



THE UNIVERSITY *of* EDINBURGH

This thesis has been submitted in fulfilment of the requirements for a postgraduate degree (e.g. PhD, MPhil, DClinPsychol) at the University of Edinburgh. Please note the following terms and conditions of use:

This work is protected by copyright and other intellectual property rights, which are retained by the thesis author, unless otherwise stated.

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author.

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author.

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given.

**“OUR MASTER & FATHER AT THE HEAD OF PHYSICK”:
THE LEARNED MEDICINE OF WILLIAM CULLEN**

Jeffrey Charles Wolf

This thesis was submitted to the School of History, Classics and Archaeology for the
degree of Doctor of Philosophy in History

The University of Edinburgh
2015

ABSTRACT

This is a study of Dr. William Cullen (1710-1790), the Scottish chemist, physician, and professor of medicine, who played a significant role in the Scottish Enlightenment.

I argue that Cullen was both a more unorthodox figure in Scottish medicine than he is generally depicted, as well as a more ambitious one. Despite his controversial doctrines, he skillfully managed the hierarchy of his profession and reached the pinnacle of success as a learned physician in the Scottish Enlightenment.

I explore Cullen's life and thought from different angles. I explicate his pedagogical persona and philosophy of medicine, both of which shaped the experiences of his pupils. I show how his neurophysiology was rooted in his contentious interpretation of the nature of the nervous fluid. And I provide a detailed look at Cullen's understanding of hygiene, or the art of health—a rarely-studied component of his practice of medicine.

DECLARATION OF MY OWN WORK

I certify:

- (i) that this thesis has been composed by me, and
- (ii) either that the work is my own, or, where I have been a member of a research group, that I have made a substantial contribution to the work, such contribution being clearly indicated, and
- (iii) that the work has not been submitted for any other degree or professional qualification except as specified.

Jeffrey Charles Wolf

TABLE OF CONTENTS

| | |
|---|-------------|
| Acknowledgements | v |
| Abbreviations | viii |
| Chapter 1: Introduction | 2 |
| I. Dr. William Cullen (1710-1790) | 2 |
| II. Historiographical Foundations | 12 |
| III. The Cullen Historiography: History of Medicine | 41 |
| IV. The Cullen Historiography: History of Chemistry | 52 |
| V. This Study | 61 |
| Chapter 2: Pedagogy | 70 |
| I. Cullen’s Pedagogical Persona | 71 |
| II. Promotion, Prestige, & Student Advocacy | 83 |
| Chapter 3: Philosophy of Medicine | 106 |
| I. Cullen’s Medical Epistemology: Inductive Dogmatism | 109 |
| II. Cullen’s Medical Ideology: Systematic Eclecticism | 131 |
| III. The Appeal of Eclecticism | 144 |
| Chapter 4: Theory of the Nervous System | 154 |
| I. Cullen & the Nervous System | 155 |
| II. ‘A General View of the Nervous System’ | 160 |
| III. 18th-Century Theories of the Nervous Fluid | 170 |
| IV. Cullen’s Inherence Theory of the Nervous System | 182 |
| V. The Scottish Context: Cullen and His Colleagues | 200 |
| Chapter 5: Hygiene, or the Art of Health | 214 |
| I. The Art of Health | 217 |

| | |
|--|------------|
| II. Cullen's Interest in Hygiene | 230 |
| III. The Virtues of Moderation | 235 |
| IV. Medical Expertise & Laying Open the Art of Health..... | 244 |
| Chapter 6: Conclusion..... | 258 |
| I. A Reassessment..... | 258 |
| II. Broader Implications | 260 |
| APPENDICES..... | 269 |
| Appendix 1A: Ship Surgeon | 269 |
| Appendix 1B: Thomson & the Family Firm | 275 |
| Appendix 1C: Cullen and Brown..... | 279 |
| Appendix 3A: Source Material | 283 |
| Appendix 3B: Cullen on Sydenham..... | 289 |
| Appendix 4A: Source Material | 291 |
| Appendix 4B: The Unifying Doctrine..... | 297 |
| Appendix 4C: The Aether Controversy..... | 308 |
| Appendix 5A: Source Material | 325 |
| BIBLIOGRAPHY | 332 |
| Cullen's Published Works | 332 |
| Manuscript Sources | 337 |
| Primary Sources | 341 |
| Secondary Sources | 348 |

ACKNOWLEDGEMENTS

I would like to acknowledge and thank a host of people who not only made this thesis possible but, at times, truly enjoyable.

Without the support of my parents, I would not have had the courage to attempt a project of this duration; nor would it have been possible.

I owe immense gratitude to my supervisors at the University of Edinburgh, Dr. Thomas Ahnert (History) and Dr. John Henry (Science Studies), who were model mentors. I realise that not every doctoral student has the good fortune to have supportive and brilliant supervisors, but I had both. Thomas and John gave me the necessary time and space, in an increasingly long project, to follow my own path, and their feedback was tremendously helpful at all stages of the process, which is particularly impressive given that I was often not physically present to discuss it with them. I only hope I have done justice to their support of my work. I would also like to thank Dr. Pauline Phemister (Philosophy), who offered her philosophical expertise and advice in the early stages of this project.

The School of History, Classics and Archaeology at Edinburgh administers the Jenny Balston Scholarship, of which I was a fortunate recipient. I am grateful as well to the donor of the award. It provided me with essential support for the first three years of my work. Without it, I would not have been able to study at Edinburgh in the first place.

For a project as dependent on manuscript material as this one, I have accrued a great deal of debt toward library staff over the years. I owe many thanks to the wonderful staff at Glasgow University Library, Special Collections and, in particular, Sarah Hepworth (Assistant Librarian, Special Collections) and David Weston (former Keeper of Special Collections) for their trust in me. They supported my efforts to digitise the Cullen Papers in mid-2011.

The other great collection of extant Cullen material is held at the library of the Royal College of Physicians at Edinburgh, helmed by the affable and knowledgeable Iain Milne (Sibbald Librarian), who was unfailingly informative. Estela Dukan was always available and helpful, even on dreary Scottish winter days. I would also like to acknowledge Alison Scott, the Archivist at the RCPE, who provided me with an early version of the new RCPE catalogue.

In the United States, I felt particularly welcomed during a half-day sojourn to the Yale Medical Library. Flo Gillich regaled me with stories, and Dr. Melissa Grafe, the Librarian for Medical History, welcomed my inquiries. Nicole Joniec, at the Library Company of Philadelphia, efficiently tracked down and digitised important correspondence. Elisabeth Brander, the Rare Books Librarian at the Bernard Becker Library, went well beyond the call of duty to help me acquire digital copies of some rare lecture notes. John Schleicher, Head of Special Collections at the McGoogan Library of Medicine, was similarly generous with his time and provided me with a scan of the very rare—possibly unique—copy of Cullen's 1770 physiology textbook. And I would like to acknowledge, in the absence of recalling further names, all the

other help I have received in the many libraries and archives I have visited or from which I have asked assistance. They are the foundation of this study.

A number of scholars indulged my naive queries and were willing, despite immense time constraints of their own, to help me further my understanding of Cullen and the Edinburgh Medical School. I thank, first of all, Dr. David Shuttleton at Glasgow University, for talking to me—the neophyte—about Cullen and for introducing me to his impressive Cullen Project team (including Dr. Jenny Bann). Meeting Dr. Shuttleton for the first time was, for me, an immense relief, for I was finally able to talk with a living, breathing expert on all things Cullen. I very much enjoyed swapping archive stories with him over lunch at the Ubiquitous Chip in Glasgow.

During one of my first visits to Special Collections at Glasgow, I happened to notice the presence of Dr. Joanna Geyer-Kordesch, and I found the gumption to introduce myself. I quickly realised the gumption was unnecessary, for she was very kind and generous with both her time and knowledge about Cullen and Stahl, among many other topics. We enjoyed a number of pleasant lunches together, both in Glasgow and Edinburgh, that are etched in my mind.

Although I have never met Dr. Georgette Taylor, she proved to be an insightful email correspondent on Cullen and eighteenth-century chemistry. Dr. Lisa Rosner, whom I have also not met, was tremendously generous by providing me with student attendance lists for Cullen's courses. I have not made enough use of them in this thesis, but I hope to in the future.

Dr. Christopher Lawrence kindly allowed me to post, on my Cullen website (<http://www.williamcullen.net>), an enhanced PDF file of his incomparable PhD thesis. Dr. John P. Wright was generous with both his expertise about Cullen and some copies of manuscript material he provided me, early in my research. Dr. Guenter Risse was likewise generous for sending me his photocopies of Cullen's unpublished work on hygiene, as well as a copy of his 2005 book. Dr. Roderick Home, who knew almost nothing about me except for my research interests, was still kind enough to provide me with a critical English translation (undertaken by the late Peter Connor) of Euler's new theory on light and colours. I regret that I have not been able to use this more extensively in this work, but it might prove essential in the future.

Dr. Adam Budd, who was a mentor in a number of ways during my time at Edinburgh, often pointed me to resources, especially about works in eighteenth-century hygiene, that I would not have thought of on my own. He also gave me productive feedback on a postgraduate talk I gave on Cullen, very early in my studies. Finally, Dr. Jane Rendall, whom I only met quite recently, was particularly generous with her unpublished work and her knowledge of Cullen's family, and it was a pleasure talking with her about Cullen during the 2013 Cullen Symposium, where we both gave talks.

I want to thank two fellow Cullen researchers, who are as passionate about Cullen and eighteenth-century medicine as I am. Sabine Kraus, at the *École des hautes études en sciences sociales*, generously provided me with her transcriptions of

important Cullen material held at the RCPE, and we spent a lovely afternoon working together at the Sibbald Library. Jane Corrie, the recipient of the PhD Scholarship funded by the Cullen Project at Glasgow, shared her knowledge of Cullen and Edinburgh science with me. I fondly remember our trip to the Royal Botanic Garden at Edinburgh, on a rainy Scottish day, where she told me about her work on John Hope and got me thinking about Cullen's botanical interests.

I owe a debt of thanks to my friend and colleague while at Edinburgh, Dr. Daniel Clinkman, who not only offered his insight into the PhD process (for he finished much more rapidly than I) but also took digital photos, on my behalf, of absolutely critical material at the Royal Society. I have discovered that it is essential to have a comrade-in-arms while one undertakes isolating, demanding work, and Dan was that person.

In the final year of this project, I met a wonderful person who has supported me throughout the *Sturm und Drang* involved in completing a written work as lengthy as this one. She has confidence in me and my writing, even when—especially when—I do not. I owe meiner Freundin, Julia W., *Dank von ganzem Herzen*.

ABBREVIATIONS

The following is a list of the archives that I have cited in this study. I have given each an abbreviation that I use in the course of this work. Further details about the manuscript collections can be found in some of the Appendices and the Bibliography.

AUL - Aberdeen University Library
EUL - Edinburgh University Library
GLHM - Glasgow University's Hunterian Museum and Art Gallery
GUL - Glasgow University Library, Special Collections
HSP/LCP - Historical Society of Pennsylvania/Library Company of Philadelphia
NAS - The National Archives (Kew, Surrey)
NLC - The Newberry Library (Chicago)
NLM - National Library of Medicine (Bethesda, Maryland)
NLS - National Library of Scotland (Edinburgh)
NRS - National Records of Scotland (formerly National Archives of Scotland)
NYAM - New York Academy of Medicine
RCPE - Royal College of Physicians of Edinburgh
RCSE - Royal College of Surgeons of England (London)
RSL - Royal Society of London
SDL - Smithsonian Dibner Library (Washington, D.C.)
UNMC - University of Nebraska Medical Center, McGoogan Library of Medicine
WHL - Wellcome Library for the History and Understanding of Medicine (London)
WUSL - Washington University of St. Louis, Bernard Becker Medical Library
YML - Yale Medical Library (New Haven)

Frequently-cited Manuscript Collections

I cite a few manuscript collections very frequently and the forms in which they appear are distinctive, so I rarely repeat the archive abbreviation in the text that follows.

These include GUL citations which almost always begin with 'MS Cullen', and RCPE citations which always begin with 'CUL/'. So whenever these appear, it is to be understood that they are from these respective archives. For example, I cite GUL, MS Cullen 326 simply as MS Cullen 326 and RCPE, CUL/2/2/1 simply as CUL/2/2/1.

I also cite lecture notes from a few specific manuscript collections so frequently that it would be cumbersome to include their names in full. First, I reference a particular 7 volume manuscript held at the NLM (MS B 4), which is a very detailed transcription of Cullen's 1772-3 course on the Institutes of Medicine. I generally cite it in this form: NLM, 7:4, i.e. citing it by volume and page number, preceded by 'NLM'. But it is to be understood that this stands for, NLM, MS B 4, Vol. 7, p. 4.

The same is true for a collection held at the Yale Medical Library. This is a five volume set of lectures notes from Cullen's 1768-69 lectures on the Institutions,

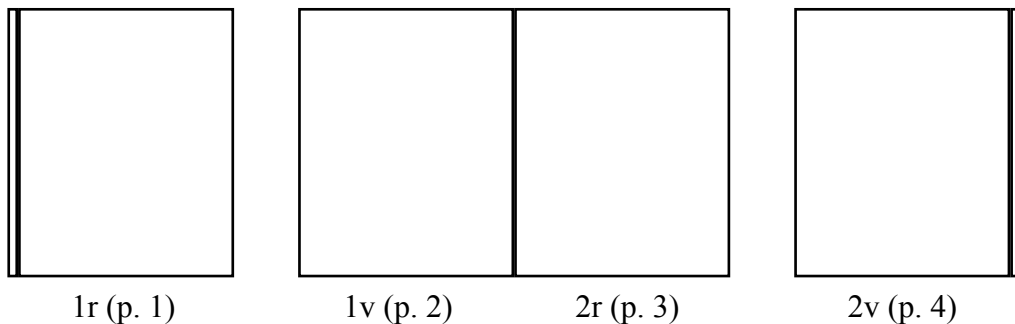
and I cite it as YML, Inst., followed by the volume and page number, e.g. YML, Inst., 3:3. Likewise for the lecture notes found at the Bernard Becker Medical Library. For the sake of succinctness, I refer to these in the following form, e.g. WUSL, 1:113. This stands for WUSL, xxWZ 260 C967L 1767, Volume 1, p. 113.

I do the same with one primary source that is not a manuscript but which I refer to so often—everyone must—that I abbreviate my references to it. I am speaking of John Thomson’s two volume biography of Cullen. I abbreviate this title as ‘TLC’ and then include the volume and page number, e.g. TLC, 1:367 refers to page 367 of the first volume of Thomson’s biography.

Editorial & Transcription Policy

As a general rule, I use brackets [like this] to indicate the insertion of editorial material. When quoting from manuscripts, I cite by pagination if one is given by the original author (I note in brackets the few cases where the author-provided pagination is given incorrectly). Otherwise, I cite by foliation. It will be clear when I am citing by foliation because of my use of ‘v’ for verso and ‘r’ for recto, e.g. 3r, or 10v. Only foliation numbering contains these abbreviations.

My understanding of foliation is as follows (in case this clashes with other interpretations). Consider a simple 4 flyleaf manuscript (two double-sided connected sheets):



My foliation for these leaves are indicated above, followed by the traditional pagination in parentheses. Thus, the folios ‘1v’ and ‘2r’ (pages 2 and 3) constitute the open leaves of the text.

Finally, when I quote from Cullen’s own folded, two-column lecture notes (normally used as lecture prompts), I indicate line breaks with a slash. For instance, something that originally appears in Cullen’s handwriting like this:

[1v]

It reduces the problem of
the action of the mind upon the
body to this how one State of

I transcribe in my text like this: “It reduces the problem of / the action of the mind upon the / body to this how one State of” (1v). When Thomson quotes from these folded notes, he rarely indicates where these breaks occur. Indeed, he sometimes transforms Cullen’s notes into full sentences including punctuation not found in the original—see, e.g., TLC, 1:26-8. Though this is not always of material consequence, I wanted to signal to the reader that I am quoting from Cullen’s handwritten lecture prompts in their original form.

This page intentionally left blank

CHAPTER ONE

INTRODUCTION

I cannot conclude this letter without repeating my obligations to you for the friendship I experienced, and the instruction I derived from you while in Edinburgh. If I have added any thing to my Stock of ideas since I left you — If I have been a patient Observer of nature — & a faithful compiler of facts — If I have been in any degree useful or Successful in my profession — I owe all these things to you. May you live long — very long to enjoy such effusions of gratitude from your pupils, and continue every year to bless the world with your invaluable Works.

-Benjamin Rush to William Cullen, September 16, 1783
[MS Cullen 108, 2r-2v]

CHAPTER 1: INTRODUCTION

This is a study of Dr. William Cullen (1710-1790), the Scottish chemist, physician, and professor of medicine, who played a significant role in the Scottish Enlightenment. I begin with a brief review of Cullen's life.¹

I. Dr. William Cullen (1710-1790)

Early Years

William Cullen was born on April 15, 1710 in the town of Hamilton in the county of Lanark, about 20km southeast of Glasgow.² He attended the grammar school in Hamilton, before continuing his studies at the University of Glasgow. We know very little about his time there, except that he was listed among the pupils “who attended the mathematical lectures of the celebrated Dr [Robert] Simson, in the year 1727.”³ After studying at Glasgow (or perhaps concurrently with his studies), he

¹ This is by no means comprehensive, and I only provide the events relevant to the study that follows. The most detailed discussion of Cullen's life and work remains Thomson's two-volume biography, the first volume of which was published in 1832 (TLC 1) and the second in 1859 (TLC 2). The best short overview of Cullen's life and work is, in my view, W. F. Bynum, “William Cullen (1710-1790),” in *Oxford Dictionary of National Biography* (Oxford University Press, 2004), <http://www.oxforddnb.com/view/article/6874> [Accessed 17 June, 2011].

² Interestingly, Cullen did not know he was born on this day and seems to have believed that he was born on November 22, 1712. I do not have space here to discuss the controversy, but we know from the Old Parish records—as did John Thomson, who reviewed them—that Cullen was in fact born on April 15, 1710. The second entry of the May 2, 1710 Old Parish Record for Hamilton, Lanarkshire reads, in part: “William Cullen of Sauches writer In Hamilton and Elizabeth Robertson his lawful married wife had yer [their] 2d son brought forth on Saturday morning...on ye [the] 15th of April 1710 And Baptized William on Sunday forenoon the 2d of May 1710.” See “Cullen, William (O. P. R. Births 647/00 0020 0063 Hamilton)”, Hamilton Parish (Lanarkshire, Scotland), *Old Parish Registers*, OPR 647/00 0020 0063, 02/05/1710, Digital Image, *ScotlandsPeople*: <http://www.scotlandspeople.gov.uk> [Accessed 02 June, 2011. Crown copyright].

³ TLC, 1:2. I have not verified this myself but there is no reason to doubt Thomson on this point. In support of this, see Volume III of the *Munimenta* for the University of Glasgow, where Cullen is described as a student of mathematics (*‘matheseos studiosus’*) under the listing for November 14, 1727. He is placed under the category of students who previously had been inscribed on the list of the Academy and who were now allowed to vote in the election of the Rector (“Nomina studiosorum in quacunq[ue] facultate qui prius in Academiae album inscripti fuerant...”). See *Munimenta Alme Universitatis Glasguensis: Records of the University of Glasgow From Its Foundation Till 1727. Vol. III—Lists of Members—Internal Economy*, ed. Joseph Robertson and Cosmo Innes (University of Glasgow, 1854), 236. This evidence suggests that Cullen was a student, at a minimum, during the academic sessions of 1726-1727 and 1727-28.

began a surgical apprenticeship with John Paisley, a respected Glasgow surgeon and member of the Faculty of Physicians and Surgeons of Glasgow (FPSG).⁴

Once he finished his apprenticeship in Glasgow, Cullen traveled to London, sometime near the end of 1729.⁵ Using family connections, Cullen was appointed surgeon to the South Sea Company ship, the *Prince William*, whose captain was his cousin, William Cleland of Auchinlee. The *Prince William* embarked on a ten month trading mission to the West Indies in late November 1730, with a six month stopover in Porto-Bello (latter day Portobelo in Colón Province, Panama).⁶

After returning in September 1731, Cullen may have stayed in London and attended the apothecary shop of a Mr. Murray, on Henrietta Street.⁷ Possibly in early 1732, Cullen returned to Scotland and stayed with his former captain and cousin, William Cleland, at his family estate of Auchinlee in the parish of Shotts, to help care for the Cleland family. Cullen remained here for perhaps two years and then, according to Thomson, “on succeeding to a small legacy by the death of a relation, resolved to devote his attention exclusively to his studies for a certain period, preparatively to fixing himself as a medical practitioner in the town of Hamilton.”⁸ This he did at the village of Rothbury in Northumberland, England (about 40km northwest of Newcastle upon Tyne), staying at the home of a dissenting clergyman there. He “was chiefly occupied with the study of general literature and philosophy,”

⁴ John Paisley (d. 1740) was educated at the University of Glasgow and was for a long time the librarian for the Faculty of Physicians and Surgeons of Glasgow (hereafter ‘FPSG’). He also published numerous articles for Alexander Monro primus’ *Medical Essays and Observations*. For what little we know about him, see Alexander Duncan, *Memorials of the Faculty of Physicians and Surgeons of Glasgow, 1599-1850* (Glasgow: James Maclehose and Sons, 1896), 119, 251; and Johanna Geyer-Kordesch, Fiona A. Macdonald and Andrew Hull, *Physicians and Surgeons in Glasgow: The History of the Royal College of Physicians and Surgeons of Glasgow, 1599-1858* (London: The Hambledon Press, 1999), 181, 217-21, 259-60. Incidentally, *Physicians and Surgeons in Glasgow* serves as an invaluable resource for learning about the medical context of Cullen’s early years. I thank Dr. Joanna Geyer-Kordesch, one of its authors, for directing me to it.

⁵ TLC, 1:4-5.

⁶ Thomson does not mention, and may not have known, what ship Cullen was attached to and the itinerary it took. Or, more intriguingly, he may have known but withheld its name and some of the details of its journey. I believe I have discovered the ship, as well as some controversy surrounding its voyage. For the full story, including the ship’s itinerary, please see Appendix 1A: Ship Surgeon.

⁷ Thomson tells us this but offers no evidence for it. Also, it remains unclear whether Cullen attended the apothecary shop before going to the West Indies, or afterwards. Thomson suggests the latter. It must remain conjecture.

⁸ TLC, 1:7. But, again, Thomson offers no evidence for this claim.

Thomson tells us.⁹ At some point, Cullen must have decided to improve his medical knowledge, for he attended medical classes at Edinburgh University during the winter sessions of 1734-35 and 1735-36. While at Edinburgh, Cullen helped to lay the foundations for a student group that became the Royal Medical Society, which still exists today.¹⁰

Upon leaving Edinburgh in 1736, Cullen set up shop as a surgeon in Hamilton.¹¹ He was quickly employed by the Duke of Hamilton, who hired Cullen as his “ordinary medical attendant.”¹² During his residence in Hamilton, Cullen also became involved in local politics, twice being elected a magistrate, serving from 1738 until 1740 or 1741. This was surprisingly eventful, for he presided over an unsettled period when the high price of grain in Hamilton, and elsewhere, led to rioting and disorder.¹³

⁹ Ibid., 1:7. The timing of Cullen’s stay in Northumberland remains unclear. It is possible he stayed there from 1733-34, before beginning his studies at Edinburgh, or perhaps spent his summers there, while wintering in Edinburgh from 1734-36. We do not yet have evidence either way.

¹⁰ Cullen explained his role in its founding to Dr. James Cleghorn, nephew of Dr. George Cleghorn, who was at Edinburgh with Cullen in the 1730s: “Your Uncle and I are I believe the only Surviving members of a Society which existed at Ed.^f in the year 1735, and which laid the foundation of the Medical Society which became more formally incorporated the year after, and as you know has flourished ever since to the great advancement of Medical Science in this University.” (MS Cullen 155, which is a draft letter; see also TLC, 1:10). For a history of the Royal Medical Society, see James Gray, *History of the Royal Medical Society, 1737-1937* (Edinburgh: Edinburgh University Press, 1952).

¹¹ We know that Cullen was hesitant to become a surgeon and even abandoned plans to sit for the examination held by the FPSG in early 1737. See Geyer-Kordesch, Macdonald and Hull, *Physicians and Surgeons in Glasgow*, 181. He was clearly more comfortable with ‘Physic’ than surgery. That being said, he appears to have planned to write ‘A Treatise of Surgery’ at some point. See sketches of his notes at MS Cullen 447.

¹² TLC, 1:11. Cullen’s account book for the dispensing of medicines, while under the patronage of the Duke of Hamilton, has survived. See RCPE, CUL/4/1, entitled “Account Book Containing the Record of Medecines [*sic*] & Medicinal Preparations Furnished by Dr William Cullen During his Residence at Hamilton From September 1737 to October 1741 Notes of Bloodlettings Performed.”

¹³ See Thomson’s description at TLC, 1:15-16. There is no space to investigate this here, but documents do exist that shed light on his time as magistrate. For instance, in a letter to the Duke of Hamilton sent in November 1740, Cullen and his co-magistrate, Charles Hamilton, wrote to inform him of the perilous situation: “At present we not only think it our duty to Inform your Grace of what has lately happen’d here but likewise find it necessary to beg your advice and protection in this Case[.] The Authority your Grace has been pleased to put into our hands is at present very much disregarded, and we are afraid of being Called in question, for not exerting it tho’ we have all the reason of the world to believe that any attempts of that kind would have been fruitless[.]” See NRS, NRAS2177/TD2011/21/Bundle 1057, 1r.

In 1740, Cullen decided to join the brotherhood of physicians and obtained his M.D. from Glasgow University.¹⁴ In November 1741 he married Anna Johnstone, daughter of a minister of Kilbarchan, in the county of Renfrew.¹⁵ After his marriage, Cullen remained a physician in Hamilton until late 1744, when he moved to Glasgow. His life as a medical teacher was about to begin.

The University of Glasgow (1746-1755)

Thomson suggests that Cullen began lecturing immediately upon his arrival in Glasgow, probably in a private capacity because he was not yet doing so at the University.¹⁶ He was admitted as a member of the FPSG in 1744 as well.¹⁷ The disruption of the Jacobite rebellion in 1745 interrupted teaching the next year,¹⁸ but in the summer of 1746 Cullen convinced Dr. John Johnstoun, the Professor of Medicine at Glasgow, to allow him “to deliver, during the following winter [1746], a course of lectures on the theory and practice of physic in the University.”¹⁹ While at Glasgow, Cullen taught almost the entire gamut of medical topics, including the Practice and Theory of Physic, Materia Medica, Chemistry, and Botany.²⁰ In 1751,

¹⁴ TLC, 1:15. See also Arthur L. Donovan, *Philosophical Chemistry in the Scottish Enlightenment: The Doctrines and Discoveries of William Cullen and Joseph Black* (Edinburgh: Edinburgh University Press, 1975), 143.

