he was instead offered a job. Other offers, of help to start a partnership and ones to join partnerships in Manchester, were declined as James believed similar offers would exist when he was ready to establish himself. BCL MS 3219/4/13/20. J. Watt jnr (Manchester) to J. Watt snr (Birmingham) 2 September 1791.

³⁹ James used his knowledge of languages and science to expand society links with foreign *savants* and societies. Musson and Robinson, *Science and Technology*, pp. 96-99. On Manchester see *Ibid.*, pp. 87-113.

⁴⁰ Albert Goodwin, *The Friends of Liberty: The English Democratic Movement in the Age of the French Revolution* (Cambridge: Harvard University Press, 1979), pp. 144-6, 180, 187. 201-2.; Edward Palmer Thompson, *The Making of the English Working Class* (London: Victor Gollancz, 1965), pp. 52-3, 111-3.

⁴¹ Robinson, "An English Jacobin," pp. 350-1.

This shift from literary-philosophical clubs to ones focused on political reform paralleled events in France. In 1791, James Watt junior, Joseph Priestley junior, Thomas Walker, Thomas Cooper and others jointly resigned from the Literary and Philosophical Society, as it did not send a letter of sympathy to Joseph Priestley.⁴² In turn, they became further entrenched in the Constitutional Society. Priestley's attempts to start a Warwickshire Constitutional Society, modelled on that of Manchester, failed to take hold. The failure was, in part, for the same reason as the mass resignation: the Birmingham riots of 1791.

14.3. Chemical Reaction: The 1791 Priestley Riots in Birmingham

The shift from literary-philosophical to political societies was disruptive to both science and industry. Birmingham and its mechanical wonders stalled for three days in July 1791. The Birmingham Riots or the 'Priestley Riots' saw several members of the Lunar Society threatened by monarchist 'Church and King' mobs. A few days after the riots James Watt contacted his old friend J.-A. Deluc, to assure him that they were not harmed by the mob:

The affair originated from some Gentlemen very foolishly celebrating the french revolution by a dinner on J^y 14th. They were warned that some tumult might ensue & advised against it, however some of them met, were insulted as they went in & therefore dispersed by 5 oclock about 8 oclock, a mob assembled broke the windows of the hotel where the company met, pulled own two Dissenting meeting houses, then Dr Priestleys house which they raised to the ground, (he & family made their escape in time.) they then destroyed a very good house in town, & from that proceeded to destroy some other houses in town & some of the best houses in the Country, mostly belonging to Dissenters, they say to the number of 10 or 15 & the amount of abuse £100000; there was the sovereignty of the People established in full authority for 3 days & nights!⁴³

The final detail was most frightening for Watt. He had an ingrained fear of popular or mob rule, and this volatility proved itself in Birmingham.

⁴² They were inspired by the Derby Philosophical Society, which sent Priestley a letter of sympathy. *Ibid.*

⁴³ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J.-A. Deluc, 19 July 1791.

James Watt's refusal to join a constitutional society was prudent, yet even loyal and quiet subjects were not immune to Birmingham's mob violence. Leading industrious townsmen reacted, as it became clear that peace and protection were elusive, by taking matters into their own hands. Boulton & Watt convinced its workers to stay home, as it would be illegal and imprudent for them to join the riots. Watt and Boulton procured arms and had their workers consent to defend themselves, Soho, and its owners from attack.⁴⁴ Such precautions, Watt explained to Deluc, should not have been necessary:

Though our principles which are well known as friends to the established government & enemie to republican principles should have been our protection from a mob whose watch word [*sic*] was Church & King yet our safety was principaly owing to Most of the dissenters living on the south of the Town, for after the first movements, they did not seem over nice in their discriminations of religion or principles.⁴⁵

The mob had not killed anyone, Watt acknowledged, and rioters only hurt the people who tried to oppose them with violence. The riots finally stopped on the third day with the arrival of the military. Watt feared that the rioters would not be punished if the matter was handled locally, and hoped that the government would become involved.⁴⁶

The Birmingham riots exposed the conflicts, contradictions, and connections of groups like the Lunar Society. Joseph Priestley was a vocal and ardent supporter of the French Revolution and republicanism.⁴⁷ He suffered most from the riots, though he did not even attend the 14 July celebratory dinner. Other Lunar men shared his liberal sympathies. James Kier had chaired the infamous revolutionary dinner, but he saved his house by assembling a small army and preparing to fire upon any attackers. The houses

⁴⁴ They likewise packed up all that could be moved to save it from a mob attack. *Ibid.*

⁴⁵ *Ibid.*

⁴⁶ *Ibid.*

⁴⁷ The rioters caused Priestley much damage, drank all his liquor, and stole or destroyed £300 in property. It left the Priestleys shaken. BCL MS 3219/4/124 J. Watt snr (Birmingham) to G. Hamilton, 24 July 1791.

of Samuel Galton junior and William Withering were also targeted. Withering and Kier were Anglicans, but were marked either for being Lunar men or for supporting reform.⁴⁸ Watt was wholly conflicted, as he sympathized with Priestley's plight but not his cause. Boulton and Watt supported England's current constitution, as Watt explained to Gilbert Hamilton, but wished "for reform in many points & are enemies to all raisers of popular tumults or to those who wish to put any power into the hands of the lower class of the people, whose intellectual power extend little further than to know who sells or give the best ale."⁴⁹ Watt's practicality was not limited to science and industry.

Watt and other moderates had an aversion to the cause of liberty, fearing it would bring about the ruin of mob rule. This fear was reinforced as Boulton and Watt's favour of the establishment over republicanism, and Boulton's Anglicanism, did not save them. The rioters indiscriminately targeted Lunar men and identified Watt as a Presbyterian. Soho was likely only saved because most Dissenters lived in the south of Birmingham.⁵⁰ Therefore, Watt took issue with fellow Dissenters promoting political reform. They risked the prosperity Britain had afforded them, despite a clear cautionary tale unfolding across the Channel. Watt predicted that the riots would leave a lasting discord in Birmingham, declaring to his father-in-law, James McGregor: "The Dissenters not being content with Toleration wished to overthrow the establishment both of church & state, happily the greatest part of the nation is of another way of thinking or we should have had the same kind of anarchy which is established in france, which to peaceable minded

⁴⁸ R. B. Rose, "The Priestley Riots of 1791," *Past & Present* 18, no. 1 (1960), pp. 73-6.

⁴⁹ Watt thought the mob would have sacrificed Priestley if he was found. Yet he then gloried "his sufferings in the cause of liberty and licentiousness." BCL MS 3219/4/124 J. Watt to G. Hamilton, 24 July 1791.

⁵⁰ Watt was among the Dissenters identified by rioters as Presbyterian. Yet, Watt admitted to Deluc that he had not even entered one of their meetinghouses in Birmingham. Boulton was well known to be an Anglican or 'Churchman.' BCL MS 3219/4/124 J. Watt snr (Birmingham) to J.-A. Deluc, 19 July 1791.

people would have been intolerable.”⁵¹ Yet, Watt did not believe Dissenters deserved the ruin wrought by the riots and he hoped the rioters would be punished to restore order and security.⁵² Consequently, Watt joined Lunar Society efforts to help Priestley. This included sending him warnings to avoid Birmingham, returning his borrowed books, replacing philosophical or scientific instruments through a collection among the Lunar Society, and a replacement Boulton & Watt copying machine.⁵³

Watt and Priestley, despite considerable political differences, each lamented the fracturing of their Lunar Society. Priestley, safe in London, was grateful for the copying machine and help in replacing his scientific apparatus. Calculating his losses was painful, particularly as it reminded Priestley of what could not be replaced. He told Watt: “This and many other [thin]gs w^{ch} ever remind me of the obligation I am under to you and the pleasing intercourse I have had with you and all my friends of the lunar society. Such another I can never expect to see. Indeed London cannot furnish it. I shall always think of you at the usual times of your meetings.”⁵⁴ Lunar men carried on in Birmingham, but much had changed with Priestley’s departure.⁵⁵ For a time meetings remained on Mondays, closest to the full moon, though they no longer had to accommodate Priestley’s preaching. Yet, the riots caused far more serious changes. Watt informed Joseph Black:

The Hellish miscreants who committed so many outrages here, *by banishing D^r Priestley, have almost broke up our Lunar Society, at least when we meet we have more politics than Philosophy* so that I have nothing new in the latter line, & the

⁵¹ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. McGregor, 31 July 1791.

⁵² *Ibid.*

⁵³ BCL MS 3219/4/124 J. Watt snr (Heathfield) to J. Priestley, 21 October 1791; *Ibid.*, Watt snr (Birmingham) to J. Priestley, 3 November 1791; *Ibid.*, Watt snr (Birmingham) to J. Priestley, 8 November 1791. BCL MS JWP W/13 5, J. Priestley to J. Watt (Birmingham), 2 November 1791.

⁵⁴ BCL MS JWP W/13 J. Priestley to J. Watt, 2 November 1791. Priestley saw his time in Birmingham as the happiest of his life. Joseph Priestley, *Memoirs of Dr. Joseph Priestley, to the Year 1795, written by himself: with a continuation, to the time of his decease by his son Joseph Priestley; and observations on his writings by Thomas Cooper... and the Rev. William Christie* (London: J. Johnson, 1806), vol 1: p. 97.

⁵⁵ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. Priestley, 8 November 1791.

former is not worth troubling you with, any further than to tell you that this town is divided into 2 parties who hate one another mortally.⁵⁶

While James Watt junior had adopted the extreme political principles of Priestley, James also shared his father's sentiment of science overwhelmed by talk of politics.

14.4. James Watt Jr: Delegate of English Republicanism to the Jacobin Club

On 4 March 1791 James Watt junior, Thomas Cooper, and John Furnell Tuffen (1752-1820), all delegates of English republicanism, crossed the English Channel to Calais.⁵⁷ Tuffen, as a member of The Friends of the People, advocated for parliamentary reform in London.⁵⁸ James went to Paris as a foreign agent for the Walker brothers, but he also acted as one for the Manchester Constitutional Society. This created conflict with his father, with the Delessert family, and with the British government. James imprudently remained committed to republicanism after events of extreme violence in France. This blindness to the effects of revolution began early. Two days after arriving in France he informed Watt senior: "We have hereto seen nothing that conveys the most distant idea of riot or tumult."⁵⁹ This naïveté lasted for two more years despite James' residence in Paris.

James returned to Paris as a confident young republican, differing considerably from his first visit an adolescent. Upon James' arrival the Delesserts again welcomed him, but he declined their requests to lodge with them as he expected a prolonged stay in Paris. There may have been more to his reluctance. Abraham Guyot and the Delesserts were the first friends to whom James delivered his father's letters. Yet, James' political sympathies saw him seek out more illustrious connections. He reported to Watt on Paris:

⁵⁶ My emphasis. Aristocrats acted like democrats by encouraging the mob. Democrats sought law, order, and aristocracy, if they were included. BCL MS 3219/4/124 J. Watt snr to J. Black, 23 November 1791.

⁵⁷ BCL MS 3219/4/13/29 J. Watt jnr (St. Omer) to J. Watt snr (Birmingham), 6 March 1792.

⁵⁸ Society of the Friends of the People, *Proceedings of the Society of Friends of the People; Associated for the Purpose of Obtaining a Parliamentary Reform in the Year 1792* (London: Westley, 1793), pp. 3-10.

⁵⁹ BCL MS 3219/4/13/29 J. Watt jnr to J. Watt snr, 6 March 1792.

The only persons of any note that we have been to see yet are Mr. Pethion the Mayor, Mr. de la Rochefoucauld & Mr. Lavoisier. Dr. Priestley gave us letters to Mr. de la Rochefoucauld and he introduced us to Mr. Lavoisier who has been very civil to us. We met ... first rate Chemists at his house, but not a word of Chemistry was there spoken, they are all mad with politics. We have not met anywhere with such a set of enragés except Mr. Lavoisier who assumes the character of modéré probably from prudential motives.⁶⁰

James failed to appreciate Lavoisier's moderate principles or to realize the true character of the Jacobins. He served, outside of politics, as an agent for Boulton & Watt's copying machines, and as an unofficial one for the Soho Mint.⁶¹ Watt senior welcomed firsthand accounts on French science, politics, and war. However, in April, James sent news that Watt dreaded: "M^r. Cooper & I have presented an address to the Club du Jacobins on the part of the Constitutional Society of Manchester soliciting a correspondence with them. It was received with much applause & a great noise here, we have sent copies home which will probably be inserted in the English papers with the Presidents Answer."⁶² Notice of their address extended well beyond the papers.

James' deeds in Paris reverberated in Birmingham and in Westminster, inspiring denunciations. The address appeared in English papers and Edmund Burke also read it in the House of Commons on 30 June 1792. Burke also denounced Thomas Paine, Thomas Cooper, James Watt (without distinguishing father from son), and Thomas Walker. This was for their desire to enter a fraternity with "the worst traitors and regicides that had even been heard of – the club of the Jacobins."⁶³ Burke implied that links between the

⁶⁰ James several met leading French chemists at Lavoisier's house: Jean Michel Moreau (1741-1814), A.-F. de Fourcroy, and Jean-Henri Hassenfratz (1755-1827). BCL MS 3219/4/13/30 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 22 March 1792. Jérôme Pétion de Villeneuve was the mayor of Paris and a *Girondin* of Paris' Jacobin club. Higonnet, *Goodness Beyond Virtue*, pp. 31-3.

⁶¹ BCL MS 3219/4/13/30 J. Watt jnr to J. Watt snr, 22 March 1792.

⁶² BCL MS 3219/4/13/31 J. Watt jnr (Paris) to J. Watt snr (London), 22 April 1792.

⁶³ Edmund Burke, *The Speeches of the Right Honourable Edmund Burke in the House of Commons and in Westminster Hall* (London: Longman, Hurst, Rees, Orme and Brown, 1816), vol. 4: p. 48.

principles of Jacobins and English constitutional societies were evident.⁶⁴ This was precisely what Burke intended with *Reflections on the Revolution in France* (1790).⁶⁵ James' actions in France and English reactions to them concerned Watt senior. Watt was anxious for his own business interests, and for James' safety and future. Reflecting on all this to J.-A. Deluc, Watt noted: "You no doubt have heard that my son James has been foolish enough to be a delegate from the forces of republicanism in England? The Manchester Constitutional (or anti constitutional) Society to these Troops of Belial the Jacobins at Paris. It has given me great pain & I have written him my sentiments upon it very fully."⁶⁶ This was futile. James was young, stubborn, and talented, having spent too much time under the influence of Cooper and others.⁶⁷ Watt lamented James' wilful blindness: "I was in the hopes that being upon the spot he might have seen enough of the evils they have caused to be cured, but he seems to shut his eyes, or to see only the fair side of their fallacious arguments."⁶⁸ James again dashed his father's hopes.

James kept company with revolutionaries in Paris, insulating himself from friends with whom he was longest acquainted. He continued, however, to conduct business and industrial research for his father.⁶⁹ Initially, James indicated that he would quit Paris and leave money collected from copying-machine sales with *Delessert & Co.*⁷⁰ Instability in

⁶⁴ *Ibid.*, pp. 47-9. James apologized if the speech caused Watt harm, hoping that the British government was not so immoral "as to revenge the Sins of the Child upon the Father." BCL MS 3219/4/13//32 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 5 May 1792.

⁶⁵ Edmund Burke, *Reflections on the Revolution in France and on the Proceedings in Certain Societies in London Relative to that Event* (London: J. Dodsley, 1790), pp. 1-15.

⁶⁶ BCL MS 3219/4/124 J. Watt snr (Heathfield) to J.-A Deluc, 27 May 1792. On this episode see Robinson, "An English Jacobin," pp. 351-52; Jones, "Living the Enlightenment," pp. 171-73.

⁶⁷ *Ibid.*

⁶⁸ *Ibid.*

⁶⁹ James told Watt about French industries and new inventions. This included one he heard of from Roland, minister of the home department, that turned flax tow into cotton. A sample was enclosed in the letter. BCL MS 3219/4/13/37 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 9 August 1792. By May 1792 James had sold all the copying machines. BCL MS 3219/4/13/32 J. Watt jnr to J. Watt snr, 5 May 1792.

⁷⁰ BCL MS 3219/4/13/36 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 30 July 1792.

Paris prevented both actions. An inability to leave had James witness some of the darkest events of the Revolution. His resolve remained intact through the 10 August 1792 attack on *Tuileries Palace*, but was tested when he saw atrocities in the September Massacres.⁷¹ Affairs were volatile and James did not know which bankers were safe, as many had loaned funds to the king to give to *émigrés*. James dismissed reports of Stephen Delessert escaping to London after defending the monarchy on 10 August.⁷² Yet, James' politics, as well as his enduring naïveté, had kept him apart from the Delesserts. He informed Watt:

I doubt the intelligence, but as our political sentiments are so extremely opposite, I avoid seeing the family as much as I can help, as there is no pleasure in arguing upon subjects when neither party have the hopes of convincing the other and which frequently occasion a degree of warmth and of ill blood [that] is highly unpleasant.⁷³

James' republican veil had not yet been lifted.

14.5. Republicanism and Radicalism within the Network

There were many people linked to the Delesserts who supported the early revolutionary cause. Besides British republicans, like James Watt junior, there were those throughout France and from Geneva. The Delesserts were moderates, but tied to several fervent republicans. Some of these friends, made through the Delesserts' interests in commerce and education, came to great prominence during the French Revolution.

Louis-Pierre Manuel, a former tutor, rose to a position of dominance in the Paris Commune. In the spring of 1788, he completed his post as a tutor for Mathew Boulton's son.⁷⁴ About a year later Manuel joined the Jacobin society at the time of its foundation. He failed to attain prominence until 1791, when he was named *procureur* or attorney of

⁷¹ BCL MS 3219/4/13/40 J. Watt jnr (Paris) to J. Watt snr (Birmingham), 4 September 1792.

⁷² James did not think that this money would not be returned, leading to bankruptcies, and that all bankers in Paris were at risk. BCL MS 3219/4/13/41 J. Watt jnr (Paris) to J. Watt snr (Truro), 12 September 1792.

⁷³ *Ibid.*

⁷⁴ BCL MS 3782/12/32 281. A. Guyot (Paris) to M. Boulton (Birmingham), 31 March 1788.

the Paris Commune. At this point Manuel's disdain for authority became unfettered. In a published letter, addressed to the king, Manuel rejected monarchy. At a Jacobin meeting, in May 1791, he suggested that Marie Antoinette be detained under suspicion during the war. Manuel was a leading force in the failed 20 June 1792 popular insurrection, which led to his suspension from the Commune. However, Manuel regained his post, leading to an intensification of his radicalism, and he was a leader in the 10 August *Tuileries* attack. At the time, Manuel argued that Louis XVI should be moved to the Temple.⁷⁵ The royal family was first confined in the Commune until the *Assemblée législative* decided where to put them. On 13 August, Manuel was among the Commune officials who escorted the royal family to be imprisoned in the Temple.⁷⁶ It was Manuel, David Jordan notes, who "ordered the coach halted in the Place Vendome so Louis could contemplate the toppled, decapitated statue of Louis XIV, another legacy of August 10. Then the procession continued."⁷⁷ On 20 January 1793, Etienne Clavière loaned his coach for the king's long parade to the guillotine, as *citoyen* Louis Capet.⁷⁸ Ironically, Huguenots and moderates from the Delesserts' network had defended and escorted Louis to safety on August 10.

Manuel's radicalism abated during Louis XVI's trial, but this did not ultimately save either man from the guillotine. Manuel, a Paris deputy in the *Convention nationale*, was one of its six secretaries to count the vote for the king's death sentence.⁷⁹ During the trial Manuel shifted his opinion. Like Paine, Manuel was upset by the vote for death and took actions against it. The extent of Manuel's activities is disputed, but it is clear that he

⁷⁵ Beauchamp et al., *Biographie moderne*, pp. 345-6.

⁷⁶ David P Jordan, *The King's Trial: The French Revolution Vs. Louis XVI* (Berkeley: University of California Press, 2004), pp. 79-80.

⁷⁷ *Ibid.*, p. 80.

⁷⁸ Whatmore, *Against War and Empire*, p. 228.

⁷⁹ Jordan, *The King's Trial*, pp. 180-90.

resigned from the *Convention* (18 January 1793), returning to his native Montargis.⁸⁰

This caused controversy there and in Paris, as both monarchists and republicans assailed him. Manuel was ultimately returned to Paris and brought before the revolutionary tribunal. Finally, on 14 November 1793, Manuel was put to death by the guillotine.⁸¹

Several other people connected to the educational and commercial affairs of the British-Franco-Swiss network were also revolutionaries. Boulton's coining agent in Paris, Dr F.-X. Swediaur, was a staunch Jacobin supporter. James Watt was still in contact with Swediaur in 1793 and tried to help him attain money owed by Augustin Monneron. Trade in tokens had become unprofitable. Clavière, finance minister of the *Convention*, brought in measures to stop their circulation and have them melted down. Watt found exchanges with Swediaur, who praised the Jacobins and the events of August and September 1792, unpalatable. Thus, Watt discouraged Swediaur from replying by stating that France had no government so long as those responsible for the 1792 murders went unpunished.⁸² Swediaur was cunning enough to survive the 'Reign of Terror,' however, many other republicans were less fortunate.

The French Revolution accomplished two things for the Genevan *représentants* that their revolution had not: ascendancy to political power and internal division. They attained much authority and celebrity during the Revolution, mainly by supporting the Comte de Mirabeau. Great oratory skills allowed Mirabeau to become one of the leading voices in the *Assemblée nationale*, but his influence was largely from work by the exiles

⁸⁰ Paine assured American ambassador Gouverneur Morris that he would support the effort to have the king exiled to America. Manuel left the hall during the vote, creating conflict and calls for his arrest. *Ibid.*, pp. 189-97. He was reported to have spoken against the king's death sentence and Jacobin violence. Finally, Manuel also aided several emigrants depart France. Beauchamp et al., *Biographie moderne*, pp. 345-7.

⁸¹ *Ibid.*, p. 347.

⁸² Watt explained his feud with Dr 'Schwediaur,' from whom he heard no more, to their mutual friend Dr William Withering. BCL MS 3219/4/124 J. Watt snr (Birmingham) to W. Withering 29 April 1793.

from Geneva. This included J.-A. Du Roveray, Clavière, Etienne Dumont, and E.-S. Reybaz. They worked, both as individuals and as a group, in Mirabeau's service: writing speeches he delivered to the *Assemblée*, and producing his *Courier de Provence* journal.⁸³ Mirabeau and his Genevan workshop advocated a political system influenced by Britain's constitutional monarchy. They wanted to retain the French monarchy, as they were wary of popular democratic power and of the Anglophobe revolutionaries courting it. In 1791, Mirabeau died unexpectedly. It was one of many factors that helped drive France toward republicanism. In September 1792, the *Convention nationale*, dominated by *Girondin* leaders like Clavière and J.-P. Brissot, replaced the *Assemblée*. Support of men like Clavière helped Brissot dominate popular politics, as had Mirabeau before him in 1791.⁸⁴

Etienne Clavière, Genevan *représentant* and friend of the Delesserts, became a leading official of the first French Republic. He was the last finance minister (*ministre des contributions*) of the *Ancien régime* and filled the same post for the new republic. In October 1791, Clavière took French citizenship to sit as a deputy of the *Assemblée*. He helped the *Girondins* establish their party as well as their journal. Yet, it was in finance that Clavière was most in his element. To foster commerce he encouraged the conversion of gold and silver luxury ornament into coin. This failed, but Clavière had more success with a second monetary measure, the *Assignats*.⁸⁵ The paper currency was backed on the nationalized lands confiscated from the Church.⁸⁶ Clavière championed the project as his own and the *Assignats* as the method to spread liberty, involve a majority of citizens in commercial activity, and cure France's crippling fiscal woes. Thus, this was an attempt

⁸³ Whatmore, *Against War and Empire*, pp. 13-4, 228-30.

⁸⁴ *Ibid.*, pp. 228-41; Jordan, *The King's Trial*, pp. 21-44.

⁸⁵ Clavière acted as *ministre des contributions*, in charge of France's finances, from March to June 1792 and again from August 1792 to June 1793. Whatmore, *Against War and Empire*, pp. 243-8.

⁸⁶ Catholic Church property was confiscated on 2 November 1789. Jordan, *The King's Trial*, p. 17.

by Clavière and Brissot, through their new dominance, to pursue long-promoted policies. This included advocating free trade, abolishing slavery, and abandoning the aristocratic mercantilist control of French industry and commerce.⁸⁷

An inability to extend peace by expanding commercial relations led to an effort to expand republicanism by war. Clavière's aversion to British mercantilism, which fostered empire and war, saw him grow more antagonistic to Britain than fellow *représentants*. He realized, though that commercial alliances with foreign powers were required for peace, and to end the Revolution. As a consequence, Charles-Maurice de Talleyrand-Périgord (1754-1838) undertook a mission to London, in January 1792, to negotiate an extension to William Eden's Anglo-French Commercial Treaty. This mission to improve the trade and political relationship failed. Talleyrand returned to Paris with J.-A. Du Roveray and Dumont. The two *représentants* led a second mission to London in July, but it also failed. Mounting internal problems led the *Girondins* to push for war. They proclaimed it as a way to establish universal liberty, but it did not take hold in other countries. Yet, the war did cut Louis XVI's last claims to power, and helped stabilize the Revolution. After the monarchy's fall war became a way to justify replacing it with a republic.⁸⁸ By autumn 1792, Clavière and Brissot realized that their new republic required aid in the war against Europe's monarchical powers. This led them to appoint E.-C. Genet as a foreign minister.

The Genet mission to America to expand republicanism and alliances was a total failure, with lasting repercussions. Genet had once been Boulton & Watt's agent at court and helped find a tutor for Boulton's son at Versailles. Despite Genet's diplomatic career,

⁸⁷ Whatmore, *Against War and Empire*, pp. 243-8.