¹⁵ TLC, 1:16-17.

¹⁶ TLC, 1:17-22.

¹⁷ Geyer-Kordesch, Macdonald and Hull, *Physicians and Surgeons in Glasgow*, 181.

¹⁸ Thomson was unsure of this but University teaching was discontinued in 1745, so it seems probable that Cullen’s extramural efforts were disrupted too, even if we cannot be certain. See *Ibid.*, 307.

¹⁹ TLC, 1:24.

²⁰ There is no Thomson-independent list of Cullen’s entire lecture history, from 1744 to 1789. In the meantime, see Michael Barfoot, “Philosophy and Method in Cullen’s Medical Teaching,” in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 115. Cullen did not publish anything while at Glasgow, though we do know he was working on a chemistry textbook (‘The Elements of Chemistry’). See MS Cullen 277-280. His only chemistry publication, which was derived from his work at Glasgow, appeared in 1756, shortly after he settled in Edinburgh. See William Cullen, “Of the Cold Produced by Evaporating Fluids, and of Some Other Means of Producing Cold; By Dr. William Cullen, Professor of Medicine in the University of Glasgow”, *Essays and Observations, Physical and Literary. Read before a Society in Edinburgh, and published by them. Volume II.* (1756): 145-156.

due in part to his teaching efforts, Cullen was appointed successor to Johnstone as Professor of Medicine.²¹

Cullen became President of the FPSG in 1747.²² In that same year, he was able to secure funds to purchase chemical apparatus to be used in conjunction with a new set of lectures on chemistry.²³ This marks the beginning of the teaching of chemistry at Glasgow and was the first independent lectureship in chemistry in Great Britain.²⁴

The University of Edinburgh (1755-1790)

Cullen was eager to move to Edinburgh in the early 1750s and was finally able to do so in 1755, despite significant opposition, when he was appointed joint Professor of Chemistry, with the ailing Andrew Plummer.²⁵ He began teaching chemistry in January 1756 and would do so successfully for the next 10 years. In 1757 Cullen began delivering clinical lectures at the Royal Infirmary, along with two

²¹ Of course, the support of his promotion by the Duke of Argyll was critical too. I note, as well, that there was some controversy associated with his appointment. Cullen clashed with the Professor of Oriental Languages (and later Church History), William Ruat, whose potential admission to the College Faculty prior to Cullen receiving his legal title for his Professorship seems to have jeopardised Cullen's access to some benefits of his new title (e.g. a College House). I cannot do it justice here, but the dispute can be followed in MS Cullen 14-16.

²² Cullen's term as President lasted from 1747-49. See Geyer-Kordesch, Macdonald and Hull, *Physicians and Surgeons in Glasgow*, 308. See also their Appendix 4, p. 428 for the Minute Book record that confirms this.

²³ The Glasgow University Senate Minutes for February 11, 1747 read: "Dr. Cullen and Mr. Carrick having attended the meeting and given their opinion about the Apparatus necessary for teaching Chemistry, the meeting being satisfied with the account they gave of it, Appoint the thirty pounds sterling of the salary of the Professor of Oriental Languages saved while Mr. Dunlop was abroad to be appropriated for purchasing the said Apparatus, as also twenty two pounds sterling out of the College revenues, that the sum of fifty two pounds may be made up for that use..." These minutes can be found at Dr. Alan Cooper's webpage at <http://www.chem.gla.ac.uk/~alanc/dept/cullen.htm> [Accessed on August 14, 2014]. See also MS Cullen 12 (c. 1748), where Cullen notes "that I have been at a considerable expence in teaching Chemistry while I have drawn but a very small Sum from Students & therefore that the consideration for giving me twenty pounds last year is as weighty now as then & I hope they will now order it to be paid" (1r).

²⁴ For further details, see *An Eighteenth Century Lectureship in Chemistry: Essays and Bicentenary Addresses Relating to the Chemistry Department (1747) of Glasgow University (1451)*, ed. Andrew Kent (Glasgow: Jackson, Son & Company, Publishers to the University, 1950).

²⁵ The Town Council Commission confirming this appointment can be found at MS Cullen 46 (it is dated March 10, 1756). Cullen's manner of obtaining this appointment caused resentment among some of his colleagues. In fact, it is not inaccurate to say that controversy and opposition were the norm for Cullen in Edinburgh, as we shall see in the course of this study.

of his colleagues. He did so for almost 20 years, until he felt compelled to give up his clinical duties (1775), due to his many other commitments.²⁶

In November 1760 the Professor of Materia Medica and Botany, Charles Alston (1685-1760), died, leaving the students of his materia medica course in the lurch. They petitioned to have Cullen teach the remainder of that year's course, which he agreed to do.²⁷ His course proved so popular, however, that student transcriptions of his lectures were passed around and eventually published without his permission.²⁸

When Cullen's colleague Robert Whytt (1714-1766) died in mid-1766, the Chair in the Institutes (Theory) of Medicine opened up. Somewhat reluctantly, and only after special pleading, Cullen agreed to give up his Chair in Chemistry for that of the Institutes, which he taught for five sessions in the period between 1766 and 1773 (excluding 1769-70 and 1771-72). He published a physiology textbook for the use of his students, to accompany this course, possibly as early as 1768, though he continued to revise it until 1772, when it took its final form.²⁹

In 1768 Cullen convinced his colleague John Gregory (1724-1773) to share joint responsibilities with him for both the Chair in the Institutes of Medicine, as well as the more prestigious (and lucrative) Chair in the Practice of Physic, which Gregory occupied.³⁰ Cullen thus began teaching the Practice of Physic every other year, beginning in 1769.³¹ Over the course of the many years in which he taught the Practice, Cullen gathered enough material to write his own textbook, the very

²⁶ TLC, 1:101-2.

²⁷ TLC, 1:141-2.

²⁸ TLC, 1:142-4. Cullen was very unhappy with this turn of events and even asked for, and was granted, an injunction by the Court of Chancery to stop the sale of the unauthorised publication. The petition for the injunction (dated December 12, 1771), can be found at NAS, C 12/1033/2, 'Cullen v. Lowndes'. A more in-depth study of this controversy would be revealing. See my Bibliography for more on this unauthorised work.

²⁹ Cullen scholars have considered the 1772 edition to be the first edition of this text, with further editions in 1777 and 1785 (these editions, however, contain minimal changes from the 1772 edition, and it is unlikely that Cullen had a hand in them). But, as I discuss in Chapter 4 (especially Appendix 4A), Cullen produced earlier editions of this text, perhaps as early as 1768, though the earliest I have been able to find in printed form is from 1770.

³⁰ I discuss this somewhat unusual arrangement in more detail in Chapter 3.

³¹ Cullen published the first edition of his nosology in 1769 to coincide with his teaching of the Practice.

successful *First Lines of the Practice of Physic*, which went through various editions, the first in 1777 and the last in 1784.³²

When John Gregory died prematurely in 1773, Cullen became the sole occupant of the Chair of the Practice of Physic, gaining increasing fame and medical business.³³ He still had enough time, through the late 1770s and early 1780s, to produce new editions of his *First Lines*, as well as some of his other works. In the early 1780s, he began work on a lengthy *Treatise of the Preservation of Health*, but it remained unfinished upon his death.³⁴ This was in part because he was more eager to produce a new work on the materia medica, which would supplant the unauthorised one still circulating. This he did in 1789, publishing the two-volume *A Treatise of the Materia Medica*.³⁵ Not long after doing so, in late 1789, he retired from teaching on account of ill health. He died in Edinburgh on February 5, 1790.³⁶

Motivations for this Study

Despite popularity and fame during his own lifetime, Cullen is little-remembered today, outside of eighteenth-century historical circles. But within those circles, there is now agreement that Cullen was a particularly significant figure in the histories of chemistry and medicine.

In chemistry, he was long ago hailed as “the true commencer of the study of scientific chemistry in Great Britain...”,³⁷ an interpretation upheld by more recent

³² Although the first edition of Cullen’s *First Lines* has sometimes been given as 1776, I have not found any reliable editions from that date—they all date from 1777. For the various editions of his *First Lines*, as well as a list of the works published by Cullen in his own lifetime, see my Bibliography.

³³ The Town Council Commission that confirms Cullen’s advancement to the Practice Chair, dated March 3, 1773, can be found at MS Cullen 47.

³⁴ I discuss this in Chapter 5.

³⁵ This *Treatise* was not simply a revised version of Cullen’s earlier lectures on the materia medica. It is justifiably considered a new work.

³⁶ A death mask survives. See GLHM, C.43, ‘Death Mask of William Cullen (1710-1790)’.

³⁷ Thomas Thomson, *The History of Chemistry. In Two Volumes. Vol. I* (London: Henry Colburn and Richard Bentley, 1830), 304.

commentators.³⁸ This is, in part, because Cullen inaugurated the teaching of chemistry at the University of Glasgow and, in so doing, obtained the first lectureship in chemistry in Britain (1747).³⁹ In his capacity as a chemistry professor, he became a close mentor and friend to Joseph Black (1728-1799), guiding him in his early researches into latent heat, for which Black became so famous.⁴⁰ Finally, though Cullen published only one paper in chemistry, it turned out to be the first public demonstration of artificial refrigeration. According to the standard history of refrigeration, Cullen's laboratory experiments on the evaporation of cold, which he published in 1756, show him to have been "the first to have made an apparatus using the latent heat of vaporization of a liquid, a phenomena of physics on which still rests almost all the production of 'artificial refrigeration'."⁴¹

Cullen's list of accomplishments in medicine is just as long. Roy Porter has declared Cullen to have been, in eighteenth-century medical circles, "the most influential teacher in the English-speaking world..."⁴² Cullen's influence was not limited to Britain—indeed, it was a group of his pupils who began the first medical college in America (the Medical College of Philadelphia), a fact Cullen knew and of which he was proud.⁴³

³⁸ I cite the relevant work in my review of the historiography below, but perhaps the best example of this is Georgette Taylor, "Marking Out a Disciplinary Common Ground: The Role of Chemical Pedagogy in Establishing the Doctrine of Affinity at the Heart of British Chemistry", *Annals of Science* 65, no. 4 (2008): 465-486.

³⁹ For more on this, see Kent, *Eighteenth Century Lectureship*. Tangentially, Cullen was also, it appears, the first in Scotland, perhaps all of Great Britain, to teach the Linnaean system of botany, which he did at Glasgow in the late 1740s. For this claim, see H. J. Noltie, *John Hope (1725-1786): Alan G. Morton's Memoir of a Scottish Botanist* (Edinburgh: Royal Botanic Garden, 2011), 90.

⁴⁰ Black was also one of the first to explore the properties of carbon dioxide, or 'fixed air' as it was then known. For the life of Black, the classic biography is still Sir William Ramsay, *The Life and Letters of Joseph Black, M.D* (London: Constable & Co., 1918). For the most recent collection of his correspondence, which also contains information about his life, see *The Correspondence of Joseph Black*, ed. R. G. W. Anderson and Jean Jones (Farnham: Ashgate, 2012).

⁴¹ Roger Thévenot, *A History of Refrigeration Throughout the World*, trans. J. C. Fidler (Paris: International Institute of Refrigeration, 1979), 47. In another formulation, Cullen's laboratory work "served as a precursor to the development of absorption refrigeration...[he] demonstrated the possibility of refrigeration when he produced a small amount of ice through vaporization by reducing the pressure under a bell jar." See Glen Asner, "Absorption, Refrigeration," in *Encyclopedia of 20th-Century Technology*, ed. Colin Hempstead and William Worthington (London: Routledge, 2004), 670.

⁴² *The Western Medical Tradition: 800 BC to AD 1800*, ed. Lawrence I. Conrad, Michael Neve, Vivian Nutton, Roy Porter and Andrew Wear (Cambridge: Cambridge University Press, 1995), 395.

⁴³ See HSP/LCP, Rush Papers, Correspondence Vol. 24, pp. 56a-d. I have transcribed this letter at the beginning of Appendix 5A.

Cullen has generally been given credit for being the first to coin the term ‘neurosis’ in his *Synopsis Nosologiae* (1769), his influential nosology.⁴⁴ Other physicians would have first come across Cullen’s neologism in his more widely disseminated *First Lines of the Practice of Physic*.⁴⁵ While Cullen’s meaning was a far cry from Freud’s (and our own), it was just one of the ways in which Cullen popularised the central role of the nervous system in health and disease.

Another way Cullen did this was through his controversial new theory of (nervous) fever, which he presented to the public in his *First Lines*. Controversial or not, it was immensely influential; Cullen’s concept of fever may have been, in the words of one scholar, the one “most widely accepted by British physicians in 1800....”⁴⁶

Finally, Cullen was also something of an institution maker: he laid the foundations for what became the Royal Medical Society at Edinburgh, which is still in existence today; he was perhaps the most instrumental figure in putting the Glasgow Medical School on the map;⁴⁷ and he played an important role in establishing the Royal Society of Edinburgh in the 1780s.⁴⁸

Despite Cullen’s list of accomplishments, there is still a great deal we do not know, or have simply misunderstood, about him. And the time is particularly ripe for a re-evaluation of his life and work. This is for a number of reasons, but the most important has to do with the accessibility of Cullen’s *Nachlass*. In 2010, the Cullen Papers, managed by Special Collections at the University of Glasgow Library

⁴⁴ Indeed, Bynum has claimed that Cullen was “without doubt the most influential nosologist in Britain....” See W. F. Bynum, “Cullen and the Study of Fevers in Britain, 1760-1820”, *Medical History. Supplement*, no. 1 (1981): 143.

⁴⁵ For these claims, see José M. López Piñero, *Historical Origins of the Concept of Neurosis*, trans. D. Berrios (Cambridge: Cambridge University Press, 1983), 1, and William F. Knoff, “A History of the Concept of Neurosis, with a Memoir of William Cullen”, *American Journal of Psychiatry* 127, no. 1 (1970): 80-84.

⁴⁶ See Leonard G. Wilson, “Fevers,” in *Companion Encyclopedia of the History of Medicine. Volume I*, ed. W. F. Bynum and Roy Porter (London: Routledge, 1993), 399. Also, see Bynum, “Cullen and the Study of Fevers”.

⁴⁷ Duncan, for instance, claimed that “Cullen and Black were the actual founders of the Glasgow School of Medicine.” See Duncan, *Memorials of the FPSG*, 129.

⁴⁸ To get a sense of Cullen’s role in this, see Steven Shapin, “Property, Patronage, and the Politics of Science: The Founding of the Royal Society of Edinburgh”, *British Journal for the History of Science* 7, no. 1 (1974): 1-41.

(GUL), had just been professionally catalogued, thanks to a generous grant from the Wellcome Trust in 2009-10 (nicely coinciding with the tricentenary of Cullen's birth).⁴⁹ This critical collection would therefore be much more accessible and well-organised for researchers, going forward.⁵⁰

Furthermore, the GUL cataloguing project has been conducted in the context of a digital revolution in the humanities. We now have, in ways we did not as recently as ten years ago, digital tools of immense power at our fingertips. This goes well beyond the use of small digital cameras in the archives. Google Books, for instance, hardly existed before 2004.⁵¹ Gale's immensely helpful *Eighteenth-Century Collections Online* (ECCO) was first released a year before that.⁵² As of 2014, the eighteenth-century historian is awash with access to thousands of books, newspapers, pamphlets, and reference material that could previously only be found in archives scattered across the globe. Now it is all searchable online. Of course, there are drawbacks to this overwhelming geyser of information, as well as benefits. But, as a doctoral student in the midst of it, I was hopeful that I could take advantage of these tools to uncover new insights about Cullen.

The confluence of these events encouraged me to dive more deeply into the archives to discover what remained in Cullen's hand. I was further encouraged by my trip to Special Collections, at Glasgow University Library, when, for the first time, I became aware of the vast amount of primary source material on Cullen held there. I quickly realised that I would not make much progress, if my only means of access was to submit paper slips to the librarian on duty, asking to view items, one-by-one, from the Collection. It would be too time-consuming. Thus I formed a more ambitious plan to 'digitise' the Cullen Collection, so I could have access to every item from my computer. I wanted to be able to compare images of documents in

⁴⁹ See <http://universityofglasgowlibrary.wordpress.com/2010/02/26/a-life-in-medicine—the-story-of-william-cullen-1710-1790-and-john-thomson-1765-1846/> [Accessed on August 14, 2014].

⁵⁰ Perhaps not coincidentally, a similar cataloguing project has now been undertaken for the other major repository of Cullen's works and *Nachlass*, the Royal College of Physicians of Edinburgh (RCPE). And while this was not a motivation for my study, it has proven immensely helpful.

⁵¹ See <http://www.google.com/googlebooks/about/history.html> [Accessed on August 14, 2014].

⁵² <http://www.jisc.ac.uk/news/the-worlds-largest-digital-library-of-18th-century-printed-books-grows-even-larger-for-uk> [Accessed on August 14, 2014].

minute detail, as well as handwriting styles and various versions of drafts, possibly from separate archives. This would not be possible without high-quality digital images. Therefore, it was my hope to ‘digitise’—i.e. to take digital photos of, and organise electronically—the William Cullen Papers. This included correspondence, lectures, drafts, and unpublished essays by Cullen himself and most of the material used by John Thomson (1765-1846) in the early- to mid-nineteenth century to write his Cullen biography.⁵³

I drafted up a project proposal, and with the help, guidance, and generosity of GUL’s Sarah Hepworth and David Weston, began taking digital photos of virtually every item in the Cullen Collection (more than 1600, I estimate). This lasted almost four months in mid-2011, but the result is that Special Collections now has copies of those images. Presuming they are one day put online—indeed, some of them may already be—Cullen scholars will have digital access to the Papers of William Cullen in a way that was not possible before.

Finally, the timing also seemed right for a new long-form examination of the life and thought of Cullen. When I began work on this study in 2010, the most recent work along these lines was already showing its age.⁵⁴ Thus, for all the above reasons, I chose to study Cullen and his work.

II. Historiographical Foundations

Before we dive into the nitty-gritty of the Cullen historiography, we would do well to foreground some of the broader historiographical debates about the Scottish Enlightenment and in particular the role of science and medicine within it. Our understanding of Cullen, after all, is necessarily connected to these broader concerns

⁵³ I was quickly overwhelmed with material, however, and partially as a reaction to this, I created a website about William Cullen, where I hoped to organise my thoughts and sketch out ideas for further inquiry. It has developed beyond this, but it remains an informal sketchpad for my engagement with Cullen’s life and work. I hope it is useful to other Cullen scholars. The website can be found at <http://www.williamcullen.net>

⁵⁴ I am thinking of the papers collected for the Bicentennial Exhibition and Symposium. See *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993).

in the historiography. In addition, the study of Cullen that follows is largely bio-intellectual in focus, and I want to spend a little time defending this approach.

Science and Medicine in the Scottish Enlightenment

Historiographical debates about the meaning and definition of the Scottish Enlightenment have gathered steam since at least the 1970s. Paul Wood suggests that one of the most disputed historiographical issues in these debates is how we are to understand the relationship between “the various branches of moral philosophy on the one hand, and natural philosophy, natural history, and medicine on the other.”⁵⁵

Alexander Broadie has helpfully characterised the broad contours of this dispute, and I follow his schematic below.⁵⁶ Roughly speaking, there are three distinct positions or camps. The first camp includes those historians who emphasise *political economy* and associated subjects as the distinctive focus of the Scottish Enlightenment. The second camp, in contrast, argues that *science and medicine* are the truly distinctive feature. The third camp takes a more inclusive view by highlighting the *shared culture* and enlightened values of the Scottish literati as distinctive rather than any particular set of subjects. Let us take a closer look at each position.

§1. Political Economy

⁵⁵ See Paul Wood, “Introduction: Dugald Stewart and the Invention of ‘The Scottish Enlightenment’” in *The Scottish Enlightenment: Essays in Reinterpretation* (Rochester: Rochester University Press, 2000), 19.

⁵⁶ See Alexander Broadie, “Introduction” in *The Cambridge Companion to the Scottish Enlightenment*, ed. Alexander Broadie (Cambridge: Cambridge University Press, 2003), 3. Note that my discussion is just a schematic of the overall debate and does not take into account many nuanced positions. For instance, I do not discuss Nicholas Phillipson’s very influential view of the Scottish Enlightenment, though it obviously deserves a place and arguably has most affinity with the political economy camp. See, for instance, Nicholas Phillipson, “Culture and Society in the Eighteenth-Century Province: the Case of Edinburgh and the Scottish Enlightenment”, in Lawrence Stone, ed., *The University in Society*, 2 vols. (Princeton: Princeton University Press, 1974), ii, 407-48, and his “The Scottish Enlightenment”, in *The Enlightenment in National Context*, eds. Roy Porter and Mikuláš Teich (Cambridge: Cambridge University Press, 1981). There is also the question of Alexander Broadie’s work, which seems to share the inclusiveness of the culture camp but focuses in particular on the set of philosophical ideas centred around the ‘science of man’. In addition to the work cited above, see Broadie’s introduction to *The Scottish Enlightenment: An Anthology*, ed. Alexander Broadie (Edinburgh: Canongate Books, 1997), and more recently, *The Scottish Enlightenment* (Edinburgh: Birlinn, 2007).

The view that what defines the Scottish Enlightenment—what it was essentially about, more than anything else—is its distinct and original discussion of issues of political economy can perhaps be traced back to Dugald Stewart, but it was given new life in the 1960s and ‘70s by Hugh Trevor-Roper (Lord Dacre). Building on Gladys Bryson’s pioneering book, *Man and Society*,⁵⁷ Trevor-Roper defined the Scottish Enlightenment in terms of its concern with ‘the social mechanism of progress’.⁵⁸ He later elaborated on this notion by equating this focus with the subject that “would come to be called ‘political economy’”.⁵⁹ Thus, what was distinctive about the Scottish Enlightenment was its concern with political economy.

Trevor-Roper’s student, John Robertson, has defended and refined this interpretation. He has defended it by claiming that the central intellectual concerns of the Scottish Enlightenment were “moral philosophy, the writing of history, and political economy”.⁶⁰ That is to say, the “investigation into the progress of society... remains at the center of the Scottish contribution to the Enlightenment”.⁶¹ Robertson refined Trevor-Roper’s analysis by stressing and reaffirming “the unity of the Enlightenment as an intellectual movement”, its distinctiveness best seen only in comparison to other national contexts.⁶²

§2. *Science and Medicine*

More than anyone else, Roger L. Emerson has offered a substantive revision of the ‘political economy’ interpretation. It was not the Scots’ investigation of

⁵⁷ See Gladys Bryson, *Man and Society: The Scottish Inquiry of the Eighteenth Century* (Princeton, NJ: Princeton University Press, 1945).

⁵⁸ See Hugh Trevor-Roper, “The Scottish Enlightenment”, *Studies on Voltaire and the Eighteenth Century* 58 (1967), 1640.

⁵⁹ See Hugh Trevor-Roper, “The Scottish Enlightenment”, *Blackwood's Magazine* 322 (1977), 373-74.

⁶⁰ See John Robertson, “The Scottish Contribution to the Enlightenment”, in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood (Rochester: Rochester University Press, 2000), 42.

⁶¹ *Ibid.*, 41-2.

⁶² *Ibid.*, 42. Robertson compares, in some detail, the Enlightenment in Scotland to that of Naples in his *The Case for The Enlightenment: Scotland and Naples 1680–1760* (Cambridge: Cambridge University Press, 2005).

political economy that was so distinctive, he has argued, but rather their original contributions to, and understanding of natural knowledge that best defines the core focus of the Scottish Enlightenment:

What the enlightened seem to me to have had in common were relatively clear and precise views about natural knowledge, its value and its uses. Rationally-grounded natural knowledge could be found and was to be sought. It was to be acted upon to improve the human condition in this world...*The Enlightenment* is a term which I would restrict to the period in which those beliefs about knowledge were institutionalised in existing bodies or in newly created institutions.⁶³

Paul Wood has built off of Emerson's work and, like Emerson, defends the claim that "science and medicine were central to, and in some cases the driving force behind, the intellectual changes encompassed by the term 'the Scottish Enlightenment', and hence were instrumental in shaping modernity in Scotland as elsewhere".⁶⁴

§3. *The Culture of the Literati*

The third interpretation of the Scottish Enlightenment that seems relevant here, associated primarily with Richard B. Sher, is a more inclusive, cultural definition that disagrees with the first two without dismissing them.⁶⁵ Rather than privileging one set of intellectual concerns over another, Sher asks: "Did not all those subjects, along with others, constitute vital components in a broad and in some respects distinctive Scottish culture of polite literature and learning, and wasn't *that*

⁶³ See Roger L. Emerson, "Science and the Origins and Concerns of the Scottish Enlightenment", *History of Science* 26 (1988), 338. Other seminal works by Emerson that outline and defend his position include "Natural Philosophy and the Problem of the Scottish Enlightenment", *Studies on Voltaire and the Eighteenth Century*, no. 242 (1986), 243-291; "Sir Robert Sibbald, Kt, the Royal Society of Scotland and the Origins of the Scottish Enlightenment", *Annals of Science* 45 (1988), 41-72; and "Science and Moral Philosophy in the Scottish Enlightenment", in *Studies in the Philosophy of the Scottish Enlightenment*, ed. M.A. Stewart (Oxford: Clarendon Press, 1990).

⁶⁴ See Paul Wood, "Science in the Scottish Enlightenment", in *The Cambridge Companion to the Scottish Enlightenment*, ed. Alexander Broadie (Cambridge: Cambridge University Press, 2003), 95. Wood has made similar claims in, among other works, "The Natural History of Man in the Scottish Enlightenment," *History of Science* 28 (1990), 89-123, and "Science, the Universities, and the Public Sphere in Eighteenth-Century Scotland," *History of Universities* 13 (1994), 99-135.