⁸⁸ France declared war on Austria 20 April 1792. Prussia declared war on France on 13 June. Finally France declared war on Britain and the Dutch Republic, as Spain and Portugal entered the First Coalition against France, in 1793. Jordan, *The King's Trial*, pp. 21-44. Whatmore, *Against War and Empire*, pp. 240-55.

and links to the French royal family, he became a republican. In 1792, Genet became attached to the *Girondins* and was appointed minister to the United States. His mission, largely planned by Brissot, was part of the wider aim of universal republicanism. Genet was to attain three main objectives. Firstly, to expand liberty by staging from American soil, regardless of official support, the overthrow of Spain in Florida and Louisiana and of Britain in Canada. Secondly, to have America repay a majority of its \$4,800,000 debt to France, from the Revolutionary War, which was to be used to buy arms and supplies for France and its Caribbean possessions. Thirdly, attain a new commercial treaty providing a special trade relationship between the two republics, help in protecting their respective territories, and the shuttering of ports to ships from mercantilist states. Yet, Genet created a diplomatic dispute that became known as the ‘Citizen Genet Affair.’ The *Girondins* did not grasp the contrasts between French and American republicanism. Genet overvalued the power of Congress and of public opinion, while he underrated the executive branch. Pro-British and pro-French factions in the U.S. cabinet struggled to determine policy. Ultimately this conflict, and France’s instability, led President Washington to choose neutrality. This angered Genet, as the countries were both republics and traditional allies. France was denied an important republican ally. The Jacobins attacked the *Girondin* and an alliance of monarchical powers invaded France. Genet lost his post but not his head, as he settled in America, avoiding the fate of fellow *Girondins*.⁸⁹

⁸⁹ Genet became a republican during a post at the court of Catherine the Great. His antics in America led to clashes with its leaders. In 1793 they requested his recall. The Jacobins came to power in Paris and agreed to recall Genet, who they wanted arrested as a criminal, for links to the *Girondins*. The Americans let Genet settle in New York, as he likely would be sent to the guillotine in Paris. Genet turned to passions he encountered in London and at Soho, including promoting steam engines, canals, agricultural improvement, manufacturing, and preventing disease. Ammon, *The Genet Mission*, pp. 10-93; Eugene R. Sheridan, “The Recall of Edmond Charles Genet: A Study in Transatlantic Politics and Diplomacy,” *Diplomatic History* 18, no. 4 (1994), pp. 463-88; Genet and Silliman, *Vindication of Mr. E.C. Genet's Memorial*, pp. 3-34; Genet, *Memorial on the Upward Forces of Fluids*, pp. 3-110.

Clavière's ascendancy in France ultimately broke the long-unified *représentants*. A majority of them enthusiastically greeted the French Revolution. Their bond had grown in Britain, as had their attachment to the Bowood Circle. This led the British reformer Samuel Romilly to Paris in 1789, where he reunited with his friends Clavière, Dumont, and Du Roveray. Dumont and Du Roveray were there to pressure Jacques Necker to alter France's backing of Genevan policies, which prevented political reform and the exiles' return. However, the exiles became caught up in the greater reform movement in France, and attached to Mirabeau.⁹⁰ E.-S. Reybaz, who had fled to Paris from Geneva, also joined Mirabeau's Genevan workshop. By Mirabeau's death in 1791, the exiles realized that efforts in Paris were futile. Reform in Geneva required direct intervention. Du Roveray and Dumont returned there, reuniting with François d'Ivernois and David Chauvet.

The exiles appealed to Clavière to help stop the rise of democracy in Geneva, but he refused and broke with his old allies. Political instability and threat of invading armies led to a new *Girondin* policy. Clavière and Brissot tried to spread democracy in Europe, as they had E.-C. Genet attempt to do in the Americas. Their survival became dictated by encouraging popular uprisings abroad, to threaten monarchies and create new allied republics. This had success in Geneva. *Représentant* efforts failed, democracy took hold, and they again fled. Yet, the *Girondin* could not stabilize the Revolution in France. In 1793 their mass arrest was ordered, as Jacobins took control. Clavière killed himself in *Conciergerie* prison.⁹¹ Brissot was sent to the guillotine on 21 October 1793.⁹² Geneva was reformed by Clavière's ascendancy in France, but not as fellow *représentant* desired.

⁹⁰ Romilly, *Memoirs*, vol. 1: pp. 75-82.

⁹¹ Clavière plunged an ivory dagger in his heart on 8 December 1793. David Chauvet returned to Geneva in 1789. François d'Ivernois stayed in England, detached from other exiles and the Revolution, to finish a history of the *représentant* struggle since 1767. Fear of Geneva's low classes made him more conservative.

Britain became a last hope to the Genevan exiles who fled an aristocratic counter-revolution in 1782, and a democratic revolution in the 1790s. The exiles used London as a base of activity, making sojourns to Paris and Geneva. Dumont and Du Roveray tried to influence the Pitt government through Lord Shelburne. D'Ivernois became a mouthpiece for Pitt, and an agent for British diplomacy. Du Roveray, who had worked as an agent for revolutionary France in London, also moved closer to Pitt. J.-A. Deluc and Du Roveray acted as spies for the British government on the Continent between 1792 and 1813. David Chauvet, Du Roveray, and d'Ivernois wrote polemics attacking the French Republic, and championing Britain as protector of small states. Subsequently, in 1794 d'Ivernois and Du Roveray were condemned to death in Geneva, in *absentia*, for treason. They were also denied French citizenship, after France annexed Geneva, in 1798. During Geneva's darkest period, as moderates were imprisoned and exiled in the 1790s, schemes were devised for a 'New Geneva' in America. Other plans were also hatched. Chauvet raised money for philanthropic efforts to render Geneva more Anglophile. There was also wide support for the Pictets' journal, which was eventually to spread of British culture throughout Europe. Finally, Du Roveray championed making Geneva a Swiss canton. This was later achieved, as several *représentants* participated in the Congress of Vienna (1814-5), at the close of the Napoleonic Wars.⁹³ It was a long time coming, but stability was finally attained for Geneva and Europe.

D'Ivernois returned to Geneva in 1790, and was elected to the *Conseil de deux cent*. In 1791 Dumont went to Geneva, joining Du Roveray and d'Ivernois. Specifically they looked to protect Genevan manners through public education taught by the pastors. Whatmore, *Against War and Empire*, pp. 229-55.

⁹² Loft, *Passion, Politics, and Philosophie*, p. 1.

⁹³ D'Ivernois and Pictet de Rochemond, despite objections from the French delegate C.-M. de Talleyrand, succeeded in having Geneva recognized as a contiguous territory and a canton of the Swiss Confederation. They were aided by Dumont, who was acquainted with Talleyrand and the British delegates. Whatmore, *Against War and Empire*, pp. 250-70.

14.6. Conclusion

The Genevan *représentants*, like other members of the British-Franco-Swiss network, were harried by revolution. They were forced from their native city by aristocratic forces in the 1780s, and democratic ones in the 1790s. It was certainly a tale of two mobs. In the United States, Benjamin Thompson was chased from his homeland for his loyalty to, and treason for, the British crown. Mobs loyal to this same crown, and the Anglican Church, destroyed the property of Joseph Priestley and of other Dissenters, in the Birmingham riots. In France, Huguenots and moderates tied to the Delessert family defended the monarchy from the revolutionary mob. Violence in Europe forced both moderates and republicans into hiding or to flee to America. Nevertheless, several members remained loyal to the republican cause. People fleeing France, Britain, and Geneva were sustained by contacts made through the network. As violence grew in Europe, America came increasingly to be viewed as a sanctuary for both practical and utopian schemes.

Political reform managed to cause deep divisions in groups, which had previously been united by scientific or economic reform. The French Revolution clearly allowed for the transformational reform that was introduced at all levels of French society, including those in science, industry, and the economy.⁹⁴ However, the terror and wars also upset pioneering work by reformers, on both sides of the Channel, impeding exchange for over two decades. Individuals, who had stood at the forefront of Enlightenment science and industry in the 1780s, were forced abroad, into hiding, into prison, or to the guillotine from violence in Europe in the 1790s. During the French Revolution's terror the British-Franco-Swiss network was reduced to sustaining members instead of facilitating the application of Enlightenment.

⁹⁴ On the importance of this change for French industrialization see Horn, *The Path Not Taken*, pp. 169-99.

15. Sustained by the Network: Protection, Assistance, Care, and Sanctuary During the Terror

During the French Revolution's most violent years the focus of many moderates shifted from science to survival. The dispersal of the Delessert network was emblematic of wider disarray. Stephen Delessert escaped to London, crossing the Channel from La Havre, after defending the monarchy on 10 August 1792.¹ This ended a futile experiment with French constitutional monarchy.² It also tore the Delesserts asunder. Mme Delessert found asylum in Normandy, Abraham Guyot sought sanctuary in his native Neuchâtel, and Mme Gautier's family and young siblings took refuge in Geneva.³ They were sustained by contacts across Europe. This was vital, especially in 1794, during the 'Reign of Terror.' In the storm before the calm, disease and violence took lives of members of the Delessert's circle, as others languished in jail. Revolution and war disrupted but did not disable this network. It provided aid, from Geneva to Edinburgh, to those who were jailed, endangered, or in escaping to America. Ultimately, the network's breadth was expanded by the tumult. Moderates were harried on multiple sides by revolution, but the network sustained them as careers, and lives, were lost during the turbulent 1790s.

15.1. Stephen Delessert Escapes Across the English Channel

The *Tuileries* siege marked a turning point for the French Revolution. The royal family were captives in the palace in Paris since 6 October 1789. They had been taken forcefully from Versailles, after decisive events like the fall of the Bastille (14 July), but before the Revolution's radical phase. Thus Louis XVI witnessed his power, and the *Ancien régime*, stripped away. The void was filled by the *Assemblée nationale*, and later the *Assemblée*

¹ BCL MS 3219/6/23 A. Guyot (Neufchâtel) to J. Watt snr (Birmingham), 27 September 1792.

² For a discussion of the *Tuileries* attack and complex political shifts see Jordan, *The King's Trial*, pp. 1-56.

³ BCL MS 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792.

législative, as well as newspapers, political clubs, and the Paris Commune. These bodies, and republican forces inside them, were bolstered by royal ineptitude and stubbornness. Louis XVI was a product of a past age, not a constitutional monarch. The king and the constitution had the support of a majority: moderates, conservatives, and many factions in between. Conversely, royalists and many republicans opposed the constitution (signed by the king in September 1791). The *Assemblée nationale* agreed to its own dissolution and was replaced by the elected *législative*. This was followed by the outbreak of wars against foreign powers and the king's attempts to subvert the constitution, culminating in the 10 August 1792 attack on *Tuileries*. In a clash of violence France became a republic.⁴

The French Revolution's first two years created fissures within the Delesserts' network, but the violence of August and September 1792 splintered it. The attack on the *Tuileries* was a violent watershed. After this event members had to flee France, or stay and risk imprisonment and the guillotine. Their network was mainly comprised of liberal reformers and Huguenot descendants, yet many members defended moderation and the monarchy.⁵ Several members took direct part in the fighting on 10 August 1792. Stephen Delessert captained a detachment of the National Guard, which had many desertions after Louis XVI's departure. Stephen had performed his duty, but was thus compromised and fled to London.⁶ P.-S. du Pont de Nemours and his son, Eleuthère-Irénée (1771-1834), fought alongside the Swiss Guard. Du Pont was compromised for leading a troop section.

⁴ The royal family made a failed escape of France in 1791. On 10 August 1792 rebels took control of the Paris Commune, which directed the National Guard, and later took the *Tuileries*. The king left to surrender to the *Assemblée*, but his Swiss Guards were massacred. Jordan, *The King's Trial*, pp. 16-40.

⁵ F. A. F. de la Rochefoucauld-Liancourt, commander of the Swiss Guard, stationed regiments on the north coast to assist the king escape France, as he had offered previously. Adolphe Thiers and Frederic Shoberl, *The History of the French Revolution* (London: Bentley, 1838), vol. 1: pp. 351-65. On 10 August his son, François de La Rochefoucauld, accompanied the royal family from *Tuileries* to the *Assemblée*, to surrender, and also sent word urging his father to flee France. Rochefoucauld, *Innocent Espionage*, pp. 249-51.

⁶ BCL MS 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792. Stephen was second commander of the seventh battalion, fourth legion, of Paris' National Guard. CJB 92 f Del. Lessert, *Famille de Lessert*, p. 31.

He stayed in France but went into hiding. E.-I. had only served as a lieutenant in the National Guard and was a well-known supporter of the Revolution. Thus, it was thought safe for him to continue operating the Du Pont printing house.⁷ This was a critical decision, as the press continued to publish liberal works and advocate moderate reform.

Stephen Delessert escaped France with his life, but little else, and had to rely on his family's network. He was in London within a month of the *Tuileries* attack, lodging with the Cazenove banking family.⁸ To remedy a lack of passport, or documents, Stephen relied particularly on Samuel Romilly, an ardent supporter of the French Revolution.⁹ By August 1792, as reports of violence and French exiles poured into England, Romilly altered his view. Romilly worked to help Stephen, who had departed France in a hurried state and had only a few acquaintances in London. This was out of a sense of attachment that Romilly felt toward the Delesserts. Stephen's arrival delayed Romilly from joining Etienne Dumont and Lord Shelburne at Bowood Park. They were eager for Romilly's news from Rochefoucauld-Liancourt. Romilly had met with the recent *émigré*, dined with him at Jeremy Bentham's house, and could clarify which members of this liberal family had been murdered in a mob attack on their estate.¹⁰ Shelburne asked Romilly to invite Stephen to Bowood. Despite this gesture, and Romilly's entreaties, Stephen would not leave London, fearing it would delay news on his family's security.¹¹ It is unclear where Stephen's politics fit on the Bowood Circle's spectrum from liberal to radical.

⁷ Eleuthère-Irénée du Pont, *Life of Eleuthère Irénée du Pont from Contemporary Correspondence*, ed. and trans. Bessie Gardner Du Pont (Newark: University of Delaware Press, 1923), vol. 1: pp. 9-11.

⁸ BCL MS 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792.

⁹ LXXXVIII. S. Romilly (Lincoln's Inn) to M. Gautier, 15 May 1792. Romilly, *Memoirs*, vol. 2: pp. 1-2.

¹⁰ LXXXIX. S. Romilly (Lincoln's Inn) to E. Dumont, 10 September 1792. *Ibid.*, pp. 3-5. Romilly clarified that the Duke was murdered, possibly by his own tenants, as was the Cardinal during an earlier attack at Carmes. In 1788, Romilly and Dumont had dined with the Duke. XCI. S. Romilly to E. Dumont, 15 September 1792. *Ibid.*, pp. 9-11. After the deaths Liancourt added Rochefoucauld to his name.

¹¹ *Ibid.*, pp. 9-10.

The ties binding the Delessert network stayed intact despite Europe's instability. In early October 1792, James Watt advised Matthew Boulton, then in London, to go see Stephen Delessert at *James Cazenove Co.*¹² Watt also invited Stephen to Birmingham.¹³ Stephen wanted to call on Watt, but could not journey that far. He informed Watt that his brother Benjamin had finally delivered Watt's letter to James Watt junior in Paris.¹⁴ Despite political differences the Delesserts were of service to James.¹⁵ Likewise, though Stephen would not leave London, Watt did what he could from Birmingham. However, Watt believed that Stephen was not fully blameless for his plight. Watt conceded, to his wife Anne, that Stephen "had done his duty" by captaining for the National Guard on 10 August, but deserved "some punishment for his democracy."¹⁶ His political sympathies aligned with those of moderates generally. They supported the Revolution, but fought to defend the monarchy. Therefore, moderates were attacked on all sides. Romilly, referring to the Delesserts' dilemma, informed Dumont: "[Stephen's] whole family, you know, are accused of being aristocrats, though their only *aristocratism* consists in wishing to defend a constitution which all France has sworn to maintain."¹⁷ The Delesserts, part of France's wealthy bourgeois, supported the early Revolution, but not its radical phases.

Stephen Delessert's stay in England was brief, but it provided vital sanctuary. By the middle of November, it was safe enough for him to return to the Continent. Stephen arrived in a desperate state, but relied on Romilly, the Delucs, the Cazenoves, and friends

¹² BCL MS JWP Box V 3. J. Watt (Heathfield) to M. Boulton (London), 11 October 1792. James Cazenove (1744-1827), a London merchant, descended from Huguenots who fled France for Geneva in the 1680s.

¹³ Stephen and Guyot's letters were delayed by Watt's stay in Cornwall. Watt's invitation arrived after Stephen departed London. BCL MS 3219/4/124 J. Watt snr (Birmingham) to A. Guyot, 6 November 1792

¹⁴ This letter had, as James Watt junior noted, indeed "made the tour." BCL MS 3219/4/107 JWP 4/67 S. Delessert (London) to J. Watt snr, 19 October 1792; *Ibid.*, 3219/4/13/43. J. Watt jnr (Nantes) to J. Watt snr (Birmingham), 17 October 1792. *Ibid.*, 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792.

¹⁵ *Ibid.*; BCL MS 3219/4/13/41 J. Watt jnr to J. Watt snr, 12 September 1791.

¹⁶ BCL MS 3219/4/124 J. Watt snr (Heathfield) to A. Watt, 14 October 1792.

¹⁷ Author's emphasis. LXXXIX. S. Romilly to E. Dumont, 10 September 1792. Romilly, *Memoirs*, pp. 3-4.

at Soho for help. It remained unsafe for Stephen in France, so he went to Holland, after obtaining news that his family was safe.¹⁸ From there he travelled to Hamburg to join its French refugee colony. Stephen's short stay, and reconnection with friends in England, was critical. They had helped Stephen escape the Jacobins, and prepared the way for his move to America in 1794. Europe was in such a state of upheaval that many members of the Delessert network were contemplating this migration, including James Watt junior.

In September 1792, James Watt junior remained safe, despite violence in Paris, as his friends fled France for their lives. Abraham Guyot believed that James' republican illusions could not have withstood the reality of the September Massacres, and the cruelty brought by such principles.¹⁹ But, even great bloodshed did not fully dampened James' republicanism. Watt senior advised James to remain abroad until it was safe to return, as England was then becoming increasingly inhospitable for republicans. Thus, James did not return until 1794. By this point he and Stephen Delessert had reconciled, and appear to have travelled together across the Channel from Holland to England. Before this, and James' reconciliation with his father, James courted the dark Jacobin side of the network.

15.2. Abraham Guyot's Escape Across the English Channel

Abraham Guyot relied on the British-Franco-Swiss network to escape France. He had remained in Paris after 10 August 1792, with Etienne and Benjamin Delessert. Stephen was the only one denounced by the Jacobins, but the whole family was in danger. The elder men were accustomed to travelling. They prepared to go the furthest, at the first sign of trouble, but stayed in Paris managing the banking house. Guyot's plans changed with the arrival of the September Massacres, and a request to come to Neuchâtel from his

¹⁸ Stephen had met with both J.-A. and Francis Deluc while in London. BCL MS 3219/4/4/37 8. F. Deluc (Windsor) to J. Watt (Birmingham) 19 November 1792.

¹⁹ BCL MS 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792.

dying father.²⁰ Guyot was Swiss, but had much difficulty procuring a passport. He only did so with the aid of a former friend: L.-P. Manuel.²¹

Guyot's quest for a passport to quit France revealed both the Revolution's tenor and terror. In Matthew Boulton's 1787 search for a tutor, for his son in Paris, he had based his model on Guyot. The best tutor that could be found for a limited appointment was Manuel, who was recommended by Guyot and the Delesserts. By 1792 much had changed. Indeed it gave weight to Bolton's appraisal, of the changes to Paris, since he left: "Great Men are become little, & little men great."²² After Guyot exhausted all other efforts of obtaining a passport, desperation led him to Manuel. Guyot hoped to persuade Manuel, who he had introduced to the Delesserts. Therefore, Guyot went to the *Hôtel de Ville* to seek an audience with Manuel, *procureur* of the Commune. The visit resulted in a passport, and macabre stories of the aftermath of the September Massacres that Guyot passed on to friends like Samuel Romilly. At the *Hôtel de Ville* Guyot was forced to wait in a room filled with devastated family and friends of prisoners. They too were waiting on Manuel, to find out if loved ones had survived the slaughter. Separately they were brought to a room, filled with tattered blood-soaked clothes and articles, to attempt to determine if their relative or friend had escaped. An equally ghastly scene transpired on the street below.²³ Romilly later recounted to Etienne Dumont:

²⁰ *Ibid.*

²¹ On 6 September, the *commissaire de police* gave Guyot a certificate. It listed him a man of letters from Neuchâtel in Switzerland, born in Boudevilliers, forty-nine years old, and living at 58 *rue Coqhéron* Paris. Guyot was to travel via Pontarlier, France, or Geneva. EUL SPD MS GB237/352. Municipalité de Paris, Section du Mail, "Certificat du Commissaire de Police, sur Demande de Passeport," 6 September 1792, "l'an quatrième de la Liberté." Two days later, after much hardship, Guyot was granted a passport signed by Manuel. EUL SPD MS GB237/352 95. Municipalité de Paris, "Passport. La Nation, La Loi & Le Roi." [sic] No. 0231. L. Manuel, Officier Municipal, 8 septembre 1792, "l'an quatrième de la Liberté."

²² BCL MS 3782/12/32/169 237. M. Boulton Sketch of letter "To Miss De Lessert," 2 November 1787.

²³ XCVII. S. Romilly (Lincoln's Inn) to E. Dumont, 2 October 1793. Romilly, *Memoirs*, pp. 28-9.

Volunteers, who were setting out for the frontiers, came in crowds to take the oath to the new government before their departure, and as they came out of the [*Hôtel de Ville*], each in his turn walked up deliberately to the prostrate statue of Louis XIV., which had been cast down with the other monuments of royalty, and p[issed] upon it in the midst of the shouts and laughter of a circle of women and children, delighted with this obscene ceremony, which lasted without interruption, during the two hours that Guyot was there, waiting for his passport.²⁴

Manuel, whose radicalism was waning, aided several philosophic friends escape France, including his former pupil Louis Tourton, Guyot, and the author Mme de Staël.²⁵

After finding sanctuary in Neuchâtel, Guyot turned to his British friends for help. Guyot was uncertain how long he would remain there, as his health was again in decline. Financial circumstances required that Guyot find employment for several years, but he saw little prospect of returning to France, and could not find work in his native country. Therefore, Guyot turned to Watt.²⁶ Before the Revolution turned violent Guyot expressed his doubts about it to Watt.²⁷ It was a mutual exchange as Watt shared his concerns, about growing threats of English mobs and democracy and alarm over James' republicanism, with Guyot.²⁸ Watt also sought to help Guyot resume his employment as a tutor.

In Guyot's quest to find pupils he appealed to the British-Franco-Swiss network. Guyot wisely shared his plan with Watt, who mobilized people throughout Britain. Watt contacted Boulton in London, requesting his aid in the search.²⁹ Fortunately, Anne Watt

²⁴ *Ibid.*, p. 28.

²⁵ Manuel secured passports and helped save the lives of Mme de Staël and her friends A. F. de Jaucourt (1757-1852) and T.-G. de Lally-Tollendal (1751-1830). XCI S. Romilly to E. Dumont, 15 September 1792. *Ibid.*, p. 9-10; Beauchamp, *Biographie moderne*, pp. 346-8. J. Christopher Herold, *Mistress to an Age: A Life of Madame de Staël* (New York: Grove Press, 2002), pp. 116-8; Reichardt, *Un hiver à Paris*, p. 101.

²⁶ BCL MS 3219/6/23 A. Guyot to J. Watt snr, 27 September 1792.

²⁷ Guyot noted that "Agitators" and "Levellers" were part of the malcontents. He was, like Watt, upset that political fever dominated the news, and reported that the conversion of Dr Black and James Kirwan, to French chemistry, were seen as a great triumph in Paris. Lavoisier's *Journal de Paris* printed their letter of abdication. BCL MS 3147/3/391 73. A. Guyot (Paris) à J. Watt, (Heathfield) 21 février 1791.

²⁸ BCL MS 3219/4/124 J. Watt snr to A. Guyot, 6 November 1792

²⁹ BCL MS JWP Box V. 3. J. Watt to M. Boulton, 11 October 1792.

was in Glasgow, as her son Gregory was then commencing his study at the university.³⁰

In requesting her service on Guyot's behalf, Watt explained:

M^r Guyot, I suppose from notions of delicacy, and not wishing to be a burden on such a distressed family, wishes to resume his old employment & desires me to recommend him to any one who has a young man or two to send abroad for their education, that is to study, not to cut a figure & spend money, and has no objection to attending them here in England or at the Scotch universities. He may be safely recommended as a Man of firm character, good temper, science & knowledge of the world with much application.³¹

Watt asked his wife to mention Guyot if she learned of any acceptable situation, as well as to John Miller (1735-1801) and other Glasgow professors. Furthermore, Watt asked Anne to inform Dr Joseph Black, experienced in such arrangements, so he could spread the word at Edinburgh.³² Watt, confident that Guyot would find pupils if he came to Britain, invited Guyot to stay with him in Birmingham, and also promised to search while he was in London.³³ There was additionally another option, as Watt noted: "Young men are frequently sent from this town into Germany to learn German[,] french & other necessary accomplishments for a Mercantile Education & pay for boarding & tutelage."³⁴ If Guyot wanted to accompany British students to the Continent and tutor them, then Watt believed he could find pupils for him. It was a safe assumption. Since 1785, Watt had been arranging for Midlands' students to complete their education in Germany.³⁵

Following Watt's invitation, Guyot returned to Britain to resume his former employment.

³⁰ BCL MS 3219/4/12 30. A. Watt (Glasgow) to J. Black (Edinburgh), 6 November 1792.

³¹ BCL MS 3219/4/124 J. Watt snr to A. Watt, 14 October 1792.

³² *Ibid.*, Miller, a pupil of Adam Smith, had liberal views, supporting the French Revolution and abolishing slavery. Smith, *The Correspondence*, p. 99 n. 1. Anne was delayed with the request to Black, but reminded him of Guyot's time in Edinburgh. BCL MS 3219/4/12 30. A. Watt to J. Black, 6 November 1792.

³³ BCL MS 3219/4/124 J. Watt snr to A. Guyot, 6 November 1792.

³⁴ *Ibid.*

³⁵ *Ibid.* Watt organized the educations of Matthew Boulton and Gilbert Hamilton's sons in Germany. BCL MS 3219/4/123 J. Watt snr (Birmingham) to G. Hamilton 4 July 1788. In 1790, Watt also arranged for Martin Walker, son of a prominent Birmingham merchant Alexander Walker, to study with F. H. Reinhard in Germany. BCL MS 3219/4/124. J. Watt snr (Birmingham) to Reinhard, 8 March 1790.

Guyot's return to Britain relied on his friends within the British-Franco-Swiss network. Besides Watt's invitation to stay in Birmingham, Guyot had help from London and Edinburgh. He was in contact with Dugald Stewart, his old professor, through the summer of 1793.³⁶ Stewart was well practiced in arranging tutors, as he had boarded, taught, and travelled with pupils for years. He found a potential position, but it was filled or fell through before Guyot arrived in Scotland. The delays anticipated by Guyot were his lingering illness, the length of the route that took him mostly through France and the Low Countries, and the difficulties of arranging coaches for one person.³⁷ Guyot was in London by early autumn meeting with Romilly, who had just returned from Scotland and a visit to Stewart. Romilly assisted Guyot, as he had Stephen Delessert. In turn, Guyot brought information on two topics close to Romilly's heart. One was that the Delesserts were all safe in Passy, save Stephen who was in Hamburg. Benjamin had been forced into the army, but by special favour avoided common active duty and joined the engineers' corps. Romilly thought overall the family was fortunate, in spite of their wealth, not to be targets of violence. The other gift Guyot brought Romilly was direct accounts of the Revolution. Guyot was in Paris during the events of August and September 1792. Consequently, Romilly found his conversations with Guyot on these topics more informed, "than are to be found in all the five or six hundred pages" of Dr John Moore's *A Journal During a Residence in France* (1793).³⁸ Guyot and Romilly's time together was brief, as Guyot soon took the road to Edinburgh via Birmingham.³⁹ He reunited with his old friends in both towns, but in sickness more than in health.

³⁶ EUL SPD MS GB237/352 6. A. Guyot (Neuchâtel) à D. Stewart (Edinburgh) 16 juillet 1793.

³⁷ *Ibid.*

³⁸ XCVII. S. Romilly to E. Dumont, 2 October 1793. Romilly, *Memoirs*, vol. 2: pp. 26-9.

³⁹ Guyot had, according to Romilly, departed London by 2 October 1793. *Ibid.*, p. 26.

Guyot struggled to find work as a tutor despite the great efforts of his friends. War and revolution deterred Britons from sending sons abroad. By April 1794, Guyot thought he would remain a year in Edinburgh, before leaving to travel with a pupil or to return home. In the interval he sought to alleviate expense and idleness with a temporary commission. He desired to guide the studies of pupils taking courses at the university for up to a year. Guyot asked to be informed if Watt, Matthew Boulton, or their friends learned of any potential pupils. Friends also literally sustained Guyot, as the inability to find work forced him to borrow £50 sterling from Boulton & Watt.⁴⁰ Watt considered sending his son Gregory to be tutored by Guyot in Edinburgh in 1794. However, Anne's anxiety over the declining health of their youngest daughter Jessy had them keep Gregory home.⁴¹ Guyot's own worsening health also complicated employment prospects.

15.3. Stephen Delessert and James Watt junior Return to England

Stephen Delessert and James Watt junior stayed linked, even as political upheaval drew them apart. They became friends as adolescents in Birmingham in 1783, when as Stephen was sent there to study, and remained close over a decade. This was through sustaining a mutual exchange, despite years of travel and study.⁴² However, in 1792 Stephen fled France, after the Jacobins threatened him, and James returned to Paris as a delegate of English republicanism to the Jacobin Club. It thus became unsafe for either man to return home and they each spend two years abroad.

⁴⁰ Guyot informed Watt that the university's summer courses were botany, physics, moral philosophy, the eight naturals, and mathematics. BCL MS 3219/3/37 21. A. Guyot (Édinbourg) à J. Watt (Birmingham), 9 April 1794; *Ibid.*, A. Guyot (Édinbourg) à Mess^{rs} Boulton & Watt, 9 April 1794.

⁴¹ BCL MS 3219/4/124 J. Watt snr (Birmingham) to A. Guyot, 15 May 1794.

⁴² They sent news and people to each other across the Channel. BCL MS 3219/6/8 D. S. Delessert (Paris) to J. Watt jnr (Manchester), 11 May 1789. *Ibid.*, S. Delessert (Paris) à J. Watt jnr (Manchester), mai 1791.

James' republicanism brought his relationship with his father to the brink. After word of Louis XVI's dethronement reached England, Watt feared for James' safety. Watt warned him to leave France, or at least Paris, as soon as he could.⁴³ James may have been threatened if the royal side triumphed on 10 August, but he had many friends among the victorious patriots.⁴⁴ He claimed to be avoiding politics, beyond freely expressing his opinions,⁴⁵ but he remained in Paris. James could not obtain a passport and was uncertain about which parts of France were safe. The Prussian army was making its way to Paris, and violence was increasing across the country, leading to the September Massacres. Fear of a counterrevolutionary plot caused patriots to murder thousands of prisoners. James witnessed a mob drag a princess' dead body through the streets, and perform indignities upon it. They struck the head upon a pike and brought it to taunt the king and queen. Such scenes horrified James, but he continued to justify that they were necessary.⁴⁶ James wisely escaped Paris, but he remained trapped on the Continent for two years.

James' persistent republicanism precipitated heated exchanges with his father. Their differing opinion was unpleasant, James claimed, especially as it caused Watt discomfort. James argued that his opinions were based on a belief that republicanism alone could bring happiness to mankind. James, appealing to Watt's honour, hoped his political views would not be held against him, and he swore he would rather take his own life than cause his father injury.⁴⁷ To clear up rumours about him James declared:

As to the anecdote representing my presenting a Sword to any Assembly for the purpose of assassinating kings, it is a mere calumny. Not that I consider the

⁴³ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. Watt jnr, 16 August 1792.

⁴⁴ BCL MS 3219/4/13/39 J. Watt jnr (Paris) to J. Watt snr (London), 23 August 1792.

⁴⁵ James conceded that he also established a collection among the English in Paris for orphans and widows of patriots who died in the *Tuileries* attack. *Ibid.*

⁴⁶ BCL MS 3219/4/13/40 J. Watt jnr to J. Watt snr, 4 September 1792.

⁴⁷ BCL MS 3219/4/13/43 J. Watt jnr (Nantes) to J. Watt snr (Birmingham), 17 October 1792.

assassination of kings as any crime when such an action may save the lives of millions of my fellow creatures, but I assure you I never would have the cowardice to propose that to others which I durst not do myself.⁴⁸

In a declaration, very similar to arguments made in Thomas Paine's main works, James argued that his revulsion was against the institution of monarchy and not specific kings, as they were no more culpable than their subjects. The abolition of blind submission in France, James argued, was a more significant advance for mankind than eradicating all monarchs of Europe. He suggested that kings were too wicked to warrant attention, that appeals had to be made to the people, that founding principles of monarchy were being abandoned in "an enlightened age," and that people everywhere were emerging from indolence to abandon a system established on "force and Priestcraft." Ultimately, James desired for nations' histories to cease simply being a catalogue of the crimes of tyrants, and to begin championing liberty's advancement and humanity's improvement.⁴⁹ Such sentiments were certainly not welcome in England, and were regarded as treasonous.⁵⁰ As James echoed Paine's sentiments in France, his father worked to silence them in England.

Watt carried on a versatile battle to cure James of republicanism, stem its advance in England, and to make it safe for James to return to England. Though happy that James escaped Paris, and was safe in Nantes preparing to make his way to Italy, Watt was sorry that James' "heretical tenets" persisted. This led Watt to express two hollow threats. One

⁴⁸ *Ibid.*

⁴⁹ *Ibid.*; Thomas Paine, *Common Sense; addressed to the Inhabitants of America* (Edinburgh: Charles Elliot, 1776), pp. 15-29. "The Age of Reason" (1794, 1795, 1807) in Thomas Paine, *The Theological Works of Thomas Paine* (London: J. Watson, 1840), I: pp. 3-5, II: pp. 46-7, III: pp. 46-8; Thomas Paine, *Rights of Man: Being an Answer to Mr. Burke's Attack on the French Revolution* (London: J. S. Jordan, 1791), pp. 19-54.

⁵⁰ On Paine's persecution in England see, John Keane, *Tom Paine: A Political Life* (London: Bloomsbury, 2009), pp. 267-350. For a summary of the attacks of English republicans in the 1790s generally, see Kenneth R. Johnston, *Unusual Suspects: Pitt's Reign of Alarm and the Lost Generation of the 1790s* (Oxford: Oxford University Press, 2013), pp. 3-330.

was to stop trying to deter James, who was old enough to think and act for himself.⁵¹ The second threat was more grave. “If [James] continues in an error prejudicial to the interests of his Country & renders himself obnoxious to government,” Watt argued he should look upon him “as an Alien to my blood, and let him try to find a father among his democratic friends.”⁵² Watt combated such sentiments at home, reflecting to Guyot on the mobs:

I am sorry to say that in spite of the flagrant example we have had, democracy seems to gain ground here; with the young the headstrong & the tyrannical who by themselves even collectively would not be formidable if it were not that the mob begin to espouse this side, and they are at least as unprincipled as the mob of Paris, though with all their brutality they have, as yet, a greater abhorrence of Bloodshed & murder, especially of assassination, but for plunder the french cannot surpass them.⁵³

Watt conceded that most of workmen around Birmingham were “Church & King men.” But he did not believe their principles or control could be relied upon, as revealed in July 1791.⁵⁴ Agents belonging to a secret society, who met “under the colour or freemasonry,” were spreading ideas of liberty and equality, and had also made “propositions” that Watt and Matthew Boulton viewed as treasonable. They saw it was their duty to contact the Attorney-General, Archibald Macdonald (1747-1826), to report “that one of the apostles of Paine has lately settled himself in the neighbourhood of our manufactory & has succeeded but too well in disturbing the principles of our workmen.”⁵⁵ Boulton and Watt argued that if actions were not quickly taken to counter such threats the result could be dangerous, as these ideas were being spread throughout England.⁵⁶

⁵¹ BCL MS 3219/4/124 J. Watt snr to A. Guyot, 6 November 1792.

⁵² *Ibid.*

⁵³ *Ibid.*

⁵⁴ BCL MS 3219/4/124 J. Watt snr (Heathfield) to Archibald Macdonald, 4 December 1792.

⁵⁵ BCL MS 3219/4/124 J. Watt snr and M. Boulton (Birmingham) to A. Macdonald, 29 November 1792.

⁵⁶ *Ibid.*

In December 1792, a ‘Church & King’ mob struck in Manchester. One of its main targets was Thomas Walker’s house. James was in Italy, and Watt senior complimented him for remaining silent on local politics, a strategy James was to follow in all countries until matters settled. The attack on Walker’s house greatly concerned Watt, and he was pleased that Walker successfully defended his property from the rabble. It led Watt to express his own political philosophy: “I detest mob government of every species, as well as the bigotry that can condescend to make use of them in any cause. If we have law let us be governed by it!”⁵⁷ Yet, such pleas to reason continued to fall on James’ deaf ears.

Events in France and England in 1793 finally brought James Watt junior to his senses. In France it was the start of the ‘Reign of Terror.’ Marie Antoinette went to the guillotine on 16 October (Louis XVI was executed on 21 January 1793). The *Girondin* suffered mass executions in late October 1793.⁵⁸ Most of James radical friends in Paris came from this group. As James’ French friends were being slaughtered, by the left wing of their own Jacobin party, his English friends were harried by right-wing English mobs. Thomas Cooper fled to America in the summer. Thomas Walker also became a target of political officials. Thus, Watt advised James to stay abroad until they knew what charges were brought against Walker, and if James would be implicated. Watt did not want James to follow Cooper, as matters could be resolved as James waited in Europe.⁵⁹ Ultimately Watt blamed Cooper, who should have known better, for leading James astray. Watt believed that had Cooper not fled he would have been prosecuted for his writings, and that the trial against Walker, a “worthy generous man,” would be pursued with greater

⁵⁷ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. Watt jnr, 18 January 1793.

⁵⁸ The *Girondins* had been under house arrest since June. Higonnet, *Goodness Beyond Virtue*, pp. 42-52.

⁵⁹ BCL MS 3219/4/13/51 J. Watt jnr (Genoa) to J. Watt snr (Birmingham), 10 September 1793; BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. Watt jnr, 9 October 1793.

cruelty than he deserved.⁶⁰ Walker had made many enemies by heading a political faction against the government. Watt, hoping James would be redeemed and avoid the fate of these two men, informed his son-in-law: “I do not like [James] going to America, because I do not see any way for his employing his talents to advantage there at least not so well as he could do here if he could return & live in peace, but he must not come home to be disgraced or embarrassed by a publick trial.”⁶¹ James eventually, after much frustration by Watt, returned quietly to England. This trip coincided with that of Stephen Delessert, who was moving to New York. Etienne Delessert, unlike Watt, wanted his son to go to America. The fate of the Delessert family and bank had become precarious in France.

Stephen Delessert had been driven out of revolutionary France, but he found a familiar circle in Hamburg. It included the partners Caspar Voght and Georg Heinrich Sieveking (1751-99), both followers of the Enlightenment. Through this and trade they developed strong links to France, which continued into the French Revolution. Hamburg merchants had economic interests in republican France winning its war against Prussia and Austria. Their interests aligned more with French bourgeois than feudal German aristocrats. Voght, like other liberal merchants, maintained support until the *Girondins* lost power in Paris. When the Jacobins took over the loyalty of most Hamburg merchants dissolved.⁶² The Jacobin ascension and subsequent arrest of thousands of people in Paris, including Etienne Delessert in 1793, precipitated Stephen’s departure from Hamburg.

Stephen’s stay in Hamburg was likely a form of insurance for the family and its banking house. It was unsafe for him to return to France. His family did return to Passy,

⁶⁰ BCL MS 3219/4/124 J. Watt snr (Birmingham) to J. Miller, 21 October 1793.

⁶¹ *Ibid.*

⁶² Jost Hermand, “The Jacobins of Hamburg and Altona,” in *Patriotism, Cosmopolitanism, and National Culture: Public Culture in Hamburg 1700-1933*, ed. Peter Hohendahl (Amsterdam: Rodopi, 2003), pp. 136-7.

but their safety was tenuous. Hamburg was a good location from which at least one family member could quickly escape Europe. Eighteenth-century Hamburg was a Hanseatic republic and free city. It was the largest German city, with its location and independence insuring dominance in industry and merchant trade.⁶³ Stephen would have felt at home amongst its ruling bourgeois elite and its large French refugee colony.

Stephen Delessert continued Enlightenment exchanges with likeminded *savants* in spite of Europe's political disturbances. This included botany and several other interests that would occupy the Delessert family for decades to come. Stephen botanized and collected as he travelled through Holland, Denmark, and Germany. These specimens, as with several collections of Asian plants purchased by Stephen, became part of his brother Benjamin's massive herbarium.⁶⁴ Stephen also sent specimens from his travels to his botanist friend J. E. Smith.⁶⁵ No doubt Stephen provided a recommendation to Smith for Caspar Voght, as he did to Watt and Boulton.⁶⁶ For more than a year Voght toured British industries, hospitals, prisons, workhouses, and monuments. This inspired him to publish a tract, on his philanthropy in Hamburg, before departing Edinburgh in 1795.⁶⁷ After Voght returned to the Continent, he corresponded with Smith on botany, herbaria, philanthropy, chemistry, and agriculture.⁶⁸ Such interests, and Voght's role as a merchant, would have united he and Stephen Delessert, and sheds some light on Stephen's stay in Hamburg.

⁶³ *Ibid.*, p. 134.

⁶⁴ Lasègue, *Musée botanique de M. Benjamin Delessert*, p. 43; Smith, *Sketch of a Tour*, p. 29, n.

⁶⁵ Smith, Linnaean Society president, explained that his "late friend Mr. Stephen Delessert, jun." had years earlier sent him Danish specimens exactly matching a recent discovery of British grass. VIII. J. E. Smith (Norwich) to Alexander McLeay (Secretary of the Linnaean Society), 1 December 1801. Linnaean Society, *The Transactions of the Linnaean Society of London* (London: R. Taylor and Co., 1804), vol. VII: pp. 276-8.

⁶⁶ BCL MS 3782/12/32 254. S. Delessert (Hamburg) to M. Boulton (Soho), 15 October 1793; BCL MS 3147/3/388/ 33. S. Delessert (Hamburg) to J. Watt (Soho), 15 October 1793. [Delivered 11 July 1794].

⁶⁷ C. Voght, *Account of the Management of the Poor in Hamburg* (Edinburgh: 1795), pp. 1-61.

⁶⁸ C. Voght (Flotbeck) to J. E. Smith 23 May 1797; C. Voght (Flotbeck) to J. E. Smith, 11 August 1798. Smith, *Memoir and Correspondence*, pp. 71-4; 76-7.

In early 1794, Stephen Delessert made a final crossing of the English Channel for a short, but eventful, sojourn in Britain. It appears that he made the trip with James Watt junior. Both men were in Holland in January,⁶⁹ and had crossed to England by February. The old friends made a reconnection at some point, and saw some of the same people in London.⁷⁰ James' employers, the Walkers, had requested he return to England. They also sent him a letter from a London counsel insisting that statements made in France could not be used for criminal prosecution against him in Britain.⁷¹ Upon returning to England James was met by his father, as they had finally reconciled, and his friend John Tuffen. Tuffen was an art and book collector, and a former banker, with whom James stayed with for several days. James avoided Manchester, informing the Walkers that it was not safe for him there, and quietly made his way to Birmingham.⁷² Stephen also saw Watt and Tuffen in London, and made Thomas Walker's acquaintance in Manchester, who Stephen referred to as "a true friend of liberty" and of the oppressed. Indeed Stephen was, as he assured James, "much running about in the country and even have been so far as Edinb^r. to see my old friend Guyot."⁷³ It must have been a joyful reunion for the tutor and pupil, but tragically both men would be dead before the end of the year.

James Watt helped Stephen Delessert in his preparations for America. This aid was vital, as Stephen's family was under threat in France and could do little for him. Watt ultimately wished Stephen "prosperity & health in the new Continent."⁷⁴ This marked one

⁶⁹ Guyot told professor Walker that Stephen was "travelling in Holland, on the point of embarking for North-America." EUL MS LA III. 352/1 166-7. A. Guyot (Edinburgh) to J. Walker (Collington) 7 January 1794. James expected to depart Amsterdam on 18 January and meet Watt in London a week later. BCL MS 3219/4/13/60 J. Watt jnr (Amsterdam) to J. Watt snr (Birmingham), 17 January 1794.

⁷⁰ BCL MS 3219/6/2 D S. Delessert (Liverpool) to J. Watt jnr (at John Tuffen, London), 1 March 1794.

⁷¹ BCL MS 3219/4/13/60 J. Watt jnr to J. Watt snr, 17 January 1794.

⁷² Jones, "Living the Enlightenment," p. 179; *Gentleman's Magazine*, 90 pt ii (1820), p. 374.

⁷³ BCL MS 3219/6/2 D S. Delessert to J. Watt jnr, 1 March 1794.

⁷⁴ BCL MS 3219/4/124 J. Watt snr to A. Guyot, March 1794.

more departure of James Watt junior's friends to America. Before returning to Britain he had entertained a like emigration,⁷⁵ but he ultimately chose to join Boulton & Watt. One of Stephen's last acts, before departing from Liverpool for New York, was to write expressing his gratitude for James, Watt senior, and Boulton's support.⁷⁶ The Delesserts were again in a state of disarray and only the network enabled Stephen to escape Europe.

Stephen and James' parallel years of wondering through Europe were over. In a final coincidence they both entered Britain in silence. For James, it was to avoid attention of the English authorities who might wish to prosecute him. For Stephen, it was to avoid French Jacobin officials learning of his movements. Stephen "was obliged to use very Grand caution as to its being known he was in Britain," Watt informed Gilbert Hamilton, "as his father with all other Bankers were in a State of Arrestation, & his being here might be made a crime of."⁷⁷ Etienne Delessert's arrest during the 'Reign of Terror' was the impetus for both Stephen's silence in Britain, and his flight to America.

15.4. Etienne Delessert's Arrest and Stephen Delessert's Escape to America

The *arrestation* of Etienne Delessert on 1 December 1793 (*11 frimaire l'an II*) dispersed his family for the second time during the French Revolution. The *Comité du arrête* sent Delessert to a *maison d'arret*, near Paris. Mme Delessert stayed in Passy and Paris, with their youngest children, to be near her husband.⁷⁸ Stephen was still in Hamburgh, but he and his brother Alexandre soon left for England on route to America. Mme Gautier went

⁷⁵ BCL MS 3219/4/13/8 J. Watt jnr (Naples) to J. Watt snr (Birmingham), 20 May 1793.

⁷⁶ Stephen had an hour before his ship left. BCL MS 3219/6/2 D S. Delessert to J. Watt jnr, 1 March 1794.

⁷⁷ BCL MS 3219/4/124 J. Watt snr (Birmingham) to G. Hamilton, 16 March 1794.

⁷⁸ AP MS AFD V13S 1 M.-C. Delessert à Fakrenkruger Bargmans [et S. Delessert] (Hambourg), 2 janvier 1794. Etienne was first imprisoned in *Saint Jacques* at *Port-libre* (Port Royal). He was transferred to a better prison on *rue de Charonne* called *maison Belhomme*. Coninck, *Banquiers et philanthropes*, p. 27.

to Berne to find a counsel and to work on securing the release of her father.⁷⁹ It was another blow to a family suffering through the most violent period of the Revolution.

Delessert's arrest was chiefly a means of extorting money, through vague charges and prolonged confinement. Imprisoned at *Port-libre*, a prison near Passy in the environs of Paris, he had friends for conversation as well as access to a vast garden for exercise and clear air.⁸⁰ Such luxuries came at great expense. It was part of the corrupt practice of imprisoning the rich, wealth being Delessert's real crime. Samuel Romilly, a lawyer and close friend of the family, learned of the arrest through J.-A. Gautier, Delessert's son-in-law.⁸¹ Romilly received only limited information, but he knew enough to deduce the true cause, informing Dugald Stewart:

Enormous sums are exacted, nominally for the board of the prisoners, but, in truth, to enrich some of the members of the governing committees. The lives of the persons so imprisoned are not supposed to be in much danger, because their deaths would put an end to a source of wealth to the persons to whose protection they are committed: but, for the same reason, their imprisonment is likely to be of long duration.⁸²

The Delesserts used extended family and a shrewd defence to secure Etienne's release.

Delessert was charged with having dealings with foreign powers, but he was not technically a French citizen. He was accused as well of having ties to the aristocracy and possessing counter-revolutionary papers.⁸³ Vague charges were also made against his banking house.⁸⁴ In response Mme Gautier enlisted help from her uncle, Jean-Jacques Delessert, a *citoyen* of Cossonay. He argued that his brother was not told of the charges

⁷⁹ CII. S. Romilly to D. Stewart, 26 August 1794. Romilly, *Memoirs*, vol. 2: pp. 40-2.

⁸⁰ *Ibid.*; AP MS AFD V13S 1 M.-C. Delessert à Fahrenkruger Bargmann [S. Delessert], 2 janvier 1794.

⁸¹ CII. S. Romilly to D. Stewart, 26 August 1794. Romilly, *Memoirs*, vol. 2: p. 41.

⁸² *Ibid.*

⁸³ *Ibid.*, p. 41; and CIV. S. Romilly to D. Stewart 1795. *Ibid.*, pp. 46-9.

⁸⁴ This included having ties to foreign powers, being the most accredited bank in the "vile city" of Lyon, and for joined with C.-A. de Calonne to cause bankruptcies of Baron de St. James (1738-87) and others, to harm the public treasury. AP MS AFD V13S 1, "Extrait du motif de l'arrestation du Cit. Delessert," Convention Nationale, 11 frimaire l'an 2 (1 December 1793) de la Republic française une et Indivisible.

against him, that they were not made public, and he was charged as a French citizen but was a *bourgeois* and *citoyen* of Cossonay. Delessert had also, J.-J. Delessert argued, married in Switzerland, and had his children listed in its public registers, and his brothers and eighty-seven year old mother still lived there. J.-J. Delessert concluded that Delessert was a foreigner and *Convention nationale* decrees ruled that Swiss citizens be returned to its cantons.⁸⁵ It was a crafty defence. Delessert and his children were born in France, but as Huguenots had to obtain official Swiss documents for births and marriages. Now these documents were used in an effort to free Delessert. Mme Gautier, her family, and Swiss officials maintained pressure. On 27 July 1794 (*9 thermidor l'an II*), after Robespierre's fall, Delessert was moved to *Conciergerie* prison in the heart of Paris. After the death of Robespierre, Delessert went on trial and was cleared.⁸⁶ On 31 August (*14 fructidor l'an II*) he was recognized as a citizen of Geneva, freed,⁸⁷ and left France to join his family in Lausanne.⁸⁸ It was joyous reunion after a year of death and terror.

The British-Franco-Swiss network facilitated Stephen Delessert's escape across the Atlantic Ocean. A few months after arriving Stephen visited Baltimore from whence he sent details on America to James Watt junior in London. This was to help James decide if he would remain Britain bound, or emigrate like many of his friends. Stephen promised to send more information after completing his tour.⁸⁹ Unfortunately, his letters

⁸⁵ AP MS AFD V13S 1, Jean-Jacques Delessert, "Le consigné J.J. Delessert Citoyen de Cossonay, agissant au nom de tous ses parents, vient réclamer l'élargissement de son Frère, E. Delessert, Banquière a Paris." (Berne), 11 March 1794.

⁸⁶ Letter CIII. S. Romilly to M. Gautier, 14 October 1794. Romilly, *Memoirs*, vol. 2: p. 42; Letter CIV. S. Romilly to D. Stewart 1795, *Ibid.*, p. 46.

⁸⁷ AP MS AFD V13S 1, "Se Comité vu les pièces produites par le citoyen Delessert Suisse l'origine négociant a Paris," Convention Nationale, Comité de Sureté Générale et de Surveillance de la Convention Nationale, 14 fructidor l'an 2 (31 August 1794) de la Republic française une et Indivisible.

⁸⁸ Letter CIV. S. Romilly to D. Stewart 1795, Romilly, *Memoirs*, vol. 2: p. 46.

⁸⁹ BCL MS 3219/6/2/D 14. S. Delessert (Baltimore) to J. Watt jnr (London c.o Tuffen & Co.), 10 June 1794.

were delayed. By September 1794, James still had no word of Stephen's "safe arrival in the land of liberty," but he was confident and that Stephen had "become a Citizen of the United States and have laid the foundation of your new commercial establishment."⁹⁰

James' second assertion was correct, as *Jean-Etienne Delessert & Co.* had been well established. Stephen, however, did not live long enough to become an American citizen.

Violence in Europe interrupted but also helped expand the Delessert network. James' opportunity to contact Stephen came through the emigration of Robert Denison junior, the son to a leading English cotton manufacturer in Nottingham. Denison was forced, James told Stephen, to leave "this Country on account of the attacks made upon his property by Church & King mobs and is in search of an establishment for himself and family in a Country where difference of opinion upon political subjects is not deemed a sufficient reason for endangering a man's life, or laying wastes his property."⁹¹ The Denisons were Unitarians. In June 1794 arsonists attacked their workshops, located near their cotton mill. This was in response to Dennison senior signing a petition against the war with France. He did so following two years of persecution and prosecutions against Unitarians throughout the country.⁹² James asked Stephen to help Denison junior, who planned to start a commercial establishment to support his family in America.⁹³ In reference to the greater exodus from England James concluded to Stephen:

The number of persons who are emigrating here to America is very great & increasing daily. Mr. Cooper sailed for Philadelphia about a fortnight ago with his wife & family and will perhaps see you at New York. His views are subtly of an

⁹⁰ BCL MS 3219/4/129 J. Watt jnr (Soho) to S. Delessert (New York), 10 September 1794.

⁹¹ *Ibid.*

⁹² Michael R Watts, *The Dissenters: The Expansion of Evangelical Nonconformity* (Oxford: Clarendon Press, 1995), vol 2: pp. 352-5.