⁶⁵ See Richard B. Sher, "Science and Medicine in the Scottish Enlightenment: The Lessons of Book History", in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood (Rochester: Rochester University Press, 2000), 99. For an earlier statement of this position, see his *Church and University in the Scottish Enlightenment* (Edinburgh: Edinburgh University Press, 1985).

what the intellectual life of the Scottish Enlightenment was all about?”⁶⁶ Sher thinks that there is no plausible way to single out one approach or set of issues as the definitive focus of the Scottish Enlightenment.⁶⁷

Instead, the most useful approach, Sher thinks, “is to define the Scottish Enlightenment as the culture of the literati, shaped by their values and attitudes, rather than as a particular set of ideas or a particular field of learning, be it science, political economy, or anything else”.⁶⁸ In this interpretation, then, science and medicine are a critical part of the cultural world of the Scottish literati but were not its defining feature.⁶⁹

The Following Study

I am not in a position to adjudicate between these three interpretations of the Scottish Enlightenment, but some reflections are necessary, in order to contextualise the study that follows. First, we should probably highlight what might be called the ‘fake debate’ about the role of science and medicine in the Scottish Enlightenment. By this I simply mean the dispute about whether science and medicine were, in some sense, important intellectual concerns in the Scottish Enlightenment. There can be no doubt that they were and are therefore worthy of study. This is not really in doubt, even among those who think issues of political economy, or polite learning, were more central. For instance, Sher agrees that science and medicine were a “crucial component, a vital part, of the cultural and social world” of Scottish thinkers.⁷⁰ And even John Robertson has conceded that Scottish thinkers’ commitment to progress may have been “professedly indebted to the methodological example of the natural philosophers,” even if this commitment was actually “expressed in a new focus on the study of society and its improvement.”⁷¹

⁶⁶ See Sher, “Science and Medicine”, 103.

⁶⁷ Ibid., 103.

⁶⁸ Ibid., 104.

⁶⁹ Ibid., 107.

⁷⁰ Ibid., 107.

⁷¹ See Robertson, “The Scottish Contribution”, 42.

Science and medicine were of undoubted importance. The crux of the debate is really about how central and defining these concerns were. Were they, in Wood's estimation, the driving force behind the Scottish Enlightenment—or not? Given my own interests, I favour this view, but I also worry that my sympathies might be clouding my judgement. It is tempting for a historian of science or medicine to come to the conclusion that those very disciplines were the central intellectual concerns of the time and place that he studies. This in no way implies that it is a false conclusion, but it warrants caution. In any case, I do not need to adjudicate the matter here; instead, I would like to highlight how the following study of Cullen can be situated within this broader historiographical debate.

First, this is a study of Cullen, particularly his work in medicine. Yet, to the extent that participants in this historiographical debate cite Cullen at all, they do so almost exclusively in terms of Cullen the chemist—not Cullen the physician.⁷² He is generally interpreted through the prism of science rather than medicine, and it is not clear, *prima facie*, that we can make the same historiographical claims about him vis-à-vis the Scottish Enlightenment irregardless of the discipline (beyond, say, that he was an important figure in each). Medicine has, in these broader debates about the Scottish Enlightenment, been given short shrift compared to science.⁷³

This is doubly significant when we consider that contemporary, eighteenth-century claims about the importance of Scottish science were more subject to dispute than claims about the significance of Scottish medicine. The Edinburgh Medical School was unquestionably world-renowned and quite probably the leading centre of

⁷² See, for some examples, Broadie, *The Scottish Enlightenment: An Anthology*, 15, and Wood, "Science in the Scottish Enlightenment", 106-7.

⁷³ Obviously, there are exceptions and my historiographical review below takes note of them. But it is striking how medicine is generally left out of the picture. To give but one example: there is no chapter in the *Cambridge Companion to the Scottish Enlightenment* devoted to medicine, and although Paul Wood's contribution on science gestures to it, it is marginal to his concerns.

medical education in the world, after the death of Boerhaave.⁷⁴ Furthermore, even the great achievements in science—Joseph Black’s discovery of latent heat, say—are more accurately seen in the context of Scottish medicine. Thus, it would seem to make sense, going forward, to try to disentangle medicine from science in these debates about how we interpret the Scottish Enlightenment. This is not to undercut the Emersonian argument for the centrality of natural knowledge, for both fit comfortably under that umbrella. Indeed, it may strengthen it, as we pay closer attention to the prominence of Scottish medicine during the Enlightenment.

Although medicine has largely been marginalised in these broader debates, it has obviously not been ignored. Christopher Lawrence’s immensely influential interpretation of medicine in eighteenth-century Edinburgh is critical here. In his widely cited article on the nervous system and society, Lawrence argued that the predominant model of the body among Edinburgh physicians was founded upon a physiology of sensibility, and its related understanding of sympathy.⁷⁵ These theories, according to Lawrence, “served to sanction the introduction of new economic and associated cultural forms by identifying the landed minority as the custodians of civilization, and therefore the natural governors, in a backward society. A related theory of sympathy expressed and moulded their social solidarity.”⁷⁶ Thus Lawrence was able to link Edinburgh medicine, in an intuitively satisfying way, with wider cultural concerns in the Scottish Enlightenment.⁷⁷ And in Lawrence’s model, Cullen had a big role. He “was the personification of Enlightenment Edinburgh.”⁷⁸ In order

⁷⁴ In the words of Lisa Rosner, “Edinburgh was one of the most prominent centres for medical education in the period between 1760 and 1826. It was widely acclaimed, both within Great Britain and on the Continent, and provided a model for medical schools in the American colonies as well.” See Lisa Rosner, *Medical Education in the Age of Improvement: Edinburgh Students and Apprentices 1760-1826*, (Edinburgh: Edinburgh University Press, 1991), 2. For more on the Edinburgh Medical School during the eighteenth century, consult *The Early Years of the Edinburgh Medical School*, ed. R. G. W. Anderson and A. D. C. Simpson (Edinburgh: Royal Scottish Museum, 1976), and more recently, Roger L. Emerson, “The Founding of the Edinburgh Medical School”, *Journal of the History of Medicine and Allied Sciences* 59 (2004), 183-218.

⁷⁵ Christopher Lawrence, “The Nervous System and Society in the Scottish Enlightenment,” in *Natural Order: Historical Studies of Scientific Culture*, ed. Barry Barnes and Steven Shapin (London: Sage, 1979), 27.

⁷⁶ *Ibid.*, 20.

⁷⁷ *Ibid.*, 35.

⁷⁸ *Ibid.*, 26.

to make Cullen fit his interpretation, Lawrence claimed that Cullen's understanding of sensibility, or sensation, was "the basis of the whole of Cullen's physiology and epistemology."⁷⁹ Indeed, sensation "might be regarded as the foundation of his whole system."⁸⁰

I will return to Lawrence's work in Chapter 6 (Conclusion) but suffice it to say that the Cullen that emerges from what follows clashes in important respects with Lawrence's interpretation. I hope therefore that the following study serves as an invitation to reassess the role of medicine in the Scottish Enlightenment.

Defending a Bio-Intellectual Approach

It might be argued that the methodological approach I take in the following work—bio-intellectual in focus—does little to support my claims above. For am I not simply producing yet another Whiggish history, one that focuses on a 'great man' of medicine in largely intellectual terms?

There is some truth in this but only superficially. First, while this is a biographical and intellectual study of a 'great man' in the history of medicine, I have done my best to avoid whiggish interpretations of Cullen. In fact, I go out of my way to show how such an approach—in the form of John Thomson's monumental biography of Cullen—leaves much to be desired.

Second, a focus on a single figure is in this case justified, I think, given Cullen's under-appreciated stature and clear centrality to the Scottish Enlightenment. Cullen was a pre-eminent figure in both scientific and medical circles in Scotland and abroad, and he was intimately connected (via Adam Smith, David Hume, Lord Kames, and others) to the larger group of Scottish literati outside of science and medicine. Although I too infrequently explore the relations between Cullen's medical theory and broader Scottish debates in moral philosophy, political economy, and history, they surely exist.

⁷⁹ Christopher Lawrence, "Medicine As Culture: Edinburgh and the Scottish Enlightenment," PhD Thesis, (London: University of London, 1984), 330.

⁸⁰ *Ibid.*, 325.

But they are likely not simple connections. It is not enough to point out, as is sometimes done, that since Cullen was friends with, say, David Hume, and since Hume thought X, Cullen must also have thought X, likely deriving it from Hume himself.⁸¹ There are as many examples of Cullen's disagreements with both Hume (and Smith) as there are similarities, and we need more concrete detective work to explore their intellectual affinities—or lack thereof.⁸² And, of course, there are questions about Cullen's relationship with other literati, not as well known as Hume and Smith.⁸³ In any case, I hope that by providing a more detailed explication of some of Cullen's core medical ideas, a new foundation will be laid as a basis for more fruitful comparisons between debates about natural knowledge, on the one hand, and moral philosophy, political economy, and history on the other. Cullen provides an ideal case study for this kind of analysis, given his leading position in the scientific and medical circles of enlightened Scotland.

A third point to make with respect to my bio-intellectual approach is that recent historical work on the Scottish Enlightenment has emphasised the local and material aspects of the development of ideas. For instance, Charles W. J. Withers has argued that recent research:

invites reconsideration of the Enlightenment in Scotland at geographical scales below the national: as an urban affair, of connections between certain towns and their universities and of the movement of people and ideas between them, and of the connections between urban life and rural Scotland, not just over the matters of economic improvement but also

⁸¹ Christie has offered the most convincing analysis of how Cullen's manner of reasoning, as well as his views about, e.g. the aether, accord with much of what Hume says on these topics. Christie writes, for example, that "The pattern of Cullen's argument again remarkably evokes Hume, in the latter's invocation of Newton's ether in his sally against the occasionalists. Thus ether was used to develop its secularising potential, in chemistry as in epistemology, and the expression is perfectly direct" (94). Even here, however, it is not clear how exactly Cullen was inspired by, or derived his views from, Hume. For all one knows, they may have been drawing from shared sources and come up with their notions independently of one another. We do not, yet, have enough concrete evidence to know either way. See J. R. R. Christie, "Ether and the Science of Chemistry: 1740-1790," in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981).

⁸² Consider, for instance, Cullen's disagreement with Smith about the necessity of university medical degrees, or his reluctance to use Hume's notion of 'Impression', not to mention his wariness of Hume's more radical version of scepticism.

⁸³ We know, for instance, that Cullen was on good terms with William Robertson, and he was a mentor of sorts to Dugald Stewart. But details of their relationships are still unclear.

culturally, in regard, for example, to the place of the highlander within universal theories of social advance.⁸⁴

This suggests that a renewed focus on the biographical, albeit with a more nuanced and sensitive methodological approach than in days past, could prove revealing. Indeed, the study that follows does in its better moments explore this kind of influence, showing for example how Cullen's geographical movement from the University of Glasgow to Edinburgh continued to structure his thinking.

Fourth, and finally, another strand of research has emphasised how the geographical movement of ideas changes their reception.⁸⁵ For these 'reception studies' to work, we must first have a solid understanding of the intellectual and biographical context in which these works were created. Only then can we analyse how their reception in different locales actually transformed their meaning. We need, in other words, an accurate and initial point of comparison, and it is my hope that the following study of Cullen goes some way to providing that, though I am well aware of not doing this enough or as often as some readers might like.⁸⁶

With some of these broader debates about the role of science and medicine in the Scottish Enlightenment foregrounded, we can now dive into a review of the Cullen historiography, which provides a framework for the chapters that follow.

The Cullen Historiography: An Overview

⁸⁴ See Charles W. J. Withers, "Toward a Historical Geography of Enlightenment in Scotland", in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood (Rochester: Rochester University Press, 2000), 80-81. Withers has expanded upon this idea and written extensively on historical geography in the Enlightenment in a number of other works, including (among others) Charles W. J. Withers, "Natural Knowledge As Cultural Property: Disputes Over the 'Ownership' of Natural History in Late Eighteenth-Century Edinburgh", *Archives of Natural History* 19 (1992), 289-303; "Geography, Science and National Identity in Early Modern Britain: The Case of Scotland and the Work of Sir Robert Sibbald (1641-1722)", *Annals of Science* 53, no. 1 (1996), 29-73; *Geography, Science, and National Identity: Scotland Since 1520* (Cambridge: Cambridge University Press, 2001); and *Placing the Enlightenment: Thinking Geographically About the Age of Reason* (Chicago: Chicago University Press, 2007).

⁸⁵ A pioneering work in this field is Fania Oz-Salzberger's *Translating the Enlightenment: Scottish Civic Discourse in Eighteenth-century Germany* (Oxford: Clarendon Press, 1995), but see also Heiner F. Klemme, *Reception of the Scottish Enlightenment in Germany: Six Significant Translations, 1755-1782* (Bristol: Thoemmes Press, 2000), and Stefanie Stockhorst, *Cultural Transfer Through Translation: The Circulation of Enlightened Thought in Europe by Means of Translation* (Amsterdam: Rodopi, 2010).

⁸⁶ I reflect on some of the limitations of this study of Cullen in Chapter 6: Conclusion.

There are two major strands in the historiography of the life and work of William Cullen. One of them has largely been the province of historians of chemistry, and the other of historians of medicine. Cullen was a professor of chemistry, in addition to that of medicine, and historians have shown how his work was significant in both fields. It was perhaps unavoidable, given the breadth of Cullen's own interests, that these two strands in the historiography have been, and often still are, treated independently of each other.

In this review of Cullen historiography, my aim is less about comprehensiveness and more about showing how the two strands complement each other. In particular, since I am writing in the context of the history of medicine, I argue that there is much in the work of the historians of chemistry that can supplement the work of those who study Cullen's approach to medicine. And, indeed, I have used insights and approaches from the historians of chemistry—and the history of science more generally—to guide my own study of Cullen.

My plan here is to provide an overview, first, of the most significant work in the English-language historiography of medicine about William Cullen, beginning with its foundations in the monumental work of John Thomson. I then review some themes from the history of chemistry that complement this work and explain how they shape my framework going forward.

The true beginning of Cullen scholarship and the bedrock of all subsequent historiography is the work of Cullen's biographer, the Scottish surgeon and physician, Dr. John Thomson (1765-1846). Thomson's edition of Cullen's works and, more significantly, his two-volume biography of Cullen's life, lectures and writings, are still the foundation of the field. For those who have studied his work, there is no doubt about its classic status—it is a towering achievement.⁸⁷

⁸⁷ For praise of this kind, see W. F. Bynum, "Cullen and the Nervous System," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 154; and Michael Barfoot, "Introduction," in *An Account of the Life, Lectures, and Writings of William Cullen, Vol. I. John Thomson. With a New Introduction by Mike Barfoot*, Lives of the Literati (Bristol: Thoemmes Press, 1997), xvii.

On account of its foundational status and historiographical legacy, I thought it worthwhile to begin by highlighting the interpretation of Cullen found in this work. Almost all subsequent Cullen scholarship is in some way indebted to it, explicitly or not.

It turns out that, due to the complex composition and authorship of the biography, there are at least two interpretations of Cullen embedded within it: the Thomsonian and Craigiean interpretations.⁸⁸ They share certain similarities; for instance, both are especially concerned to rebut the view of Cullen as a highly speculative thinker, who indulged in fanciful hypotheses. But in what follows I emphasise their differences. A better understanding of these two interpretations illuminates the origins of Cullen scholarship and allows us to see how their legacies still shape the field today.

§1. The Thomsonian Interpretation

My focus here is on Thomson's portrayal of Cullen within the confines of his two-volume biography.⁸⁹ What are its central features? How are we meant to understand Cullen, after reading it? This approach is less sensitive to Thomson's milieu and more focused on a close reading of the text itself. My goal here is simply to outline the picture of Cullen that Thomson tries to establish by means of his biography.⁹⁰

Thomson hints at the kind of portrait he is going to provide, both in the preface to volume I of the *Life* as well as the preface to his already published edition of Cullen's *Works*. In the latter, he admits that one of the objects he had in view was

⁸⁸ For a brief discussion of some of these complexities, see Appendix 1B: Thomson & the Family Firm.

⁸⁹ For the purposes of this discussion, I include both volumes of the biography. Or, more precisely, I include all of volume I and the first 400 pages of Volume II. The remaining part of Volume II was written by David Craigie, with guidance from Allen Thomson. However, even this is a simplification of the truth. We must be careful even with the assumption that John Thomson was the sole author of Volume I. And if we add to this the fact that we know his son, William, was also responsible for contributing to Volume II, then the question of authorship becomes quite complicated. I refer to John Thomson's biography and a single Thomsonian interpretation (excluding Craigie's contribution) for clarity and simplicity's sake, but the matter is neither.

⁹⁰ In Appendix 1B: Thomson & the Family Firm, I make an effort to discuss Thomson's milieu and some of the constraints he was operating under while writing his biography of Cullen.

“to put the public in possession of documents that appear to me to establish Dr. Cullen’s claims to originality for observations and doctrines, which, under various modifications, have been repeatedly brought forward since his time, and made the bases of new theories or systems of Medicine.”⁹¹ In the preface to volume I of the *Life* itself, Thomson adds that he hopes “that the statements I am about to give, may tend to correct several mistakes and misrepresentations in the very erroneous accounts of his Life which have hitherto been given to the Public.”⁹² Very generally, then, we must be alert to instances where Thomson makes claims on behalf of Cullen’s originality and where he attempts to rebut the ‘several mistakes and misrepresentations’ he has identified in the published literature about Cullen.

With these as guides, one finds that throughout the course of both volumes (excluding Craigie’s contribution) Cullen is portrayed in a few different guises: we see (i) Cullen the medical teacher (ii) Cullen the original thinker and (iii) Cullen the fact-focused practitioner (and teacher) of clinical medicine.⁹³

The Medical Teacher

The very first sentence of the preface to Volume I gives us a sense of how Thomson views his subject: “Among the many eminent Teachers of Medicine to whom this country has given birth, there is certainly no one who, by his Lectures and Writings, has had a greater influence on the opinions and practice of medical men, and on the general progress of medical science, than the late Dr CULLEN.”⁹⁴ Cullen is, first and foremost, a Teacher of Medicine. And again and again, throughout the biography, Thomson is at pains to emphasise Cullen’s popularity in the classroom,

⁹¹ William Cullen, *The Works of William Cullen: Containing His Physiology, Nosology, and First Lines of the Practice of Physic; With Numerous Extracts From His Manuscript Papers, and From His Treatise of the Materia Medica. Volume 1*, ed. John Thomson (Edinburgh: William Blackwood, 1827), v.

⁹² TLC, 1:ix.

⁹³ Due to lack of space, I have omitted discussion of a prominent theme of Volume II: Thomson’s laborious effort to destroy the reputation of John Brown and his system of medicine. I include a discussion of this in Appendix 1C: Cullen and Brown.

⁹⁴ TLC, 1:vii.

the adoration of his pupils, and the continued interest he showed in their lives, long after they ceased being under his tutelage.⁹⁵

Cullen was continually revising his lectures, Thomson tells us, always keeping pace with the latest discoveries, in medicine or chemistry.⁹⁶ He had a talent for arrangement and simplicity that enabled his pupils to follow his courses with interest and delight.⁹⁷ Yet Cullen's talents as a medical teacher were not confined to the classroom; he "entered into all the circumstances of the situation and views of his young friends" and took a keen interest in the pursuits and interests of his pupils, long after they left Edinburgh.⁹⁸ Indeed, Thomson provides copious excerpts from Cullen's correspondence with his pupils as testament to this.⁹⁹ Cullen was mentor to both William Hunter and Joseph Black, and Thomson suggests that it was Cullen's general habit, "during a long series of years, to attach to himself in intimacy and friendship almost all those of his pupils who were in any way distinguished by their ardour and diligence in the pursuit of knowledge."¹⁰⁰

Examples from Thomson's biography could be multiplied but the point here is only to show how Cullen's success as a medical teacher was a particular concern of Thomson's. He did not *have* to highlight this as extensively as he did in Volume I—but he chose to do so.

The Original Thinker

Another focus of Thomson's biography, a critical one, was its emphasis on Cullen the original thinker. As I noted above, one of Thomson's purposes for publishing Cullen's works was to show the public that Cullen was a more original thinker than was commonly assumed. His ideas, Thomson argues, have not been

⁹⁵ Thomson's focus is not so much on Cullen's pedagogy *per se* (which is the subject of my next chapter), as it is on the reasons for why he thinks Cullen was so justifiably popular among his students.

⁹⁶ *Ibid.*, 41-3.

⁹⁷ *Ibid.*, 109-110.

⁹⁸ *Ibid.*, 132.

⁹⁹ In addition to the correspondence printed in Thomson's narrative, see Notes H (1:583-591) & U (1:623-654) in the Appendix to Volume 1.

¹⁰⁰ TLC, 1:59.

fully appreciated. But not only that—in fact Cullen’s original ideas and observations had been “under various modifications...repeatedly brought forward since his time, and made the bases of new theories or systems of Medicine.”¹⁰¹ The thinly veiled claim here, which Thomson makes explicit in both volumes, is that later thinkers, knowingly in some cases, plagiarised from Cullen and called his ideas their own. This is a major theme and focus of the biography.

About Cullen’s only published essay on chemistry, Thomson writes: “Several ingenious variations upon these experiments, and additions to them, have since been made by philosophers, who have strangely neglected to refer to Dr Cullen’s Essay, or to acknowledge the originality of the discoveries which it contains.”¹⁰² At this point, the reader is tempted to think of Cullen’s pupil, Joseph Black, in this regard. Did Black neglect Cullen’s prior work? Thomson suggests that Black was himself in debt to Cullen for directing him (Black) “to similar inquiries, but must also have furnished him with several of the data from which his simple and comprehensive theory of *Latent Heat* was afterwards so philosophically deduced.”¹⁰³ But the implication of plagiarism against Black is quickly swatted away when Thomson admits that “Dr Black was fully aware of the value of Dr Cullen’s observations on the cold produced by evaporation” and that he said as much in his letters to Cullen.¹⁰⁴ What Thomson is doing here is transferring some of the originality of Black’s discoveries back to his preceptor—without suggesting plagiarism.

But other pupils of Cullen were not so easily spared Thomson’s criticism. Daniel de la Roche (sometimes spelled ‘Delaroché’ or ‘Delarouche’) (1743-1812) was a pupil of Cullen’s who published a thinly veiled account of Cullen’s physiology, which De la Roche had acquired from attending Cullen’s lectures (in addition to Cullen’s published textbook).¹⁰⁵ Thomson rejects De la Roche’s claim that his book is an explanation of his own opinions, albeit indebted to Cullen’s published work.

¹⁰¹ Ibid., v.

¹⁰² TLC, 1:56. For Cullen’s essay, see Cullen, “Cold Produced by Evaporating Fluids”.

¹⁰³ TLC, 1:56.

¹⁰⁴ Ibid., 1:56.

¹⁰⁵ Daniel de la Roche, *Analyse Des Fonctions Du Système Nerveux* (Geneva: Du Villard Fils & Nouffer, 1778).

Instead, Thomson insisted that De la Roche's work, "consists in most parts of a literal, and in some parts of a free translation of Dr Cullen's account of the functions of the Nervous System, as given in his lectures on Physiology, Pathology, and Therapeutics, to which Dr De la Roche has occasionally added illustrations taken from other sources."¹⁰⁶ Thomson here makes no secret of his purpose in dismissing De la Roche's claims to originality. Whatever praise is due De la Roche's book really ought to "be transferred to 'its legitimate owner,' Dr Cullen, as his Lectures were the source from which the whole of Dr De la Roche's ideas on the functions of the Nervous System, and more particularly those which relate to the operation of the Animal power, or Energy of the Brain, were immediately and undeniably derived."¹⁰⁷ This notion of transferring ownership to Cullen is a key strategy of Thomson's in his quest to rehabilitate Cullen's reputation, in order "to do justice to his memory."¹⁰⁸

If Cullen was an original thinker, in the Thomsonian view, where did his originality lie? There was one topic of medicine where Cullen's contributions, in Thomson's view, were especially original (Cullen thought so too). The area of medicine was physiology, or the doctrine of the animal economy, and in particular, Cullen's ideas on the excitable state of the nervous system. "His speculations upon this subject," Thomson writes, "which pervade all parts of his writings, are, in many respects, original, and must be regarded, I conceive, as the foundation of those doctrines which have since been considered as peculiar to the Medical School of Edinburgh, and usually designated, by Continental writers, under the appellation of the *Theory of Excitement*."¹⁰⁹ Indeed, Cullen's understanding of the functions of the nervous system was for Thomson a key to understanding all of Cullen's medical writings. Cullen's doctrines on this matter (and especially on the 'Animal Power or Energy of the Brain') "were incorporated with every opinion which he taught concerning the phenomena of the animal economy, the causes of diseases, and the operation of medicines; and they may be said to constitute a most important part, if

¹⁰⁶ TLC, 1:435-6.

¹⁰⁷ *Ibid.*, 437.

¹⁰⁸ *Ibid.*, ix. I return to this point in Appendix 1C: Cullen and Brown.

¹⁰⁹ *Ibid.*, 310. This topic is the focus of Chapter 4.

not the sole basis, of that system of the Practice of Physic, which he made the subject of prelection, as well as of study, for a period of nearly forty years before he ventured to give it to the public.”¹¹⁰

Thomson admits that Cullen’s ideas were not *ab novo*, that traces of them can be found in various writings of his predecessors. Cullen himself admitted the influence of Friedrich Hoffmann’s writings, as well as those of Baglivi. But Thomson argues that Cullen “seems to have been the first medical teacher who pointed out the general and automatic agency of this power in all the motions of the animal economy, voluntary, involuntary, and mixed; and who endeavoured to collect and arrange the principal facts regarding it under distinct heads.”¹¹¹ To support this, Thomson cites Cullen’s own view of his originality on this topic, where he tells his auditors, “The subject of the Nervous System has been but slightly touched on by any physiologist, and very imperfectly handled; and I flatter myself that I have brought it more into view than has hitherto been done. You will be greatly at a loss to find much assistance in studying it, in the writings of physiologists.”¹¹²

For Thomson, a great deal of Cullen’s originality as a medical thinker—and perhaps the foundation of Cullen’s medical System—has to do with his understanding of the functions of the nervous system, especially those concerning the energy of the brain and its levels of excitement and collapse.

Fact-focused Clinician

We have pointed out a number of instances of Thomson’s stated goal of highlighting Cullen’s originality. But we have said next to nothing about the other goal of Thomson’s, mentioned above, about correcting ‘mistakes and misrepresentations’ that the public had imbibed. There are many specific criticisms of Cullen that Thomson was certainly responding to—that his Latin was poor, or that he was a derivative, unoriginal thinker, for instance—but there is one that looms over

¹¹⁰ Ibid., 265. See, also, p. 429.

¹¹¹ Ibid., 429.

¹¹² Ibid., 429-430.

the rest. Above all, Thomson's goal was to rebut the criticism of Cullen as a highly speculative teacher, prone to indulging in frivolous hypotheses, even encouraging his students to do the same. Thomson usually framed this criticism in a particular way. For instance, he suggests that if Cullen had published his clinical reports and cases, "it is impossible that the erroneous assertion so often ignorantly repeated of Dr Cullen's being merely a speculative teacher of practical medicine, could ever for a moment have been entertained by the foreign medical public."¹¹³

Almost the exact same phrase—"merely a speculative teacher of practical medicine"—and the same concern with foreign, non-British critics occur in other places, as well. It has perhaps not been emphasised enough that one of Thomson's most important audiences was the group of leading physicians and medical thinkers who practiced on the Continent.¹¹⁴ In one of the most explicit references to this criticism, Thomson takes issue with French physician Philippe Pinel's (1745-1826) representation of Cullen:

That the prejudices excited against Dr Cullen...and the inclination manifested during his lifetime to represent him as a merely speculative teacher of practical medicine, should have been adopted by his professional rivals, or by those unacquainted with that constant reference to observation, and to the results of experience, which he observed in all his inquiries and reasonings, will not surprise any one conversant with medical history; but that these prejudices should have been imbibed, retained, and propagated, long after his death, by no less distinguished a medical philosopher than M. Pinel, who was himself so well acquainted with Dr Cullen's writings, must be matter of equal surprise and regret.¹¹⁵

¹¹³ Ibid., 110.