⁹³ BCL MS 3219/4/129 J. Watt jnr to S. Delessert, 10 September 1794. James also gave Denison a letter for Robert Morris junior (1769-1804). He met James at Soho in August 1794, acting as a land agent for his father. BCL MS 3219/4/129 J. Watt jnr (Soho) to Robert Morris jnr (Philadelphia), 1 September 1794.

oppositional nature and I fancy he will lose no time in firing upon his New Settlement on the Banks of the Susquehannah.⁹⁴

The idea of utopian British settlements on the banks of the Susquehanna River was a popular one in within radical circles. It drew Cooper and the Priestleys to Pennsylvania.

James' loyalty to family and business kept him in England, but he regretted not joining his friends in the 'land of liberty.' War continued in Europe, which James viewed as destructive and madness. He thought his "old enemy the sanguinary Robespierre," who spread much ruin, died too gently for a rogue who blemished the history of the French Revolution with blood.⁹⁵ James explained to Stephen that, despite his own past, he would remain tied to England and his family:

My father is upon the point of retiring from business and committing active management to me, so that you see I am tied down to this country and must either sink or swim with it. I certainly do hope to look forward to better times, but do not mean to have anything to do with politics until I am sufficiently independent to be able to do good to others, without doing harm to myself.⁹⁶

James had finally come to heed some of his father's advice on politics and business. The redirected focus of James' talents and energy proved to be a boon to Soho.

Enlightenment connections helped Stephen Delessert's escape to America and to set up a commercial firm, but did not prevent his death. He and his partner, Guillaume le Veillard *fils*, established *Jean-Etienne Delessert & Co.* in New York City in 1794.⁹⁷ They had support from the British-Franco-Swiss network and several leading American

⁹⁴ BCL MS 3219/4/129 J. Watt jnr to S. Delessert, 10 September 1794.

⁹⁵ Robespierre's punishment, James argued, should have been equal to his guilt. He hoped for a benevolent government to surface in France, for it to learn from Robespierre's tyranny, and that unfettered power would never again be entrusted to one person. James thought the crimes from the Revolution would stain France's history, and haunt the friends of humanity more than its enemies. *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ HL MS W2 – 5442-3. DPDN BP "Power of Attorney," for Etienne Delessert of Helvetia by Victor du Pont of New York, Merchant, 30 April 1802; *Ibid.*, 5444-5 "Power of Attorney," for Geneviève-Elizabeth Bellamy for Louis Guillaume de Vieillard, by Victor du Pont of New York, Merchant, 30 April 1802.

officials.⁹⁸ Their timing was critical, as each man's father was imprisoned in Paris. Le Veillard *père* had initially supported the Revolution, and was elected mayor of Passy in 1790. Yet he was condemned in 1793, as he had escorted the king on 10 August 1792 to the *Assemblée législative*, and was sent to the guillotine in June 1794.⁹⁹ Ill fortune also fell on the sons who were caught in a wave of Yellow Fever that hit New York in 1794. The epidemic took Stephen's life on 28 September,¹⁰⁰ and that of Le Veillard *fils*. There were, fortunately, survivors of the scourge. Stephen's brother Alexandre had immigrated as well, recovered from Yellow Fever, obtained citizenship after living in America for three years, and enabled the Delesserts to buy property in Rosendale, New York.¹⁰¹ New lives in America were not free from tragedy, but thousands of Europeans were forced to take risks in the 'New Continent' because war and revolution that ravaged their old one.

1794 was a ruinous year for the British-Franco-Swiss network. Assaults did not end with 1791 'Church and King' mob attacks on the property of reformers, Dissenters, and Lunar men. Loyalists continued to target reformers and their houses. This included John Wilkinson, as his Bradley works were threatened by a mob in 1794.¹⁰² Thomas

⁹⁸ Stephen carried an introduction from Gouverneur Morris (1752-1816), American ambassador to France. G. Morris (Paris) to J. Lowell (Boston), 27 January 1794. Ferri, *Lettres et manuscrits*, p. 45. Le Veillard had a letter, on a failed attempt to sail to America, from John Adams for his cousin Samuel Adams (1722-1803), indicating that Le Veillard was to start a mercantile business. J. Adams (Amsterdam) to S. Adams, 13 October 1780. John Adams, *Papers of John Adams* (Cambridge: Belknap Press, 1977), vol. 10: pp. 265-6. In 1793, J.-A. Gautier informed Thomas Jefferson that Le Veillard was departing for Philadelphia, to partner in a commercial house planned by French firms. J.-A. Gautier (Paris) à T. Jefferson, 25 mai 1793. T. Jefferson, *The Papers of Thomas Jefferson*, ed. John Catanzariti (Princeton: Princeton University Press, 1995), vol. 26: pp. 114. Le Veillard left *Goix, Cart, & Le Veillard* in 1794 to join Delessert. NYHS MS "William Le Veillard's Last Will and Testament, Surrogates Office City of New York. Made public and declared, 11 August 1789." Witnessed, Anthony Brunau, Pierre Malibran, and John Wilkes, Notary Public. Proved David Geleston, Surrogate of the County at the City of New York, 15 August 1795, pp. 530-3.

⁹⁹ Le Veillard, a *gentilhomme servant* to the king, was also accused of favouring the *fermiers généraux* and of conspiring in tyranny and despotism against the people. He was imprisoned in Luxembourg. Lopez, *Mon Cher Papa*, pp. 148-9; Smith et al., eds., *Correspondance générale d'Helvétius*, pp. 141-2 n. 1.

¹⁰⁰ Lasègue, *Musée botanique de M. Benjamin Delessert*, p. 43.

¹⁰¹ NYSL MS CFLP (SC7004) 9/48/9. Alexandre Delessert (Paris) to Lucas Elmendorph, (Councillor at law Kingston County of Ulster State of New York), 27 August 1804.

¹⁰² BCL MS JWP Box V. 30. J. Watt snr (Birmingham) to M. Boulton (London), 23 May 1794.

Walker was acquitted of conspiracy charges in 1794, as were the London reformers who faced treason trials. However, in 1793, less fortunate Scottish ‘Friends of Liberty’ had been sentenced to transportation to Botany Bay.¹⁰³ French antimonarchist mobs had attacked moderates in Paris in 1792, forcing survivors into hiding or exile. The terror intensified in 1793, spreading beyond Paris. J.-A. Gautier’s brother Jacob Gautier (1764-93) was killed during riots while serving as a member of the National Guard in Lyon.¹⁰⁴ A *Convention nationale* was established in Geneva, despite it being an independent republic. Officials, encouraged by Jacobins, made mass arrests on 10 July 1794. No guillotines were set up, but there were deaths, and 300-400 citizens were arrested. This included Pierre Prévost, though his confinement was brief.¹⁰⁵ Other members of the network were less fortunate. Antoine Lavoisier was imprisoned in *Port-Libre* in 1793, along with his father-in-law and several other tax collectors. On 8 May 1794, Lavoisier was sent to the guillotine (*19 Floreal l’an II*).¹⁰⁶ In July 1794, P.-S. Du Pont was also confined, in *La Force* prison. He and other moderates only escaped the guillotine with the Robespierre’s fall and death.¹⁰⁷ Unfortunately, disease also threatened their network.

15.5. Disease, Desperation, Death, and Revolutionary Medicine

Two other deaths in 1794 greatly impacted the British-Franco-Swiss network. They were the unexpected deaths Abraham Guyot and Jessy Watt, who died within days of one

¹⁰³ On the scandal and defences involved in these trials, see Goodwin, *The Friends of Liberty*, pp. 282-361.

¹⁰⁴ XCI. S. Romilly to E. Dumont, 15 September 1792; XCVII. S. Romilly to E. Dumont, 2 October 1793. Romilly, *Memoirs*, pp. 9-11; 26-7.

¹⁰⁵ Candolle, “Notice sur M. Pierre Prevost,” p. 4. James Cazenove’s relatives, Antoine-Charles (1775-1852) and Jean-Antoine (1770-1843), were also imprisoned. The brothers emigrated to America after their release. John Aspling and Anthony-Charles Cazenove, “Autobiographical Sketch of Anthony-Charles Cazenove: Political Refugee, Merchant, and Banker, 1775-1852,” *The Virginia Magazine of History and Biography* 78, no. 3 (1970), pp. 296-301.

¹⁰⁶ Charles Coulston Gillispie, *Science and Polity in France: The Revolutionary and Napoleonic Years* (Princeton: Princeton University Press, 2004), pp. 318-23.

¹⁰⁷ Robespierre was arrested 27 July and guillotined 28 July. Du Pont, *Life of Eleuthère*, vol. 2: pp. 307-21.

another. Guyot's lingering illness, likely bowel cancer, grew worse upon his arrival in Edinburgh. Thus he stayed there for the winter. For treatment he took medicines and spent two weeks at Dr Joseph Black's house. Black and Dr Alexander Monro II (1733-1817) each examined Guyot. Tumours in his bowels obstructed surrounding organs, complicating digestion. Drs Monro and Black prescribed laudanum and other palliatives, but they did not expect a recovery.¹⁰⁸ Guyot was fortunate to have access to expert help.

Guyot was a minor figure in late-Enlightenment science, but his vital role in the Delessert network led to friendship with leading Edinburgh *savants*. In May 1794, Black informed James Watt that Guyot was in a weakened state, was at peace with his situation, took relief in Black's care, and would not live long. Despite this, Guyot was concerned about the £50 that he had borrowed from Boulton & Watt. Black assured Watt that Guyot left sufficient funds to pay the debt with Sir W. Forbes, J. Hunter, & Co., who arranged for his final affairs.¹⁰⁹ Guyot died on 22 May.¹¹⁰ Black informed Watt, "our worthy friend Guyot expired, he was excessively weakened & emaciated & died with the greatest tranquillity, and with expression of being pleased with the attentions of his friends to the last."¹¹¹ Black did not note which of Guyot's Edinburgh friends surrounded him at death. Yet, they included many of its leading lights: Black, James Hutton, John Walker, William Forbes, James Hall, and Dugald Stewart. Guyot was an amateur scientist, or as he put it, a 'semi-philosophical friend' to leaders of science and industry. Though Guyot was a tutor, an experimenter, a member of scientific *académies* and societies – and a transmitter of

¹⁰⁸ BCL MS 3147/3/391 A. Guyot (Edinburgh) to J. Watt snr (Birmingham), 10 May 1794.

¹⁰⁹ BCL MS 3219/4/44 27 J. Black (Edinburgh) to J. Watt, 10 May 1794. Guyot left money, some earned in Edinburgh, with Forbes' bank to settle accounts. *Ibid.*, 26 J. Black (Edinburgh) to J. Watt, 6 June 1794.

¹¹⁰ Guyot's obituary notes that he was a member of several foreign academies, and had been a familiar figure in Geneva, Berlin, and Paris' literary circles. *Gentleman's Magazine*, 64 pt. 1 (1794), p. 577.

¹¹¹ BCL MS 3147/4/44 26. J. Black to J. Watt, 6 June 1794.

philosophical news, books, and materials – he remains an unheralded contributor to late eighteenth-century science. Guyot was not mourned in death *as* a leading figure of the Enlightenment, but his death was mourned *by* leading Enlightenment figures.

Watt was upset by the illness and death of Guyot,¹¹² but also preoccupied by his youngest daughter's consumption and death. After years of illness her health declined in the 1790s, becoming a grave concern in spring 1794. Jessy was a daughter of an engineer living in the provincial town of Birmingham. However, she had access to some of the best medical minds in Britain. The three physicians Watt consulted for her care were Dr Erasmus Darwin, who refused George III's requests on several occasions to become royal physician;¹¹³ Dr William Withering, the discoverer of digitalis; and Dr Thomas Beddoes, the pioneer of pneumatic medicine. Access to these great physicians came from Watt's membership in the Lunar Society. It did not ultimately save poor Jessy, but provided the best care available and some relief on her path to a painful death.

A host of treatments was employed by Watt to save his beloved daughter. It was hoped that Jessy would recover enough to be able to travel in the spring, to take airs and exercise on the Hampshire coast. There her health was to be supervised by Dr Withering, just returned from Lisbon, where he treated his own health. He too suffered pulmonary consumption and stayed in Hampshire for relaxation and the benefits of the sea air.¹¹⁴ As was common, Withering sent his medical advice to Watt by correspondence. Advice on "the mode of treatment" for Jessy also came from doctors Watt referred to as "on the

¹¹² Watt hoped a reversal in Guyot's condition would come from Dr Black's attentive care, noted that the money owed Boulton & Watt was of no consequence, especially given Guyot's health, and asked Black to be remembered to him. BCL MS 3147/4/12 J. Watt (Birmingham) to J. Black (Edinburgh) 15 May 1794.

¹¹³ G. C. Cook, "Dr Erasmus Darwin MD FRS (1731-1802): England's Greatest Physician?," in *The Genius of Erasmus Darwin*, ed. C. U. M. Smith and Robert Arnott (Burlington, 2005), p. 49.

¹¹⁴ BCL MS 3147/4/12 J. Watt to J. Black, 15 May 1794; Schofield, "The Lunar Society," p. 157.

spot.”¹¹⁵ Dr Darwin prescribed treatments, by letter and when he visited Jessy in person, over several months. He too believed she would benefit from a slow journey to England’s southern coast. Darwin also recommended a myriad of treatments for Jessy’s many ailments, such as cold baths, opium, and horizontal swinging “to induce sea-sickness.”¹¹⁶ Watt employed some of these methods, along with common medicines, several of which he found useful in treating Jessy’s symptoms. In late May, Jessy became worse. Watt sent for Darwin, who prescribed palliatives to treat Jessy’s fever and fits, but Darwin was not confident about her condition.¹¹⁷ With the failure of some rather conventional eighteenth-century medical remedies Watt turned to pioneering ones.

Watt grew receptive to radical methods, as treatment of sea air and exercise for Jessy were far off, and those given by Darwin and Watt were no curative. Watt had Dr Beddoes treat Jessy daily over a week, however, he too thought her condition hopeless. Beddoes had Jessy breathe fixed airs from, effervescing mixtures of pneumatics, that were placed close to her. Jessy “sometimes inhaled it mixt [*sic*] with atmospheric,” Watt told Black, “but without other apparent effect than it being grateful to her.”¹¹⁸ Aggressive fevers and seizures suffered by Jessy prevented them from trying other airs and active medicines. Watt found that yeast calmed her fits and he used it with other medicines. Ultimately, Jessy died of pulmonary consumption on 6 June 1794. Her troubling and

¹¹⁵ BCL MS 3147/4/12 J. Watt (Birmingham) to J. Black (Edinburgh) 9 June 1794.

¹¹⁶ Darwin’s other suggestions included frequent gentle exercise, covering in flannel, wine and water, rest, tincture of foxglove, tincture of cantor and laudanum, a special diet and methods to stimulate digestion, and yeast. BCL MS 3219/4/23/28 28. E. Darwin (Derby) to J. Watt snr (Birmingham), 13 December 1793; *Ibid.*, 29. E. Darwin (Derby) to J. Watt snr (Heathfield), 1 January 1794, *Ibid.*, 30. E. Darwin (Derby) to [Anne Watt], 12 March 1794; *Ibid.*, 31. E. Darwin (Derby) to J. Watt snr (Heathfield), 25 April 1794, *Ibid.*, 32. E. Darwin [Derby] to J. Watt snr (Heathfield), 25 May 1794.

¹¹⁷ The medicines Watt employed included, common palliatives, julep with oyster shells, Magnesium and salt of tartar, myrrh and tonic medicine, yeast. BCL MS 3147/4/12 J. Watt snr to J. Black, 15 May 1794; *Ibid.*, 3219/4/124 J. Watt snr (Birmingham) to E. Darwin, 19 May 1794; *Ibid.*, JWP Box V. 30. J. Watt snr (Birmingham) to M. Boulton (London), 23 May 1794; *Ibid.*, 4/12 J. Watt snr to J. Black, 9 June 1794.

¹¹⁸ *Ibid.*

convulsive cough, as well as high fever and fast pulse, delivered a haemorrhage of the lungs and death a few minutes later. Watt informed Black that had this not happened, Jessy may have remained in pain for several more days, but her disease was too advanced to expect any realistic chance of recovery.¹¹⁹ Jessy and Guyot suffered their afflictions for years, and in concert when he visited Birmingham. Their deaths, within a fortnight of one another, devastated parts of the British-Franco-Swiss network. Guyot and Jessy's links to this network did not save their lives, but did provide access to preeminent physicians, as well as medicine that made their last days moderately easier.

Desperation and revolutionary advances in chemistry led *savants* to hope for its application in medicine. In 1794, Watt declared to Joseph Banks: "Mankind have been long enough occasionally poisoned by the channel of the lungs, let us try if we cannot receive medicines by the same ~~channel~~ way. Bright hopes are held out & the chances of doing evil is small, for we cannot much anticipate the fate of consumptive patients nor add to the sufferings of the paralytic nor the cancerous."¹²⁰ It was too late for a cancerous patient like Guyot, but despair led Watt to treat a consumptive Jessy with airs. They did not cure her, but Jessy's treatment is significant on two counts. Firstly, she had unique access to, and was one of the first patients treated with, Beddoes' pneumatic medicine. Beddoes reported that he and Watt had "applied airs as well as we cd. to her great ease, though she died before we cd. get a proper apparatus made." Watt began working on the invention within days of Beddoes seeing Jessy, and later finished "a domestic apparatus for procuring & holding airs."¹²¹ This led to the second outcome of Jessy's illness. Watt's

¹¹⁹ *Ibid.* See Trevor H. Levere and David Philip Miller, "Inhale it and See? The Collaboration between Thomas Beddoes and James Watt in Pneumatic Medicine," *Ambix* 55 (2008), pp. 5-8.

¹²⁰ BCL MS 3147/4/65 28, J. Watt "Copy Letter to S^r Banks," 7 December 1794.

¹²¹ T. Beddoes to J. Wedgwood, 12 August [1795]. Quoted in Levere, "Dr Thomas Beddoes," p. 214.

descriptions and drawings of his apparatus, and Beddoes' accounts of experiments using it on animals, were later published. As with Watt's letter to Banks, this was part of a comprehensive effort to solicit subscriptions and establish Beddoes' Pneumatic Institution in Bristol. By 1798, the campaign was successful.¹²²

Beddoes' institution did not produce the medical breakthroughs sought by he and his supporters, but its formation and operation represent several notable achievements. Watt and Beddoes' partnership in pneumatic medicine attracted wide interest, inspiring like collaborations between physicians and engineers on the Continent.¹²³ Gregory Watt's consumption, like that of his sister, impacted Beddoes' institution and science by helping launch Humphry Davy's career. He served as Beddoes' assistant and their circle included several men who later influenced British science and literature.¹²⁴ James Watt indicated in the early stages that the institution would test "the efficacy of factitious airs in various fatal diseases in a more effectual manner than can be done by private practitioners."¹²⁵ As an organizational model, for a new way of practicing institutional experimental medicine, the institution succeeded in this aim. It was aided by being established through a public subscription campaign. This emerged as a popular method to establish institutions or societies, dedicated to science and industry, instead of relying on traditional forms of patronage. Remarkably, a medical institute run by the vocal democrat Beddoes, using new radical experiments on animals and humans, employing chemistry associated with

¹²² *Ibid.*, pp. 213-6; BCL MS 3147/4/65 28, J. Watt "Copy Letter to S^r Banks," 7 December 1794.

¹²³ BCL MS 3219/4/29 21. L. Odier to T. Beddoes, 3 September 1797 [Copy]; "Médecine," *Bibliothèque britannique*, pp. 309-10.

¹²⁴ For this gathering of poets and scientists see Fullmer, *Young Humphry Davy*, pp. 86-7; 121-52; Margaret C. Jacob and Michael J. Sauter, "Why did Humphry Davy and Associates not Pursue the Pain-Alleviating Effects of Nitrous Oxide?," *Journal of the History of Medicine and Allied Sciences* 57, no. 2 (2002), pp. 162-76. Many people linked to Beddoes' circle went to Bristol to breathe nitrous oxide (laughing gas), including several tied to the Lunar Society. Levere, "Dr Thomas Beddoes," pp. 209-21.

¹²⁵ BCL MS 3147/4/65 28, J. Watt "Copy Letter to S^r Banks," 7 December 1794.

France and distrusted by the British establishment, and supported mainly by provincial and Scottish contributors tied to the Lunar Society, was established during a British-Franco war, the French Revolution, and a time of repressive and reactionary law in Britain.¹²⁶ The establishment of institutions, practically applying science to medical or social ills and based on subscription campaigns, continued into the nineteenth century.

15.6. Conclusion

Revolutions disrupted Europe but also precipitated the British-Franco-Swiss expansion to America. During the turbulent 1790s, members were harried on multiple sides by mobs of varying political stripes. Fortunately, the network sustained victims of the mobs. War and instability obstructed science, industry, and commerce. Nevertheless, *savant-fabricants* continued working in fields where “genius applied to useful works” might increase “the enjoyment of life.”¹²⁷ This included pneumatic medicine. A perception of a need for expanded enlightenment led M.-A. and Charles Pictet start *Bibliothèque britannique* in 1796, in Geneva. It was a valuable resource for the diffusion of British literature and science. In this same period new industries were begun in America. They were aided by connections made with the flow of Europeans across the Atlantic Ocean in this period. The return of stability in Europe enabled members of the Delessert network to start building a new society. Their measures included founding philanthropic soup establishments and societies to encourage industry and agriculture. In 1802, the Peace of Amiens temporarily ended one British-Franco war. This resulted in a rush of traffic over the English Channel and the Atlantic Ocean.

¹²⁶ Trevor H. Levere, “Dr Thomas Beddoes: Chemistry, Medicine, and the Perils of Democracy,” *Notes and Records of the Royal Society* 63, no. 3 (2009), pp. 215-29; Stewart, “His Majesty's Subjects,” pp. 231-41.

¹²⁷ Fulton said this referring to Watt. BCL MS 3219/6/2 F. R. Fulton (Paris) to J. Watt jnr, 5 February 1802.

16. The Twilight of Enlightenment: The British-Franco-Swiss Network and its Post-1801 Cross-Channel Traffic

Revealing examples of what was lost by a decade of political revolution and war became clear during the peace of 1801-2. Scientific and industrial collaborations flourished as Enlightenment networks reconnected. On 4 October 1802, R. L. Edgeworth crossed the Channel to Calais with his daughter Maria, an accomplished author, and other family members.¹ They were part the swarms of Britons travelling to France, around the Peace of Amiens, for the first time since the French Revolution. Peace inspired a desire to see the changes wrought by war. Edgeworth had contacted M.-A. Pictet, who visited had them at Edgeworthstown in 1801, to attain recommendations and advice for their visit.² Pictet noted that their name was a sufficient introduction, as Maria and Edgeworth's *Practical Education* insured they were "as well known at Paris as any celebrated French author."³ Their profile was raised further by Pictet's report of his visit, and translations from their book, in the *Bibliothèque britannique*.⁴ Yet, Pictet did recommend them to one family: "Only I recommend you to call, as soon as you are at Paris, on Mad^e *Gautier de l'Essert* rue Coquéron a young widow who has lived some time in England, speaks English and is fond of you and your daughter. She is a distinguished character, and so is her brother *Benjamin Del'Essert*, a French Rumford."⁵ This was a useful introduction.

The Delesserts acquainted the Edgeworths with Paris' great scientific and cultural milieux. Like many prominent visitors the Edgeworths felt at home with the Delesserts in 1802, a great year in the twilight of the Enlightenment. International *savants* mingled in

¹ NLI MS 10166/7 314. Charlotte Edgeworth (Paris) to Emmeline King (London), 29 October 1802.

² R. L. Edgeworth (Edgeworthstown) to M.-A. Pictet (Geneva), 22 December [1801], in Häusermann, *The Genevese Background*, pp. 60-1.

³ Pictet's account of his visit to Edgeworthstown had appeared in his journal the month before (January 1802 p. 107.) [M.-A. Pictet to R. L. Edgeworth from Copie-Letters], 15 February 1802, in *Ibid.*, pp. 61-2.

⁴ *Ibid.*, p. 31

⁵ *Ibid.*, p. 62. The other recommendations Pictet were Mme Lavoisier and the Stael-Necker family.

the salons of the *hôtel Delessert* in a continuation of the salon and journalistic culture of pre-revolution France. Links between scientific acquaintances, limited by a decade of war to letters, were re-established. Survivors of the tumultuous 1790s, joined efforts to extend philanthropy, encourage industry, and reform agriculture. Bourgeois measures in Paris displayed more unity than aristocratic ones in London. The *hôtel Delessert*, a British-Franco-Swiss nexus, extended Enlightenment from Geneva to Edinburgh and beyond.

16.1. Cross-Channel Traffic Before the Peace: Gautier-Delessert

By the time the Edgeworth family arrived in Paris in late October 1802, there had been a steady flow of British and Franco-Swiss traffic over the Channel. The English sojourn of Madeleine and J.-A. Gautier had both social and commercial motivations. They moved to London 1799.⁶ Gautier had taken over the banking house *Grand & Cie* in 1794, with the death of R. F. Grand.⁷ The firm did much business with America, facilitating Gautier's ties to Benjamin Franklin and Thomas Jefferson. In 1795, Gautier began his own firm: *J.-A. Gautier & Cie*.⁸ His links to the Necker family, association with Grand, and marriage to Etienne Delessert's daughter, established him in European finance. Gautier also opened a branch in Hamburg in this period,⁹ in addition to the one he set up in London. P.-S. du Pont de Nemours, after arriving in New York to found his own commercial house, contacted Gautier to commend him on the London expansion.¹⁰

⁶ CXV. Etienne Dumont (Hastings) à S. Romilly, 4 août 1799. Romilly, *Memoirs*, pp. 68-70.

⁷ Gautier trained under Jacques Necker in Paris before working for *Grand & Cie* with Rodolphe-Ferdinand Grand (1726-94). Grand, a friend and neighbour to Franklin in Passy, acted as a banker for French aid to America after its revolution. Thomas J. Schaeper, *France and America During the Revolutionary Era: The Life of Jacques-Donatien Leray de Chaumont, 1725-1803* (New York: Berghahn Books, 1995), pp. 96-9.

⁸ J.-A. Gautier to T. Jefferson, 24 March 1795; *Grand & Cie*, and *Gautier & Cie* to T. Jefferson, 24 March 1795. Jefferson, *The Papers of Thomas Jefferson*, vol. 28: pp. 317-8.

⁹ J.-A. Gautier and M.-M. Delessert married in 1789. Szramkiewicz, *Les régents et censeurs*, p. 78, n. 6.

¹⁰ HL MS W2-589. DPDN C. P.-S. du Pont de Nemours à J.-A. Gautier, 26 pluviôse de l'année VIII.

Late-Enlightenment traffic ensured that the Gautiers had many friends in Britain. They lived with their two children at a house in London, and also stayed in Chelsea.¹¹ Visits with Samuel and Anne Romilly, and son William (1798-1855), led to discussions on the formation of ideas. Etienne Dumont reread Thomas Day's *Sandford and Merton*, and cautioned his friends against rushing education. Mme Gautier had earlier assured Romilly that she would raise her children with Rousseau's *Émile* as her guide.¹² Dumont and Romilly were also eager for the Gautiers' reflections, from inside the storm of the French Revolution, and Gautier's thoughts on changes since his last stay in England.¹³

The Gautiers' stay in England saw a reunion between Passy and Soho, which was again facilitated by the Delucs at Windsor. The Gautiers were disappointed that Boulton cancelled a visit to them in London, and at missing M. R. Boulton and James Watt who had called on them. Gautier asked to be told of Boulton's return.¹⁴ More significantly, Mme Gautier repaid Boulton's 1786 visit, by calling on him and his daughter at Soho.

Mme Gautier's visit to Soho represents a rare documented description of a tour by a woman. She and her husband, who arrived in late summer of 1800, were among many Franco-Swiss visitors to Soho. A description of Mme Gautier's "overflowing heart," and praise of Boulton's "great & uncommon benevolence," was relayed by Frances Deluc:

'Of all the interesting things to be seen at Soho['] Says [Mme Gautier] 'M^r. Boulton himself is the most interesting, we passed an evening listening to him, & we wished he had never ceased to speak; we would have heard him constantly without having another wish; he is an inexhaustible mine of precious Knowledge, & of every thing that is amiable; he treated us with the utmost Kindness & made us travel through a Country of Wonders! We felt a real sorrow in parting with him

¹¹ BCL MS MBP 228 300 F. Deluc (Greys-Walk) to M. Boulton (Soho), 4 June 1800.

¹² LXXXVI. M. Gautier à S. Romilly, 1791. Romilly, *Memoirs*, vol. 1: pp. 450-3. CXV. E. Dumont (Hastings) à S. Romilly, 4 août 1799. *Ibid.*, vol. 2: pp. 68-70.

¹³ *Ibid.*; CXVII. S. Romilly (Coves) to M. Gautier, 29 September 1800. *Ibid.*, pp. 68-75.

¹⁴ BCL MS MBP 228 300 F. Deluc (Greys-Walk) to M. Boulton (Soho), 4 June 1800.

acquisitions of Genius are so rare; that one could value sufficiently all the instances of their company.’¹⁵

Mme Gautier was no stranger to science and technology. After finally seeing the wonders of Birmingham, as her brothers had years before, she was amazed most by its proprietor. They continued, despite a decade separated by war and revolution, to praise one another.

J.-A. Gautier’s declining health led to a shortened stay in Soho, and ultimately to his family’s return to France. Illness diminished his ability to complete affairs required for his London bank, delaying their departure weeks. They encouraged Boulton to return to visit them at Passy, offering to fulfil any request he had for them.¹⁶ Boulton agreed that Gautier should not suffer a British winter, hoped to see them return, and extended his invitation to the Delesserts: “I shall be truly happy to see an[y of] them at Soho where they will find peace [MS. illegible] & Liberty, with a hearty welcome in spite of politicks or wars.”¹⁷ Soho, like Passy, remained open to this network during war, and flourished in peace. For Gautier it was not war, nor politics, but disease that chased him from England. Its climate plagued his health. The hope was to have him recover, by spending the winter in Geneva, and then return to England. Frances Deluc concluded to Boulton that, as the Gautiers were so descent and amiable, it would have been a great acquisition to have kept them in London or its suburbs.¹⁸ Their departure was a missed opportunity for all parties.

Gautier’s failing health also prevented a Scottish tour. Sentiments in Edinburgh mirrored those in Birmingham and London. Dugald Stewart regretted that ill health prevented the Gautiers’ desired visit. He had anticipated hosting them and introducing

¹⁵ BCL MS MBP 228 301 F. Deluc (Windsor) to M. Boulton, 7 September 1800.

¹⁶ BCL MS MBP 234 Letter Box G1 117. J.-A. Gautier (London 31 Hatton Garden) to M. Boulton (Soho), 7 October 1800; *Ibid.*, 119. M. Gautier (Londres) à M. Boulton (Soho), 27 octobre 1800.

¹⁷ BCL MS MBP 234 Letter Box G1 118. M. Boulton (Soho) to J.-A. Gautier, 22 October 1800.

¹⁸ *Ibid.*; BCL MS MBP 228 301 F. Deluc to M. Boulton, 7 September 1800.

them to his circle in Edinburgh. Conversely, Stewart hoped they would visit in the future, and extended his hospitality to their friends “led by curiosity or business to this part of the World.” Stewart was also confident that Gautier would recover, in a milder and more stable climate, and hoped European affairs would stay calm and not disturb them.¹⁹

The Gautiers crossed the Channel in November 1800 during a great storm, which was taken by some as portents. Their ship was blown off course to Ostend instead of Calais.²⁰ J.-A. Deluc, then living in Berlin, experienced this storm and declared to his daughter: “Storms of another nature are much more threatening to us, that Society seems nearly dissolved, that no moral ties remain between man & man, & that the progress of the French are so great that they make one tremble.”²¹ Deluc’s pious Calvinism informed his scientific interests and he feared French republicanism.²² This had abated by 1801-2, and France enjoyed a brief respite, only to be replaced by Napoleon’s despotism. Storms were also emblematic of Gautier’s future. British friends were delayed in learning of the family’s return. Gautier’s health declined, he did not make it to Geneva, and he died in Paris on 23 December 1800.²³ Unfortunately his health like Europe’s peace was tenuous.

16.2. Cross-Channel Traffic Before the Peace: François Delessert

Uncertainty over British-Franco peace prevented François Delessert from attending the Edinburgh University, but not from visiting Soho. Stability in 1783 had enabled his two eldest brothers to spend three years in Britain. Dugald Stewart, who had helped establish

¹⁹ BGE Ms fr. 9118/4 fol. 96-7. CBD. D. Stewart (Edinburgh) to J.-A. Gautier (London), 9 October 1800.

²⁰ Frances too witnessed the storm, likely on 9 November. BCL MS MBP 228 303 F. Deluc (Bath) to M. Boulton, 3 January 1801. Mme Gautier told Boulton in October that they would soon depart. BCL MS MBP 234 Letter Box G1 119. M. Gautier à M. Boulton, 27 octobre 1800. Haarlem’s Academy of Science later sought to solve “the cause of violent tempests,” listing 9 November 1800 for evidence. Academy of Sciences at Haarlem, “Annual Meeting of the Academy of Sciences at Haarlem,” *The Magazine of Natural History and Journal of Zoology, Botany, Mineralogy, Geology and Meteorology*, August 1838, p. 450.

²¹ Frances passed on Deluc’s words. BCL MS MBP 228 303 F. Deluc to M. Boulton, 3 January 1801.

²² BCL MS 3147/4/65 21. J. Lind (Windsor) to J. Watt snr (Birmingham), 20 February 1795.

²³ Galiffe, *Notices généalogiques*, vol. 2: p. 605.

them in Edinburgh, expected to do the same for François. However, the Delesserts feared looming war, and suffered J.-A. Gautier's untimely death. Stewart learned of it in a letter from Mme Gautier, transmitted by M.-A. Pictet to Scotland. Hope endured for François' sojourn. Mme Delessert's plan to send François there pleased Stewart, who expected to again connect with her family and believed that the university excelled in education.²⁴ Despite Stewart's promise of hospitality, and Mme Delessert's intent, François did not study in Scotland. He made a brief English tour, but it was dictated by affairs in France.

Traffic over the Channel increased as the Peace of 1802 neared, but its duration was tenuous. Peace facilitated Grand Tours, as it had in 1763 and 1783, but those in 1801-2 were brief. François Delessert arrived in London in late 1801 with a letter from Etienne Dumont to Jeremy Bentham, part of a tradition of transmitting material between the *hôtel Delessert* and Bowood. Dumont, acting as travelling a tutor to Lord Shelburne's son, tried to lure a solitary Bentham to Paris.²⁵ Through François, Frances Deluc at last had word from Mme Gautier. The Delucs maintained a conduit between London and Birmingham, as the Delesserts did between Paris and Britain. François also brought updates on Gregory Watt's improved health and French, as the Delesserts saw him often in Paris. After François arrived in London his brother-in-law Gautier died. This event put François' visit to Birmingham in jeopardy, but he remained determined to see Soho.²⁶

Despite the uncertainty and brevity of François' tour he was, aside from Abraham Guyot and Gautier, the fourth Delessert to see the mechanical wonders of Soho. François arrived with a letter of introduction from Gregory Watt to his brother James. Given the

²⁴ BGE Ms fr. 9118/4 fol. 98-9. CBD. D. Stewart (Edinburgh) to M.-M. Gautier, 28 August 1801.

²⁵ François' delay led Dumont to find another way to send almanacs and to tease Bentham. 1676. E. Dumont (Paris) à J. Bentham (Londres), 27 novembre 1801. Bentham, *The Correspondence*, vol. 6: p. 457.

²⁶ Gregory advanced in French, and had been ill but was currently healthy. The Delucs found François very amiable. BCL MS MBP 228 307 F. Deluc (Windsor) to M. Boulton (Soho), 27 December [1801].

short stay Gregory asked his brother to make François' time as enjoyable as he could.²⁷ In January, François made it to Soho with his friend, a son of Antoine François Haldimand (1741-1817). They stayed a day, though Watt senior sought to have them stay longer. The pair was eager, despite snow, to move north to see the industrial cities of Liverpool and Manchester. François expected to start his return journey to France by late January.²⁸ On his visit François saw Soho's wonders and the Watts. Mme Gautier regretted not seeing the Watts, as they were in Scotland, on her tour but she did see Gregory often in Paris.

16.3. Cross-Channel Traffic Before the Peace: Watt, Pictet, and Rumford

Gregory Watt visited the Continent in 1801, to pursue his passion for geology and to recover his health. In 1794, he had joined the Boulton & Watt partnership, as it expanded to include their sons, and had graduated with distinction from Glasgow in 1796. Gregory was afflicted by pulmonary consumption, which killed his sister Jessy in 1794 and took Gregory in 1804. James Watt sent him to Cornwall in 1797, in an early effort to improve his health. Gregory lodged with the family of a young Humphry Davy, and was essential in bringing Davy to the notice of Thomas Beddoes.²⁹ Beddoes hired Davy to work at the Pneumatic Institute in Bristol.³⁰ Davy remained until 1801, leaving to work as Chemical Lecturer and Director of Laboratories at the Royal Institution in London, founded by

²⁷ BCL MS JWP C2/10 10. G. Watt (Paris) to J. Watt jnr (Soho), 1801.

²⁸ BCL MS 3219/4/125 J. Watt snr. (Heathfield) to G. Watt, 25 January 1802; BGE MS 4243 f. 187-93. AMC. F. Delessert (Paris) à A. Marcet (chez A. F. Haldimand Londres), juin 1802. This was likely William François Haldimand (1784-1862). His sister, Jane Marcet (1769-1858), and family took part in banking, education, and science. Claire Etcheagaray et al., "The Correspondence of Dugald Stewart, Pierre Prevost, and their Circle, 1794–1829," *History of European Ideas* 38, no. 1 (2012), p. 66 n. 137, p. 30 n. 39.

²⁹ Hugh S. Torrens, "The Geological Work of Gregory Watt, his travels with William Maclure in Italy (1801–1802), and Watt's 'proto-geological' map of Italy (1804)," *Geological Society of America Special Papers* 411 (2006), p. 180; BCL MS JWP W/9 T. Beddoes to J. Watt snr, 15 July 1798.

³⁰ Levere, "Dr Thomas Beddoes," pp. 209-15.

Count Rumford.³¹ Later in 1801 Gregory met Rumford in Paris. They toured its great scientific establishments and Rumford introduced Gregory to leading French *savants*.³²

Several visitors to the Continent in 1801, before the peace, were motivated by scientific interests. This required particular documents. Gregory Watt was able to obtain them,³³ as had Rumford and M.-A. Pictet who left London together in September 1801.³⁴ They had corresponded for years but only met in 1801, on Pictet's fourth trip to England. Rumford, about a year into their epistolary exchange, inquired into Pictet's proficiency in English.³⁵ Pictet replied that he lived England for over a year in 1775-6, managed to learn English, and developed "a great partiality for England and your countrymen in general."³⁶ Through Geneva's difficult economic period during the French Revolution Pictet took on English boarders, and taught natural philosophy courses on mineralogy and chemistry in English.³⁷ Pictet explained to Rumford how political revolution spawned his journal:

We were since revolutioned, undone here; my personal resources were destroyed, and my situation much embittered by public hardships added to domestic difficulties. I weathered the tempest as well as I could, contributed perhaps to keep alive the sacred fire in our academy which escaped, unhurt, the revolutionary whirlwind. As soon as the weather became tolerable I put a new sail to my ship (again in English cloth) and our *Bibliothèque Britannique*, undertaken by three persons only, my brother, M. Maurice and myself, all three nearly in the same circumstances, will I hope bring us fairly honourably to port.³⁸

³¹ Count Rumford (Royal Institution) to Humphry Davy, 16 February 1801. Bence Jones, *The Royal Institution, Its Founder and Its First Professors* (New York: Arno Press, 1975), pp. 317-321.

³² Rumford introduced Gregory to Gaspard-Clair-François-Marie Riche de Prony (1755-1839), and Jean-Henri Hassenfratz (1755-1827). Some of the other luminaries Gregory met with included C.-L. Berthollet, Nicolas-Louis Vauquelin (1763-1829), Luigi Vincenzo Brugnatelli (1761-1827) and Alessandro Volta. BCL MS JWP C2/10 9. G. Watt (Paris) to J. Watt jnr (Soho), 8 November 1801.

³³ The Peace was only concluded on 25 March 1802. Gregory had to obtain a passport from French officials and a British licence of permission to travel. The latter was granted by the Duke of Portland (23 July 1801). Gavin de Beer, "Gregory Watt's Tour on the Continent, 1801," *Annals of Science* 13, no. 3 (1957), p. 127.

³⁴ Pictet and Rumford managed the feat of obtaining special passports through Rumford's benefactor Lord Pelham (1756-1826). Bickerton, *Marc-Auguste and Charles Pictet: the Bibliothèque britannique*, p. 137.

³⁵ 13) C. Rumford (Munich) to M.-A. Pictet, 17 June 1797. Pictet, *Correspondance*, vol. 3: pp. 518-9.

³⁶ 15) M.-A. Pictet to C. Rumford, 7 July 1797. *Ibid.*, vol. 3: p. 521.

³⁷ *Ibid.*, pp. 521-2.

³⁸ *Ibid.*, p. 522. Frédéric-Guillaume Maurice (1750-1826), an agronomist, helped found the journal.

It was in an endeavour to grow the journal that Pictet first contacted Rumford in 1796.³⁹ Translations of Rumford's scientific work became a fixture in Pictet's journal.

The editors of the *Bibliothèque britannique* were plagued in its early years by incessant problems of finding contributors, subscribers, and transmitters. They sought aid from the Swiss diaspora to transmit materials from Britain to Geneva. Etienne Dumont, J.-A. Gautier, E.-S. Reybaz, François d'Ivernois, Alexander Marcet and P.-F. Prévost were called on in Britain and France to assist the journal.⁴⁰ Problems with Prévost (and a need to increase British subscribers, contributors, and contacts) brought Pictet to England in 1798. Rumford was then in Munich, they missed meeting by a matter of days, but had been appointed to a post in London by his German patron.⁴¹ Pictet relied on the British-Franco-Swiss network and found *savants* and publications to benefit his periodical.⁴²

Rumford and Pictet finally met in 1801. Pictet returned despite his roles editing and translating his journal, performing experiments, and as professor at the *Académie*. Rumford invited Pictet to lodge with him in London and to see the newly established Royal Institution. Pictet's visit was not restricted to London. In letters to Rumford and a public notice soliciting for his journal, Pictet stated his design of promoting it in Britain's "three Kingdoms."⁴³ He made on a hurried tour of the British Isles visiting educational, philanthropic, geological, agricultural, and industrial sites, which he chronicled in *Voyage*

³⁹ 1) M.-A. Pictet to C. Rumford, 18 August 1796. Pictet, *Correspondance*, vol. 3: pp. 496-7.

⁴⁰ Bickerton, *Marc-Auguste and Charles Pictet*, p. 115, 347-8.

⁴¹ Elector Karl Theodor (1724-99) of Bavaria appointed Rumford Minister Plenipotentiary at the London. Pictet sought to replace Prévost who failing to send material. 42) C. Rumford (Munich) to M.-A. Pictet, 18 August 1798; 43) M. A. Pictet to C. Rumford, 17 August 1798. Pictet, *Correspondance*, vol. 3: pp. 550-2.

⁴² Pictet failed to meet Charles Blagden and Joseph Banks. In Paris, Pictet's circle included the Gautiers, Delesserts, Candolle, Odier, Mallet, J.-C. de Lamétherie and Alexander von Humboldt. Pictet depended on the Bowood and Franco-Swiss circles in London. Bickerton, *Marc-Auguste and Charles Pictet*, pp. 124-9.

⁴³ They again almost missed meeting. Pictet could not leave until his courses finished in May and Rumford cancelled a return visit to America after being recalled to Bavaria. 50) C. Rumford to M.-A. Pictet, 27 August 1800; 53) M.-A. Pictet to C. Rumford, 6 January 1801; 54) C. Rumford to M.-A. Pictet, 20 January 1801; 56) M.-A. Pictet to C. Rumford 15 March 1801. Pictet, *Correspondance*, vol. 3: pp. 561-70.

en trois mois en Angleterre, en Ecosse, et en Irlande (1802). He collected material for his journal and instruments for experiments. Pictet also made acquaintances with professors in Edinburgh, as well as Richard Kirwan and the Edgeworths in Ireland.⁴⁴ This urgent pace was unnecessary. Pictet was, upon his return to London, stranded with Rumford for weeks. They had to wait for an embargo to end to cross the Channel to the Continent.⁴⁵

16.4. Aristocratic or Baconian Science: The Royal Institution versus Soho

The utilitarian benefits Count Rumford sought from science were how it could benefit the state, not his own livelihood. He had long supported himself, and his scientific work, with wealthy patrons and ample pensions. This practice tied into his philanthropic and reform measures in Bavaria. Feeding the poor cheap hearty soups, for them to labour fabricating military uniforms in workhouses, insured numerous state benefits.⁴⁶ Rumford took part in similar reform measures in England, and directed the founding of the Royal Institution of London. He had first conceived of it in 1796, as Pictet was establishing the *Bibliothèque britannique*. This institution, like other institutions founded at this time, was subscription-based and aimed to diffuse knowledge, reduce poverty, and encourage industry. However, conflicts between Baconian and aristocratic visions of science, and ones from Rumford's style of management, led to the Royal Institution realizing few of its founding principles.

The Royal Institution was a creation of a confluence of science, industry, and philanthropy in the 1790s. Before Rumford departed London in 1795, after a British tour promoting his methods, he provided Thomas Bernard (1750-1818) a plan for setting up soup establishments and workhouses. Bernard, a rich lawyer who had studied at Harvard

⁴⁴ Marc-Auguste Pictet, *Voyage de trois mois en Angleterre, en Ecosse, et en Irlande pendant l'été de l'an IX (1801 v. st.)* (Genève: Impr. de la Bibliothèque britannique, 1802), pp. 1-250.

⁴⁵ Pictet had Pierre Prévost cover his lectures. Bickerton, *Marc-Auguste and Charles Pictet*, pp. 136-7.

⁴⁶ Jones, *The Royal Institution*, pp. 27-45; Brown, *Benjamin Thompson*, pp. 98-135.

and knew Rumford in America, was a devoted philanthropist. Rumford's plan was based on his Munich reforms and used by Bernard to establish the Society for Bettering the Conditions and Increasing the Comfort of the Poor in 1796. It attained royal patronage and fostered the creation of the Royal Institution.⁴⁷ Bernard encouraged and discussed the idea with Rumford after his return from Munich in 1798. They met other philanthropists at Bernard's rooms in London's Foundling Hospital, where he was treasurer. After a few meetings a committee formed, within the Bettering Society, to work with Rumford to plan the institution. As the project progressed it took on wealthy subscribers and official status. In meetings of the general proprietors, at Joseph Banks' home in Soho Square in March 1799, a management structure was devised and they agreed to seek royal sanction. Proprietors included lords, earls, baronets, gentlemen, and politicians. Rumford, Bernard, Banks, and Henry Cavendish were among the proprietors who became managers.⁴⁸

The Royal Institution's managers, considering its aims to diffuse knowledge and encourage industry, selected well for its first professor. In 1799, Rumford informed Pictet that they had £8000 in subscriptions, bought a house in London, attained patronage and a charter and from George III, and hired Dr Thomas Garnett (1766-1802) as professor of natural philosophy and chemistry to give public lectures. Rumford conceded that much work remained, and that there was antipathy to such enterprises in Britain.⁴⁹ This may have been partially overcome had Garnett been better accommodated. In 1797, Garnett had procured a pneumatic apparatus, for Anderson's Institution in Glasgow where he

⁴⁷ Rumford's plan included his stove improvements, "Proposals for Forming, by Private Subscription, an Establishment for Feeding the Poor, and Giving Them useful Employment; And also for furnishing Food at a cheap Rate to others who may stand in need of such Assistance," (1796). Bernard, whose father was final British governor of Massachusetts, married well and left law. Fullmer, *Young Humphry Davy*, pp. 322-5.

⁴⁸ Jones, *The Royal Institution*, pp. 55-6, 114-40.

⁴⁹ 44) C. Rumford (Brompton Row) to M.-A. Pictet, 27 October 1799. Pictet, *Correspondance*, vol. 3: pp. 552-3.

taught, from James Watt. Garnett toured English towns as an itinerant lecturer in summer, and sent a syllabus to Watt to gauge interest among Birmingham manufactures.⁵⁰ It must have been high as Watt's friend Dr John Carmichael thought Garnett had "created a taste in the rising generation for chemistry by showing them its utility and connection with the different manufactures."⁵¹ Garnett's lectures used working models to explain machines or mathematics and experiments to exhibit science. The lectures attained praise from *savant-fabricants* in the Midlands and surpassed expectations of Anderson's managers.⁵² This institution influenced Rumford's institution, which attempted to copy features including instruction for workers, women, mechanics, and artisans. Garnett was well suited and connected for his role. Yet the mechanics school and hall of machine models, though not stillborn, died in infancy. Garnett's lectures at the Royal Institution were popular and helped establish its reputation for fashionable science. However, Rumford's overbearing style led to conflicts, Garnett's mistreatment and departure, and his replacement by Humphry Davy.⁵³ These shifts were products of the Institution's inherent divisions.

Rumford kept Pictet informed on the Royal Institution's progress, which was slow despite initial excitement. In 1800, Rumford predicted that its chemical laboratory and scientific lecture theatre would be built by early 1801. Rumford asked for the institution's regulations to be promoted in Pictet's journal, which was a fixture in the reading room and read often.⁵⁴ Pictet hoped to see the finished institution on his visit, but Rumford's enthusiasm was waning, as he replied: "You will find the Royal Institution quite in its

⁵⁰ BCL MS JWP C1/23 31 T. Garnett (Glasgow) to J. Watt snr (Birmingham), 24 January 1797; T. Garnett, "Proposals for Two Courses of Lectures one on Natural Philosophy, the other on Chemistry," [n.d.].

⁵¹ BCL MS JWP C1/23 30. J. Carmichael to J. Watt, 9 February 1797.

⁵² *Ibid.* 31. T. Garnett, "Proposals;" Musson and Robinson, *Science and Technology*, p. 108, 146-7.

⁵³ Garnett studied medicine at Edinburgh before lecturing. Rumford also took from Anderson's plans for a laboratory, workshops, a lecture theatre, and hall of inventions. Brown, *Benjamin Thompson*, pp. 225-234.

⁵⁴ 48) C. Rumford (Royal Institution) to M.-A. Pictet, 5 July 1800. Pictet, *Correspondance*, pp. 558-9.

infancy, but I think you will find it a promising child. I wish to heaven that it may not be neglected and spoiled! It must, I am afraid, be nursed a long time, much longer than I could have wished.”⁵⁵ Rumford’s initial plan, sanctioned by aristocratic donors and the monarchy, was to provide tactile instruction to mechanics, bypassing manufacturers to directly train London workers. Such training was needed, Britain was at war with France, but aristocratic managers like Joseph Banks, and other gentry, grew anxious about the threat of urban workers with unfettered access to science and technology. Rumford’s style led to further quarrels with staff and managers.⁵⁶ Another challenge to Rumford and his institution was opposition from influential manufacturers like Matthew Boulton.

Rumford’s approach to science and industry conflicted with *savant-fabricants* like Boulton and Watt. They devoted much labour and capital to improve the steam engine, and on patents to protect it. They were not helped by the many visitors to Soho who tried to pirate their work by devious means. Rumford was also guilty of industrial espionage against Soho. In 1791, he sent an agent from Munich to copy the steam engine.⁵⁷ During the Royal Institution’s planning stages Joseph Banks invited Boulton and Watt to dine with Rumford. Success in currying favour with the prominent *savant-fabricants* was temporary. In 1800 Charlotte Matthews (1759-1802), Boulton’s banker, contributed ten guineas to the institution in his name. Boulton, who long courted the nobility, reported

⁵⁵ 50) C. Rumford (Harrogate) to M.-A. Pictet, 27 August 1800. *Ibid.*, p. 561.

⁵⁶ Morris Berman, *Social Change and Scientific Organization: the Royal Institution, 1799-1810* (Ithaca: Cornell University Press, 1978), pp. 13-30; Jon Kliner, *Transfiguring the Arts and Sciences: Knowledge and Cultural Institutions in the Romantic Age* (New York: Cambridge University Press, 2013), pp. 46-84.