¹¹⁴ The exceptions to this claim are the works by Lawrence (1988) and Jacyna (1994) that I cite in Appendix 1B: Thomson & the Family Firm. Thomson's concern with foreign, especially French, critics is unsurprising, given the rise and dominance of French medicine in the early nineteenth century. For the classic statement of the rise of Parisian medicine, see E. H. Ackerknecht, *Medicine at the Paris Hospital, 1794-1848* (Baltimore: Johns Hopkins Press, 1967). For a re-evaluation, see *Constructing Paris Medicine*, ed. Caroline Hannaway and Ann La Berge, *Clio Medica* (Amsterdam: Rodopi, 1998).

¹¹⁵ TLC, 1:119-120. Thomson specifically references Pinel's article 'Clinique' from the *Dictionnaire des Sciences Medicales*, where Pinel describes Cullen as a physician who had great skill in making insidious links between "hypothèses ingénieuses." These gave his doctrines the appearance of truth and "une certaine gravité imposante." See Philippe Pinel, "Clinique," in *Dictionnaire Des Sciences Medicales. Tome Cinquième*, ed. C. L. F. Panckoucke (Paris, 1813). Pinel had also translated Cullen's *First Lines of the Practice of Physic* into French as *Institutions de Médecine-pratique* (Paris: Duplain, 1785).

If this was the ‘misrepresentation’ that was foremost in the list of criticisms of Cullen that needed combating, what was the best way of doing so? Cullen, the ‘merely speculative teacher of practical medicine’, needed to be replaced with a more hard-nosed, fact-focused, empirical teacher and clinician. This is not a simple task to accomplish. Cullen’s thought, especially as represented in his lectures, is often oblique, almost slippery. It is much easier to determine what Cullen is skeptical of, or thinks mistaken, than to know what he thought himself. There are a variety of reasons for this, not least of which was Cullen’s increasing lack of control over the ownership of the content of his lectures. They became public commodities, passed around among current and former students, who were eager to have the most comprehensive and accurate copies. Indeed, some of his lectures actually became, much to his chagrin and largely without his authorisation, published work.¹¹⁶ Or, to take another example, at least one of Cullen’s pupils published a medical dissertation that, in providing a caricature of Cullen’s own ideas and method of exposition, subjected Cullen to ridicule.¹¹⁷ Thus, as Cullen grew aware of the public nature of his lectures, he used more oblique, guarded language to explain his ideas, giving him more flexibility to manage the controversies his doctrines might provoke.

In any case, the obliqueness and accompanying nuance of Cullen’s thinking was ripe for a variety of interpretations, some more grounded in the material than others. Thomson’s decision to emphasise Cullen as a hard-nosed, fact-focused clinician could be defended with a great variety of manuscript materials to which only he had access. Thomson’s custody of Cullen’s manuscripts lent his portrayal a great deal of authority.

¹¹⁶ The best example of this is the unauthorised publication, in the early 1770s, of his lectures on the materia medica. See, for instance, William Cullen, *Lectures on the Materia Medica, As Delivered by William Cullen, M.D. Professor of Medicine in the University of Edinburgh. Now Published by Permission of the Author, and with Many Corrections From the Collation of Different Manuscripts by the Editors* (London: T. Lowndes, 1773). There are various editions of this work, and the story behind them is both complicated and interesting. I do not have space to discuss it here, but I add a few more details in the Bibliography.

¹¹⁷ I refer here to the controversy fomented by Smellie’s anonymous article ‘Aether’ in the first edition of the *Encyclopedia Britannica* (1771), where he indirectly attacked Cullen’s controversial theory of the nervous system. I mention this critical episode in Chapter 4 and discuss it in Appendix 4C: The Aether Controversy.

But Cullen the speculative, hypothetical teacher can also be found in his *Nachlass*. Thomson, had he chosen to, could have portrayed him as a daring, speculative thinker who extended the boundaries of knowledge and, through his own example, incited his pupils to do the same. But this portrayal would have been open to criticism in Thomson's time, in ways that it might not be today. Thomson's portrayal of Cullen is very much rooted in his own context and era; his decision to emphasise certain themes and aspects of Cullen's thought came at the expense of others. We may agree or disagree, but the first step in doing so is recognising that it could have been otherwise, that Thomson had a choice, albeit one that was circumscribed by the context he faced while writing.¹¹⁸

In volume II of his biography, Thomson continues to portray Cullen in the guise of the fact-focused clinician. Discussing Cullen's success in his lectures on the Practice of Physic, Thomson writes: "The chief insinuation that has been thrown out by those who have wished to depreciate the merits of Dr Cullen as a teacher of practical medicine, has been, that he himself indulged, and that he encouraged his pupils to indulge, in frivolous hypotheses, to the neglect of more solid practical inquiries...."¹¹⁹ Thomson emphasises instead "with how much earnestness he enforced on his students the necessity of a minute and accurate attention to facts; pointed out the fallacies of systems, and shewed that the proper use of hypothesis is to suggest inquiry, and to guide, but not to supersede, the investigation of facts."¹²⁰ Thomson cites, in support of this, a long excerpt from Cullen's introductory lectures to his Practice of Physic course from the early 1780s.¹²¹ And this does in fact support Thomson's argument. But Thomson elides over earlier statements by Cullen that could be used to paint an alternative picture. For example, at times Cullen appears to be a much more explicit advocate for the value of hypothesis in uncovering medical knowledge. In his 1768-69 lectures on the Institutions, for instance, he tells his auditors that hypotheses are allowable "if we admit them to have a place with a view

¹¹⁸ For more on this context, see, once again, Appendix 1B: Thomson & the Family Firm.

¹¹⁹ TLC, 2:94.

¹²⁰ *Ibid.*, 2:95.

¹²¹ Thomson prints his excerpt at TLC, 2:95-98. Cullen's handwritten introduction to his 1781-82 lectures (Thomson's source) can be found at MS Cullen 326.

to future Correction, & if they unite with other things in our general Laws.”¹²² In fact, hypotheses are unavoidable: “A Man must generalize, he must form Hypotheses, & this is not to be condemned if he rejects or confirms them by comparing them with as many Facts as possible.”¹²³ In a later set of lectures, he insists that they have their use: “I must say that if Hypotheses are confined to the Closet, or even to College they are not without their use, and there is no Philosopher that has not dealt in them more or less and in these parts of our Science in which we have not made much progress, we shall not go much further without them, and we shall be tempted to do so, according to the importance of the Subject....”¹²⁴ In short, Thomson’s claim was, as all interpretations are, selectively constructed to support his own views.

A variation of this argument of Thomson’s is that Cullen’s method of generalising from facts has not been properly understood by his critics, and far from showing Cullen to be a highly speculative thinker, actually show him to have been a supremely successful master of the ‘inductive philosophy’.¹²⁵ Thomson appears to have thought that misunderstandings of what Cullen was doing in his influential textbook, the *First Lines of the Practice of Physic*, were a big part of the reason why Cullen was conceived to be such a speculative thinker.¹²⁶ As he writes more colourfully a little later, those who believe that Cullen “was a mere theoretical physician, unacquainted with diseases as they present themselves in nature, and speculating upon them in his closet from the information supplied by the writings of others, and that his own writings exhibit rather the workings of his imagination than the results of his personal experience, would do well to peruse the series of cases of fever which he was accustomed to sketch in his lectures....”¹²⁷

¹²² YML, Lectures upon the Institutions of Medicine, in Five Volumes (hereafter ‘YML, Inst.’), 1:164.

¹²³ YML, Inst., 1:165.

¹²⁴ NLM, MS B 4, 2:200 (hereafter only ‘NLM’ and the volume and page number will be cited).

¹²⁵ Thomson is here touching upon the long-standing debate in medicine between Dogmatists and Empiricists, between those who underscored the importance of theory versus those who emphasised empirical observation. I discuss Cullen’s position in this debate in Chapter 3.

¹²⁶ TLC, 2:133-4.

¹²⁷ Ibid., 2:164-5.

Thomson wants to replace these misunderstandings of Cullen with a picture of him as a fact-focused, experience-based clinician who, while making generalisations, was always doing so *from facts*. Indeed, a proper consideration (in Thomson's view) of his thoughts on fever in the *First Lines*, which were often seen as highly theoretical and speculative, confirms this (the personal pronoun here shows how strongly Thomson felt about it):

Every re-perusal of Dr Cullen's First Lines of the Practice of Physic, and comparison of them with the other medical text-books at that time in existence, or which have since appeared, tends to confirm in me the belief that his work exhibits in the execution of all its parts, but particularly of that relating to fever, the most skilful [*sic*] and successful application of the principles of inductive philosophy, to the study and practice of physic, that has ever been made by any single physician...I doubt whether it has yet been, or is likely soon to be, surpassed or equalled.¹²⁸

§2. *The Craigiean Interpretation*

John Thomson was not the sole author of his biography of Cullen. David Craigie (1793-1866), a prominent Edinburgh physician, authored a good portion of the second half of volume II. Craigie graduated from the University of Edinburgh Medical School in 1816 and became a Fellow of the Royal College of Physicians in 1832 (and president from 1861-3).¹²⁹ He was owner and sometime editor of the periodical *Edinburgh Medical and Surgical Journal* but was perhaps best known as the author of a series of textbooks, including *Elements of General and Pathological Anatomy* (1828) and *Elements of the Practice of Physic* (1836). He was known for having a particularly wide-ranging knowledge of the medicine of his day.

Craigie's views of Cullen are significant because he is the only other interpreter of Cullen, besides Thomson, who had the advantage of knowing Cullen's own pupils and younger colleagues. He was intimately involved with learned medicine in Edinburgh for most of his life. He was, as well, an extraordinarily

¹²⁸ *Ibid.*, 2:134.

¹²⁹ For a short summary of Craigie's life from which these details are drawn, see Norman Moore, 'Craigie, David (1793–1866)', rev. Michael Bevan, *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/6584> [Accessed 9 May, 2014]. A detailed study of Craigie and his works would certainly shed more light on his understanding of Cullen, among other topics.

learned physician and knew Cullen's works better than anyone, save Thomson himself. Moreover, in preparing his contribution to volume II, he had access to most of the primary source material that Thomson did, while working with Allen Thomson (son of John). For all these reasons, it is proper to give Craigie's interpretation due consideration.

Yet the Craigiean interpretation has been largely overlooked. It is not difficult to see why: first, Craigie's most explicit explanation of his interpretation of Cullen comes in an anonymous review of the first volume of John Thomson's *Life of Cullen*.¹³⁰ Even to the extent Cullen scholars have suspected Craigie to be the author of this review, it has been largely overshadowed by Sir William Hamilton's review from the same year.¹³¹ Consequently, Craigie's most concise and explicit statement of his interpretation of Cullen has hardly been appreciated.

Second, although Craigie's contribution to the second volume of Thomson's biography is more well known, his views are blunted on account of the context in which he was writing. Specifically, he was working with Allen Thomson to complete a book, most of which had already been written by John and William Thomson. Thus, he had little room to disagree with the Thomsonian interpretation. The emphasis was on continuity, not difference.¹³² Add to this the fact that most commentators simply treat the entire volume as a work by Thomson, rather than

¹³⁰ David Craigie, "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson", *The Edinburgh Medical and Surgical Journal* 38, no. 113 (1832): 384-420. It is highly likely that Craigie was the author of this review, for a number of reasons that I can only summarise here: first, Craigie was already doing a lot of work for the *EMSJ* in 1832, for in the very same issue (No. 113) where the review appears, there are two papers by Craigie (Articles VIII & XII). It appears that no other author has more than one article to his name. This suggests, at least circumstantially, that Craigie was already editing the journal by 1832. Second, there is a striking similarity in language and ideas between the 1832 review and Craigie's contribution to Vol. II of the Cullen biography. Compare, for example, TLC, 2:675-6 with p. 406 of the review.

¹³¹ Mike Barfoot is the only one, so far as I am aware, who references (though he does not discuss) Craigie's anonymous review of the first volume of John Thomson's *Life of Cullen* (1832). See Barfoot, "Philosophy and Method", 131, n. 68. For Hamilton's review, see Sir William Hamilton, "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson, M.D.", *The Edinburgh Review* 55, no. 110 (1832): 461-479.

¹³² At the same time, Allen Thomson and David Craigie sometimes disagreed about the appropriate content and length of Craigie's contribution. I cannot explore this here, but these disagreements cropped up in their correspondence about the volume (see MS Cullen 614-628 & 651-708).

separating out Craigie's contribution for analysis, and it is no wonder that Craigie's own interpretation has been neglected.¹³³

What, then, is the Craigiean interpretation of Cullen? Broadly, there is continuity between Craigie and Thomson's views insofar as they reject the criticism of Cullen as a fanciful speculator. Craigie puts this colourfully in the opening of his 1832 review:

At all times, but particularly of late, it has been a sort of fashion with many to underrate the labours of this distinguished genius, and to represent him as a mere rash speculatist and fanciful innovator, who was totally ignorant of the practical details of his profession, who could not, and did not, take the trouble to observe the phenomena of disease, and who was ever ready to supply, by the creations of his own fancy, any deficient links in the chain of facts requisite to support a preconceived hypothesis.¹³⁴

Craigie is just as eager to deny this as Thomson, but his strategy for doing so is a bit different. He does, like Thomson, emphasise the many practical virtues and insights of Cullen's works, especially in his *Treatise of the Materia Medica*. But he also emphasises Cullen's constitutional scepticism much more strongly than Thomson does. That has been a particularly important legacy of the Craigiean interpretation, though this insight is not usually linked to Craigie.¹³⁵

In addition to Craigie's emphasis on Cullen's scepticism, an even more significant difference between the two interpretations has to do with which aspects of Cullen's medical theory each found most important. The Craigiean interpretation downplays Cullen's contributions to physiology and highlights, instead, Cullen's contributions to therapeutics and materia medica.

Cullen's Scepticism

¹³³ It is possible that Craigie wrote more articles specifically on Cullen. I have not examined his papers. A brief review of some of his other published works—especially his *Elements of the Practice of Physic* (1837) and *Elements of General and Pathological Anatomy* (1851)—shows that he often referred to various aspects of Cullen's thought.

¹³⁴ Craigie, "Review of Thomson", 384-5.

¹³⁵ In more recent discussions, Cullen's sceptical approach is linked to his friendship with Hume. See Christopher Lawrence, "Medicine as Culture: Edinburgh and the Scottish Enlightenment" (PhD Thesis, University of London, London, 1984); and J. R. R. Christie, "Ether and the Science of Chemistry: 1740-1790," in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981).

Craigie emphasised Cullen's sceptical approach to medicine. It was a scepticism suited to his temperament, one which encouraged him to question facts and to speak in terms of uncertainty and doubt.¹³⁶ This sceptical attitude, Craigie thought, pervaded his teaching and writings, and in doing so set an example for his pupils. Cullen taught them that a physician ought "to think and inquire for himself, to shun slavish subjection to any authority, and to take for granted nothing which is not ascertained by repeated observation..."¹³⁷ This might lead to slower progress in medical knowledge but one which assured greater certainty.

Craigie suggests that Cullen's constitutional scepticism prevented him from engaging in undue speculation and rash hypothesising. Cullen may have been called "speculator, hypothetical writer, system-builder, and similar names not very becoming, even had there been reason for their application."¹³⁸ But these were mistaken epithets, for Cullen was much more akin to a 'skeptical inquirer', one who "denies, doubts, and calls in question every statement not well substantiated."¹³⁹ Did not Cullen himself suggest as much in the preface to his final work, when he wrote:

It may be alleged that I seem to be very sceptical with respect to the assertions of writers on the *Materia Medica*; and it may be true that I have been perhaps too rigorous in that respect: but I am persuaded that every practitioner of judgment and extensive experience must to a very great degree become sceptical upon the same subject. As my doubts, however, have arisen chiefly from my own experience, I must in candour admit, that my experience, like that of every one else, may be fallacious, especially in concluding from negative experiments.¹⁴⁰

Craigie, whether referencing Cullen's own words or his own, is at pains to emphasise Cullen's sceptical approach to medical inquiry.

On Physiology

¹³⁶ Craigie, "Review of Thomson", 409.

¹³⁷ TLC, 2:610.

¹³⁸ *Ibid.*, 2:621-22.

¹³⁹ *Ibid.*, 2:622.

¹⁴⁰ William Cullen, *A Treatise of the Materia Medica. In Two Volumes* (Edinburgh: Charles Elliot, 1789), 1:xi-xii.

In both his 1832 review and his contribution to volume II of the *Life of Cullen*, Craigie essentially repeats the following phrase: “Cullen was no anatomist; and in physiology he was, it must be admitted, infinitely inferior either to Haller or to Whytt.”¹⁴¹ This point, and its corollary, that Cullen’s most original and important contributions were not in physiology but in some other area, is really at the heart of the Craigiean interpretation and also marks one of the starkest differences between Craigie and Thomson.

Cullen, it is true, embraced a theory of animal life which privileged living properties over mechanical and chemical ones, which distinguished his views as “peculiar to himself and new to his auditors.”¹⁴² But they were not, in Craigie’s view, completely novel or original. Whytt had already conducted experiments on the nervous system that changed the course of both physiology and pathology, while Haller produced an immense collection of experiments and observations that overturned the doctrines of Boerhaave and laid the foundation for modern physiology.¹⁴³ In fact, Craigie continues, although the eclectic system of Boerhaave was the most prevalent, “it was by no means so exclusively such that no other doctrines were allowed to prevail.”¹⁴⁴ There were also those physicians who followed the doctrines of Stahl, for instance, or Rega’s “popular view of the sympathies between the stomach and other parts” on Hoffmannian principles,¹⁴⁵ all of which “must have been highly instrumental in preparing the minds of physicians for a considerable change in the character of their theoretical principles.”¹⁴⁶

It was above all the research of Haller and Whytt, that contributed to the overthrow of Boerhaavian medicine. In fact, “for the whole system of modern physiology, and most of the important peculiarities of its pathology, we are indebted to the exertions of Haller and Whytt, and the investigations to which the

¹⁴¹ Craigie, “Review of Thomson”, 406. For the similar phrase in Volume II, see TLC, 2:675. This is, incidentally, one of the most compelling pieces of evidence for Craigie’s authorship of the anonymous 1832 review.

¹⁴² *Ibid.*, 395.

¹⁴³ *Ibid.*, 395.

¹⁴⁴ *Ibid.*, 395.

¹⁴⁵ *Ibid.*, 396.

¹⁴⁶ *Ibid.*, 396.

controversies between these two acute and accomplished philosophers gave rise.”¹⁴⁷ In short, Craigie downplays Cullen’s work in physiology, when set in comparison to his predecessors, Haller and Whytt. Thomson discusses and emphasises the importance of Haller and especially Whytt, as well, but he does not conclude from this, as Craigie does, that Cullen was “infinitely inferior either to Haller or to Whytt” on physiological matters.¹⁴⁸

If it is true that Cullen was simply building upon his more illustrious predecessors, who themselves had seriously questioned the basis of the Boerhaavian system, then it seems strange to insist that Cullen alone, rather than a group of medical thinkers, was responsible for overturning Boerhaavian orthodoxy. Indeed, Craigie points out that even Whytt’s doctrines were not consonant with Boerhaavian principles. So, the notion “that Cullen assailed and overturned the Boerhaavian system of medicine, affords an entirely erroneous view of the matter, and that the system of that learned and ingenious eclectic was already tottering on its foundation from a variety of causes.”¹⁴⁹ This observation, Craigie hastens to add, is not made to denigrate Cullen’s merits as a medical thinker, but it is a way of showing that his true value did not consist in his contributions to physiology or his demolition of the Boerhaavian system.¹⁵⁰ Thus, Craigie is not de-emphasising Cullen’s contributions to physiology full-stop; he is doing so, in part, so that he can point to other areas of Cullen’s medical theory that he finds more significant.

But before we get to that, we should note that Craigie did think there were some aspects of Cullen’s physiology which were superior, in some respects, to the work of Haller and Whytt. The primary example here was “the penetration and sagacity with which he could investigate and illustrate the psychological branches of physiological science....”¹⁵¹ This can be seen in his understanding of insanity and other nervous diseases, his views on sleep, his emphasis on the role of custom, and

¹⁴⁷ Ibid., 396.

¹⁴⁸ Ibid., 406.

¹⁴⁹ Ibid., 399.

¹⁵⁰ Ibid., 399-400.

¹⁵¹ Ibid., 406.

his disquisitions on the influence of mental impressions.¹⁵² Cullen also did a great service by “removing a vulgar prejudice regarding the terms *theory* of medicine and *physiology*, by which it has been usually designated.”¹⁵³ Craigie seems, tentatively, to agree with Thomson that Cullen’s physiological exploration of the various functions and properties of the nervous system “was certainly most novel, and perhaps most important in its practical applications.”¹⁵⁴ But, after reviewing Thomson’s discussion of this topic, Craigie concludes, in what amounts to a lukewarm endorsement at best, that Cullen’s “speculations are doubtless refined, and perhaps not all susceptible of strict proof.”¹⁵⁵ He thinks, instead, that Cullen’s ‘principal talent’ was “that he possessed a peculiar and unrivalled faculty, in directing all his knowledge of the physical and physiological sciences to the single object of the rational and successful treatment of disease.”¹⁵⁶ And this can be seen, above all, in his therapeutic principles and approach to the *Materia Medica*.

Because Craigie’s 1832 book review is only of the first volume of Thomson’s *Life of Cullen*, which barely discusses Cullen’s *Materia Medica* (except for a brief discussion of the publication of the unauthorised lectures on this topic), there is little scope for Craigie to highlight Cullen’s merits in this regard, beyond the references to which I have already pointed. But he does do this at length in his contribution, published almost 30 years later, to volume II of Thomson’s *Life*.

This occurs in the context of discussing Cullen’s final publication, the two-volume *A Treatise of the Materia Medica* (1789).¹⁵⁷ We see immediately the very high value Craigie places upon this work. He points out, continuing a Thomsonian theme, that many of Cullen’s critics have unjustifiably believed that Cullen’s writings were full of speculation and conjecture. But the best refutation for these claims could be found in Cullen’s final publication.¹⁵⁸ For “*Materia Medica*,” Craigie observes,

¹⁵² *Ibid.*, 406.

¹⁵³ *Ibid.*, 407.

¹⁵⁴ *Ibid.*, 409.

¹⁵⁵ *Ibid.*, 413.

¹⁵⁶ *Ibid.*, 400.

¹⁵⁷ William Cullen. *A Treatise of the Materia Medica. In Two Volumes* (Edinburgh: Charles Elliot, 1789).

¹⁵⁸ TLC, 2:522-3.

“was, indeed, one of the branches of Practical Medicine, the knowledge of which Dr Cullen had most assiduously cultivated.”¹⁵⁹

If Cullen’s *Materia Medica* were examined on its own terms, “it may safely be pronounced to be not only equal to the best of Cullen’s writings, but by far the most practical and serviceable of the whole.”¹⁶⁰ Indeed, Craigie praises the *Materia Medica* in glowing terms and insists that those who were capable of making informed judgements about it agreed that it was a superior work, one that was both exceptionally thorough, highly practical, and ahead of its time.¹⁶¹ Craigie’s enthusiastic assessment of the *Treatise on Materia Medica* was a distinctive component of his interpretation of Cullen’s merits as a medical figure.

Foundations

Embedded within the dense, source-rich biography of William Cullen, composed over many years by multiple authors, two primary interpretations of Cullen’s life and work emerge: the Thomsonian and Craigiean interpretations. I have explored their shared assumptions, as well as their differences. Both were attempts to reject the criticisms of Cullen as a rash speculator, one who could not resist offering his students fanciful hypotheses, disconnected from fact. Thomson highlighted Cullen’s strict empiricism, whereas Craigie pointed to his constitutional scepticism. But the two differed when it came to Cullen’s chief virtues as a medical figure: Thomson thought his physiological framework, centred on a novel approach to the nervous system, was most original, whereas Craigie was more enamoured with Cullen’s practical inquiries into therapeutics and the *materia medica*.

These foundational interpretations have been embraced, rejected and modified throughout the course of Cullen scholarship since the nineteenth century. And they are still relevant: most discussions of Cullen justifiably begin with

¹⁵⁹ *Ibid.*, 2:527.

¹⁶⁰ TLC, 2:532, note.

¹⁶¹ TLC, 2:533.

Thomson's work, as we are about to see in our review of more recent Cullen historiography.

III. The Cullen Historiography: History of Medicine

Most of the original scholarship conducted by historians of medicine about Cullen in the past 75 years can be grouped into four subject areas: Cullen's clinical work, his understanding of fevers and therapeutics, his nosology (classification of disease), and his understanding of the nervous system. There has also been some work done in miscellaneous areas of Cullen's life and work that does not yet constitute a body of research, but which certainly provides a starting point for more inquiry, so I include these topics in my historiographical review as well.

The Clinician

John Thomson had emphasised Cullen's talents as a clinician, and in his biography he printed many excerpts from Cullen's clinical lectures and consultation letters to patients.

But it was not until the 1970s that a modern re-examination of Cullen the clinician began in earnest. Guenter Risse was perhaps the first historian to analyse Cullen's work in this area, especially his consultation letters to patients.¹⁶² He described Cullen's consultation practice and provided a general overview of Cullen's therapeutic recommendations, including his emphasis on dietary changes, his most frequently employed medications, as well as some details about the kinds of patients Cullen consulted via post.¹⁶³ Risse concluded that Cullen's famous and controversial theory of the nervous system played only a minor role in his recommendations and

¹⁶² G. B. Risse, "Doctor William Cullen, Physician, Edinburgh": A Consultation Practice in the Eighteenth Century", *Bulletin of the History of Medicine* 48 (1974): 338-351. Risse had also just published a letter from Cullen's consultation correspondence that depicts his approach to child care. See G. B. Risse, "William Cullen and Child Care. A 1788 Letter", *Clio Medica* 8, no. 1 (1973): 65-67.

¹⁶³ Risse, "Doctor William Cullen, Physician", 349.

instead stressed trusted methods of treatment that called for healthy lifestyle changes.¹⁶⁴

Risse returned to a number of these themes almost twenty years later in his contribution to the bicentennial symposium marking Cullen's death.¹⁶⁵ Having written, in the interim, a history of Edinburgh's Royal Infirmary,¹⁶⁶ Risse used his essay to compare Cullen's clinical approach in his consultation practice with that of his clinical work, treating a much poorer patient group, at the Royal Infirmary. Not only did Risse's paper reveal how Cullen treated actual cases of fever at the Royal Infirmary, but it showed how Cullen tailored his clinical approach to the context and background of the patients he treated.¹⁶⁷

Since Risse's pioneering work, there has been continued interest in Cullen's approach to clinical medicine, especially his correspondence by post.¹⁶⁸ Wayne Wild has recently extended Risse's discussion by considering a larger selection of Cullen's consultation letters.¹⁶⁹ He argues that Cullen's behaviour and rhetoric, as represented in these letters, show him to have embodied "the rhetorical expression of

¹⁶⁴ Ibid., 350-51.

¹⁶⁵ G. B. Risse, "Cullen As Clinician: Organisation and Strategies of An Eighteenth Century Medical Practice," in *William Cullen and the Eighteenth Century Medical World*, ed. A Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993). For Risse's most recent exploration of some clinical themes in Scottish medicine (albeit not necessarily focused on Cullen), see G. B. Risse, *New Medical Challenges During the Scottish Enlightenment*, Clio Medica: The Wellcome Series in the History of Medicine (Amsterdam: Rodopi, 2005). I discuss his analysis of Cullen's 'art of health' in Chapter 5 below. Risse discusses nervous disease in this book as well (see Ch. 9) but a more detailed study is Heather R. Beatty, *Nervous Disease in Late Eighteenth-century Britain: The Reality of a Fashionable Disorder*, Studies for the Society for the Social History of Medicine (London: Pickering & Chatto, 2012).

¹⁶⁶ G. B. Risse, *Hospital Life in Enlightenment Scotland: Care and Teaching at the Royal Infirmary of Edinburgh* (Cambridge: Cambridge University Press, 1986). This book is essential for understanding the context of Cullen's clinical work at the Royal Infirmary.

¹⁶⁷ For Cullen's treatment of fevers at the Royal infirmary, see Risse, "Cullen As Clinician", 142-45. Risse concluded that Cullen was more conservative and moderate with his correspondence patients and more aggressive therapeutically with his poorer Royal Infirmary ones (146).

¹⁶⁸ A short work on this topic, that includes excerpts from these letters, is R. Passmore, "William Cullen and Dietetics," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993).

¹⁶⁹ Wayne Wild, "The Correspondence of Dr William Cullen: Scottish Enlightenment and New Directions in Medicine-by-Post," in *Medicine-by-Post: The Changing Voice of Illness in Eighteenth-Century British Consultation Letters and Literature*, Clio Medica/The Wellcome Series in the History of Medicine 79 (Amsterdam: Rodopi, 2006).

sympathy.”¹⁷⁰ Wild also highlights the uniqueness of the consultation letters as an historical collection, noting how rare it is to have not only both sides of the correspondence but such a voluminous collection as well (21 volumes in total).¹⁷¹

It is the uniqueness of this collection, and its potential for analysis, that may have inspired the most recent investigation of Cullen the clinician. The AHRC-funded Cullen Project, a collaboration between the School of Critical Studies at the University of Glasgow and the Royal College of Physicians of Edinburgh (RCPE), is “creating a publicly accessible, online scholarly edition of one of the most important archives of eighteenth-century medical ‘consultation letters’.”¹⁷² Directed by David Shuttleton at the University of Glasgow, this project has the potential to supersede all earlier work on Cullen’s consultation letters. This is because it will produce a critical digital edition of the full run of Cullen’s consultation letters, with scholarly editorial apparatus, as well as cutting-edge, XML-based search functions. Cullen’s consultation correspondence, a critical part of his work as a practicing physician in eighteenth-century Scotland, will thus become accessible like never before. These are exciting times for anyone interested in Cullen the clinician.

Fevers & Therapeutics

Theories of fever, and their treatment, have always been a conspicuous part of eighteenth-century medicine.¹⁷³ Since Cullen had an unorthodox, controversial theory of fever (as set out in his *First Lines of the Practice of Physic*), John Thomson spilled a good portion of ink outlining and defending Cullen’s views.¹⁷⁴

¹⁷⁰ Ibid., 186. For an interesting example of Cullen’s clinical advice for his friend, Adam Smith, see Michael Barfoot, “Dr. William Cullen and Mr. Adam Smith: A Case of Hypochondriasis?”, *Proceedings of the Royal College of Physicians of Edinburgh* 21, no. 2 (1991): 204-14.

¹⁷¹ Wild, “Correspondence of Dr William Cullen”, 182.

¹⁷² <http://www.cullenproject.ac.uk/about-the-project.php> [Accessed on May 13, 2014.] It is scheduled to launch in the autumn of 2014.

¹⁷³ For the role of fever in eighteenth-century medicine, see Bynum, “Cullen and the Study of Fevers”; Andrew Cunningham, “Sydenham Versus Newton: The Edinburgh Fever Dispute of the 1690s Between Andrew Brown and Archibald Pitcairne”, *Medical History* Supplement No. 1 (1981): 71-98; and Johanna Geyer-Kordesch, “Fevers and Other Fundamentals: Dutch and German Medical Explanations c. 1680 to 1730”, *Medical History. Supplement*, no. 1 (1981): 99-120. For a general overview of fevers in medicine, see Wilson, “Fevers”.

¹⁷⁴ TLC, 2:107-174.

More recently, Bynum revived interest in Cullen's theory of fevers, and eighteenth-century therapeutics more generally, by situating Cullen's work in the context of a larger British fever literature.¹⁷⁵ Bynum was at pains to show the complexities of Cullen's theory of fever, with the notion of *debility* occupying a key position.¹⁷⁶ Although Cullen never argued for "a set of definitive therapeutic instructions which were to be applicable in all circumstances"¹⁷⁷—in contrast to John Brown—his therapeutic recommendations, Bynum points out, tended to be on the aggressive side, with an emphasis on stimulating remedies.¹⁷⁸ However influential Cullen's theory of fever may have been in his own lifetime, Bynum claimed that it "barely survived his death."¹⁷⁹

Lawrence has also discussed Cullen's theory of fever, using student lecture notes that recorded the essence of Cullen's 1757 clinical lectures, in which he outlined an early version of his theory.¹⁸⁰ Lawrence emphasised Cullen's role as "the most eloquent and popular expositor of the new theories of fever."¹⁸¹ Cullen attacked the older humoralist concepts of *coction* and *crisis* and replaced them with his 'solidist', vital theory of fever as a disease characterised by *debility*. Lawrence quotes Cullen's conclusion that "a debility of the nervous power forms the beginning of the cold fit, and lays the foundation of all other phenomena" in fevers.¹⁸² This new theory Cullen took to be original to himself. Through Lawrence's work, then, we see how Cullen used his understanding of the nervous system to form a controversial theory of fever.

¹⁷⁵ Bynum, "Cullen and the Study of Fevers". Bynum's earlier chapter on eighteenth-century medical care is also significant in this respect. See W. F. Bynum, "Health, Disease and Medical Care," in *The Ferment of Knowledge: Studies in the Historiography of Eighteenth-Century Science*, ed. George S. Rousseau and Roy Porter (Cambridge: Cambridge University Press, 1980).

¹⁷⁶ Bynum, "Cullen and the Study of Fevers", 139. For the sake of space, I am simplifying Bynum's discussion here, especially his analysis of how Cullen's nosology was related to his theory of fever.

¹⁷⁷ *Ibid.*, 139-40.

¹⁷⁸ *Ibid.*, 145.

¹⁷⁹ *Ibid.*, 147.

¹⁸⁰ Lawrence, "Medicine As Culture", 386-94. Lawrence cites from a set of lecture notes held at the Wellcome Library. See WHL, MS 3782 which are two volumes of lectures taken down by George Paterson (1734-1817), while attending Cullen's lectures at Edinburgh. In contrast, Bynum had largely used Thomson's edition of Cullen's works.

¹⁸¹ *Ibid.*, 386.

¹⁸² *Ibid.*, 389.

There has been less work on other areas of Cullen's practical medicine, including his pathology and therapeutics, but Stott's contribution has been notable.¹⁸³ She interprets a set of Cullen's physiology lectures from the early 1770s to show that Cullen was keen on using his medical teaching to promote virtuous conduct.¹⁸⁴ Indeed, for Stott, Cullen's pathology "underwrote the practice of Stoic self-command which, by the end of his life, Adam Smith had come to identify as the principal virtue..."¹⁸⁵ She therefore concludes that Cullen's lectures on pathology and therapeutics were really a way for him to 'promote virtue'.¹⁸⁶

If less research has been done on Cullen's pathology and therapeutics since the 1980s, it is not on account of its unimportance, or indeed, for lack of engaging material.¹⁸⁷ Bynum has justifiably emphasised the significance of studying therapeutics from a historical perspective, including Cullen's work. In the long run, "therapy is more constant than theory... In the short run, however, there are pronounced swings in therapeutic fashion. Why?... Viewed in this way, the history of therapeutics... can become a way into the urgent professional and social realities of the medicine of any particular period."¹⁸⁸

Nosology

One cannot discuss Cullen's practice of medicine without understanding his nosology. And he was, in Bynum's words, "without doubt the most influential

¹⁸³ Rosalie Stott, "Health and Virtue: Or, How to Keep Out of Harm's Way. Lectures on Pathology and Therapeutics by William Cullen c. 1770", *Medical History* 31, no. 2 (1987): 123-142. See also her brief re-appraisal of Cullen in Rosalie Stott, "William Cullen and Edinburgh Medicine: A Reappraisal", *The Society for the Social History of Medicine Bulletin* 38 (1986): 7-9.

¹⁸⁴ Stott, "Health and Virtue", 126.

¹⁸⁵ *Ibid.*, 126.

¹⁸⁶ *Ibid.*, 140.

¹⁸⁷ It is striking that there has been no re-evaluation, since Craigie, of Cullen's work on *Materia Medica*, especially given his lengthy publication on the topic.

¹⁸⁸ Bynum, "Cullen and the Study of Fevers", 147.

nosologist in Britain....”¹⁸⁹ Of course, the significance of nosology to understanding Cullen’s approach to medicine has long been recognised, at least since John Thomson.¹⁹⁰

It may have been Lester S. King who initiated the modern interest in Cullen’s nosology and approach to system.¹⁹¹ Like Faber before him, King saw Cullen as the first physician to make advances over Sauvages’ nosology.¹⁹² Not only did Cullen reduce Sauvages’ eleven classes of disease to four, but he was also more explicit about how his arrangement linked symptoms to functions.¹⁹³ In everything nosological, Cullen “wanted to simplify, to keep to essentials, and to make these as meaningful as possible.”¹⁹⁴ Though Cullen’s nosology certainly had its drawbacks, King thought “his faults were far fewer than his predecessors’.”¹⁹⁵

Bynum has justifiably stressed Cullen’s awareness “both of the contingencies of his own nosological scheme and of the importance of local pathological changes even in diseases which he continued to count as general affections.”¹⁹⁶ Indeed, his nosology, in Bynum’s view, was really more of a pedagogical guide to clinical practice than an essentialist understanding of disease.¹⁹⁷ Because of this, he was not

¹⁸⁹ Ibid., 143. For discussions of eighteenth-century nosology, see Knud Faber, *Nosography: The Evolution of Clinical Medicine in Modern Times. Second Edition, Revised* (New York: Paul B. Hoeber, 1930), Ch. 1; Lester S. King, “Nosology,” in *The Medical World of the Eighteenth Century* (Chicago: Chicago University Press, 1958); Lester S. King, “Boissier De Sauvages and 18th Century Nosology”, *Bulletin of the History of Medicine* 40, no. 1 (1966): 43-51; Esther Fischer-Homberger, “Eighteenth-century Nosology and Its Survivors”, *Medical History* 14, no. 4 (1970): 397-403; Julian Martin, “Sauvages’s Nosology: Medical Enlightenment in Montpellier,” in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and Roger K. French (Cambridge: Cambridge University Press, 1990); and W. F. Bynum, “Nosology,” in *Companion Encyclopedia of the History of Medicine: Volume 1*, ed. W. F. Bynum and Roy Porter (London: Routledge, 1993).

¹⁹⁰ TLC, 2:1-77.

¹⁹¹ King, “Nosology”. He discusses Cullen’s nosology in Ch. 7, on pp. 214-219, though the entire chapter serves as an excellent introduction to the nosologies of Linnaeus, Sauvages, Cullen, and Erasmus Darwin.

¹⁹² Ibid., 214. In comparing eighteenth-century nosologies after Sauvages (those of Vogel, Cullen, Macbride, Sagar, and Vitel), Faber had earlier written that Cullen’s was the only one “which marked a real advance....” See Faber, *Nosography*, 25.

¹⁹³ King, “Nosology”, 215.

¹⁹⁴ Ibid., 215.

¹⁹⁵ Ibid., 219.

¹⁹⁶ Bynum, “Cullen and the Study of Fevers”, 137.

¹⁹⁷ Ibid., 137.

bothered by potential conflicts between his neatly organised nosology and the more general implications of his pathophysiology.¹⁹⁸

Lawrence has an excellent, detailed discussion of Cullen's nosology, that echoes some of the same themes as Bynum. He underscores, even more than Bynum, the pedagogical motivations and uses of Cullen's nosology. In this respect, his nosology had at least two aims: first, it would allow the young physician to accurately distinguish between diseases. And in so doing, it encouraged new inquiry into various clinical observations. It was a framework "that would stimulate nosography rather than stultify it. It was meant to point to possibilities, to encourage fine discrimination, to eliminate irregularities..."¹⁹⁹ This is why it was so tightly integrated into Cullen's teaching of the Practice of Physic. It provided students with "a coherent, logical, easily memorisable account of diseases..."²⁰⁰

Second, nosology was founded on the success of natural history, and so it concerned itself with the natural histories of diseases. For Cullen, this understanding of disease was inexplicably linked to his neurophysiological framework. Therefore, when Cullen taught his pupils the practice of medicine on the back of his nosology, he was also revealing to them his entire system of medicine.²⁰¹ In Lawrence's words, "To accept his account of the neuroses was in large measure to follow his theory of the nervous system."²⁰²

The Nervous System

One of the leading intellectual themes of the first volume of John Thomson's biography of Cullen was the originality of Cullen's understanding of the nervous system, as well as its centrality to Cullen's approach to medicine.²⁰³

¹⁹⁸ Ibid., 137.

¹⁹⁹ Lawrence, "Medicine As Culture", 370.

²⁰⁰ Ibid., 370.

²⁰¹ Ibid., 371.

²⁰² Ibid., 371.

²⁰³ See my discussion of Thomson's interpretation earlier in this chapter.

This has largely been reproduced in the secondary literature on Cullen since then, especially given its potential connections to Scottish culture at that time. More than any other topic, Cullen's approach to the nervous system has captured the interest of Cullen scholars. I discuss a lot of this literature in Chapter 4, so for now I will only highlight some of the broader themes that have emerged.

Lawrence's scholarship has been the most influential in this regard. In a series of works, he has offered his interpretation of Cullen's approach to the nervous system, as well as linked Scottish medicine's focus on sensibility and the nerves to larger concerns of Scottish society during the Enlightenment. He has argued that Cullen's emphasis on the nervous system—indeed his entire system of physiology—was founded on the concepts of sensation and sympathy. Expanding on Whytt's work, whom Lawrence sees as a critical influence, Cullen developed “a totally naturalistic account of health and disease based on the laws of the environment-organism relationship.”²⁰⁴

Lawrence's interpretation of Cullen's physiology buttressed his argument about the connection between Scottish medicine and its position within Scottish society. In particular, he argued that “Through a theory of sensibility, physiology served to sanction the introduction of new economic and associated cultural forms by identifying the landed minority as the custodians of civilization, and therefore the natural governors, in a backward society. A related theory of sympathy expressed and moulded their social solidarity.”²⁰⁵

John Wright has also written extensively on Cullen's physiology. In a series of works, Wright has contextualised Cullen's views about the nervous system—and about the role of the mind, in particular—in comparison to his most important medical predecessors, including Boerhaave, Gaubius, and Whytt.²⁰⁶ In contrast to

²⁰⁴ Christopher Lawrence, “Ornate Physicians and Learned Artisans: Edinburgh Medical Men, 1726-1776,” in *William Hunter and the Eighteenth-Century World*, ed. William F. Bynum and Roy Porter (Cambridge: Cambridge University Press, 1985), 171.

²⁰⁵ Christopher Lawrence, “The Nervous System and Society in the Scottish Enlightenment,” in *Natural Order: Historical Studies of Scientific Culture*, ed. Barry Barnes and Steven Shapin (London: Sage, 1979), 20.

²⁰⁶ John P. Wright, “Metaphysics and Physiology: Mind, Body and the Animal Economy in Eighteenth-Century Scotland,” in *Studies in the Philosophy of the Scottish Enlightenment*, ed. M. A. Stewart (Oxford: Clarendon Press, 1990).

Lawrence, Wright has emphasised Cullen's continuity with Boerhaave (and Descartes) and his differences with Whytt, with respect to how the mind functions in the body: "By defining the mind as that which thinks or is conscious, in opposition to both Whytt and Porterfield, Cullen believed that he could study experimentally the causal relations between mind and body."²⁰⁷

Bynum has, in contrast to both Lawrence and Wright, de-emphasised the importance of Cullen's physiology, taken by itself. Echoing the Craigiean interpretation, he argues that Cullen's physiology was that of a clinician and nosologist rather than of an experimentalist, like Whytt or Haller. Bynum sees this in Cullen's neuromuscular physiological framework. Cullen "was not an experimentalist and derived his neuromuscular physiology from many sources...."²⁰⁸ For Bynum, Cullen did not tailor his nosology or clinical recommendations to his physiology; rather, his physiological assumptions, like the continuity between muscles and nerves, allowed him to develop a broader conception of disease.²⁰⁹

Auxiliary Topics & New Angles

The four subject areas I have described above constitute the bulk of the secondary literature on Cullen in the history of medicine. But there are some auxiliary subject areas that, while they have not yet had the same amount of focus, are nonetheless relevant to our understanding of Cullen. And they have the potential to be significant areas of research in Cullen historiography in the years to come.

To begin, the subject of agriculture was always something close to Cullen's heart. Not only did he spend, in his twilight years, a lot of time experimenting with techniques at his 'farm' at Ormiston Hill, but he delivered private lectures on the

²⁰⁷ John P. Wright, "Materialism and the Life Soul in Eighteenth-Century Scottish Physiology," in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood, Rochester Studies in Philosophy (Rochester: University of Rochester Press, 2000), 191.

²⁰⁸ Bynum, "Cullen and the Nervous System", 160.

²⁰⁹ *Ibid.*, 158.

topic.²¹⁰ Lord Kames sought out his advice, and he also engaged in some agricultural projects in an attempt to improve the Scottish linen manufacturing industry.²¹¹ Thus it is somewhat surprising that only one attempt has been made, post-Thomson, to describe Cullen's interest and writings on agriculture.²¹² Charles Withers describes Cullen's lectures on agriculture and agricultural chemistry and argues that they show how Cullen exhibited the widely shared commitment to civic improvement. Cullen's interest in agriculture "highlights that philosophical concern not only of eighteenth-century Scotland but throughout Europe with advances in agriculture based on practical knowledge and theoretical discourse...."²¹³ In his agricultural lectures, Cullen was keen to distribute 'philosophical' knowledge so that it would be of use to the 'Intelligent Artificer'.²¹⁴

Cullen was not simply a professor of medicine; he was also a respected and widely read medical author. Scholars have begun to illuminate Cullen's connections to the publishing world in Great Britain, as well as the histories of some of his works.²¹⁵ McDougall has explored Cullen's relationship to the medical bookseller Charles Elliot.²¹⁶ And while not focusing on Cullen per se, Zachs helps us understand Cullen's interactions with the very successful (and prickly) London bookseller, John

²¹⁰ Charles W. J. Withers, "William Cullen's Agricultural Lectures and Writings and the Development of Agricultural Science in Eighteenth-Century Scotland." *Agricultural Historical Review* 37, no. 2 (1989): 144-156.

²¹¹ TLC, 1:74-79.

²¹² Withers, "William Cullen's Agricultural Lectures".

²¹³ *Ibid.*, 148.

²¹⁴ *Ibid.*, 152.

²¹⁵ For a general introduction to Scottish publishing during the Enlightenment, see Richard B. Sher, "Science and Medicine in the Scottish Enlightenment: The Lessons of Book History," in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood (Rochester: Rochester University Press, 2000); *The Culture of the Book in the Scottish Enlightenment*, ed. Paul Wood (Toronto: University of Toronto, 2000); and Richard B. Sher, *The Enlightenment and the Book: Scottish Authors and Their Publishers in Eighteenth-Century Britain, Ireland and America* (Chicago: University of Chicago Press, 2006).

²¹⁶ Warren McDougall, "Charles Elliot's Medical Publications and the International Book Trade," in *Science and Medicine in the Scottish Enlightenment*, ed. Charles W. J. Withers and Paul Wood (East Linton: Tuckwell Press, 2002).

Murray.²¹⁷ Jolley has asked some questions, still unanswered, about the publishing history of Cullen's best-selling textbook, *First Lines of the Practice of Physic*.²¹⁸

Another angle into understanding Cullen, hitherto unexplored, focuses attention on his large and successful family. Jane Rendall, above all, has done much to reveal details about Cullen's family, especially his daughters and eldest son, Robert. She has discussed Robina Cullen's correspondence with Benjamin Rush, after her short-lived emigration to Pennsylvania in the late eighteenth-century.²¹⁹ She has contextualised the Cullen sisters' politics and social life, among a wider network of Scottish Whigs and political radicals (including the Thomson family).²²⁰ And she has shined a light on Margaret Cullen's novel *Home* (1802)—a “didactic and provocative attack on the existing laws of marriage and inheritance, and on the ties of kinship”²²¹—which she interprets both in terms of the radical gender politics of the period, as well as the poor financial circumstances of the Cullen daughters themselves (their father having died bankrupt with complicated financial and legal obligations left outstanding).²²² Finally, in an excellent though still unpublished essay, Rendall has unearthed some fascinating details about William Cullen's unpaid debts upon his death in 1790. She charts the various legal and financial disputes

²¹⁷ William Zachs, *The First John Murray and the Late Eighteenth-Century London Book Trade: With a Checklist of His Publications* (Oxford: Published for the British Academy by Oxford University Press, 1998). For discussion of Cullen's interactions with Murray, see Ch. 6. Their relationship soured by 1784, and Murray lashed out at him, going public with criticisms of Cullen's conduct. Zachs describes what happened on pp. 191-5. For Murray's public attack on Cullen, see John Murray, *An Author's Conduct to the Public, Stated in the Behaviour of Dr. William Cullen, His Majesty's Physician at Edinburgh* (London: J. Murray, 1784). A more detailed analysis of this controversy would be welcome.

²¹⁸ L. Jolley, “Two Inquiries About the Bibliography of William Cullen”, *The Bibliothek: A Journal of Bibliographical Notes and Queries Mainly of Scottish Interest* (1956): 28-29.

²¹⁹ Jane Rendall, “‘Friends of Liberty and Virtue’: Women Radicals and Transatlantic Correspondence, 1789-1848,” in *Gender and Politics in the Age of Letter Writing, 1750-2000*, ed. Caroline Bland and Máire Cross (Aldershot: Ashgate, 2004). She discusses Robina's relationship with Frances Wright, and the appeal of America, in Jane Rendall, “Prospects of the American Republic, 1795-1821: The Radical and Utopian Politics of Robina Millar and Frances Wright,” in *Enlightenment and Emancipation*, ed. Susan Manning and Peter France (Lewisburg: Bucknell University Press, 2006).

²²⁰ Jane Rendall, “‘Women That Would Plague Me with Rational Conversation’: Aspiring Women and Scottish Whigs, c. 1790-1830,” in *Women, Gender and Enlightenment*, ed. Barbara Taylor and Sarah Knott (Basingstoke: Palgrave Macmillan, 2005).

²²¹ *Ibid.*, 331. For a more recent and detailed discussion of this topic, see Jane Rendall, “Family, Politics and Reform in Margaret Cullen's *Home: A Novel* (1802),” in *Women in Eighteenth-century Scotland: Intimate, Intellectual and Public Lives*, ed. Katie Barclay and Deborah Simonton (Farnham: Ashgate, 2013).

²²² Rendall, “Rational Conversation”, 331.

between Robert Cullen, the profligate eldest heir, and the rest of the Cullen family that continued well into the nineteenth century. Rendall has provided us with new details, not to be found elsewhere, about the lives of the entire Cullen family, especially Robert.²²³

IV. The Cullen Historiography: History of Chemistry

In their interpretations of Cullen's life and work, historians of chemistry have often begun with different assumptions and sources than historians of medicine. There are two primary reasons for this, though each has a number of implications: first, Thomson's discussion of Cullen's chemical doctrines and teaching is much less detailed than his subsequent discussion of Cullen's medicine, leaving large lacunae. Second, although Cullen taught chemistry at Edinburgh for more than 10 years, it has generally been associated more with his Glasgow days, for that is when his most famous pupil, Joseph Black, studied (and worked) with him.

Let me suggest a few ways that these assumptions have marked the research in the history of chemistry as complementary to that in the history of medicine: It has resulted in (1) Less dependence on Thomson and his work, and thus a focus on an alternative set of primary sources (2) A focus on Cullen's early career in Glasgow (3) Greater use of methodological approaches drawn from the history of science, especially the importance of pedagogical influence and networks and (4) An emphasis on Cullen's underlying aether theory, as part of his chemical doctrines.

Independence from Thomson & Alternative Sources

An important aspect of the chemical historiography on Cullen worth highlighting is its independence from the Thomsonian framework. Despite

²²³ Jane Rendall, "Medicine, Politics, Gender, and the Reputation of William Cullen (1710-1790)" (Unpublished paper, November 26, 2012). As of August 2014, this essay had not yet been published. I thank Dr. Rendall for providing me with a copy. Not only does it contain the fullest description of the life of Robert Cullen of which I am aware, but Rendall helpfully includes a family tree in Appendix A and an estimate of Cullen's annual income in Appendix B.

Thomson's own interest in chemistry,²²⁴ the space he devotes to Cullen's chemical researches is meagre compared to the space devoted to Cullen's work in medicine.²²⁵ Perhaps this is unsurprising, but it has encouraged historians of chemistry to look elsewhere for both sources and interpretive frameworks. They have not been nearly as dependent on the Thomsonian framework as historians of medicine, for better or worse.