⁵⁷ Rumford first had an agent, Joseph Baader, try to purchase a Boulton & Watt engine, after conversations on Bavaria’s lack of steam engines. The Elector let Baader negotiate for an engine to safely supply water to Manheim, a fortified town. RL RP TS 1791 001825. J. Baader (Munich) to Boulton & Watt (Birmingham), 27 February 1791. Yet, Rumford turned to covert means. For Rumford’s espionage against Soho, and his proposed partnership for his stove inventions, see Brown, *Benjamin Thompson*, pp. 136-7; 158; 228-9.

favourably on the institution's royal and noble patronage to his son.⁵⁸ After Matthew inspected the institution, however, Soho opposed displaying its technology at Rumford's institution. M. R. Boulton plainly articulated the perspective of British manufacturers:

It may be a very pleasant amusement for the Nobility and other idle Loungers who have never added an Iota to the Purse of the Nation by the Sweat of their Brow, to diffuse the Inventions & Advantages acquired by the Perseverance & painfull Study of the grovelling mechanics, but how will it be relished by the Inventor himself? Will he think himself sufficiently reared for his Pains & Perseverance in struggling against Misery and Want, by a Vote of thanks for the liberal Communication of his Discovery?⁵⁹

Manufacturers did see utility in institutions that diffused scientific knowledge. But, M. R. Boulton insisted, they opposed ones that were a medium to expose their techniques.⁶⁰

M. R. Boulton revealed the difference between Soho and Rumford's approach to science by comparing method and accomplishment. Restrictive states like Bavaria needed institutions to encourage industry, whereas enterprise by solitary manufacturers in Britain enabled it to lead the industrial nations. M. R. Boulton doubted that Rumford's institution would produce inventions like Arkwright's machine that improved cotton manufacturing. An intermediary, Mr Lee, told M. R. Boulton that Rumford expected an updated example of their steam engine for the Royal Institution. Lee informed Rumford that drawings were superior to a working model, for both information and repairs. Rumford responded that he did not desire a model, but a full working engine to show its labour and parts, which could be copied by workmen. If they could not acquire one from Soho, Rumford

⁵⁸ Morris Berman, *Social Change*, pp. 75-6; RL TS RP 1800 001825. C. Matthews (London) to M. Boulton, 11 February 1800. Matthews opened the Earl of Aylesford's letter, in case it was on copper business, but Aylesford was instead encouraging Boulton's support for Rumford and his institution.

⁵⁹ M. R. Boulton told Boulton that the Count's philosophy had bested his judgement. Nobility may support the institution, but not manufacturers who would see it as diffusing the fruits of their industry, not general knowledge. RL RP TS 001825. RC 5A "Thoughts & relextions [*sic*] on Count Rumford's proposed establishment for ye exhibition of models of the machinery of or Manufactories at the Royal Institution in a letter to M. B. March 1800," M. R. Boulton to M. Boulton. Original: Box 2, 67 Birmingham Assay Office.

⁶⁰ *Ibid.*

explained, they would get one elsewhere.⁶¹ Consequently, the rift between Soho and Rumford continued. It was a sensitive period, as Boulton & Watt's patent expired in May 1799. Boulton was elected as a proprietor to the Royal Institution but, taking Matthew's council, declined until Rumford's involvement ceased.⁶² Boulton and Watt opposition to Rumford's approach was warranted. The episode exposed weaknesses in his plan for the Royal Institution, and a lingering gulf between the British state and its manufacturers.

Rumford's peripatetic nature insured that he failed to stay involved with one project, or remain in one place, for long. This trait, and antipathy to Rumford's approach, led to a curtailed role in the Royal Institution. Ultimately, Rumford and Banks were both alienated from it, abandoning it to Bernard. He and other philanthropist managers courted fashionable science in London.⁶³ However, Rumford's character also created fellowship with *savants* like M.-A. Pictet. They each failed to reproduce British industry, but made important contributions to Enlightenment physics.⁶⁴ Pictet's 1801 tour was his fourth visit to Britain. He often received invitations and introductions from Rumford,⁶⁵ who in turn asked Pictet to "smooth the way" for him in Paris.⁶⁶ Pictet and the Delesserts insured that Rumford, who overstayed his welcome in London, found an inviting atmosphere in Paris. British aristocrats feared that diffusing knowledge and encouraging industry to the lower orders would contribute to political revolution. French bourgeois diffused knowledge and

⁶¹ M. R. Boulton asked Boulton's advice, advising they withhold support until they had more details. *Ibid.*

⁶² Boulton, elected March 1800, had his son scrutinize the institution. Brown, *Benjamin Thompson*, p. 229.

⁶³ On Rumford's struggles see *Ibid.*, pp. 233-42; W. J. Sparrow, *Knight of the White Eagle: A Biography of Sir Benjamin Thompson, Count Rumford (1753-1814)* (London: Hutchinson, 1964), pp. pp. 131-40.

⁶⁴ On their scientific contributions see Chang, "Rumford and the Reflection of Radiant Cold," pp. 127-69.

⁶⁵ 41) C. Rumford (Munich) to M.-A. Pictet, 28 July 1798; 52) C. Rumford (Edinburgh) to M.-A. Pictet, 18 October 1800; 58) C. Rumford (Royal Institution) to M.-A. Pictet, 3 April 1801. Pictet, *Correspondance*, vol. 3: p. 549, 564, 571.

⁶⁶ Rumford proposed that they travel to Paris together, but he first had to go to Bavaria and Pictet was to return to Geneva. 55) C. Rumford (Royal Institution) to M.-A. Pictet, 8 March 1801. *Ibid.*, pp. 567-8.

encouraged industry within the same groups, hoping to advance France's pace toward industrial revolution, and prevent another one in politics.⁶⁷

16.5. *Société philanthropique: 'Benjamin Del'Essert, a French Rumford'*

On 22 September 1801, Count Rumford and M.-A. Pictet crossed the Channel. They left England together, but parted company in Calais. Pictet headed for Paris and Rumford for Munich. In October, Rumford arrived in Paris and soon dined at the *hôtel Delessert* with A.-P. Candolle, Benjamin Delessert, and Pictet, who Rumford thought already departed for Geneva.⁶⁸ The Franco-Swiss circle anticipated the event. Rumford and Pictet's respective projects had influenced *savants* in Paris for years. This gathering insured a congealment of science, industry, and philanthropy that persisted beyond the 1802 peace.

Pictet's journal insured that Rumford's reputation and innovations preceded him in Paris. The Edgeworths, taking Pictet's lead, called Delessert "The French Rumford."⁶⁹ In 1800 Delessert and Candolle, friends united in botany and philanthropy, created France's first soup establishment for the poor.⁷⁰ It was fostered by the vast Delessert network. Since 1796, the *Bibliothèque britannique* had featured excerpts of Rumford's essay on economic soups.⁷¹ Candolle read them in Geneva, supplied plans for a Rumford stove that Delessert had constructed, and helped Delessert start an establishment on *rue Mail*. They cooked soup, as much as three-hundred helpings daily, dispensing it to local

⁶⁷ This helped France pursue its own course to industrialization. Horn, *The Path Not Taken*, pp. 125-95.

⁶⁸ RL MS 795602-962351, RC 2. Count Rumford's Journal, "Journey from London to Munich and from Munich to London by Paris in the Autumn of 1801." Copied at the Lavender House. Began Thursday the 29th of April and finished Monday Evening the 4th of May 1802 by M. P. [Transcript; The manuscript was copied by Lady Palmerston and is housed at the University Library, Birmingham], pp. 1-8.

⁶⁹ NLI MS 10166/7 313. M. Edgeworth (Paris) to M. Sneyd, 31 October 1802.

⁷⁰ Candolle described their anticipation at Rumford's arrival. Candolle, *Mémoires*, p. 184.

⁷¹ Marc-Auguste Pictet, Charles Pictet de Rochemont, and Frédéric Guillaume Maurice, *Bibliothèque britannique, Extrait des ouvrages Anglais périodiques* (Genève: la Bibliothèque britannique, 1796), vol. 1, no. 4, pp. 643-72. Fritz Redlich, "Science and Charity: Count Rumford and His Followers," *International Review of Social History* 16, no. 2 (1971), p. 204.

poor. Delessert was local director for the *bureau de bienfaisance*.⁷² He and Candolle promoted their methods by publishing on the procedures, recipes, stove construction, and utility. This included *Sur les fourneaux à la Rumford, et les soupes économiques* (1799-1800), and a notice in J.-C. de La Méthrie's *Journal de physique*.⁷³ Other early attention of their soup establishment appeared in progressive periodicals, such as *Journal de Paris* and *Décade philosophique*.⁷⁴ Disseminating reform remained vital for the Enlightenment.

The promotion and popularity of Delessert and Candolle's soup establishment led to expansion. By 1802, there were twenty soup kitchens. Collectively, they distributed over a million servings of soup annually at minimal cost. A committee of active philanthropists formed to aid in the organization of the growing soup establishments. The committee expanded operations and solicited subscriptions from political elite. Prominent ones came from Joséphine Bonaparte (1763-1814), Mathieu de Montmorency (1767-1826), and Jean-Antoine Chaptal, minister of the interior. In 1802, the committee became the *Société philanthropique*, and broadened its mandate.⁷⁵ Ultimately, the *Société philanthropique* attempted to provide a comprehensive approach to welfare.

⁷² The *bureau de bienfaisance* dispensed rations tokens. Candolle, self-experimenting, ate soup three times a day for eight days, finding no lost weight and good health. Candolle, *Mémoires*, pp. 176-78.

⁷³ Benjamin Delessert and Augustin Pyramus de Candolle, "Notice sur les soupes de Rumford établies à Paris rue du Mail No 16," ed. Jean-Claude De Laméthrie, *Journal de physique, de chimie, d'histoire naturelle et des arts* 50 (1800), pp. 200-6. *Ibid.*, *Sur les fourneaux à la Rumford et les soupes économiques* (Paris: chez Magimel, 1799), pp. 1-40.

⁷⁴ Antoine-Alex Cadet de Vaux (1743-1828) published letters supporting the utility of Rumford soups in his journal. *Ibid.*, p. 27. Jean-Baptiste Say ed., "Les bons effets qui ont déjà résulté des Soupes à la Rumford, fondées à Paris, dans la rue du Mail," *La Décade philosophique, littéraire et politique / par une société de Gens de lettres* 35 (20 Fructidor, An VIII), pp. 500-01. Vaux, a pharmacist and philanthropist, founded the *Journal de Paris*, and was president of the *Société des soupes économiques*. Redlich, "Science and Charity," p. 205, n. 3. J.-B. Say (1767-1832) helped found the *Décade philosophique*, was secretary to Clavière, close to Candolle and Delessert, and a political economist. Richard Whatmore, *Republicanism and the French Revolution: An Intellectual history of Jean-Baptiste Say's Political Economy* (Oxford: Oxford University Press, 2000), pp. 10-2. Notice also appeared in *Moniteur universel*. Candolle, *Mémoires*, pp. 119-77.

⁷⁵ *Comité central de la Société des soupes économiques*. Redlich, "Science and Charity," pp. 205-7.

The aim of the *Société philanthropique* was welfare for workers and not charity for the abject poor.⁷⁶ This was part of a general movement that was nonetheless targeted. Historian of medicine Dora Weiner, in her work on the role the *Société philanthropique* in French medicine, distinguishes ‘welfare’ from ‘charity.’ The charity boards under the *Ancien régime* sought advice from Catholic priests, whereas the *Société philanthropique* practiced secular welfare assistance and involved doctors. Enlightenment philanthropists saw charity as humiliating for those in need, and serving the provider’s interests. Groups dispensing welfare or *bienfaisance* (a neologism of the 1760s) instead aimed to assist industrious indigent who deserved it. The *Société philanthropique* chose a demographic it was able to help: patients who were very sick but did not have chronic or terminal illness. Intervention combated the tendency by the poor to seek medical aid when it was too late. Quick cures for working poor let them return sooner to work in factories and other vital sectors. *Société* members catered to indigent workers, but not people who they thought could afford to pay. This left state agencies to assist the most sick and destitute citizens.⁷⁷

Participation in the *Société philanthropique* led to the creation of other societies. This included many *sociétés de secours mutuels*, or mutual aid societies to help workers in times of need. Candolle worked with Mme Gautier, and other female philanthropists, to establish the *Société de maternelle* to assist poor women with childbirth, and a second society to care for the children of working mothers.⁷⁸ The Delesserts and Candolle were Enlightenment philanthropists who practiced a multifaceted approach to welfare.⁷⁹

⁷⁶ The first incarnation of the *Société philanthropique* began in 1780. It helped elderly people and blind children until its decline during the French Revolution. Dora B. Weiner, “The Role of the Doctor in Welfare Work: The Philanthropic Society of Paris, 1780-1815,” *Historical Reflections* 9 (1982), p. 284.

⁷⁷ *Ibid.*, pp. 280-303.

⁷⁸ Candolle, *Mémoires*, pp. 180-1.

⁷⁹ For a comprehensive examination of French philanthropy in this period see Duprat, “*Pour l’amour de l’humanité*,” vol. 1: pp. 327-473; *Ibid.*, *Usage et pratiques de la philanthropie*, vol. 2: pp. 589-890.

Société philanthropique policies were heavily influenced by its leaders. P.-S. du Pont, who returned from America in 1802, served as a vice-president.⁸⁰ He and other leaders focused on instilling self-help among the poor, instead of religion, by promoting mutual aid societies, hygiene, and practices to prevent disease. Du Pont, an experienced politician and political economist, appealed to governing officials in economic terms. He used statistics to show how the *Société philanthropique* saved Paris great sums, and aided the poor at a cheaper rate than public hospitals. Expanding to one dispensary for every arrondissement, Du Pont explained, would increase savings further. Delessert, long-serving treasurer of the *Société*, promoted financial welfare among the poor, including employment measures and savings banks, as well as insurance, lending, and mutual assistance projects. The most scientifically-minded leaders focused on medical welfare. Pharmacists Antoine Auguste Parmentier (1737-1813) and Cadet de Vaux, and botanist A.-P. Candolle, promoted the *Société's* important roles in vaccination, attendance by skilled physicians and surgeons, dental care, and dispensing medicine. Other programs insured aid for the elderly, education for the poor, and associations for workers.⁸¹

Benjamin Delessert maintained an enduring commitment to philanthropy. This was more a product of contact with workers than a wealthy banker's guilty conscious. He established several industries on the family's property of Passy, including a refinery for beet-sugar manufacturing and a cotton mill. The poverty of factory workers influenced his philanthropy, and his scientific industries influenced his welfare work.⁸² An example

⁸⁰ Weiner, "The Role of the Doctor," p. 285. Du Pont returned to promote the his company, he sought to be named a senator by Napoleon, and Jefferson had asked him to aid in talks for Louisiana. Raymond F. Betts, "Du Pont de Nemours in Napoleonic France, 1802-1815," *French Historical Studies* 5.2 (1967), pp 190-9.

⁸¹ *Ibid.*, pp. 285-95. Vice-presidents of the *Société philanthropique* included P.-S. du Pont (1807-13), and Antoine Auguste Parmentier (an XII-1806) Benjamin Delessert served as treasurer (an XII-1828), and A.-P. Candolle acted as a vice-secretary (an XII-1807). *Ibid.*, p. 298.

⁸² On the Delesserts' philanthropy see Coninck, *Banquiers et philanthropes*, pp. 8-112.

of this crossover was recorded by Count Rumford in 1801. Rumford met with the original soup committee where he observed: “A working Model of an Apparatus for making Soup by means of steam which M. Delessert had caused to be constructed was shown there at work and was much admired.”⁸³ It is not clear if this was an adaption of an invention of Rumford, of James Watt, or a combination of their work. Delessert and Candolle’s philanthropic work led them to focus on preventing poverty, instead of just treating it. Ultimately, the *Société philanthropique* led to a society to encourage industry.

16.6. Founding the *Société d’encouragement pour l’industrie nationale*

The founding of the *Société d’encouragement pour l’industrie nationale* has, oddly, been contentious. One version emerged in 1847, before the society’s fiftieth anniversary. This was written by Théodore Olivier (1793-1853), a member, and was approved at a society meeting. The instructions for Olivier, and his office, were to research the names of founding members to be engraved on a marble tablet. It was to be placed in the meeting rooms to remind all of the service these utilitarian men performed for France, and its national industries. Olivier went beyond this and wrote a history of the founding. It focused on Charles de Lasteyrie (1759-1849) and Benjamin Delessert, both agronomists and philanthropists, as playing a central role in the society’s creation. They had sought to profit from a British model, met with several peers at Delessert’s salons, and determined to found a society that would encourage French industry. In this version the society began as a private initiative in a private setting. French ministry officials joined, leading to more organized meetings.⁸⁴ Olivier’s version emerged as the official story and later influenced

⁸³ RL MS 795602-962351, Count Rumford’s Journal, p. 34.

⁸⁴ Olivier’s rapport on the “Fondateurs de la Société” was prepared for the *Conseil d’administration* and approved a meeting on 23 June 1847. Théodore Olivier, “Rapport fait par M. Thoéd. Olivier, au nom du

historical scholarship.⁸⁵ Recent work calls Olivier's account into question, as a result of its curious timing as well as scant documentary evidence. Scholars suggest Olivier's version was a product of nineteenth-century ambitions and institutional memory. Recent accounts instead credit the involvement of bureaucrats, from J.-A. Chaptal's ministry of the interior, from the outset.⁸⁶ The truth behind the *Société d'encouragement's* founding lies, as it so often does, somewhere between these two disputed versions.

The actual founding of the *Société d'encouragement* was similar to that of the Royal Institution. A.-P. Candolle played a role akin to that of Count Rumford. Candolle, after a *Société philanthropique* meeting in 1799, sought to show the cause of poverty:

Since this meeting, at first very modest and dedicated to the economical soups, took hold a more general goal, I had searched to draw their attention to the causes of poverty and I searched to show all the utility that resulted from financial encouragements shrewdly granted to industry. I read a paper on this subject in one of the meetings, I understood that this goal was too vast to be bound to us and demanded a particular society.⁸⁷

Society members took up Candolle's ideas while he was in Geneva, and gave a copy of his paper to the *ministre de l'Intérieur*. Advice was sought from it and Chaptal, who was supportive of such interests. Chaptal had members of his office to attend the matter.⁸⁸ A committee formed composed of these men, Candolle, and Delessert who met at the *hôtel Delessert* to discuss forming a new society. A ministry official and Candolle were tasked with writing its plan. Candolle asserted that he made it "principally in the spirit of that of

bureau, au conseil d'administration de la Société d'encouragement pour l'industrie nationale," *Bulletin de la Société d'encouragement pour l'industrie nationale* 46, no. 511 (1847), pp. 309-19.

⁸⁵ Duprat, *Usage et pratiques*, vol. 2: p. 1024. Coninck, *Banquiers et philanthropes*, p. 119; AP AFD V13S 3. Join-Lambert, *Benjamin Delessert*, p. 100.

⁸⁶ Andrew J. Butrica, "Creating a Past: The Founding of the Société d'Encouragement pour l'Industrie Nationale Yesterday and Today," *The Public Historian* 20, no. 4 (1998), pp. 20-3, 30-3; Gillispie, *Science and Polity in France: The Revolutionary and Napoleonic Years*, pp. 629-30.

⁸⁷ Candolle, *Mémoires*, p. 200.

⁸⁸ Members from Chaptal's department were Jean-Baptiste Huzard (1755-1838), Joseph-Marie de Gérando (1772-1842), and Louis Costaz (1767-1842). *Ibid.* On Chaptal see Horn, *The Path Not Taken*, pp. 169-293.

the *Société des arts de Genève* but enlarged to be adapted to France and to marry it, that is to say, with the foundations of that of the *Société Philanthropique*.”⁸⁹ The *Société d’encouragement* was the brainchild of private philanthropists, an extension of their work with the poor, but its first meetings at the *hôtel Delessert* included government officials.

The *Société d’encouragement* was a product of an Applied Enlightenment. It, like societies in Geneva and London, encouraged the marriage of science and industry for the reduction of poverty and promotion of manufacturing. The origins were in philanthropic circles, uniting private and government *savants* interested in science and industry, within semi-private salons, which were places of scientific middling and mingling. Olivier’s founding story, published in June 1847, strove to include the neglected role of Charles de Lasteyrie and Delessert. This version may have confused Lasteyrie with Candolle, and London with Geneva, but was correct about Delessert. The emphasis on Delessert, in a founding story that appeared four years before the society’s fiftieth anniversary, no doubt resulted from Delessert’s death on 1 March 1847. Candolle and Delessert, in contrast to their long service to the philanthropic society, played only minor committee roles once the *Société d’encouragement* expanded. Chaptal’s officials took leading positions.⁹⁰

Delessert was a founder the *Société d’encouragement*, but he characteristically avoided attention and allowed his collaborators to take credit for its establishment.⁹¹ The society’s published account, and those by visitors to Paris in 1801-2, testified to his place

⁸⁹ *Ibid.*, pp. 200-1.

⁹⁰ A.-J. Chaptal was *président*, Louis Costaz *vice-président*, and J.-M. de Gérando *secrétaire*. Benjamin Delessert, A.-P. Candolle, and Charles de Lasteyrie served on the *Comité d’Économie*. Other prominent *savants* made up the rest of this and the other committees. *Bulletin de la Société d’encouragement pour l’industrie nationale*, ed. Frédéric Cuvier, No II. (Paris: Imprimerie de Madame Huzard), pp. 26-7.

⁹¹ AP AFD VI3S 3. Join-Lambert, *Benjamin Delessert*, p. 100.

in the society.⁹² Accounts by Candolle and Delessert in the 1830s also demonstrates their involvement.⁹³ For Delessert it arose not in memoirs, but in a political pamphlet.⁹⁴ He ventured into the uncharted waters of self-promotion, in discussing his patriotism, by fighting in Belgium during the French Revolution, and pursuits that contributed further to France's greatness: "I occupied myself, upon my return, in creating great industrial establishments; later, I was named a judge of the tribunal of commerce of Paris, ... & finally, an associate of the *L'Institut, académie des science*; — I was one of the original founders of the *société d'encouragement pour l'industrie nationale*."⁹⁵ Delessert's role in this society was vitally related to the industries he established early in the 1800s.

16.7. The *l'hôtel* Delessert in Twilight of the Enlightenment

The Delesserts insured that the Edgeworths, Count Rumford, Samuel Romilly, and other guests saw Paris' great sights. This included the *Louvre*, *Panthéon*, and the *Jardin de Plantes*, but also hospitals and prisons.⁹⁶ Britons also mingled with great *savants*. In the day they visited institutions like the *Institut nationale*, meeting Monge, La Grange, La Place, Berthollet, Cuvier, Guyton de Morveau and Prony. During the evenings visitors attended the salons of Mme Delessert, Mme Gautier, Mme Lavoisier, Mme and M. Suard and the abbé Morellet.⁹⁷ Rumford carried out scientific experiments with Mme Gautier at

⁹² *Bulletin de la Société*, pp. 26-7; RL MS 795602-962351, Count Rumford's Journal, pp. 38-44. Yorke lists Delessert, Candolle, Lasteyrie, Montgolfier, and Parmentier on "The Committee of Economical Arts." Henry Redhead Yorke, *Letters from France, in 1802* (London: H.D. Symonds, 1804), vol. 2: pp. 218-220.

⁹³ Candolle's memoir, written in the 1830s, was published by his son in 1862. Whatmore uses it to show J.-B. Say's enduring republicanism. Whatmore, *Republicanism and the French Revolution*, p. 12.

⁹⁴ This was to combat slander in his department's journal, leading Delessert to self-defense. AP MS V13S 3 Benjamin Delessert, "A M.M. Les Électors De L'Arrondissement de Saumur" (Paris) 12 février 1839.

⁹⁵ *Ibid.*

⁹⁶ NLI MS 10166/7 FTF 315. C E Edgeworth (Paris) to E. King (Bristol), 5 November 1802; RL MS 795602, Rumford's Journal, p. 8-14; Romilly, "Diary of a Journey to Paris, in *Memoirs*, vol. 2: pp. 80-91.

⁹⁷ *Ibid.*, pp. 91-4; NLI MS 10166//7 FTF 320. C. Edgeworth (Paris) to C. Sneyd (Edgeworthstown), 3 December 1802; RL MS 795602, Rumford's Journal, pp. 11-14.

Mme Lavoisier's salon. At Mme Gautier's salon Rumford met leading men of science and active philanthropists.⁹⁸ Enlightenment science, be it in salon or *société*, was social.

In 1802, Lunar families reunited and met members of the Delessert network. The Edgeworths left Ireland together but only Emmeline went to Bristol, to marry John King, Thomas Beddoes' assistant.⁹⁹ The family passed through England, calling on the Darwins in Derby and the Wedgwoods at Etruria. Links lasted despite Josiah Wedgwood's death in 1795 and that of Erasmus Darwin in 1802, amidst writing a letter to Edgeworth.¹⁰⁰ The Edgeworths met Humphry Davy in London, whom they knew from Bristol. He showed them the Royal Institution and they were impressed by its lecture hall, Rumford kitchen, machines, and models.¹⁰¹ In the family's first days in Paris they met the Delesserts and the Watts.¹⁰² In 1801, James Watt had sent Gregory to France with an introduction to the Delesserts. "[I]n more peaceable times than the present," Watt told Mme Delessert, "it would give me much pleasure to have made a journey to Paris in company with M^{rs} Watt & to have seen once more those kind friends who have survived the troublesome times which are now passed away & which we seriously lamented."¹⁰³ Nevertheless, the arrival of peace, and growing fears over Gregory's health, brought the Watts to Paris in 1802.

Gregory Watt's Grand Tour was undertaken to recover his health, but did more to assure his scientific credentials. Since 1797, Gregory's physicians (Beddoes and William Withering), father, and brother had been discussing that he travel in Europe to treat his

⁹⁸ *Ibid.*, p. 11, 61.

⁹⁹ Butler, *Maria Edgeworth*, p. 142, 188.

¹⁰⁰ NLI MS 10166//7 FTF 308. M. Edgeworth (Loughborough) to S. Ruxton (Black Castle), 25 September 1802; NLI MS 10166//7 284. E. Darwin (Priory, near Derby) to R. L. Edgeworth (Edgeworthstown) 17 April 1802. [completed by Sophia Manwaring informing Edgeworth of Dr Darwin's death].

¹⁰¹ Maria was also impressed by the galvanic battery Davy showed them at the Royal Institution. NLI MS 10166//7 FTF 308. M. Edgeworth (Sittingbourne) to C. S. Edgeworth (Edgeworthstown), [October 1802].

¹⁰² *Ibid.*, FTF 314. C. Edgeworth [Paris] to E. King (Bristol), 29 October 1802.

¹⁰³ 213 J. Watt snr (Heathfield) to M.-C. Delessert, 10 July 1801. Ferri, *Lettres et manuscrits*, p. 50.

consumption. James Watt junior hoped that warm Italian climates and fresh German air would aid Gregory's health, that he would learn a new language, that Gregory would use recommendations to James' Italian friends, and that Gregory would spend a winter with James' old German tutor.¹⁰⁴ Gregory felt fair on his Swiss tour and time in Paris. In late 1801, Rumford brought back positive reports of Gregory's health to Davy who passed them on to Watt.¹⁰⁵ Gregory suffered on his Italian tour. Weather in the north brought his consumption to a crisis.¹⁰⁶ Consequently, his parents travelled to the Continent, only to have Gregory persuade them to divert course for Paris, as he improved in Germany.¹⁰⁷ Watt's sons had him give their best to the Delesserts, as Gregory stated: "To the Delessert family & to Mad^{me} D. especially I owe very much indeed."¹⁰⁸ Gregory met great *savants*, collected at geologic sites, and retraced James' footsteps. In Naples, he met the physician and geologist William Thomson (1760-1806), through J.-C. de La Méthrie's introduction. Among the items Gregory ostensibly was to send Thomson, after returning to England, were coins from Matthew Boulton, crystallized lead from James Keir, and the mineral sarcites from Benjamin Delessert. Such connections let Gregory to complete several scientific feats before his death. This included reviewing geological publications for the *Edinburgh Review*, publishing a paper on his experimental work on basalt formation in the Royal Society's *Philosophical Transactions*, and a 'proto-geological' map of Italy.¹⁰⁹

¹⁰⁴ BCL MS 3219/4/34 7. J. Watt jnr (Clifton) to J. Watt snr (Birmingham), 1 October 1797.

¹⁰⁵ BCL MS 3219/6/33 66. H. Davy to J. Watt snr (Heathfield), 20 December 1801. *Ibid.*, 6/43 20. G. Watt (Geneva) to J. Watt snr, 1 October 1801.

¹⁰⁶ BCL MS JWP C2/12 1. G. Watt (Innsbruck) to A. Watt (Birmingham), 20 June 1802.

¹⁰⁷ BCL MS JWP C2/10 G. Watt (Dresden) to J. Watt jnr (Soho), 12 September 1802.

¹⁰⁸ BCL MS JWP C2/12 11. G. Watt (Rotterdam) to J. Watt snr (Paris), 13 October 1802; James also asked to be remembered to Dr F.-X. Swediaur *Ibid.*, 34. J. Watt jnr (Soho) to J. Watt snr (Paris), 14 October 1802.

¹⁰⁹ "Observations on Basalt," only appeared in offprint before Gregory died in 1804. *Ibid.*, pp. 179-96.

The Grand Tour of Gregory Watt was useful for Soho. He became a partner in the new firm, M & R Boulton J & G Watt & Co, in 1802.¹¹⁰ Gregory sent home news of the destruction of a Boulton & Watt engine in Caserta, an order from Milan for pneumatic apparatus, and an offer from the Italian Republic for Boulton to set up a mint.¹¹¹ Boulton still sought foreign contracts and to supply coin to the French Republic, insisting he could furnish a mint to work faster and cheaper than French ones. He planned to visit Paris, but this and hopes for new contracts ended with a return of war in 1803. James Watt's queries in Paris found that J.-P. Droz was favoured for coinage contracts, had used his usual guile to gain favour, and was aided by Boulton's advances.¹¹² Droz likely wanted "the means of execution" for these methods, so Watt warned Boulton to "guard, against impostors for such are abroad."¹¹³ Fear of industrial espionage and hope for collaboration endured. A new venture also resulted from Gregory's tour. Two Americans in Paris in 1802, were Robert R. Livingston (1746-1813), a politician, and inventor Robert Fulton, who formed a steamboat partnership. Gregory sent Fulton's steam-engine inquiries to James, giving them a channel to Soho's amenable second generation.¹¹⁴ Fulton and Livingston pioneered the steamboat, secured monopolies on American rivers, bought steam engines from James Watt junior, and spurred Soho's expansion into steamboats.¹¹⁵ These enterprises derived from contacts made in Paris, and the British-Franco-Swiss network's expansion to America.

¹¹⁰ BCL MS JWP C2/12 22. J. Watt jnr (London) to J. Watt snr (Birmingham), 26 January 1802.

¹¹¹ *Ibid.*, 44. G. Watt (Florence) to J. Watt snr (Birmingham), 3 May 1802; *Ibid.*, 46. G. Watt (Rome) to J. Watt snr (Birmingham), 27 May 1802; Torrens, "The Geological Work of Gregory Watt," p. 185.

¹¹² BCL TS JWP Box V 79. M. Boulton (Soho) to J. Watt (Paris), 10 October 1802; *Ibid.* 79. J. Watt (Paris) to M. Boulton (Soho), 24 October 1802. *Ibid.* 80. J. Watt (Paris) to M. Boulton (Soho), 27 October 1802.

¹¹³ BCL MS JWP Box V 80. J. Watt snr (Paris) to M. Boulton (Soho), 27 October 1802.

¹¹⁴ BCL JWP C2/10 11. G. Watt (Paris) to J. Watt jnr (Soho), 22 pluviôse [11 February] 1802.

¹¹⁵ George Dangerfield, *Chancellor Robert R. Livingston of New York, 1746-1813* (New York: Harcourt, Brace, 1960), pp. 404-22; NNHS MS RRLP. R. Fulton (New York) to R. R. Livingston, 24 November 1810. BCL MS 3219/4/36 J. Watt jnr (Rotterdam) to J. Watt snr (Birmingham), 13 January 1818.

Upon arriving in Paris in October 1802, the Edgeworths found a fertile confluence of science and industry. Benjamin Delessert welcomed them and helped them negotiate Paris, as it grew crowded and expensive from the influx of English visitors.¹¹⁶ James Watt, before leaving Paris, introduced the Edgeworths to Gaspard de Prony, head of the engineering school *École nationale des Ponts et Chaussées*, whom Gregory Watt had met through Rumford in 1801.¹¹⁷ Watt and the Edgeworths also saw, and were amazed by, J.-M. Montgolfier's *belier* (hydraulic pump), which raised water high in the air. The Edgeworths enjoyed Montgolfier's plain manner, which was similar to that of Watt, and discussing his new hot-air improvements. Montgolfier and Edgeworth shared interests, including methods to steer balloons.¹¹⁸ *Savant-fabricants* spoke a common language.

Soon after the Edgeworths arrived Delessert provided them an invitation to the *hôtel Delessert*, which hosted reformist *savants* throughout 1801-2. This included Count Rumford, M.-A. Pictet, A.-P. Candolle, Mme Lavoisier, P. S. du Pont, and F. A. F. de la Rochefoucauld-Liancourt, Charles Blagden, Germain Garnier (the celebrated translator of Smith's *On the Wealth of Nations*) and several members of the Bowood Circle including Jeremy Bentham, Samuel and Anne Romilly, their nephew Mark Roget and his pupils, André Morellet, Henry Petty (son of Lord Shelburne) and his tutor Etienne Dumont.¹¹⁹ These *savants* of science, law, and political economy were in good company.

¹¹⁶ NLI MS 10166//7 FTF 310. M. Edgeworth (Chantilly) to C. Sneyd (Edgeworthstown), 19 October 1802; *Ibid.*, 316. F. Edgeworth (Paris) to M. Sneyd (Edgeworthstown), 21 November 1802.

¹¹⁷ R. L. Edgeworth (Paris) to C. Sneyd, 18 November 1802. Edgeworth, *Maria Edgeworth in France*, pp. 32-3; BCL MS JWP C2/10 9. G. Watt (Paris) to J. Watt jnr (Soho), 8 November 1801.

¹¹⁸ BCL MS JWP Box V 80. J. Watt snr to M. Boulton, 27 October 1802; NLI MS 10166//7 FTF 326. M. Edgeworth (Paris) to M. Sneyd (Edgeworthstown), 10 January 1803.

¹¹⁹ NLI MS 10166//7 FTF 313. M. Edgeworth (Paris) to C. Sneyd (Edgeworthstown), 31 October 1802; Candolle, *Mémoires*, pp. 112-3. 2722. J. Bentham to B. Delessert, 28 November 1820. Bentham, *The Correspondence*, vol. 10: pp. 200-3.

Guests at the *hôtel Delessert* represented a mixture of journalistic and scientific culture, linking pre and post-Revolutionary France. Morellet was an accomplished translator. Dumont was translator, editor, and abridger of Bentham, but was not the first to translate Bentham. Etienne Delessert had translated the *Defense of Usury* before 1789.¹²⁰ Dumont's first translations appeared in the Pictets' journal. Bentham, like the Edgeworths and other British writers, was introduced to many European readers through the *Bibliothèque britannique*.¹²¹ The *hôtel Delessert* acted as a nodal point for it, and for other journals, writers, and *savant-fabricants*. M.-A. Pictet's long friendship with the Delesserts served his journal. Mme Gautier, a regular correspondent, sent updates on Parisian science to Pictet in Geneva. The Delessert brothers received source material,¹²² as banking houses were important centres of collection. *Hôtel Delessert* visitors were also treated to Enlightenment relics, including the herbarium and letters from J.-J. Rousseau, and a manuscript copy of Benjamin Franklin's autobiography.¹²³ In 1798, Benjamin Delessert translated parts of it for J.-B. Say's journal *la Décade philosophique*.¹²⁴ Translations and journals remained fundamental to diffusing knowledge across Europe.

Britons became connected to French scientific societies and institutions. In 1801, Rumford was welcomed to meetings of the *Société philanthropique*, attended sittings of the *Institut nationale* and was proposed as a foreign member, and was named a member

¹²⁰ Bentham, *Lettres sur la liberté du taux de l'intérêt de l'argent*, pp. i-vii.

¹²¹ See Blamires, *The French Revolution*, pp. 181-99, 233-88.

¹²² Bickerton, *Marc-Auguste and Charles Pictet*, p. 145.

¹²³ Besides Rousseau's letters, Mme Gautier organized for Romilly to read the manuscript of *Franklin's Life*. Romilly noted that there was only one other copy, made by Franklin with a letter copying machine, held by Franklin's grandson. The manuscript, given to Le Veillard in Passy, was inherited by his daughter or granddaughter after he went to the guillotine. Romilly, *Memoirs*, vol. 1: pp. 65-6; 2: 79-80.

¹²⁴ Benjamin Franklin, "Fragment des mémoires de Franklin, écrits par lui-même, et non publiés," *La Décade philosophique, littéraire et politique / par une société de Gens de lettres* 15 (30 pluviôse, An VI – 30 February 1798), pp. 345-58. Maria Edgeworth sent the journal to Ruxton so she could see Delessert's uncredited translation from the unpublished manuscript of Franklin's autobiography. NLI MS 10166/7 FTF 384. M. Edgeworth to M. Ruxton (Black Castle), [November 1803]. Delessert's first translation of Franklin was Benjamin Franklin, *La morale des Échecs* (Paris: [de l'imprimerie de B. Delessert], 1792).

of the *Société d'encouragement*.¹²⁵ Typically, Rumford tried to influence the course of the *Société*, proposing a merger with the *Conservatoire des arts et métiers*, arranged “on the principle of the Royal Institution of Great Britain.” Rumford had Benjamin Delessert invite Claude-Pierre Molard (1759-1837), head of the *Conservatoire*, to dine at the *hôtel Delessert* to discuss a union.¹²⁶ No merger occurred, but Rumford and Delessert remained close. Rumford continued to send materials, destined for Pictet in Geneva, through the Delesserts. Blagden likewise transported materials for Rumford and other Britons to the Delesserts. In a telling exchange, Delessert sent a lamp and a filtering vase with Rumford to present to the managers of the Royal Institution. In turn, they gave Delessert an ivory ticket for “perpetual free admission.”¹²⁷ By 1803 the managers, seeking more practicality, asked Matthew Boulton if Soho could mint metals to give subscribers as tickets.¹²⁸

Attempts to attract Lunar men to bodies founded to encourage industry took place on both sides of the Channel. Edgeworth’s 1802 Paris visit, unlike that of 1772 when he was young and unknown, saw him attain honours and celebrity. He attended sittings of the *Institut nationale* but the *Société d'encouragement*, and its great hall with models of machines, impressed the Edgeworths most. A month after their arrival, Edgeworth was named a foreign correspondent of this *Société*.¹²⁹ James Watt was also well received by *savants* in Paris in 1802,¹³⁰ but it took six years for the *Institut nationale* to elect him as a

¹²⁵ RL TS RC 5A 001825. Dec-Sept, 1801. C. Rumford (Paris) à Elector Joseph Maximilian I, 10 décembre 1801. Humboldt and Blagden were also elected. Maurice P Crosland, *The Society of Arcueil: A View of French Science at the Time of Napoleon I* (Cambridge: Harvard University Press, 1967), pp. 179-80.

¹²⁶ RL MS RC 2. 795602-962351, “Count Rumford’s Journal,” pp. 38-44.

¹²⁷ RL TS RC. 1802 001825. C. Rumford (Brampton) to B. Delessert, 16 March 1802.

¹²⁸ Sparrow, *Knight of the White Eagle*, pp. 128-30.

¹²⁹ NLI MS 10166/7 FTF 323. J.-M. de Dégerando (*Secrétaire de la Société d'encouragement pour l'Industrie Nationale*) à R. L. Edgeworth, 2 frimaire an 11 (23 November 1802); *Ibid.*, 321. M. Edgeworth (Paris) to S. Ruxton (Black Castle), 8 December 1802.

¹³⁰ 238. J. Watt (Heathfield) to J. Robison, 26 April 1803. Watt and Black, *Partners in Science*, pp. 377-8.

corresponding member. Watt's absence from Soho delayed a reply,¹³¹ which was later sent through Joseph Banks. Yet, two years later Watt remained uncertain if it had been received in Paris. This episode is used by Peter Jones as an example of the disarray of the Republic of Letters during the Napoleonic Wars.¹³² This disorder cannot be denied and also struck the Delessert network, but it persevered and reprised its role as a refuge.

16.8. The Resumption of War and the Network' Role as a Refuge

In January 1803, police officials ordered R. L. Edgeworth to quit Paris within twenty-four hours, and to exit the French Republic's territory within fifteen days. François Delessert provided extensive aid to the beleaguered Edgeworth. François accompanied him to see officials, wrote a letter to the *Grand juge*, and ensured that Edgeworth's appeal to First Consul Napoleon Bonaparte (stating his ignorance for the reason of his deportation and lack of connection to any political faction) was delivered. Mme Gautier bravely offered her country house in Passy to Edgeworth for asylum, as her grandmother had for forty years earlier to Rousseau. Edgeworth declined, despite Mme Gautier's encouragement, to avoid compromising his friends. Instead he and Maria stayed at a Passy inn, arranged by François. The Edgeworths first believed that Napoleon had ordered the deportation, and were later told that it came from the *Grand juge*, based on information that Edgeworth and Abbé Edgeworth (1745-1807) were brothers. The abbé, last confessor of Louis XVI, was a distant relation of Edgeworth whom he had never met.¹³³ Yet, police records state

¹³¹ An American visitor to Soho, received by James Watt junior, brought a certificate of election and letter from secretary Jean-Baptiste-Joseph Delambre (1749-1822). BCL MS 3219/4/33 10. J. Watt jnr (Soho) to J. Watt snr (Kington), 27 July 1808.

¹³² Banks became a foreign associate of the *Institut* in 1801, causing controversy in Britain, as would have Blagden's latent plan to make Napoleon a Royal Society Fellow. Jones, *Industrial Enlightenment*, p. 224.

¹³³ NLI MS 10166/7 FTF 330. R. L. Edgeworth (Paris) to C. Sneyd 27 January 1803; *Ibid.*, 332. Copy R. L. and M. Edgeworth to First Counsel, 27 January 1803; *Ibid.*, 334. Copy R. L. and M. Edgeworth (Passy) to Lord Whitworth, 23 January 1803. *Ibid.*, 366A. M. Edgeworth Notes on Paris. [1802-3].

that the actual cause was Edgeworth's 'indiscreet talk.'¹³⁴ He was also imprudent for choosing not be presented to Bonaparte, a great object of attraction for Britons in Paris.¹³⁵ In defense against the deportation, Edgeworth noted that he was the author of *Practical Education*, a Fellow of the Royal Society, and was "overwhelmed by favours from men of letters and science at Paris."¹³⁶ This was evident in a declaration defending Edgeworth, prepared by Joachim Le Breton (1760-1819) and M.-A. Pictet, which explained that the abbé and Edgeworth were not brothers. Prominent figures from the early and the Applied Enlightenment signed the declaration, including P.-S. du Pont, Abbé Morellet, J.-B.-A. Suard, Pictet, Benjamin Delessert, and Gaspard de Prony.¹³⁷ Pictet and Le Breton took it to the *Grand juge* who conceded the mistake and allowed Edgeworth's return to Paris.¹³⁸

The Edgeworths' revelled in Parisian science and society, but left France early. They curtailed their trip, omitted sojourns to Lyon and Geneva, and remained wary of the French state and pending war. Upon departing Maria Edgeworth reflected to her aunt:

The fine sights we have seen, and the fines speeches we have heard at Paris pass off from the mind like a dream, but the recollection of the real friendships we have received there never I hope will be effaced. The persons we found it most difficult to part with were—you will easily guess—Madame Delessert, Madame Gautier, M. Pictet and the excellent Abbé Morellet, poor old man, it was most painful to part with him because he have no chance of ever seeing him again.¹³⁹

From France the Edgeworths headed to Edinburgh. Edgeworth learned from Dugald Stewart, that his son his son Henry was sick. Henry was advancing in chemistry and other

¹³⁴ John Goldworth Alger, *Napoleon's British Visitors and Captives, 1801-1815* (Westminster: A. Constable, 1904). p. 113.

¹³⁵ NLI MS 10166/7 FTF 320. C. Edgeworth (Paris) C. Sneyd (Edgeworthstown), 8 December 1802.

¹³⁶ NLI MS 10166/7 FTF 332. Copy R. L. and M. Edgeworth to First Counsel, 27 January 1803; *Ibid.*, 331. F. and R. L. Edgeworth (Passy) 4 pluviôse An 11. [24 January 1803].

¹³⁷ NLI MS 10166/7 FTF 357. Copy. R. L. Edgeworth declaration to Grand juge, 4 pluviôse An 11. [24 January 1803]. Oddly Colvin cites the list, including that there are notes by two *savants* that wished they had been included, but excludes Benjamin Delessert. Edgeworth, *Maria Edgeworth*, p. 89 n. 2.

¹³⁸ NLI MS 10166/7 FTF 330. R. L. Edgeworth to C. Sneyd 27 January 1803.

¹³⁹ NLI MS 10166/7 FTF 360. M. Edgeworth (Calais) to M. Sneyd, 4 March 1803

studies at the university, as had his brother Lovell in the 1790s.¹⁴⁰ Lovell did not accompany the family to Scotland, however, and became trapped on the Continent.

The Peace of Amiens was brief, as war erupted again in 1803. Lovell Edgeworth had arrived in Paris in 1802. He joined his friend Dr Peter Mark Roget who had spent several months there with pupils from Manchester. They travelled together to Geneva. David Chauvet, Roget's old teacher in London, housed Roget's party at Pâquis and Geneva. They remained in Geneva for a year, exploring its environs, attending meetings with men of science, and studying chemistry with M.-A. Pictet. Another attraction was Mme de Staël, who Napoleon banished in 1803. Her salon at the Necker estate Coppet hosted *savants* including Pictet, Pierre Prévost, Etienne Dumont, and A.-P. Candolle.¹⁴¹

British and Swiss mingled in Geneva until May 1803. As the war intensified word spread of an order to arrest all adult English, within French territory, as prisoners of war. Days of confusion followed and Roget's party was helped Mme de Staël, Prévost, and Dr Louis Odier. Roget and his pupils attempted to flee to Switzerland, and asked Lovell to join them, but the borders had closed. They returned to Geneva and in July learned that all English would be taken as prisoners to Verdun. This forced Roget to claim Genevan citizenship, through his father, which alone saved him from arrest. He sent his pupils, both minors, away to ensure their safety, first to Lausanne and then to Neuchâtel. In the struggle to attain records, proving his right to citizenship and a passport, Roget relied on his uncle Samuel Romilly in London, Etienne Delessert and C.-M. de Talleyrand in Paris,

¹⁴⁰ *Ibid.*; NLI MS 10166/7 146. M. Edgeworth to M Ruxton, 16 July 1796; *Ibid.*, 280. L. Edgeworth (Pall Mall) to H. Edgeworth (Edinburgh), 22 December 1801.

¹⁴¹ NLI MS 10166/7 FTF. 301. L. Edgeworth (Geneva) to H. Edgeworth, (Edinburgh), 28 July 1802; *Ibid.*, 288. L. Edgeworth (Geneva) to C. S. Edgeworth, 29 June 1802; Kendall, *The Man Who Made Lists*, pp. 130-50; Samuel Romilly Roget, ed., *Travel in the Two Last Centuries of Three Generations* (London: T.F. Unwin, 1921), pp. 66-117.

and Prévost, R.-G. Prévost-Dacier, and Odier in Geneva. Roget escaped in late July, and met his pupils in Neuchâtel. An obscure route through Germany and Denmark, efforts to hide their British traits, illness, and avoidance of French troops led to a prolonged four-month journey.¹⁴² Nevertheless, they fared better than Lovell who left Geneva with the other English prisoners in July. Lovell remained imprisoned in the “abominable hole” of Verdun and elsewhere for eleven years.¹⁴³ Through this time the Delesserts helped Lovell and handled his banking.¹⁴⁴ R. L. Edgeworth sought aid from Joseph Banks, requesting that he apply to Napoleon, through the *Institute nationale*, to let Lovell travel as a man of letters to Italy or Germany. This was denied, though other Britons attained permission to travel in France.¹⁴⁵ In particular Lovell and Roget’s old friend Humphry Davy, who was given consent before Lovell gained freedom in 1814, after over a decade in confinement.

16.9. Trafficking Sugar, Sheep, and Steam across the Network

The Napoleonic Wars slowed network traffic, but links formed or rekindled in the peace persisted. Through the war Charles Blagden and Benjamin Delessert exchanged scientific news and texts.¹⁴⁶ The Delessert network aided Britons trapped on the Continent, sent envoys to London in 1792 trying to extend the Anglo-French commercial treaty, and overcame barriers to science and industry. British naval blockades (1806-14), Napoleon’s Continental System (1806-13), and America’s Embargo Act (1807-09) encumbered trade. France lost access to overseas possessions, and to lucrative staples such as sugar. Ample

¹⁴² *Ibid.*, pp. 90-135.

¹⁴³ *Ibid.*, pp. 117-35; L. Edgeworth (Verdun) to Nathaniel Philips, 14 August 1803. Constance Hill, *Maria Edgeworth and Her Circle in the Days of Buonaparte and Bourbon* (London: John Lane, 1910); pp. 78-80.

¹⁴⁴ NLI MS 10166/7 628. M. Edgeworth to M. Ruxton (Black Castle), 20 March 1808; 763. L. Edgeworth (St. Germain-en-Laye) to R. L. Edgeworth, 20 June 1810; *Ibid.*, 866. L. Edgeworth (St. Germain-en-Laye) to R. L. Edgeworth, 25 July 1812; *Ibid.*, 995. L. Edgeworth (Paris) to R. L. Edgeworth, 21 February 1814.

¹⁴⁵ NLI MS 10166/7 634. M. Edgeworth (Edgeworthstown) to M. Ruxton (Black Castle), 26 May 1808; 637. M. Edgeworth (Edgeworthstown) to M. Ruxton (Black Castle), 9 June 1808.

¹⁴⁶ RSL MS CB/1/3/219-40. B. Delessert (Paris) à C. Blagden (Royal Society, London), 7 novembre 1806 – 21 octobre 1815; Draft C. Blagden to B. Delessert (Paris), 4 March 1808 – 21 April 1812.

state funds and the *Institut nationale* sponsored renown *savants* including J.-A. Chaptal, Guyton de Morveaux, and C.-L. Berthollet to find alternatives to sugar cane. Yet it was Delessert, amateur chemist and botanist, who discovered the method to mass-produce beet sugar at his Passy refinery in 1811.¹⁴⁷ In early 1812, Napoleon toured the refinery and rewarded the discovery.¹⁴⁸ Yet, it was only after the Restoration that Delessert was nominated a member of the *Académie des sciences* in the *Institut nationale*.¹⁴⁹

A second industry developed by the Delesserts was purebred sheep breeding for woollen production. The *Treaty of Basel* (22 July 1795), ending the Revolutionary War between Spain and France, broke Spain's monopoly on Merino sheep. As a member of the *Société d'agriculture* Etienne Delessert led the importation of 4,000 Spanish sheep to France. Delessert succeeded in experiments crossbreeding Merinos and French breeds, formerly attempted with the royal flock at Rambouillet.¹⁵⁰ In 1801, Delessert sent four rams on *The Benjamin Franklin* to his New York farms. The rams shared a cargo hold with French materials collected by E.-I. du Pont to establish a gunpowder manufactory in America. One ram, Don Pedro, survived the Atlantic crossing and Delessert was credited with introducing the first full-blooded Merino ram to America. The ram's great progeny were critical for America's Merino mania and its wool industry.¹⁵¹ Merinos were highly desired in France, Britain, and America the industry expanded. The Delesserts partnered

¹⁴⁷ Delessert reported it to Chaptal who informed Napoleon. Crosland, *The Society of Arcueil*, pp. 32-6.

¹⁴⁸ Napoleon awarded Delessert the *Legion d'honneur* and his refinery employees a bonus week's pay. "Paris, le 2 janvier," *Gazette nationale ou le Moniteur universel* (Paris, 3 January 1812); 2. J.-A. Chaptal à B. Delessert (rue Coq-Héron), 2 janvier à midi [1812]. Ferri, *Autographes livres anciens et modernes. Vente aux enchères publiques* (21 décembre 2011 à Drouot, Paris), p. 3.

¹⁴⁹ BGE MS fr. 4736 f. 178. M.-M. Gautier (Passy) à P. Prévost-Marcet (Genève), 8 août 1816. The *Institut's* First Class was renamed the *Académie des sciences* in 1816. Crosland, *The Society of Arcueil*, p. 3.

¹⁵⁰ AP AFD VI3S 3. Join-Lambert, *Benjamin Delessert*, pp. 98-9.

¹⁵¹ HL MS W2 2559. DPDN C. E. Delessert (Paris) to P.-S. du Pont de Nemours (New York) 20 April 1801; James Mease, "Account of Don Pedro," in *Archives of Useful Knowledge: A Work Devoted to Commerce, Manufacturers, Rural and Domestic Economy, Agriculture, and the Useful Arts* (Philadelphia: David Hogan, 1811), vol. 1: pp. 103-6.

with Robert R. Livingston and the Du Ponts to export Merinos.¹⁵² Joseph Banks and William Eden made similar efforts in Britain.¹⁵³ French and Americans, seeking to counter British industrial dominance, collaborated to improve wool and gunpowder production. The British-Franco-Swiss network's cosmopolitanism enabled it to overcome trade barriers, as members pioneered improvements in sheep, sugar, and steam.