To begin, it is worth recalling the emphasis of Thomson's discussion on this topic.²²⁶ First, following Dr. Thomas Thomson's interpretation of Cullen—indeed excerpting from his work—John Thomson argued that Cullen was the first to value highly, and to seriously explore, the significance of philosophical chemistry in Great Britain.²²⁷

Second, Thomson highlighted Cullen's frequent use of affinity tables, inspired by those first developed by the French chemist Étienne François Geoffroy (1672-1731).²²⁸ These were an effective pedagogical tool that showed Cullen's keen interest in double elective attractions. Thomson claims that Cullen was the first to use diagrams of this nature.²²⁹

Third, Thomson made a particular point of showcasing Cullen's mentorship of, and inspiration to, his pupil Joseph Black, who went on to such great fame in the annals of chemistry for, among other reasons, his theory of latent heat. Thomson suggested that in fact Black owed a great debt to Cullen for his originality in chemistry, which, Thomson hastens to add, Black was cognisant of and for which Black did not fail to thank his mentor.²³⁰

²²⁴ Thomson produced a well-regarded edition of Fourcroy's *Elements of Chemistry* in 1800 and, according to Jacyna, "By the later 1790s Thomson had thus established a reputation in Edinburgh as an authority on chemistry and particularly on French chemistry." See L. S. Jacyna, *Philosophic Whigs: Medicine, Science, and Citizenship in Edinburgh, 1789-1848* (London: Routledge, 1994), 12.

²²⁵ Thomson also does not reprint Cullen's published work on chemistry in his two-volume edition of Cullen's works, effectively eliminating it from the canon.

²²⁶ TLC, 1:29-62.

²²⁷ *Ibid.*, 1:40.

²²⁸ *Ibid.*, 1:44.

²²⁹ *Ibid.*, 1:45. Both Crosland and Taylor have expanded upon this more recently—see below.

²³⁰ *Ibid.*, 1:45.

Finally, Thomson points to Cullen's long-standing interest in the topics of heat and cold.²³¹ For instance, Cullen devoted a large portion of his lectures to the topics of heat and fire, and his only published paper in chemistry dealt, in an original and unappreciated manner (according to Thomson), with the cold produced by the evaporation of various fluids.²³²

Some of these themes, as we shall see, have been explored in more detail relatively recently, but earlier historians of chemistry were more frustrated than satisfied with Thomson's short discussion of Cullen's chemical work.

William Wightman, in the 1950s, was explicit about this. He noted that Thomson's *Life of Cullen*, while it offered quite a few facts, did so in an unsatisfactory manner. His attitude may well have been representative of historians of chemistry in the mid-20th century, when he wrote: "Unfortunately Thomson was no historian: his work is wordy, badly planned, contains interminable digressions, and is almost without documentation or indication of the provenance of the manuscript materials which he evidently had before him. Also, he was a physician; consequently he deals with the medical lectures in far greater detail than he does with the chemical."²³³

Wightman was surprised that no account of the content of Cullen's chemistry lectures had yet been published. He was shocked when he came across a chemical manuscript that had seemingly lay unread "in an unfrequented corner of the library of Marischal College, Aberdeen, for a hundred and fifty years..."²³⁴ Thus he spends

²³¹ *Ibid.*, 1:51-3.

²³² *Ibid.*, 1:56. For Cullen's paper, see Cullen, "Cold Produced by Evaporating Fluids".

²³³ William P. D. Wightman, "William Cullen and the Teaching of Chemistry", *Annals of Science* 11, no. 2 (1955): 154. This attitude contrasts sharply with the general assessment, by historians of medicine, that Thomson's biography is, in Bynum's words, "one of the best books ever written on eighteenth-century medicine." See Bynum, "Cullen and the Nervous System", 154.

²³⁴ Wightman, "Cullen and the Teaching of Chemistry", 155.

most of his article describing this manuscript and the contents of similar ones that might be used to reconstruct Cullen's chemical lectures.²³⁵

Finally, Wightman pointed out that Leonard Dobbin's transcription of an unpublished Cullen essay in chemistry (on the different species of salts) lent support to his view that the Thomsonian framework was an inadequate guide to what Cullen actually taught in his chemistry lectures—new sources and interpretations would be necessary.²³⁶

Historians of chemistry have pursued these goals with particular ardour, given their independence from the Thomsonian interpretation of Cullen's work.

Cullen's Glaswegian Origins

Historians of chemistry have always been interested in Cullen's years in Glasgow because he initiated the teaching of chemistry at the University of Glasgow, and he also taught his most famous pupil, Joseph Black, while there. Thus, Cullen's Glasgow years have had a special importance in the history of chemistry.

Aside from Thomson's gloss in his biography, Cullen's years in Glasgow were a focus of an edited collection of papers, delivered on the occasion of the bicentenary of Cullen's inauguration (in 1747) of the Lectureship in Chemistry at the University of Glasgow.²³⁷ Mackie's paper, in particular, drew attention to the turbulent relations between the Presbytery of Glasgow and the faculty and students of the university, during Cullen's time there as a student.²³⁸ Although the university expanded and

²³⁵ Wightman published a follow-up article that went into more detail about the contents of various chemical manuscripts, some in Cullen's hand, and it is one of the first efforts to reconstruct the content of Cullen's chemical lectures at both Glasgow and Edinburgh. See William P. D. Wightman, "William Cullen and the Teaching of Chemistry—II", *Annals of Science* 12, no. 3 (1956): 192-205. He argued that an analysis of these manuscripts showed "definitive evidence of Cullen's extraordinarily 'modern' attitude to the function of chemistry in an industrial community" (193).

²³⁶ Wightman, "Cullen and the Teaching of Chemistry", 155. For Dobbin's transcription, see Leonard Dobbin, "A Cullen Chemical Manuscript of 1753", *Annals of Science* 1, no. 2 (1936): 138-156.

²³⁷ Kent, *Eighteenth Century Lectureship*.

²³⁸ J. D. Mackie, "Glasgow University in the Eighteenth Century," in *An Eighteenth Century Lectureship in Chemistry: Essays and Bicentenary Addresses Relating to the Chemistry Department (1747) of Glasgow University (1451)*, ed. Andrew Kent (Glasgow: Jackson, Son & Company, Publishers to the University, 1950), 33-37.

thrived during the course of the eighteenth century, it was not always a peaceful expansion, and disputes—sometimes violent—were not uncommon.²³⁹

In his effort to contextualise Cullen's origins and early career in Glasgow, Donovan has expanded on some of these observations. He highlights the University of Glasgow's role within the context of the struggle between reformers and the old guard occurring in Scotland in the first half of the eighteenth century. Although the old regenting system of teaching was abolished in 1727, the process was not without controversy.²⁴⁰ And these debates spilled over into more general questions about who was responsible for setting university policy. Principal Stirling, who was also a minister, claimed responsibility, but the faculty and students disagreed and their dispute became public, with rival factions.²⁴¹ This legal dispute, which was ongoing while Cullen was a student, was finally resolved in 1727. If we add to this the prosecutions of various faculty members for unorthodox religious views—especially John Simson, the professor of divinity—we begin to see an unstable University, divided by faction, during the time Cullen was a student.²⁴² Donovan argues that this turbulent context shaped Cullen's later views and positioned Cullen firmly in one of the factions, the reformist one, which incorporated the new natural philosophy and emphasised toleration in religious matters.²⁴³

While our understanding of Cullen's early career in Glasgow still remains murky, his origins in the West of Scotland and his time in Glasgow shaped his outlook for the rest of his life. For it must surely be the case, as Donovan has emphasised, that “Since Cullen began both his university education and his teaching career in the University of Glasgow, an investigation of the battles which were wracking that institution while Cullen was attending it will help us understand the social and intellectual issues which were to occupy him throughout his long life.”²⁴⁴

²³⁹ Ibid., 33.

²⁴⁰ Donovan, *Philosophical Chemistry*, 14-15.

²⁴¹ Specifically over the issue of how to elect the rector of the university. See Ibid., 15-16.

²⁴² Ibid., 16-17. I speculate more about this in Ch. 3.

²⁴³ Ibid., 18.

²⁴⁴ Ibid., 3-4.

Historians of chemistry have thus justifiably pointed to the Glaswegian context in the first half of the eighteenth century as a fruitful source of inquiry.²⁴⁵

Pedagogical Influence

A particularly interesting and fruitful aspect of the chemical historiography on Cullen is its focus on pedagogy and its networks of influence. In this respect, the chemical historiography has fruitfully drawn from recent methodological concerns from the history of science.²⁴⁶

This is not to say that Thomson neglected the topic, but again, his focus was on Cullen's teaching of medicine.²⁴⁷ Historians of chemistry, in contrast, have tried to elucidate Cullen's pedagogical influence in chemistry, through Joseph Black especially, but on other pupils as well.

Post-Thomson, Crosland initiated this line of investigation with his essay on Cullen's chemical 'equation' diagrams.²⁴⁸ He argued that Cullen's use of these diagrams "was an important step in the teaching of chemistry in the eighteenth century" but because he did not publish them, they were not widely used.²⁴⁹ Crellin, in two essays from the early 1970s, highlighted Cullen's use of chemical apparatus,

²⁴⁵ Historians of medicine have also started to dig up sources about Cullen's life in Glasgow. For his connection to the Royal College of Physicians and Surgeons of Glasgow, for instance, see Geyer-Kordesch, Macdonald and Hull, *Physicians and Surgeons in Glasgow*, esp. Chs. 5, 6 & 8. For his connection to the Infirmary at the Glasgow Town's Hospital, see Fiona A. Macdonald, "The Infirmary of the Glasgow Town's Hospital, 1733-1800: A Case for Voluntarism?", *Bulletin of the History of Medicine* 73, no. 1 (1999): 64-105.

²⁴⁶ I am thinking, in particular here, of work along the lines of David Kaiser's collection on pedagogy and science. See *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*, ed. David Kaiser (Cambridge: MIT Press, 2005). Rosner has long focused on pedagogy and education as well, e.g. Lisa Rosner, "Eighteenth-Century Medical Education and the Didactic Model of Experiment," in *The Literary Structure of Scientific Argument: Historical Studies*, ed. Peter Dear (Philadelphia: University of Pennsylvania Press, 1991); and Lisa Rosner, "Ants in the Academy: Formic Acid and the University Dissemination of Enlightenment Science", *Eighteenth-Century Thought* 2 (2004): 207-231.

²⁴⁷ The exception being his discussion of Cullen's tables of affinity.

²⁴⁸ M. P. Crosland, "The Use of Diagrams As Chemical 'Equations' in the Lecture Notes of William Cullen and Joseph Black", *Annals of Science* 15, no. 2 (1959): 75-90.

²⁴⁹ *Ibid.*, 90.

as well as some of the pedagogical virtues of the organisation and content of his lectures on chemistry.²⁵⁰

Quite recently, Georgette Taylor has gone much further by not only describing some of Cullen's most effective pedagogical tools but showing how these tools were handed down and re-interpreted by an influential network of former pupils. Taylor began this line of research in her PhD thesis,²⁵¹ but she focused on Cullen in particular in a subsequent journal article.²⁵² She has argued that Cullen used his doctrine of chemical 'affinity' to demarcate philosophical chemistry from other endeavours.²⁵³ This concept became a pedagogical tool, along with the use of affinity tables, so that his students took them to be an essential part of what it meant to do chemistry, thus instituting a new 'norm' for the discipline.²⁵⁴ According to Taylor, "Cullen's role in instituting this consensus was crucial. His deployment of his affinity theory as a pedagogical tool implicitly designated it as a unifying principle to the discipline, a role it retained in the next century."²⁵⁵ Taylor's work shows quite clearly that didactic innovations, like Cullen's affinity tables, had more than just pedagogical influence; they could, and did, alter the content of the discipline itself, especially for future practitioners.²⁵⁶

Cullen's Aether Theory

²⁵⁰ For the former, see J. K. Crellin, "William Cullen and Practical Chemistry", *Actes du XIIIe Congrès International d'Histoire des Sciences, Paris, 1968* 6 (1971): 17-21. For the latter, J. K. Crellin, "William Cullen: His Calibre As a Teacher, and An Unpublished Introduction to His *A Treatise of the Materia Medica*, London, 1773", *Medical History* 15, no. 1 (1971): 79-87.

²⁵¹ Georgette Taylor, "Variations on a Theme: Patters of Congruence and Divergence Among 18th Century Chemical Affinity Theories" (PhD Thesis, University College London, 2006). Taylor places Cullen at the top of a pedagogical pyramid "that encompassed many of the most active chemists in Britain by the third quarter of the eighteenth century" (Taylor, "Disciplinary Common Ground", 478.) For a graphical representation of this pyramid, see Appendix B of her PhD thesis.

²⁵² Georgette Taylor, "Unification Achieved: William Cullen's Theory of Heat and Phlogiston As An Example of His Philosophical Chemistry", *The British Journal for the History of Science* 39, no. 04 (2006): 477-501.

²⁵³ *Ibid.*, 466.

²⁵⁴ *Ibid.*, 466.

²⁵⁵ *Ibid.*, 466.

²⁵⁶ Taylor continues to explore this theme in the work of one of Cullen's pupils, George Fordyce. See Georgette Taylor, "Pedagogical Progeniture or Tactical Translation? George Fordyce's Additions and Modifications to William Cullen's Philosophical Chemistry Part I", *Ambix* 61, no. 1 (2014): 48-66.

There is one more aspect of the chemical historiography on Cullen that I wish to highlight here: its focus on Cullen's underlying theory of the aether, as fundamental to his understanding of chemistry. It was not a topic that Thomson had mentioned in his discussion of Cullen's chemistry.²⁵⁷ But historians of chemistry, in their quest to understand Cullen's chemical doctrines, have tried to elucidate his most fundamental theories about the workings of nature, which usually involved a discussion of the aether.

Donovan discusses Cullen's aether theorising, in the context of his theory of fire.²⁵⁸ This is often where Cullen brought up the notion, for he linked his theory of fire to his conception of the aether. Both fire and aether were subtle, elastic fluids that pervaded all bodies.²⁵⁹ Advocating an aether theory similar to Bryan Robinson's interpretation of Newton's views, Cullen suggested that a chemical explanation of fire within the context of a more general theory of the aether would allow chemists, in Donovan's interpretation, "to construct an attraction-repulsion theory which would address the particular phenomena they study while drawing upon the conceptual resources of an overarching natural philosophy."²⁶⁰ The details of Cullen's theory do not concern us here, the point simply being that historians of chemistry, like Donovan, realised that explicating Cullen's fundamental chemical doctrines also meant interpreting his aether theory.

A few years after Donovan's work, Christie wrote at some length about Cullen's concept of the aether, as part of his chemistry.²⁶¹ Christie concurs that a concept of aether—one which Cullen developed over time—underpinned Cullen's

²⁵⁷ He does note its centrality to Cullen's understanding of the nervous system but is at pains to underplay its significance. For more on this, see Chapter 4.

²⁵⁸ Donovan, *Philosophical Chemistry*, Ch. 6, esp. pp.140-43.

²⁵⁹ *Ibid.*, 141.

²⁶⁰ *Ibid.*, 143. Bryan Robinson's work on aether was published in 1743. See Bryan Robinson, *A Dissertation on the Aether of Sir Isaac Newton* (Dublin: Geo. Ewing and Wil. Smith, 1743).

²⁶¹ Christie, "Ether". The entire volume in which this essay resides is worth consulting, especially Roger K. French, "Ether and Physiology," in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981); and P. M. Heimann, "Ether and Imponderables," in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981).

system of chemistry (and medicine too).²⁶² He thought, as well, that Cullen's discussion of aether was congruent with Hume's, in that both saw 'ethereal speculation' as a secular alternative "to any reliance on a realm of divine causation in nature."²⁶³

Georgette Taylor has extended and refined Donovan and Christie's discussions by further explicating Cullen's theory of heat in the context of his philosophical chemistry.²⁶⁴ Using new sources from Cullen's final year as Professor of Chemistry (1765-66), Taylor has shown how Cullen constructed a single, comprehensive theory of the generation of heat, by assuming the existence of an imponderable, Newtonian aether.²⁶⁵ Cullen assumed an ontology that divided the world into ordinary, inert matter and an aetherial elastic fluid.²⁶⁶ Oscillatory motions excited in an aetherial, subtle fluid were the cause of heat.²⁶⁷ Taylor suggests that this was a reversal of sorts from the theory that Christie and Donovan had described, suggesting that Cullen had continued to develop his views. In the earlier set of lectures, the variable density of the aether surrounding bodies explained attraction.²⁶⁸ In these later lecture notes, elective attraction between particles initiated the generation of heat by combination. The movement of the aether was caused by elective attraction—not the other way around.²⁶⁹ The details of his theory of heat are still a bit obscure, but Taylor has convincingly shown how central Cullen's aether theorising was to his conception of philosophical chemistry.

To conclude this historiographical review, we have seen how the two major strands of historiography complement each other, sometimes in unexpected ways. In particular, work in the history of chemistry critically supplements the picture of Cullen that has emerged from scholarship in the history of medicine. Not only have

²⁶² Christie, "Ether", 96. As I mention in Chapter 4, Christie saw Cullen, justifiably, as "Eighteenth-century Scotland's most committed ethereal scientist" (86).

²⁶³ *Ibid.*, 88. Christie also makes the argument that Cullen's 'philosophical chemistry' exhibited striking similarities to the philosophical assumptions of both Hume and Smith (93).

²⁶⁴ Taylor, "Unification Achieved".

²⁶⁵ *Ibid.*, 479.

²⁶⁶ *Ibid.*, 486-7.

²⁶⁷ *Ibid.*, 491.

²⁶⁸ *Ibid.*, 500.

²⁶⁹ *Ibid.*, 500.

historians of chemistry shown, in Thomas Thomson's words, that Cullen was "the true commencer of the study of scientific chemistry in Great Britain,"²⁷⁰ but they have also illuminated Cullen's early life in Glasgow, his pedagogical influence, and the aetherial ontology that underpinned much of his theorising about the natural world.

V. This Study

In the study that follows, one of my principal aims has been to take some of the approaches and insights of the chemical historiography and apply them to our understanding of Cullen, in the context of the history of medicine. The divide between the historiography of chemistry and medicine has been necessary at times, but it is nonetheless artificial.

§1. Methodology

I identified, in my review of the historiography above, at least four ways in which the chemical historiography complements the work on Cullen in the history of medicine. Below I explain how I have used these complementary approaches to frame what follows.

Independence from Thomson

My approach is founded on the belief that we need to study Cullen independently of Thomson's interpretation, and, more critically, from the source material he has provided for us. Historians of chemistry have by necessity had to do this because of Thomson's limited treatment of Cullen's chemical views. Historians of medicine, on the other hand, faced with such rich source material as well as Thomson's influential interpretation of Cullen, have more happily followed in his

²⁷⁰ Thomson, *The History of Chemistry. In Two Volumes. Vol. I*, 304.

footsteps. But it is time to move away from Thomson and his interpretation of Cullen.

It is not that we should ignore the Thomsonian edifice—indeed, I have already discussed it at some length in this introduction. Thomson’s biography is still indispensable, and our understanding of Cullen must always engage with what Thomson has done. But we need not follow the interpretive path that Thomson has paved before us. Thus, wherever possible, I return to the original source material, eliminating Thomson’s editorial filter. And I extend my analysis with a significant amount of new material, either neglected by Thomson or which I have uncovered through extensive searches in numerous archives. Chapter 5, “Hygiene, or the Art of Health,” for example, draws upon primary source material that Thomson possessed but never discussed, while Chapter 3, “Philosophy of Medicine,” also uses material that Thomson had but rarely interpreted. Chapter 2, “Pedagogy,” and Chapter 4, “Theory of the Nervous System,” both draw upon significant new source material of which Thomson was likely unaware. While all of these topics have been discussed before to varying degrees, the use of new sources allows for fresh, and I hope more accurate, interpretation.

There is one part of the Thomsonian edifice that has been particularly unhelpful, and it is Thomson’s assumption that Cullen was a static thinker, whose views changed very little since he first began teaching in the 1740s until he died in 1790.²⁷¹ Stated so baldly, no historian would nowadays endorse it, and while few have followed Thomson in this regard, it has had more subtle effects. There is so much extant Cullen material that one is tempted, for the sake of time, to focus singularly on, say, Cullen’s published textbook on physiology as representative of his views. And, the thinking goes, there can be no serious harm in doing so, especially if (and here the unconscious assumption kicks in), as Thomson says, his views did not materially change since the 1740s. But I show in a number of chapters that this obscures not only the development of Cullen’s thought over time, but steers us away

²⁷¹ TLC, 1:25. Thomson bases his claim on testimony from the Glasgow surgeon, Dr. Robert Wallace, who told him—from a recollection more than 60 years after the fact—that Cullen, during the late 1740s, taught a lot of the same doctrines which later appeared in his writings.

from asking why Cullen wrote or lectured what he did *when* he did. It hinders our examining, from year to year, the local context that shaped the content of Cullen's lectures and publications.

The Pedagogical Context

Of all his responsibilities, Cullen appears to have taken his pedagogical role particularly seriously. I offer some explanations for why this was the case in the next chapter, but one piece of evidence here should suffice to show that he gave his teaching very high priority. Charles Elliot, Cullen's publisher near the end of his life, told the London printer Thomas Cadell in 1784 that he had to excuse Cullen for his tardiness in correcting proofs of the recent edition of his *First Lines*, for "If ever man was a slave, he is one to the fullest degree. He makes it a rule that nothing interferes with his class, but the rest of the day he cannot call a moment his own."²⁷²

If this is the case, any interpretation of Cullen needs to be understood, where relevant, in the context of his responsibilities and goals as a medical teacher. Many of his publications were, for example, textbooks for the use of his students. Moreover, Cullen not only taught thousands of students but was diffident about publishing his own ideas, until late in his career. So Cullen's 'influence', such as it was, is only partially captured by a focus on his publications, as opposed to his lectures. We need a much better understanding not only of the content of his lectures, but also of how his pupils understood them. This pedagogical approach promises to provide a more accurate sense of how Cullen's ideas were adopted or disputed, by those who listened to him in the semi-public venue of the classroom. This is why I have not only included a chapter on Cullen's pedagogy (Chapter 2) but have tried to draw out, in subsequent chapters, how Cullen's own thinking and actions can be understood, at least on some level, in the context of his identity as a medical teacher.

Origins in Glasgow

²⁷² Quoted in McDougall, "Elliot's Medical Publications", 221.

Another feature of the chemical historiography worth exploring in the medical domain is a greater concern with Cullen's background and life in Glasgow. It is understandable why historians of medicine have focused on Cullen's career in Edinburgh. Not only did he teach many more courses in medicine while there, but the extant material available for that time period is more extensive and detailed. Yet this obscures Cullen's Glaswegian origins and, in particular, the general intellectual framework for his approach to both natural philosophy and medicine. While Cullen's views developed over time (as I have just argued above), there is still a sense in which the *fundamentals* of his approach were largely worked out before he began teaching in the mid-to-late 1740s. This is not to say that Thomson's static view is correct; only to suggest that the principles of Cullen's intellectual framework were largely intact, before he settled in Edinburgh. In particular, I would highlight the period from about 1731, when he returned from his voyage overseas, to 1746, when he began teaching at the University of Glasgow, as fundamental to his general outlook. And almost all of this—save his stint as a medical student at Edinburgh in the mid-1730s—was a product of his life in the West of Scotland.

I therefore take note of Cullen's origins in Glasgow. In Chapter 2, I explore the pedagogical identity that he formed when he first began teaching there. In Chapter 3, I speculate that Cullen's concern with sectarianism and his unorthodox religious views may have been a function of his coming of age in the unsettled religious atmosphere of Glasgow in the 1720s. In Chapter 4, I emphasise his underlying Newtonianism, and his appropriation of Newton's aether theorising into his own understanding of the nervous system, an appropriation that happened long before he took up his post at Edinburgh. And I note, in Chapter 5, Cullen's early interest in the topic of hygiene, while he taught at Glasgow University. In this sense, once again, I am following in the footsteps of historians of chemistry who have long seen his career in Glasgow as highly significant.

Aether Theory

The above three considerations reflect my general approach in the study that follows. But there is also a particular topic (rather than approach) that I wish to highlight here, one which the historians of chemistry have rightfully focused on: Cullen's aether theory. As my review of the historiography indicates, while this topic has not been neglected by historians of medicine, it has not been a focus of detailed inquiry, either. That is what I attempt to do in Chapter 4, and I do so with the belief that it was a fundamental doctrine for Cullen, both in chemistry and medicine. Indeed, if there is a single topic that unites Cullen's approach to both disciplines, it is his aether theory. While I have not had space to explicate his broader ontology of matter in any detail, I hope I have sufficiently underscored its importance to understanding Cullen's thought.

Limits of this Study

This leads me to my last methodological point: my aim here has not been comprehensiveness, even on any one medical topic. There is simply too much material to make such an attempt in a study of this length. For example, I say little to nothing about Cullen's famous nosology of diseases, his controversial theory of fever, his understanding of Method in natural history, his clinical medicine, or his understanding of the extent to which the Soul governs the functions of the body—though I have been tempted by all of these topics.

Nor have I made full use of the extant material available to the Cullen scholar. There is no critical edition of Cullen's correspondence, and this has hampered my own use of his letters. His clinical lectures are likewise rich with material, but I have all too rarely cited them in this study. This is to say nothing of the excellent historical work and primary source material available for many of Cullen's contemporaries that, had I used them more effectively, would have allowed me to provide a much richer sense of the local context, and intellectual milieu, of Cullen's life and work in Enlightenment Scotland.

§2. Structure & Road Map

In the study that follows, I have eschewed comprehensiveness for a more varied approach. Nonetheless, there is still an underlying structure to the choice of topics chosen: Chapter 2 is a study of Cullen's pedagogical identity, which is critical to any interpretation of Cullen's life and work. Chapter 3 continues the theme of pedagogy by exploring what Cullen taught his students about how they should approach the study of medicine. It is not just about pedagogy, however, as it also illuminates Cullen's philosophy of medicine. This serves as a helpful bridge into the intellectual world of Cullen's medical thought, the focus of Chapters 4 and 5. Chapter 4 is a window into Cullen's theory of medicine, founded as it is, on his understanding of the nervous system. Chapter 5 is an examination of one rarely-studied component of Cullen's practice of medicine—his thoughts on how to preserve one's health. Finally, in Chapter 6, I summarise the results of this study, speculate about some of its implications, and suggest avenues for future research on Cullen.

In the course of the following chapters, two overarching themes emerge. First, I show that Cullen was both a more unorthodox figure in Scottish medicine than he is generally depicted, as well as a more ambitious one. Despite his controversial doctrines, he skillfully managed the hierarchy of his profession and reached the pinnacle of success at Edinburgh. But this very success masks the opposition he meant with, including his colleagues' rejection of his most fundamental doctrines.