In 1813 select traffic over the Channel resumed as war raged in Europe. Humphry Davy had become one of Europe's most celebrated *savants*. Davy requested Napoleon's permission to travel on the Continent to examine Vesuvius and a French volcano. The tour was inspired by Vesuvius' active state, Davy's desire to test his volcanic theory, and possibly as well by Gregory Watt's 1802 geological tour.¹⁵⁴ Napoleon consented, despite the war, adding to his and Davy's celebrity. The party included Davy's new wife and new chemical assistant at the Royal Institution, Michael Faraday (1791-1867). Count Rumford hosted them at Auteuil, near Passy, showing them his laboratory. This was a highlight in Rumford's late years as, he had alienated friends in Paris. In 1805, he had married Mme Lavoisier, besting P.-S. du Pont and Charles Blagden. Yet, marriage turned unhappy and violent. It was not helped by Rumford's desire to demolish Antoine Lavoisier's caloric theory, as Lavoisier had phlogiston, and other disputes with French *savants*. Rumford retired to Auteuil, an outcast of Parisian circles. One of Rumford's few friends, Benjamin Delessert, served as executor and eulogizer at Rumford's small funeral. It is a testament to the return of scientific traffic that Rumford died in Auteuil (1814), Blagden in Arcueil

¹⁵² E.-I. du Pont to P.-S. du Pont de Nemours, 21 March 1809. Du Pont, *Life of Eleuthère Irénée*, vol. 8: pp. 156-60; NYHS MS RRLP [Copy] R. R. Livingston (Clermont) to E. Delessert, 4 November 1806; *Ibid.*, E. Delessert (Paris) à R. R. Livingston (Clermont), 27 mai 1809.

¹⁵³ NYHS MS RRLP C. Blagden (London) to R. R. Livingston, 21 May 1811; John Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State and the Uses of Science in the Age of Revolution* (Cambridge: Cambridge University Press, 1998), pp. 105-20. Banks had Eden import a flock in 1791.

¹⁵⁴ Brown, *Benjamin Thompson*, p. 304; De Beer, "Gregory Watt's Tour on the Continent," p. 136; Torrens, "The Geological Work of Gregory Watt," pp. 180-9.

(1820), and Davy in Geneva (1829). Davy's second tour to the Continent was undertaken in a futile effort to recover by his health and a to conduct further scientific research.¹⁵⁵

Napoleon's fall in April 1814, led to a return of peace and Enlightenment traffic. James Watt junior was asked by his friend, Benjamin Gott (1762-1840), for introductions to men in Paris or manufacturing towns for Benjamin Gott junior (1793-1817).¹⁵⁶ Gott senior, a prosperous Leeds cloth manufacturer, had introduced a Boulton & Watt steam engine to his firm's factory in the 1790s.¹⁵⁷ The aim of Gott junior's tour was to discover if Flemish and French wool production would rival Britain in furnishing America.¹⁵⁸ James gave Gott junior an introduction to his old friend Benjamin Delessert.¹⁵⁹ It was part of reconnections in the Delessert network, as its second generation took control.¹⁶⁰

By 1814 James Watt junior had assumed full management of Soho's steam-engine business, having expanded it considerably.¹⁶¹ Under his influence, planning and production were streamlined. Critical materials were relocated to the plant or quickly attainable by canal. Soho conducted more business under James and M. R. Boulton than it did under their fathers' management.¹⁶² This was a result of James having, after his return to Britain in 1794, shifted his focus from politics to industry. In 1814, he informed Delessert: "With politics, and particularly French politics I have little [to] do nearly since I last saw you." Yet, James like many Britons had hoped to see the Revolution's fortunes

¹⁵⁵ Davy married Jane Apreece (1780-1855) in 1812. Rumford bequeathed Davy a gold watch and Delessert a gold snuffbox. Brown, *Benjamin Thompson*, pp. 255-306; Jones, *Royal Institution*, pp. 394-401.

¹⁵⁶ BCL MS JWP Muirhead Box IV. Benjamin Gott (Leeds) to J. Watt jnr (Birmingham), 24 May 1814.

¹⁵⁷ For the Gott family and industrialization in Leeds see Margaret C. Jacob, "Mechanical Science on the Factory Floor: The Early Industrial Revolution in Leeds," *History of Science* 45, no. 2 (2007), pp. 203-12.

¹⁵⁸ BCL MS JWP Muirhead Box IV. B. Gott jnr (Leeds) to J. Watt jnr (Birmingham), 24 May 1814.

¹⁵⁹ BCL MS 3219/6/12 162 J. Watt jrn (Soho) to B. Delessert (Paris), 3 June 1814.

¹⁶⁰ M. R. Boulton pursued other ventures, including the Soho Mint after Boulton became ill in 1805. Jones, "England Expects...", pp. 201-3. M. R. Boulton sent friends to Delessert in 1814, and Maria Edgeworth recommended Josiah Wedgwood II in 1818. BCL MBP Private Correspondence. M. R. Boulton to B. Delessert, 1814; 177. M. Edgeworth to B. Delessert, 11 February 1818. Ferri, *Lettres et manuscrits*, p. 39.

¹⁶¹ BCL MS 3219/6/12 162, J. Watt jrn (Soho) to B. Delessert (Paris), 3 June 1814.

¹⁶² Jones, *Industrial Enlightenment*, p. 55; Musson and Robinson, *Science and Technology*, p. 200.

repaired by the Napoleonic regime. James invited Delessert to Soho if he was able to again visit Britain.¹⁶³ Likewise, the Delesserts tried to entice Watt senior to Paris after contact resumed in 1814. Peace led Delessert to assert: “At present we are consoled by a happier future, we have the perspective of a long peace and of a durable union between the two countries, and no other rivalry than those in the arts and industry. This is a form of war where you personally have attained all forms of glory.”¹⁶⁴ While Delessert and Watt do not appear to have taken up these invitations, members of their families did visit.

British-Franco-Swiss traffic over the Channel increased following the conclusion of the Congress of Vienna in 1815. This included Etienne Gautier who crossed to Britain in 1816, with a recommendation from his uncle Benjamin Delessert to James Watt junior. Gautier and Dr Laurent Théodore Bielt (1781-1840) toured Britain’s remarkable sites, including Soho.¹⁶⁵ The Watts were as persistent in visiting Passy as the Delesserts were Soho. In October James junior returned to the Continent. His party visited more than a dozen towns in Flanders, obtaining information on industry.¹⁶⁶ Beyond inspecting ports, engines, and manufactories James met old scientific friends. He introduced his travelling partner John Rennie (1761-1821) to Charles Blagden, and to C.-L. Berthollet, and P.-S. Laplace of the *Soci te d’Arcueil*.¹⁶⁷ The group cultivated some of the best minds in French science.¹⁶⁸ Rennie also dined with Gaspard de Prony. James deliberately avoided seeing Prony “or any of the Ponts & Chauss es” men out of fear of being besieged by

¹⁶³ BCL MS 3219/6/12 162, J. Watt jrn to B. Delessert, 3 June 1814.

¹⁶⁴ 396. B. Delessert (Paris)   J. Watt snr, 9 aout 1814. James Watt and James Patrick Muirhead, *The Origin and Progress of the Mechanical Inventions of James Watt* (London: J. Murray, 1854), vol. 2: p. 358.

¹⁶⁵ BCL MS 3219/4/53 33. B. Delessert (Paris)   J. Watt jnr. (Birmingham), 27 aout 1816. Jones, “Knowledge and Technology,” p. 40. Bielt was Swiss, took medical training in France, and was influenced by British physicians. Diana E. Manuel, ed., *Walking the Paris Hospitals: Diary of an Edinburgh medical Student, 1834-1835* (London: Wellcome Trust Centre for the History of Medicine, 2004), pp. 20-2, 45.

¹⁶⁶ BCL MS 3219/4/36. J. Watt jnr (Paris) to J. Watt snr (Birmingham), 8 October 1816.

¹⁶⁷ *Ibid.*, J. Watt jnr (Paris) to J. Watt snr (Birmingham), 24 October 1816.

¹⁶⁸ A.-P. Candolle and von Humboldt were also members. See Crosland, *The Society of Arcueil*, pp. 56-146.

visits of its agents “who would have expected a reciprocity of sights.”¹⁶⁹ Concerns of espionage lingered, as did Enlightenment exchange. Another friend James met at Paris was Dr François-Xavier Swediaur. The republican had thrived during the revolution, but his business suffered with the monarchy’s return. James also reunited with the Delessert and Gautier families, who were very kind to him. Finally, James saw Faujas St. Fond, his old travelling partner, at the *Jardin de Plantes*.¹⁷⁰ St. Fond was the aeronaut and geologist who took James to France thirty years earlier. These reunions marked a curtain call for the British-Franco-Swiss network, but it was not to be James’ last trip to the Continent.

Watt junior, after building engines to power American steamboats, expanded his firm to develop them in Europe. In 1817 he purchased the *Caledonia*, refurbished it with a Soho engine, and made one of the first steamboat crossings of the English Channel.

Finally, James secured a Dutch privilege for a company formed around the *Caledonia*.¹⁷¹

16.10. Conclusion

Cross-Channel traffic in 1801-2 reconnected the British-Franco-Swiss network. Franco-Swiss visited scientific and industrial sites in Britain and Britons visited similar sites in Paris and Geneva. Throughout 1801-2, the *hôtel Delessert* hosted cosmopolitan guests, introducing them to the Enlightenment culture resurging in Paris. This included a great confluence of science, industry, and philanthropy, as well as the presence of British and American visitors, created a breeding ground for collaboration among international *savant-fabricants*. The Delesserts’ network, having survived revolution and war, continued to pursue the Applied Enlightenment into the nineteenth century.

¹⁶⁹ BCL MS 3219/4/36. J. Watt jnr to J. Watt snr, 24 October 1816.

¹⁷⁰ James planned to see René Just Haüy (1743-1822) and Cuvier’s comparable anatomy collection. *Ibid.*

¹⁷¹ BCL MS 3219/4/36 J. Watt jnr (London) to J. Watt snr (Birmingham), 19 April 1817; *Ibid.*, J. Watt jnr (Rotterdam) to J. Watt snr (Glasgow), 16 October 1817; *Ibid.*, J. Watt jnr (Rotterdam) to J. Watt snr (Birmingham), 13 January 1818.

Conclusion: Effecting Transformation from Enlightenment to Modernity

The Delessert network's cosmopolitan exchange of education, science, and industry, into the nineteenth century, demonstrates the endurance of the Enlightenment. It did not end with the French Revolution, which introduced reform at all levels of French society. New French political orders, both republican and Napoleonic, relied on science and industry to achieve their aims. Nationalism and war created more barriers to Franco-British relations than had existed in the *Ancien régime*. Yet, the *hôtel Delessert* remained a crossroads of the Enlightenment. This persisted despite the death of the first generation of the Lunar Society and the Delesserts. The second generation assumed control of scientific sites and industrial establishments. Shared interests insured cosmopolitan exchange into the 1840s. Ultimately, network members participated in effecting the transformation to modernity.

The French Revolution undeniably transformed France, and western culture, yet state direction of the economy persisted. Industry had been hindered under the *Ancien régime* by aristocratic privilege, patronage, and corruption.¹ Great changes induced by the Revolution led to greater bourgeois involvement and encouragement of industry during the Napoleonic era. However, historians continue to debate the industrial achievements of Napoleon's government, and leading ministers like J.-A. Chaptal. The role of this regime in French industry has been characterized as part of a failed legacy, stretching back to the 1660s, which stifled ingenuity by having a small clique make broad economic policy. Chaptal's accomplishments have also been questioned, as the gap between British and French development – and between French scientific theory and application – seems to have widened between 1790 and 1815.² Conversely, policies by Chaptal and other

¹ Pollard, *Peaceful Conquest*, pp. 159-62.

² *Ibid.*, pp. 161-2; Jones, *Industrial Enlightenment*, pp. 225-6.

ministers appointed by Napoleon – that institutionalized education, science, and industry – are viewed as having stabilized France, which laid the foundation allowing for French industrialization to draw near that of Britain by 1914.³ There was, regardless of the ultimate success of state contributions, a departure from trying to import British methods. The Revolution and Franco-British war created both ideological and physical barriers to cross-Channel exchange. Furthermore, as Jeff Horn has demonstrated, the “threat from below” of civil unrest, forced France onto a unique course to avoid further revolution. Britain’s industrialization model became for France, after 1789, the path not taken.⁴ The Delesserts helped prevent popular revolt through philanthropy and by founding the first savings banks.⁵ Yet, these methods also related to their scientific and industrial pursuits. Members of the cosmopolitan Delessert network continued to take the road less travelled.

The British-Franco-Swiss network managed, remarkably, to maintain its path of cosmopolitan exchange despite revolution, nationalism, and war. This included assisting members forced across or trapped on the other side of the English Channel or Atlantic Ocean, participating in efforts to extend the Anglo-French commercial treaty, and joining the projects that circumvented embargoes and blockades. The network thus facilitated the shipment of Merino sheep for breeding, Soho engines for steamships, methods for beet-sugar refining, and apparatus for gunpowder manufacturing across international borders. These actions were a continuation of eighteenth-century mutual exchange, which differed from industrial espionage, direct cash purchase, or state sponsorship. The latter example provides a most glaring contrast. Under Napoleon the official aim was to grow 32,000 hectares of sugar beets in France in 1811. Yet an environment of confusion, unawareness,

³ Gillispie, *Science and Polity*, pp. 611-40; Horn, *The Path Not Taken*, pp. 169-248.

⁴ *Ibid.*, pp. 195-290; Horn, “Avoiding Revolution,” p. 87-102.

⁵ Coninck, *Banquiers et philanthropes*, pp. 87-122; Redlich, “Jacques Laffitte,” pp. 144-6.

and mismanagement prevailed among factories, farmers, and officials. Ultimately, only 6,785 hectares of sugar beets were planted in the French Empire in 1811.⁶ On 2 January 1812, Benjamin Delessert presented a loaf of bread, made from beet sugar fabricated at his private refinery, to Chaptal who brought it to Napoleon at the Tuileries. The emperor rushed to Passy, leading Chaptal to inform Delessert in Paris to quickly meet them at his refinery.⁷ Napoleon subsequently ordered Chaptal to set up a large rival state refinery, modeled on that of Delessert. Not only had Delessert bested Napoleon's chemists, but his banking functions gave him certain sway over the emperor.⁸ E. C. Spary argues that Chaptal and Napoleon's inspection broached industrial espionage, and was at least surveillance of a rich liberal banker "with a semi-autonomous domain just outside Paris and no small degree of power over Napoleon himself."⁹ The Delesserts continued, as they had since 1777, to enjoy success despite state involvement in France's economy, and to prosper by their position in Passy, just beyond the centre of power.

The strategic location of the *hôtel Delessert* insured that it remained a geographic, temporal, and cultural crossroads of the Enlightenment. Banking had drawn the family, through generational migration, to Paris. Retention of property and connections in Lyon and Geneva expanded the family's commercial capacity. Immersion in cosmopolitanism and intimacy with J.-J. Rousseau led them to pursue education, science, and industry. Paris was a central Enlightenment and European node, not because it was where the *philosophes* lived but because of its geographical and cultural centrality. This is what

⁶ Pollard, *Peaceful Conquest*, p. 162.

⁷ 2. J.-A. Chaptal à B. Delessert (rue Coq-Héron), 2 janvier à midi [1812]. Ferri, *Autographes*, p. 3.

⁸ *Delessert & cie* had lent credit to Napoleon since the Consulate (1799-1804). In 1803, Delessert became a governor of the *Banque de France*, which managed the empire's treasury. E. C. Spary, *Feeding France: New Science of Food, 1760-1815* (Cambridge: Cambridge University Press, 2014), pp. 299-309.

⁹ *Ibid.*, p. 307.

attracted so many *philosophes*, *savants*, and *fabricants*. By the 1780s the Delesserts had expanded their banking, wealth, and network. Their townhouse, *rue Coq-Héron* Paris, placed them at the centre of activity, as their property in Passy provided an escape. This let them maintain their health, from both urban ills and revolutionary violence, and gave them space to cultivate a botanical *musée* and industries. The Grand Tour of Stephen and Benjamin to Britain expanded their network, establishing links to London, Birmingham, and Edinburgh. Thereafter, the *hôtel Delessert* stood at the centre of the British-Franco-Swiss network, representing both a literal and figurative crossroads of the Enlightenment. The Delesserts' houses, salons, bank, and *musée* served as spaces of middling as well as collection. They sent or received plants, animals, minerals, books, *savants* and *fabricants* from Europe and beyond. The liminal Delesserts were a temporal and cultural crossroads, linking Rousseau to the wider network, British Francophiles to Continental Anglophiles, Franco-Swiss to Huguenots, moderates to radicals, the Lunar Society to Franco-Swiss *savant-fabricants*, and ultimately the Enlightenment to the early Industrial Revolution.

The Delessert network endured despite war, revolution, and the deaths of the members of its first generation. Madeleine and Etienne Delessert's marriage, influenced by Rousseau fifty years earlier, was long and prosperous. Mme Delessert died in 1816. Etienne suffered this loss greatly, dying later that year, and elicited sympathetic responses throughout their network.¹⁰ In 1817 R. L. Edgeworth died, outliving three wives and nine of his many children. James Watt died in 1819. Maria Edgeworth informed Watt junior:

When we saw you, we could scarcely help envying you for having enjoyed longer than ourselves the happiness of possessing such a father – your father was 84 ours only 74 when he died. Yours was a most rare example of rigor of intellect &

¹⁰ XXI. A. Romilly to M. Edgeworth, 5 July 1816. Lady Anne Garbett Romilly et al., *Romilly-Edgeworth letters, 1813-1818*, ed. Samuel Henry Romilly (London: J. Murray, 1936), p. 145; BCL MS 3219/4/36. J. Watt jnr (Paris) to J. Watt snr (Birmingham), 24 October 1816.

warmth of heart preserved so much beyond the common age of men – I cannot conceive of a more happy death, terminating a more happy useful, honorable – I had almost said glorious life – for true glory surely belongs to time, who serves instead of destroying or teaching his fellow creatures to destroy one another – I hope some writer as eminent in literature as your father was in science, will endeavor to do justice to his memory and thus add still further to the utility which Mr. Watt’s life has been to the world.¹¹

Such sentiments along with a common commitment to science and utility united the Lunar Society, the Delesserts, and their wider network through revolutionary times.

In 1820 Maria Edgeworth returned with her sisters to Paris, on a trip that marked both the persistent social bonds and shifting modes of transit. The Delesserts welcomed the Edgeworths, engaging them in tours of exotic plants, flowers, and greenhouses. Maria was touched by the duration of the Delesserts’ “habits and attachments,” which had sustained them through great revolutionary change.¹² Forms of travel had also undergone shifts. The Edgeworths crossed the Irish Channel by steamboat, on route to France, and François Delessert’s family crossed the English Channel by steamboat in 1826, for a sojourn to London. By 1854, his son visited the rebuilt Crystal Palace in Sydenham.¹³

Key figures of the network’s second generation, like its first, died in close succession. Mme Gautier, M. R. Boulton, Benjamin Delessert, James Watt junior, and Maria Edgeworth died within a decade (1839-49). Through this time the botanical collections of the Delessert *musée* and Rousseau remained focal points for the family and the network.

The influence of Rousseau and the Delesserts formed links in European botany spanning eighteenth-century and nineteenth-century voyages of discovery. Alexander von

¹¹ BCL MS 3219/6/70 18. M. Edgeworth (Edgeworthstown) to J. Watt jnr, 6 September 1819. Benjamin Delessert, like Maria Edgeworth, sent James Watt junior condolences on the loss of his father. *Ibid.*, 19. B. Delessert (Paris) à J. Watt jrn (Birmingham), 18 octobre 1819.

¹² M. Edgeworth (La Celle) to F. A. Edgeworth, 4 June 1820. Edgeworth, *Maria Edgeworth*, pp. 140-1.

¹³ Hill, *Maria Edgeworth*, p. 226. AP MS VI3S 5. S. Delessert, “Journal d’un séjour à Londres en 1826,” pp. 1-89; *Ibid.*, 3. F. B. Delessert, “Le Palais Cristal de Sydenham,” pp. 1-12.

Humboldt, a friend and correspondent of Benjamin Delessert, spent years in Paris. The Delesserts were bankers and patrons to Aimé Bonpland and may have sent Merino sheep to him in Buenos Aires. In 1829 specimens from Humboldt and Bonpland's voyage to South America were added to Delessert's *musée*.¹⁴ Delessert had combined donations to the herbarium, with his own purchases, to create a massive collection. The herbarium, originally given by Rousseau, grew year-by-year expanding to 87,000 species. By 1847 at Delessert's death it held roughly 300,000 specimens. Only two contemporary private herbaria matched it: that of A.-P. Candolle and British botanist William Jackson Hooker (1785-1865).¹⁵ Delessert enlarged his herbarium by buying collections and sponsoring naturalists' voyages, including those of his nephews who botanized in the South Pacific.¹⁶ In 1845 Delessert helped Hooker's son, Joseph Dalton Hooker (1817-1911), to connect with Humboldt in Paris.¹⁷ J. D. Hooker wrote to his close friend and colleague Charles Darwin (1809-82) wishing he too was in Paris to see the Delesserts' collection and to share in meetings with Humboldt, who inspired Darwin's voyage on the *H.M.S. Beagle*.¹⁸ Ultimately, the Delesserts represent the missing link between Rousseau and Darwin.

The Delesserts were liminal figures who entered the Enlightenment late and, also, exited it late. Major events in the family's history were, like past decades, emblematic of the period. In 1847 Benjamin Delessert died and his vast herbarium and botanical library

¹⁴ Bell, *A Life in Shadow*, pp. 142-222; H. Walter Lack, "The Plant Self Impressions prepared by Humboldt and Bonpland in Tropical America," *Curtis's Botanical Magazine* 18, no. 4 (2001), p. 225.

¹⁵ AP V13S 3. Join-Lambert, *Benjamin Delessert*, p. 97; Stafleu, "Benjamin Delessert," p. 928.

¹⁶ Adolphe Delessert, *Souvenirs d'un voyage dans l'Inde: exécuté de 1834 à 1839* (Paris: Fortin-Masson, 1843), pp. i-iii, 80, 134; Eugène Delessert, *Voyages dans les deux Océans Atlantique et Pacifique: 1844 à 1847: Brésil, États-Unis, Cap de Bonne-Espérance, Nouvelle-Hollande, Nouvelle-Zélande, Taïti, Philippines, Chine, Java, Indes Orientales, Égypte* (Paris: A. Franck, 1848), p. 98.

¹⁷ Joseph Dalton Hooker, *Life and Letters of Sir Joseph Dalton Hooker O.M., G.C.S.I.*, ed. Leonard Huxley (London: J. Murray, 1918), vol. 1: pp. 178-86.

¹⁸ J. D. Hooker (Ghent) to C. Darwin, [late February 1845]. Charles Darwin, *The Correspondence of Charles Darwin*, eds. Frederick Burkhardt and Sydney Smith, (Cambridge: Cambridge University Press, 1988), vol. 3: pp. 147-50.

were left to his brothers. By then their network and collections were global. The family continued Rousseau's practice of disseminating botany to amateurs by employing an accessible classification system, while producing inexpensive books to spread scientific information to a wide audience.¹⁹ Diffusion of botanical science was the fundamental impulse for Delessert's *musée*. François Delessert made this clear after Benjamin's death:

My brother, M. Benjamin Delessert, bequeathed to me his botanical collections, his herbaria, and his library. I regard it as one of my primary duties to continue, in honour of his venerated memory, as it may depend on me, his generous intentions respecting the sciences, by facilitating the research of savants and amateurs who desire to visit these galleries.²⁰

Expanding access to science was part of the Delesserts' Enlightenment philosophy.

Ultimately, the breakup of the Delesserts' *musée* occurred during a general period of scientific institutionalization. François Delessert's daughters, Caroline Hottinguer and Madeleine Bertholdi (1831-1910), inherited the fateful task of dismantling the *musée*. After François' death in 1868 they broke up the collection, donating the botanical library to the *Institut de France* and the herbarium to the city of Geneva. The division was regretted, as the collections had been renowned for its accessibility to professional and amateur scientists. Yet this coincided with a wider shift to institutionalization.²¹ Before this point, the Enlightenment had become expansive. The bonds between the Delesserts and Lunar Society alone lasted for more than a half-century. Traffic over the Channel in the 1760s, 1780s, 1802-3, and after 1815, reveals the networks' enduring connections.

In this period science and society were both becoming increasingly enclosed, professionalized, and institutionalized. The public sphere, essential for Enlightenment

¹⁹ Hoquet, "La bibliothèque botanique," pp. 109-11; Stafleu, "Benjamin Delessert," pp. 927-33.

²⁰ François Delessert à M. le Président de l'Académie des sciences (Séance du 29 mars 1847), in *Revue botanique: recueil mensuel*, ed. Pierre Etienne Simon Duchartre (Paris: A. Franck, 1847), vol. 2: p. 476.

²¹ Hoquet, "La bibliothèque botanique," pp. 109-12; Stafleu, "Benjamin Delessert," pp. 933-5.

culture, had weakened by 1850. The grand Republic of Letters slowly shifted as a public and semi-public sphere (based on centres of production and literary bourgeois family culture) went through a structural transformation into private communities of consumers and individual incomes.²² *Musées* transitioned into museums. Cinemas and cafes replaced salons and coffeehouses. Grand Tours, either to sites of erudition or production, were supplanted by railway journeys. Slow sojourns by carriage, enabling observation through the senses and reflective writing of travel novels and journals, were subsumed by rapid transit and the purchase of books. The spectacle of hot-air balloons was replaced by the more practical passages by canals and barges, and blimps, across borders. The epistolary Republic of Letters shifted into rapid communication networks, through the technologies of telegraph and telecommunications.²³ Members of the Lunar Society and the Delessert network predicted and pioneered such advances as the telegraph, photography, railways, motor coaches, air travel, and cinema. While, these technologies were only perfected later in the nineteenth century,²⁴ the networks of Enlightenment had proved to be a stepping-stone, extending over decades, to a technological modernity.

²² Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry Into a Category of Bourgeois Society* (Cambridge: MIT Press, 1991), pp. 154-80.

²³ On the cultural repercussions of these shifts see Stephen Kern, *The Culture of Time and Space, 1880-1918* (Cambridge: Harvard University Press, 2003), pp. 1-108; Carolyn Marvin, *When Old Technologies Were New : Thinking About Electric Communication in the Late Nineteenth Century* (New York: Oxford University Press, 1988), pp. 3-100; Wolfgang Schivelbusch, *The Railway Journey: The Industrialization of Time and Space in the 19th Century* (Berkeley: University of California Press, 1986), pp. 1-88.

²⁴ Lunar men discussed using steam for carriages and boats, Edgeworth's work on telegraphs and proposed railway system, and air balloons. Schofield, *The Lunar Society*, pp. 29-31, 50, 72-3, 250-4, 334-8, 409-438; Rumford commended Livingston's work in steamboats and suggested that steam wagons be used to carry people by land. NYHS MS RRLP C. Rumford (Auteuil) to R. R. Livingston, 8 December 1811. Davy and the Wedgwoods, like several of the Delesserts, did early photography. John Hannavy, ed., *Encyclopedia of Nineteenth-Century Photography* (New York: Routledge, 2008), p. 21, 408, 606-14, 669-72. P. M. Roget's paper, on optical deceptions of wheel spokes through vertical apertures (*Philosophical Transactions* 1825), influenced cinema's development. Swinton, "The Remarkable Accomplishments," pp. 916-7.

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