Second, I depict Cullen in the guise of the learned physician in the Scottish Enlightenment. We see both his ideals of learned medicine, as well as what he took to be threats to those ideals. In exploring this persona, we therefore get a better sense of learned medicine in the mid-to-late eighteenth century.

In addition to these overarching themes, each chapter has its own agenda. In Chapter 2, I explore the most characteristic features of Cullen's pedagogical identity and suggest that it may have been modelled after Hutcheson's pedagogical persona—or from a shared Glaswegian norm. Cullen used his teaching identity to secure the

advocacy of the medical students themselves, whose support Cullen deliberately and carefully enlisted to advance his own career.

In Chapter 3, I explicate Cullen's philosophy of medicine, specifically his medical epistemology (inductive Dogmatism) and ideology (systematic Eclecticism). Cullen used his inductive Dogmatism to defend the authority of learned medicine, while his systematic Eclecticism served as an effective pedagogical tool and a flexible way to manage professional controversy. It may have also resonated with him on account of his unorthodox religious views.

In Chapter 4, I argue that the key to understanding Cullen's neurophysiology is his understanding of the nature and function of the nervous fluid, what he himself called his 'Theory of the Nervous System'. It unified his approach to the nervous system and accounts for its most distinctive features. It was a decidedly Newtonian theory, one which emphasised the inherence of a subtle elastic fluid in the medullary substance of the nerves. Despite its Newtonian pedigree, it was contentious and largely dismissed by his colleagues at Edinburgh.

In Chapter 5, I show that hygiene, or the art of health, was a long-standing topic of special importance to Cullen. He counselled his patients to manage the non-naturals through virtuous moderation, striking a proper balance between a varied life and a strict, regimented one. Cullen used his understanding of hygiene to defend medical expertise and the authority of learned medicine, in contrast to the view that all one needed was common sense.

In Chapter 6, I wrap things up and point to some promising topics for future inquiry.

Let us begin, then, with an examination of Cullen's pedagogical persona, a critical ingredient of his popularity and success.

This page intentionally left blank

CHAPTER TWO

PEDAGOGY

Tho' no publick teacher could be more fortunate than Dr C[ullen] in the assiduous attendance of his pupils, there must ever be exceptions in such great numbers. He lectured at a very early hour and one very bad morning in winter, he observed a very deficient muster and waited for a little as if expecting more attendants, but looking for them in vain he said "like Caesar I set little value on numbers, I will go on with the 10th Legion." This of course ensured him the title of Julius for the remainder of the season. On another morning one of these whose former delinquencies had not escaped his notice came in when the lecture was nearly half over. He said, "Do you not see the stranger gentlemen why do you not make room for him[;] let him have one of the last seats by the fire this cold morning".

-Sir Gilbert Blane in a letter to Dr. John Thomson, July 26, 1828.
[MS Cullen 451, 3r-3v]

CHAPTER 2: PEDAGOGY

In almost all interpretations of Cullen's life and work, commentators have highlighted his extraordinary success as a teacher. John Thomson portrays him as the Teacher of Medicine *par excellence*, and David Craigie concurs.¹ He was adored by his students and paid them special attention both inside and outside the classroom. Many of them maintained correspondence with him throughout the rest of his life.

More recent scholars have been no less effusive. Crellin calls Cullen's teaching "possibly the most significant in eighteenth-century British medical education" as he highlights some of its innovations.² Donovan claims that "he was a daring and innovative teacher and a lecturer whose instruction sparkled with a vitalizing purposiveness that looked beyond the confines of the specific subjects he taught."³ Stott insists that the "frame of reference" in which Cullen can more fruitfully be studied...lies within the realm of his dynamic relationship with his students, all his work was intended as a means towards their improvement and as subordinate to that end."⁴ Barfoot emphasises the importance of seeing Cullen's preference for System through the prism of pedagogy.⁵ And historians of chemistry, like Georgette Taylor, have explored the lasting influence of Cullen's pedagogical tools.⁶

While it is safe to say that the significance of Cullen's teaching has not gone unnoticed, there have been few attempts to explain Cullen's strategies and

¹ See my review of the historiography in Chapter 1, where I discuss their interpretations of Cullen.

² See J. K. Crellin, "William Cullen: His Calibre As a Teacher, and An Unpublished Introduction to His *A Treatise of the Materia Medica*, London, 1773", *Medical History* 15, no. 1 (1971): 79; and J. K. Crellin, "William Cullen and Practical Chemistry", *Actes du XIIe Congrès International d'Histoire des Sciences, Paris, 1968* 6 (1971): 17-21.

³ Arthur L. Donovan, *Philosophical Chemistry in the Scottish Enlightenment: The Doctrines and Discoveries of William Cullen and Joseph Black* (Edinburgh: Edinburgh University Press, 1975), 3.

⁴ Rosalie Stott, "Health and Virtue: Or, How to Keep Out of Harm's Way. Lectures on Pathology and Therapeutics by William Cullen c. 1770", *Medical History* 31, no. 2 (1987): 125.

⁵ Michael Barfoot, "Philosophy and Method in Cullen's Medical Teaching," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 113-118.

⁶ Georgette Taylor, "Marking Out a Disciplinary Common Ground: The Role of Chemical Pedagogy in Establishing the Doctrine of Affinity at the Heart of British Chemistry", *Annals of Science* 65, no. 4 (2008): 465-486. Also notable here are M. P. Crosland, "The Use of Diagrams As Chemical 'Equations' in the Lecture Notes of William Cullen and Joseph Black", *Annals of Science* 15, no. 2 (1959): 75-90; and Crellin, "William Cullen: His Calibre As a Teacher".

motivations for becoming a successful teacher. In this chapter, I want to know not only *how* Cullen became the kind of pedagogue he was, but also some of the uses to which he put his pedagogical popularity to work. I argue that Cullen developed a Hutchesonian style of pedagogy that was both cutting edge and precisely tuned to the demands of his students. At least in Edinburgh, Cullen's pedagogical persona was not uncontroversial. Nonetheless, I also show how Cullen deliberately used his pedagogical rapport with students to advance his professional interests at the Edinburgh Medical School, skillfully managing the controversy that surrounded his popularity.

I. Cullen's Pedagogical Persona

In exploring Cullen's teaching identity, I have two queries in mind: first, what were the most characteristic features of Cullen's teaching style? Second, why did he adopt *these* features and not others? He could have been another kind of teacher, after all. Were there particular pedagogical models from which he may have drawn? In other words, how did he form his teaching persona?

Forming an Identity

Traditional explanations of Cullen's teaching style and manner—his identity as a teacher—assume that Cullen was the kind of teacher he was because of the kind of person he was. The notable features of his teaching were, then, simply extensions of his personality or mind. Thomson, for instance, writes that Cullen's "lectures were distinguished by that simplicity, ingenuity, and comprehensiveness of view, which marked at all times the philosophical turn of his mind; and...were delivered with that clearness and copiousness of illustration which in his lectures he ever instructed and delighted his auditors."⁷ James Anderson (1739-1808), who was a great admirer and, later, friend of Cullen's, was a student at the University in the late 1750s and early

⁷ TLC, 1:109-110.

1760s.⁸ He observes something similar: Cullen was a genius, he explains, of which there are two classes: “The first may be said to view objects individually, as through a microscope...The other takes a sweeping view of the universe at large, considers every object he perceives, not individually, but as a part of one harmonious whole.”⁹ Cullen was part of this second class: “Such was the turn of Cullen's mind. The talent for arrangement was that which peculiarly distinguished him from the ordinary class of mortals; and this talent he possessed perhaps in a more distinguished degree than any other person of the age in which he lived.”¹⁰ Anderson had earlier linked this same talent—this ‘turn of Cullen’s mind’—to the popularity and success of his lectures: “His singular talents for arrangement, his distinctness of enunciation, his vivacity of manner, and his knowledge of the science he taught, rendered his lectures interesting to the students, to a degree that had been till then unknown at that university. He became, therefore, in some measure adored by the students.”¹¹ Anderson’s explanation of Cullen’s teaching prowess, like Thomson’s, was rooted in peculiar features of Cullen’s personality.

Thomson and Anderson express little interest in Cullen’s identity as a teacher, beyond referring it to his personality. There is some undoubted truth to these claims, but this kind of explanation does not withstand scrutiny. It is akin to saying that Cullen was a great teacher because he was born that way, and this, in turn, shuts off inquiry. Ultimately, it is not a very satisfying historical explanation.

So I want, instead, to reopen this inquiry and ask a different, perhaps more fruitful question: how did Cullen *form* his teaching identity? I will assume that it was not simply an extension of his personality but a skill that he honed over time for

⁸ Anderson would later become known as a political economist with a particular interest in agriculture, and he published many works on a variety of subjects. He also became a friend and confidante of Jeremy Bentham’s (who, incidentally, was an admirer of Cullen’s nosology). For more on James Anderson, see C. F. Mullett, “A Village Aristotle and the Harmony of Interests: James Anderson (1739-1808) of Monks Hill”, *The Journal of British Studies* 8, no. 1 (1968): 94-118; and Rosalind Mitchison, “Anderson, James (1739–1808)”, *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/475>, [Accessed 30 July, 2014].

⁹ James Anderson, “Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh, Continued From Page 56”, *The Bee, or Literary Weekly Intelligencer* 1, Jan. 26 (1791): 122.

¹⁰ *Ibid.*, 122.

¹¹ James Anderson, “Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh”, *The Bee, or Literary Weekly Intelligencer* 1, Dec. 22 (1790): 8.

particular purposes. There is an intriguing observation in Anderson's account of Cullen to this effect, if read in a way contrary to Anderson's intent. Anderson writes (my italics): "The adoration which generous conduct excites, is the reward which nature hath appropriated exclusively to disinterested beneficence. This was the *secret charm* that Cullen ever carried about with him, which fascinated such numbers of those who had intimate access to him. This was the *power* which his envious opponents never could have an opportunity of feeling."¹² This is suggestive if we consider Cullen's teaching prowess to be just such a 'secret charm' or 'power' that Cullen used to achieve his interests, whether those were obtaining a more prestigious academic position or attracting more students to his courses, thereby increasing his income. The point is that if we think of Cullen's teaching identity as just that—an identity that he developed and enacted depending on the context—then a new path of inquiry opens up. We can now ask, first, what were the notable features of this pedagogical identity? Second, what resources or pedagogical models were accessible for him to use, when he began to develop his teaching persona?

Notable Features of Cullen's Pedagogical Persona

Before we can say anything meaningful about Cullen's pedagogical identity, we need to know what its most significant features were. What did his students and contemporaries find noteworthy about his approach to teaching? And what can we say about these features as a whole?

I discuss a handful of the most significant features below. Taken together, they show that Cullen's pedagogical approach was innovative and heterodox, at least compared to some of his colleagues. And they exhibit his desire to make his lectures familiar and accessible to his students—something not to be taken for granted in eighteenth-century medical education. In short, he paid acute attention to the needs of his pupils, and in doing so, won their praise and support, which could be used to further his own professional interests.

¹² James Anderson, "Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh, Continued From Page 10", *The Bee, or Literary Weekly Intelligencer* 1, Jan. 12 (1791): 45.

One innovation Cullen adopted quite early on in his Glasgow days was his decision to teach in English rather than Latin. While this was not unheard of, it was not the norm either, especially in Edinburgh. In fact, when Cullen later moved to the capital, some of his detractors questioned his Latin fluency. After noting that Cullen delivered lectures on a number of subjects at Glasgow, one anonymous critic scoffed:

Bye the bye, I cannot help observing here, how much you are to blame in not informing us, in what language these Lectures were given. Here they are delivered in Latin, to the study of which, I am told, you have applied, since your setting in this town; so far undoubtedly there is some merit in making up the deficiencies of youth. But as it seldom happens, that people in years are endowed with the gift of tongues, which they had not imbibed when young, it is to be regretted, that, in enumerating all your other accomplishments, this, which is said to be the key to science, is not once mentioned. Surely it was highly necessary to inform us with respect to this point, that we might the better judge what chance you had to draw Foreigners to this Class.¹³

Thomson may have had this particular passage in mind when he wrote that Cullen's decision to lecture in English rather than Latin "was considered by many as a rash innovation; and some, desirous to detract from his reputation, or not sufficiently aware of the advantages attending this deviation from established practice, have insinuated that it was owing to Dr Cullen's imperfect knowledge of the Latin that he was induced to employ the English language."¹⁴

Another characteristic feature of Cullen's teaching was his provision of private classes and meetings, beyond the official course on offer. Samuel Bard, a student from colonial America who studied at Edinburgh in the early 1760s (1762-65), described one of these private meetings in a letter to his father:

Doc:^r Cullen has lastly entertained me much by some private Lectures he gives to those who attend him for a second year; upon what he calls the chemical Pathology...what I greatly admire is y^e Manner in which he gives these Lectures, we are convened at his own house once or twice a Week, where after Lectering [*sic*] for one hour, we spend another in an easy Conversation upon the subject of the last evenings Lecture, & every one is

¹³ Anon, *A Letter From A Citizen of Edinburgh, to Doctor Puff* (Edinburgh, 1764), 11-12.

¹⁴ TLC, 1:28. Thomson goes on to show how baseless this accusation was. And Lawrence suggests that Whytt may have already been delivering some lectures in English when Cullen arrived there in 1756 (even if Rutherford, who held the Chair in Practice, did not). See Christopher Lawrence, "Medicine as Culture: Edinburgh and the Scottish Enlightenment" (PhD Thesis, University of London, London, 1984), 318.

incouraged [*sic*] to make his Remarks or Objections with the greatest freedom & Ease.

I can not help comparing [*sic*] him upon these Occasions to Socrates or some other of the ancient Philosophers surrounded by his admiring Pupils—it must certainly make him very happy, at least it must feed his Vanity, to see so many even from the Wilds of America crouding [*sic*] his Lectures, and listening to him with the greatest pleasure and attention—for he never speaks but you may see these emotions painted in the faces of allmost [*sic*] all his hearers & so universal a silence reigns, that was a pin to drop it would be distinctly heard.¹⁵

Cullen expressed a keen interest in his pupils' lives outside of academic settings as well. In fact, he was particularly known for the various ways in which he helped some of his poorer students deal with the cost of attendance. James Anderson described some of Cullen's generous acts in detail: "...he was at all times singularly attentive to [his pupils'] pecuniary concerns. From his general acquaintance among the students, and the friendly habits he was on with many of them, he found no difficulty in discovering those among them who were rather in hampered circumstances, without being obliged to hurt their delicacy in any degree."¹⁶ For example, with respect to course payment, Cullen:

often found out some polite excuse for refusing to take payment for a *first* course, and never was at a loss for one to an after course. Before they could have an opportunity of applying for a ticket, he would sometimes lead the conversation to some subject that occurred in the course of his lectures; and as his lectures were never put in writing by himself, he would sometimes beg the favour to see their notes, if he knew they had been taken with attention under a pretext of assisting his memory: Sometimes he would express a wish to have their opinion of a particular part of his course, and presented them with a ticket for that purpose: and sometimes he refused to take payment, under the pretext that they had not received his *full* course the preceding year...Thus, he not only gave them the benefit of his own lectures, but by refusing to take their money, he also enabled them to attend those of others that were necessary to complete their course of studies...it was a general rule with him, never to take money from any student for more than two courses of the same set of lectures, permitting him to attend these lectures as many years longer as he pleased, *gratis*.¹⁷

¹⁵ NYAM, *Bard Collection, 1760-1820*. Letter from Samuel Bard to his father John, February 4, 1764. 1v-2r. In some secondary works which quote this passage, the phrase 'at least it must feed his Vanity' is not included. It is crossed out, in pencil, in the actual letter, but this has clearly been done by some later editor—not Bard himself. I have quoted the original as written (cf. Whitfield J. Bell, Jr., "Some American Students of 'That Shining Oracle of Physic,' Dr. William Cullen of Edinburgh, 1755-1766", *Proceedings of the American Philosophical Society* 94, no. 3 (1950): 275-281.)

¹⁶ Anderson, "Cursory Hints, Jan. 12, 1791", 47.

¹⁷ *Ibid.*, 47-8.

Cullen's manner of lecturing was also noteworthy. As mentioned, he lectured in English instead of Latin, but he also abandoned the traditional method of reading from written lectures. He seems to have made this decision near the beginning of his teaching career—along with using English as the language of instruction—as made plain by his own notes that have survived from what is likely his very first lecture as a teacher at the University of Glasgow in 1746 (the notes are dated November 4th and 5th, 1746): “Another particular to be noticed / The Want of written Lectures / These might be more correct in / diction & fluent in the Stile [*sic*] / But they would have taken up too / much time otherways usefull / I Shall be as correct as possible / but perhaps a familiar Stile [*sic*] / more agreeable than a formal one / & the delivery more fitted to com- / mand attention.”¹⁸

Another deviation from traditional practice that Cullen highlights in these early lectures is his reluctance to follow a medical textbook very closely: “For Securing attention a text / usefull The only tolerable one / Dr Boerhaaves which I Shall / frequently explain / But for several reasons I Shall / not follow it exactly / Boerhaave himself gives a very / good reason / I ought to give a text my self / but shall not attempt it till / after a little more experience / in teaching / In the mean time I Shall endeavour / to Supply it by an easy clear order & me- / thod So that the want of a text may be less felt.”¹⁹ Interestingly, we might note a particular that Cullen does *not* highlight here: his use of English. He did not feel the need to defend his use of it, which suggests it was not particularly unusual to teach in English at Glasgow in 1746. Francis Hutcheson and William Leechman, among others, had been lecturing in English for years before Cullen took up his post. The situation was almost certainly otherwise at the more cosmopolitan Edinburgh, where there was an

¹⁸ CUL/2/1/10, near the beginning of the volume (the RCPE volumes of Cullen's handwritten notes are not paginated).

¹⁹ CUL/2/1/10, at the beginning of the volume ('Monday Nov^r 4th 1746'). Incidentally, Thomson does this passage less than justice. He writes that Cullen “explained to his audience his reasons for not adopting as textbooks the Institutions and Aphorisms of Boerhaave, works which were then very generally employed for that purpose in the different medical schools of Europe. While he acknowledged the great merit of these writings, he pleaded, as an apology for this innovation, the example of Boerhaave himself...” (TLC, 1:26-7). But this seems too strong: from above, we can see that Cullen was merely apologising for not following Boerhaave as closely as usual. He would still use Boerhaave as a text in his class, even if he felt obliged to ‘frequently explain’ it.

assumption of ‘drawing Foreigners’ to the classes and thus a need to teach in the more universal language of Latin.

Cullen would often elucidate his lectures with printed handouts and syllabi that consolidated a lot of the points he made, or intended to make, in his lectures. Some of these found their way into Cullen’s printed textbooks. It would be going too far afield to explore this here, but Cullen certainly appears to have devoted considerable time and energy to developing pedagogical handouts.²⁰ One comes across numerous examples of structured, sometimes lengthy handouts that Cullen prepared for his students so that they could better understand his lectures. To give but one example: For his *Institutions of Medicine* course, Cullen prepared a lengthy outline of his discussion of Therapeutics, the third part of the course.²¹ It covered the means of preventing and curing diseases, including his ‘Scheme of Particular Indications’. He touches upon the use of astringents, resolvents, tonics, stimulants, expectorants, lithontriptics, and many other therapeutical indications. The detailed discussion in his lectures would have been much easier to follow with a printed outline like this in hand. In short, I suspect that a more extensive review of Cullen’s pedagogical handouts, especially in medicine, would add to our view of him as a particularly innovative and student-focused teacher, though we would, to be sure, need to compare Cullen’s efforts with those of his colleagues and predecessors.²²

Cullen’s lively and familiar style of lecturing was another feature of his pedagogical persona. James Anderson left us a description of the general tenor of Cullen’s lectures. They:

²⁰ I have already noted, in my review of the historiography, some discussions of this, with respect to chemistry, in the Cullen literature. See, e.g. Crosland, “Use of Diagrams”; Crellin, “William Cullen: His Calibre As a Teacher”; and Taylor, “Disciplinary Common Ground”. The same attention has not yet been focused on Cullen’s pedagogical innovations in his medical lectures, though they were likely as influential.

²¹ There are likely multiple copies of this handout extant, but one of them—with Cullen’s handwritten commentary and emendations, no less—can be found near the end of CUL/2/1/15 and is entitled ‘*Institutions of Medicine. Part III.*’ It is 35 pages in length.

²² For more examples of Cullen’s handouts and prepared syllabi, consult the following: MS Cullen 1069, CUL/2/2/8, pp. 197-8, and for a particularly interesting example, as it has to do with Cullen’s ontology of matter (his ‘Hypothesis for the Attraction of Cohesion’), see the insert at YML, Inst., 1:37-38.

were delivered *viva voce*, without having been previously put into writing, or thrown into any particular arrangement. The vigour of his mind was such, that nothing more was necessary than a few short notes before him, merely to prevent him from varying from the general order he had been accustomed to observe. This gave to his discourses an ease, a vivacity, a variety, and a force, that are rarely to be met with in academical discourses...In consequence of this unshackled freedom in the composition and delivery of his lectures, every circumstance was in the nicest unison with the tone of voice, and expression of countenance, which the particular cast of mind he was in at the time inspired.²³

Another Edinburgh student, Gilbert Blane (1749-1834), who studied at the University of Edinburgh in the late 1760s and early 1770s, described some of his memories of Cullen to John Thomson in a letter written near the end of his life.²⁴ He emphasises, especially, Cullen's *manner* of teaching:

Further, the Medical world do not seem truly aware of how much they owe to the singular excellence of the personal Manner in which he imparted his doctrines viva voce for so long a series of years to his numerous auditores [*sic*] and through them to all quarters of the world...it is only by dint of what I have called manner that the attention of pupils can be kept up. And how different were those lively improvisors those extemporaneous exemplifications and illustrations so happily introduced by Dr C[ullen] particularly in his clinical lectures, how different, I say, from the manner of those dry and didactic praelectors who with their eyes slavishly fixed on their Manuscript ran the risk of lulling their auditors to sleep by their monotonous hum void of all emphasis or expression of mental erudition.²⁵

Here Blane refers to other 'dry and didactic' teachers that simply read from manuscripts to their students, which was in contrast to Cullen's easy, familiar *viva voce* style of teaching. It is not clear who Blane had in mind, but a lively lecturer could not be taken for granted. Even the great Robert Whytt, according to David Skene, did not have a good reputation for his lectures, for "as far as I can hear, I

²³ Anderson, "Cursory Hints, Jan. 26, 1791", 124-5.

²⁴ After graduating from Edinburgh, Blane eventually served with distinction as a physician and surgeon in the Royal Navy, especially in the West Indies. He was particularly notable for authorising the distribution of lemon juice to all seamen in 1795, in order to combat scurvy. For more on Blane, see J. Wallace, "Blane, Sir Gilbert, first baronet (1749-1834)", *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/2621>, [Accessed 30 July, 2014]; R. D. Leach, "Sir Gilbert Blane, Bart, MD FRS (1749-1832)", *Annals of the Royal College of Surgeons of England* 62, no. 3 (1980): 232-239; N. A. M. Rodger, "Medicine and Science in the British Navy of the Eighteenth Century," in *L'Homme, La Santé Et La Mer: Actes Du Colloque International Tenu À L'Institut Catholique De Paris Les 5 Et 6 Décembre 1995*, ed. Christian Buchet (Paris: H. Champion, 1997); and *British Military and Naval Medicine, 1600-1830*, ed. Geoffrey L. Hudson, Wellcome Series in the History of Medicine, (Amsterdam: Rodopi, 2007), Ch. 8.

²⁵ MS Cullen 451, 1r-1v & 2v. The letter is dated July 28th, 1828.

would be giving him 3 Guineas for reading over Haller; which may be cheaper done at home.”²⁶

In any case, Blane praised Cullen as “the most popular professor of my time” and thought his manner of teaching allowed him to secure “the personal affection as well as respect of his auditors and those minds must have been strangely constituted which could not be inspired with these feelings towards one whom they saw and heard to be animated by the most sincere and ardent desire of promoting their best interest, and those of society.”²⁷

To summarise, some of the most notable features of Cullen’s teaching identity were his use of English instead of Latin as the language of instruction; his provision of private classes and meetings, in addition to his usual course; his generosity towards students who may have had financial difficulties; his use of oral lectures in a clear, familiar style that was lively (‘viva voce’), precise (‘artless elocution’) and engaging, and which did not necessarily stick closely to a textbook (until he published his own); his pedagogical handouts; and his ability to illicit ‘the personal affection as well as respect’ of those who attended his lectures. Taken together, these features show Cullen to have been an innovative and particularly accessible teacher in the eyes of his students. He would put this skill to good use, in order to advance his career.

The Pedagogical Model

But before we get to questions of use, one might wonder how Cullen became the popular and innovative teacher he was known to be. One way of pursuing this is to ask: what resources or models were available to Cullen when he first began to teach in Glasgow in the 1740s? Because a number of Cullen’s pedagogical innovations were ones he adopted fairly early, we should really be looking to his time in Glasgow rather than Edinburgh to pinpoint their origins. And once we do that, an

²⁶ Quoted in Lisa Rosner, *Medical Education in the Age of Improvement: Edinburgh Students and Apprentices 1760-1826* (Edinburgh: Edinburgh University Press, 1991), 51.

²⁷ MS Cullen 451, 2v.

obvious, influential model presents itself: Francis Hutcheson (1694-1747), the occupant of the Chair of Moral Philosophy at the University of Glasgow. There are, in fact, striking parallels between Hutcheson's and Cullen's manner of teaching.²⁸

First, according to Hutcheson's biographer, William Robert Scott, "Hutcheson, instead of confining himself to an oral commentary in Latin upon some scholastic text-book, inaugurated a new method of lecturing in English and he covered the whole field of 'Natural Religion, Morals, Jurisprudence and Government,' in the five daily lectures he gave each week."²⁹ Hutcheson also held private classes, as Cullen was to do, "which were largely attended by 'tradesmen and youths from the town' . . ."³⁰ This appears to have been something that "most of the other professors" at Glasgow were inclined to do as well.³¹ Cullen would thus have had a number of different models for this practice.

Hutcheson's general approach to teaching was revelatory. Scott writes that "He was in the habit of walking up and down 'in the arena of the room' as he spoke. Since his elocution was good and his voice and manner pleasing, he raised the attention of his hearers at all times. . . . Leechman . . . mentions that 'his happy talent of speaking with ease, with propriety and spirit, rendered him one of the most masterly and engaging teachers that has appeared in our age' ."³²

In fact, if we read Leechman's life of Hutcheson, we see even more similarities between the teaching style and practices of the two men. Leechman tells us that Hutcheson "took a peculiar delight in assisting worthy young men, in

²⁸ I am not the first to notice this. J.D. Mackie, in a chapter on Glasgow University in the eighteenth century, wrote about Hutcheson, "Not only did he handle his subject with a wide tolerance, but he paid little attention to his notes, walked up and down (Thom called him the 'ambulatory Professor'), and spoke in English. Cullen taught in English too, and very soon the practice of lecturing in Latin ceased." See J. D. Mackie, "Glasgow University in the Eighteenth Century," in *An Eighteenth Century Lectureship in Chemistry: Essays and Bicentenary Addresses Relating to the Chemistry Department (1747) of Glasgow University (1451)*, ed. Andrew Kent (Glasgow: Jackson, Son & Company, Publishers to the University, 1950), 33. Drawing upon Mackie's discussion, Donovan makes the link a bit more explicit. He writes, "Even in matters not directly related to academic subjects Cullen, like Hutcheson before him, generously assisted his students." See Donovan, *Philosophical Chemistry*, 65.

²⁹ William Robert Scott, *Francis Hutcheson: His Life, Teaching and Position in the History of Philosophy* (Cambridge: Cambridge University Press, 1900), 62-3.

³⁰ *Ibid.*, 63.

³¹ *Ibid.*, 63.

³² *Ibid.*, 64.

straightened circumstances, to prosecute their studies with his money, and admitting them to attend his colleges without paying the customary fees.”³³ This is exactly the kind of thing Cullen would later do with his own students, as we saw from James Anderson’s testimony. Hutcheson’s students, like Cullen’s, chose to attend his lectures repeatedly, “for four, five, or six years together, still fresh entertainment, tho’ the subject in the main was the same every season.”³⁴ Hutcheson was “fond of well-disposed youth, entering into their concerns, encouraging and befriending them on all occasions, [such that he] could not fail to gain their esteem and affections in a very high degree.”³⁵ Scott sums up the admiration Hutcheson won from his students in a way that could have equally been written about Cullen. Hutcheson “was not merely a brilliant, enthusiastic lecturer, but the earnest and far-seeing friend of the student outside the class-room. Either side of his character would have won him the respect, which the Scotch student always yields unsparingly to his Professor, but both together made him venerated by the young men throughout the University.”³⁶

Given these striking comparisons, and the fact that, as Cullen began his teaching career, Hutcheson’s example had been shining at Glasgow for almost twenty years (though Hutcheson died just two years later), it would have been a very accessible and influential pedagogical model for Cullen to draw upon when developing his own identity as a professor. I am not suggesting, however, that Cullen must have witnessed Hutcheson teaching or that there was anything beyond an indirect influence. Cullen was never a student of Hutcheson’s, and the amount of

³³ Francis Hutcheson, *A System of Moral Philosophy in Three Books; Written by the Late Francis Hutcheson, L.L.D* (London, 1755), xxvi.

³⁴ *Ibid.*, xxxiii-iv.

³⁵ *Ibid.*, xxxvii.

³⁶ Scott, *Francis Hutcheson*, 74.

time that they overlapped in Glasgow was fairly short.³⁷ Nonetheless, the Hutchesonian pedagogical model would have been accessible and influential when Cullen began his own teaching career, and I *am* suggesting that Cullen drew from it.

Of course, it is also possible that Cullen and Hutcheson were drawing jointly from another set of pedagogical norms that pervaded the Glasgow academic community at the time.³⁸ This is outside the scope of this chapter, but it is not hard to conjecture why Hutcheson and Cullen's teaching style became so popular in Glasgow at that time, given their constituency. Auditors in Glasgow would not have simply been sons of the nobility and landed class; in fact, a sizeable portion were middle-class students whose fathers were in the growing fields of industry and commerce.³⁹ Therefore, they may not have known Latin and would have thus appreciated courses taught in English. Accessibility and familiarity of style was well calculated to appeal to them. The context of Glasgow pedagogy was seemingly ripe for the manner of teaching that both Hutcheson and Cullen established. Be that as it may—no doubt this could be explored further—my point here is simply that we have

³⁷ Hutcheson died in 1746. There is circumstantial evidence, however, that shows Cullen had become close with the Hutcheson family, or at least Hutcheson's son, Francis, by 1748. Francis obtained his M.D. at Glasgow in 1750, under Cullen. There is a letter (MS Cullen 1200) from the young Hutcheson to Cullen, for instance, that describes his medical classes at Edinburgh in 1748 (he took classes there before obtaining his degree at Glasgow). Their correspondence continued for the rest of Cullen's life. It would not be surprising if Cullen had been on good terms with the senior Hutcheson himself. They overlapped in Glasgow for at least two years between 1744 and 1746, and it is possible Cullen met him earlier when he obtained his M.D. at Glasgow in 1740. At the very least, they shared a lot of the same friends. It is not necessary to establish any direct, causal link between the two men for my argument to work, but it is an interesting, unexplored question.

³⁸ For discussions about Glasgow University in this period, see, especially, *Glasgow: Beginnings to 1830*, ed. Gordon Jackson and T. M. Devine (Manchester: Manchester University Press, 1995), Chs. 2, 7 & 9; *The Glasgow Enlightenment*, ed. Andrew Hook and Richard B. Sher (East Linton: Tuckwell Press, 1995), Chs. 1-3 & 6; Roger L. Emerson, "Medical Men, Politicians and the Medical Schools at Glasgow and Edinburgh 1685-1803," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993); and Mackie, "Glasgow University". For some anecdotes about University life during the period, see David Murray, *Memories of the Old College of Glasgow: Some Chapters in the History of the University* (Glasgow: Jackson, Wylie and Co., 1927); and James Coutts, *History of the University of Glasgow, 1451-1909* (Glasgow: James Maclehose and Sons, 1909), Chs. 3 & 5.

³⁹ Although the data are certainly imperfect, Mathew's study of the backgrounds of Glasgow University students suggests that in the 1740s the three most prevalent occupations of fathers of matriculated students were 'Nobility and Landed' (32%), 'Industry and Commerce' (26%) and 'Church' (16%). Within the second group, the majority were middle class (96%). Mathew compares these figures with those of Cambridge—not just in the 1740s but throughout the eighteenth century—and concludes that "Glasgow was drawing in a much wider range of classes and occupations..." (82). See W. M. Mathew, "The Origins and Occupations of Glasgow Students, 1740-1839", *Past & Present*, no. 33 (1966): 74-94.

found a very plausible set of pedagogical norms that Cullen likely drew upon to develop his own teaching style and practice.

There is an interesting implication to the argument above. Although Cullen's teaching style and pedagogical approach were criticised and resisted upon his move to Edinburgh, they were eventually assimilated to such an extent that Cullen's manner of teaching came to represent, to later observers like James Anderson, the superiority of Edinburgh medical education. The Edinburgh Medical School flourished, while its rivals (including Glasgow) floundered, precisely because it could attract teachers of Cullen's calibre. But what this obscures is how much the Edinburgh Medical School actually owes to its rival in the West. For what Cullen did was to import the Hutchesonian pedagogical ideal (from moral philosophy) into the pedagogical environment of the Edinburgh Medical School.⁴⁰ This means that what has long seemed, post-Cullen, to be typical of Edinburgh medical education was in fact a Glaswegian innovation.⁴¹

II. Promotion, Prestige, & Student Advocacy

We now have a better understanding of how Cullen may have begun to develop his own teaching persona: he was surrounded by the success of the Hutchesonian pedagogical model at Glasgow and may have been inspired to model his teaching style on that foundation. And his manner of teaching was both innovative and extraordinarily attuned to the demands of his students. This is the *how*; what can we say about the *why*?

It is by no means straightforward to pin down what Cullen's motivations were for shaping his pedagogical persona in the way he did. And I think it would be too conjectural to speculate about them, especially because he developed his teaching

⁴⁰ We could further complicate the story by noting that Hutcheson himself was not a Glaswegian but from Ulster (although he did spend his formative educational years at Glasgow University). For more on the life of Hutcheson, see Scott, *Francis Hutcheson*.

⁴¹ Lawrence, for instance, has called Cullen "the personification of Enlightenment Edinburgh." See Christopher Lawrence, "The Nervous System and Society in the Scottish Enlightenment," in *Natural Order: Historical Studies of Scientific Culture*, ed. Barry Barnes and Steven Shapin (London: Sage, 1979), 26.

style while a new lecturer in Glasgow, and our documentary evidence for this period of his life is far from robust. Instead, a more promising query is to ask about some of the things that Cullen's pedagogical identity allowed him to do, or claim about himself. How did Cullen take advantage of his popularity as a teacher? For what purposes did he put his popularity to use?

In what follows, I argue that Cullen's uses for his pedagogical identity were, at the very least, a mix of pecuniary and social concerns, with an emphasis on the latter. I suggest that Cullen was less interested in the higher fees he obtained from the popularity of his courses and more enamoured by the respect that came along with successively prestigious academic positions, e.g. the most senior academic position at the Edinburgh Medical School, the Chair in the Practice of Physic. And to be chosen for this position, he knew the overwhelming support of the medical students themselves would prove powerful. Indeed, he even had a hand in shaping their advocacy of his promotion. Thus, his pedagogical identity allowed him to secure prestige and professional advancement via the power of the students, even in the face of significant opposition.

Pecuniary Concerns

Before seeing how Cullen took advantage of his popularity with his students, it is important to consider the pecuniary benefits that Cullen may have reaped by becoming such a beloved teacher. It is significant that Edinburgh professors, like Cullen, were paid directly by the pupils that attended their courses. Thus, the more popular Cullen's courses were, the more income he generated. Some historians have taken this as a convincing explanation for why Cullen had an incentive to become the innovative and popular teacher that he was: it was in his economic interest to do so, and he was rewarded for it.

Without specific reference to Cullen, J.B. Morrell, in his excellent discussion of the academic structure of science at the University of Edinburgh, writes that the holders of scientific and medical chairs at Edinburgh "were generally encouraged by

the class fee arrangement to increase their exertions, especially in teaching and publication.”⁴² Donovan suggests something similar.⁴³ But Golinski provides the most forceful articulation of this explanation. He argues that when Cullen first arrived in Edinburgh, he would not have had a big private practice, so he was “almost entirely dependent on student fees for his livelihood,” and therefore “the ability to attract a large audience was clearly essential.”⁴⁴ He was successful, in these early years teaching chemistry, by “satisfying the needs of these medical students, by teaching chemistry ‘as it may best answer the purpose of students of physic’, while at the same time expanding his audience to encompass men from outside the university with a cultural or commercial interest in the subject.”⁴⁵ Golinski’s implication is clear: Cullen catered his teaching style to attract as large an audience as possible for the purposes of earning more income.

As appealing as this explanation seems, it is unclear how strong this economic incentive was. Golinski himself, in a later work, seems to suggest otherwise by placing more emphasis on the income generated by private practice. He writes that medical faculty members “continued to rely on private practice for a significant part of their incomes and still depended on aristocratic patronage for appointments and preferment. They thus remained closely involved in a public intellectual culture that extended well beyond the bounds of the university.”⁴⁶ True, Cullen may have had little private practice when he got to Edinburgh and may have thus been more dependent on student fees. But he did not, on account of this, change his pedagogical style—a persona he developed years earlier while a new lecturer in Glasgow.

To establish Cullen’s economic incentive to attract a very large audience, we would need to show that student fees were a substantial part of Cullen’s income.

⁴² J. B. Morrell, “The University of Edinburgh in the Late Eighteenth Century: Its Scientific Eminence and Academic Structure”, *Isis* 62, no. 2 (1971): 170-171.

⁴³ Donovan, *Philosophical Chemistry*, 65-66.

⁴⁴ J. V. Golinski, “Utility and Audience in Eighteenth-century Chemistry: Case Studies of William Cullen and Joseph Priestley”, *The British Journal for the History of Science* (1988): 5.

⁴⁵ *Ibid.*, 5.

⁴⁶ J. V. Golinski, *Science As Public Culture: Chemistry and Enlightenment in Britain, 1760-1820* (Cambridge: Cambridge University Press, 1992), 15.

There is little firm data on this, but circumstantial evidence suggests that Cullen was, in general, much more reliant on income from private practice than on student fees.⁴⁷ Cullen's decision to move to Edinburgh, for instance, had more to do with developing a wide and lucrative private practice than it did with acquiring a teaching position. In 1751 he wrote from Glasgow to his former pupil and friend, William Hunter:

This leads me to tell you that, I am quite tired of my life. I have a good deal of Country Practice which takes up a great deal of time and hardly ever allows me an hour's leisure. I get but little money for my labour and indeed by Country Practice with our payments a Man cannot make money as he cannot overtake a great deal of business. On this account I have some thoughts of accepting of a proposal that was lately made to me of removing to Edinburgh. Dr. Plummer, Professor of Chymistry [*sic*] is a very rich man, has given up practice and had proposed to give up his teaching in favour of Dr. Elliot...As the income of that office cannot be very considerable and my success in the way of practice is uncertain I have hesitated about agreeing to their proposal...⁴⁸

Likewise, in Lord Kames' efforts to convince Cullen to move to Edinburgh, he especially highlights the possibility of a full private practice: "In all appearance you cannot fail of coming soon into business here...Dr Dundas had a world of Business not only in the town but in all the towns about it. You may naturally take his place till multiplicity of Business confine you within the City."⁴⁹

In both Cullen's letter of 1751 and Kames' of 1754, the overriding concern, at least financially, is the prospect of a lucrative private practice. Student fees were not a particularly significant financial consideration for Cullen, in the context of his move to Edinburgh.

⁴⁷ Rendall has made perhaps the only concrete estimates for Cullen's annual income, starting in the 1770s. She estimates about £920 per annum, plus publication income. See Jane Rendall, "Medicine, Politics, Gender, and the Reputation of William Cullen (1710-1790)" (Unpublished paper, November 26, 2012), Appendix B. We may soon have more reliable data on the income generated by Cullen's private practice—at least his consultation by post—with the completion of the AHRC-funded Cullen Project (<http://www.cullenproject.ac.uk/>), under the leadership of David Shuttleton at Glasgow University. Other estimates of income can be inferred from the appendices in Roger L. Emerson, *Academic Patronage in the Scottish Enlightenment: Glasgow, Edinburgh and St Andrews Universities* (Edinburgh: Edinburgh University Press, 2008); and Rosner, *Medical Education*. The tables in Morrell (1971) are also worth consulting for comparison.

⁴⁸ MS Cullen 185, 1v-2r. This MS is actually a transcript, in (possibly) William Thomson's handwriting, of the original letter by Cullen. The original letter is not in the GUL or RCPE collections.

⁴⁹ MS Cullen 1145, 1r (September 17, 1754).

A more important consideration had to do with the prestige he would acquire by obtaining more senior academic appointments, especially at Edinburgh. Thus, Cullen's ability to attract a large audience—his popularity as a teacher—had less to do with pecuniary reasons and more to do with the leverage this gave him with the Town Council, and other patrons, when it came time to being considered for academic promotion. Golinski recognises this, when he writes that “Cullen clearly succeeded in satisfying the needs of this diverse constituency [of students and auditors], and by doing so contented the Edinburgh Town Council. The Council, in whose power the appointments to all medical chairs lay, had a distinct interest in a professor's teaching abilities...It was therefore important for Cullen to convince the Council as well as potential students of his talents as a lecturer.”⁵⁰

Cullen's ability to influence the Town Council and other interested parties on account of his teaching prowess is well illustrated by his long, frustrating but ultimately successful attempt to obtain the Chair of the Practice of Physic at Edinburgh, which we consider next.

The Lure of Prestige

Cullen was an astute observer of, and influential player in, the political machinations of academic appointments at Edinburgh. To provide an early example: after he was controversially appointed by the Edinburgh Town Council in 1756 to Dr. Plummer's position as Professor of Chemistry, there was an outcry by some of the other professors, who felt that they had not been sufficiently consulted. Some even hinted that Cullen would not be admitted to the Academic Senate, on account of this. In response, Cullen drafted a Memorial explaining the legal basis for the Town Council's decision, as well as the inadmissibility of being rejected by the Academic Senate, after being chosen by the Council. In short, he was a careful student of the workings of academic appointments at Edinburgh.⁵¹

⁵⁰ Golinski, “Utility and Audience”, 5.

⁵¹ See MS Cullen 74, where these issues are discussed. This Memorial does not appear to be in Cullen's own handwriting, but it was in his possession, and other versions of it that are extant (e.g. MS Cullen 714/16) strongly suggest that Cullen was ultimately responsible for its content.

We too must have a basic grasp of how appointments were conducted at Edinburgh before we can understand Cullen's attempt to obtain the Chair of the Practice of Physic, almost ten years later. Therefore, I will discuss, first, how Edinburgh Medical School appointments generally worked at Edinburgh. Second, I will re-examine Cullen's long and controversial campaign—called by one of his pupils the “Great Affair”—to obtain the Practical Chair at Edinburgh. This controversy illustrates that Cullen knew the value of his pedagogical identity and used it to increase his chances of academic promotion. The promise of greater prestige and status that this would afford him was, I suggest, a more enticing reward than the pecuniary benefits he gained from having more students.

Medical Appointments at the University of Edinburgh

The appointment of professors to posts at the Edinburgh Medical School differed significantly from the process at other Scottish universities. The primary difference was that the legal patron of the University was the Edinburgh Town Council, not a Master of the College or a Dean of the Faculty.⁵² Securing the approval of the Town Council was thus a precondition to obtaining an appointment.⁵³

Yet the Town Council—or, rather, its representatives and baillie—rarely chose the candidates. This was usually done through the traditional channels of patronage, with input from the relevant corporate bodies and interested parties. Emerson summarises the complex web of various constituencies that could be involved in the process: “Surgeons and physicians, like writers and advocates, had corporate interests to protect. So too did the University and the town as the numbers of medical students increased to become of great economic importance...Students from time to time also influenced appointments, as did men who taught extramurally...However,

⁵² Emerson has compared the appointment process at the different Scottish universities (see, especially, Emerson, *Academic Patronage*, 11-13.)

⁵³ Morrell has highlighted this feature of appointments at Edinburgh. See J. B. Morrell, “The Edinburgh Town Council and Its University, 1717-1766,” in *The Early Years of the Edinburgh Medical School*, ed. R. G. W. Anderson and A. D. C. Simpson (Edinburgh: Royal Scottish Museum, 1976), 46-47.

as with the law chairs, the Town Council exercised little independent judgement and did not really pick the appointees.”⁵⁴

Given this complex process, a professor who wished to be promoted, or to secure any kind of academic appointment, usually needed, to begin with, the support of a patron.⁵⁵ With suitable patronage, the Town Council was likely to agree to the appointment, unless a powerful corporate body, like the Royal College of Surgeons, the Royal College of Physicians, or even, increasingly, the medical students, objected. The wishes of the medical faculty were clearly important as well. Anyone hoping to navigate the appointment process, then, would have been advised to obtain the support of as many of these groups as possible.

We need not untangle the importance of these various interests; obviously some were more important than others, and the details of any particular appointment depended on a host of factors. What I wish to show, in my discussion of the Great Affair below, is how Cullen’s knowledge of this complex appointment process allowed him to exploit his popularity as a teacher. In particular, Cullen was attune to the value of having the support of the body of medical students. For, as Emerson reminds us, medical education was a big business in Scotland at the time of Cullen: “The towns derived a lot of money from university students and were concerned with the reputation of their colleges and the quality of the men appointed to teach.”⁵⁶ And while the Town Council may have simply taken the advice given to it by powerful and prominent medical men and patrons, it was still clear to everyone “that the prosperity of the city depended heavily on the reputation of the medical school, which could be kept up only through the appointment of good men.”⁵⁷ It was this reality that Cullen so deftly exploited in his own battle to obtain the Practical Chair.

⁵⁴ Emerson, *Academic Patronage*, 273.

⁵⁵ Emerson emphasises the influence of ‘men of power’ in calling the shots for appointments at Edinburgh, even though the Town Council had to agree to sign the necessary papers: “At Edinburgh the situation was much more complex. The Town Council was the legal patron to most chairs, with the Crown naming to others...A legal right to appoint was never a guarantee that the legal patron would in fact choose the person appointed, only that he would in the end sign the necessary appointment papers. The ‘men of power’ called most of the shots.” See *Ibid.*, 13.

⁵⁶ *Ibid.*, 532-3.

⁵⁷ *Ibid.*, 304.

The Great Affair

From 1764 to 1769 Cullen, with the help of his supporters, attempted to obtain the most prestigious and valuable academic appointment at the University of Edinburgh medical school, the Chair in the Practice of Physic. He seems to have coveted the position for quite some time. Shortly after Cullen had obtained the joint appointment for the Practical Chair in 1769, Cullen's eldest son, Robert, told a friend that "I am pleased with it upon many accounts but none more than that I think it will render the remainder of my Father's life more agreeable to him. It is the Object he has long had his heart set upon, which he has been often disappointed of & which he has at length attained, with out the aid of any interest whatever, in spite of the envious artifices of his Enemies."⁵⁸

Robert Cullen was not right, however, in saying that Cullen obtained the position without the help "of any interest whatever." First, although Cullen did not obtain the position via traditional channels of patronage, it was not through lack of trying. We know that he asked some of his close friends, like William Hunter, to use their influence in London to plead his case with powerful patrons—but to no avail.⁵⁹

But more to the point, the medical students themselves served as his 'interest'. For we know that the public support of his promotion by many medical students seems to have played a significant role in his success, especially once it became clear that he would not be able to win the support of political patrons. Their advocacy of his promotion was a powerful tool of which he took advantage. In fact, new evidence suggests that Cullen had a direct hand in the students' campaign to secure his promotion. Therefore, in reviewing the 'Great Affair' below, I highlight both the students' role in the controversy, as well as the influence of Cullen's teaching abilities in securing their support.

⁵⁸ RSL, CB/1/3/101, 1r-v (alternative classification: BLA.C.66). The letter is dated May 11, 1769. Bower, in his history of the university of Edinburgh, echoes this. Cullen, he wrote, "seems, from the very first, to have been very ambitious of obtaining the professorship of the practice of physic; and for a good many years to have principally directed his studies to that branch of the profession." See Alexander Bower, *The History of the University of Edinburgh. Vol. II* (Edinburgh: Alexander Smellie, 1817), 386.

⁵⁹ See Hunter's letters to Cullen, describing his efforts in this regard, especially MS Cullen 1147 & 1149.

Phase 1: 1764-April 1766

The jockeying for the Practical Chair began in earnest in 1764, when its current long-standing occupant, John Rutherford (1695-1779), indicated that he wished to retire and to choose his successor.⁶⁰

Sometime in the summer of 1764, Rutherford let people know he was thinking of resigning, and he initially proposed that Francis Home become his successor.⁶¹ But, despite some initial support from Lord Milton, Baron Mure, and John Hume, objections from the College were strong enough—and Home’s credentials too weak—for him to be accepted by the Town Council.⁶² Therefore James Stuart Mackenzie, Lord Bute’s brother and government manager of patronage posts in Scotland, switched his allegiance to Cullen’s candidacy later that year.⁶³ Despite this, Rutherford would still not resign in favour of Cullen.⁶⁴

The Cullen camp, growing frustrated, went public with their arguments for Cullen’s suitability for the job. In the *Address to the Citizens of Edinburgh* (1764), ostensibly written by an anonymous former pupil of Cullen’s, the writer argues for

⁶⁰ Rutherford was part of the group of physicians who began the teaching of medicine at the Edinburgh Medical School in the 1720s. Inspired by the example of Boerhaave (under whom he studied), he initiated the teaching of clinical medicine at Edinburgh at the Royal Infirmary in 1748. For more on Rutherford, see D’A. Power, “Rutherford, John (1695–1779)”, rev. Jean Loudon, *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/24363> [Accessed 30 July, 2014].

⁶¹ In confirmation of this, Lawrence cites a letter to David Hume from Hugh Blair. See Lawrence, “Medicine As Culture”, 317-18.

⁶² Emerson has printed Home’s petition to Lord Milton, seeking support. It is interesting for what he takes the relevant qualifications of the position to be. See Emerson, *Academic Patronage*, 304-5.

⁶³ *Ibid.*, 305.

⁶⁴ Why did Rutherford have so little respect for Cullen? Two possibilities stand out. First, he seems to have rejected Cullen’s entire approach to medicine. Certainly the two men, coming from different generations, would not have agreed about the importance of a Boerhaavian system of medicine (Rutherford was Boerhaavian; Cullen was not). Second, there are also some hints that Rutherford was suspicious of Cullen’s unorthodox religious faith (I explore this near the end of the next chapter). The Rev. Alexander ‘Jupiter’ Carlyle (1722-1805), who was a student in Edinburgh in those days, captured both of these possibilities, at least implicitly, when he recalled in his autobiography that “Dr. Rutherford, Professor of the Practice of Physic, beginning to fail, and being afraid of Cullen becoming his successor, whom he held to be an heretic, he readily entered into a compact with Gregory, whom he esteemed orthodox in the medical faith, and resigned his class to him.” See Alexander Carlyle, *Autobiography of the Rev. Dr Alexander Carlyle, Minister of Inveresk, Containing Memorials of the Men and Events of His Time*, ed. John H. Burton (Edinburgh: William Blackwood and Sons, 1860), 460-1.

Cullen's qualifications by noting his experience and popularity as a teacher.⁶⁵ Cullen had taught for ten years at Glasgow and "the school of physic there owed its birth entirely to him."⁶⁶ At Edinburgh, thus far, Cullen's reputation led to a great increase in the number of students in chemistry.⁶⁷ Indeed, Cullen's prowess as a teacher was already well-known throughout the city.⁶⁸

Perhaps this is why the students of medicine, according to the writer, desire "to have Dr *Cullen* as professor of practice, and Dr *Black* of chemistry. They have not indeed expressed this desire publicly, nor have I any commission to express it here; but I am certain they would readily do it, were they consulted; and I speak with confidence, as being daily conversant among them, and therefore well acquainted with their sentiments."⁶⁹

The writer emphasises the importance of the opinions of the students, for their sentiments "must influence their future conduct, and perhaps that of many others connected with them; I cannot doubt but that my fellow-citizens, and especially the patrons of the university, will pay that attention to them which they deserve."⁷⁰

This pamphlet is particularly interesting, for new evidence suggests that Cullen had a direct hand in its composition. What appears to be a few pages from an early draft of the *Address* survives in the Cullen collection at Glasgow University Library.⁷¹ While mere possession of this document is not enough to show Cullen's involvement, a close inspection reveals that some of the editorial corrections are in

⁶⁵ We may never know the extent to which Cullen played in role in composing these public addresses. But new evidence, discussed below, suggests he had a direct hand in some of them. In any case, I refer to the anonymous writers and supporters of his candidacy as the 'Cullen camp', without necessarily including Cullen himself.

⁶⁶ Anon, *Address to the Citizens of Edinburgh* (Edinburgh, 1764). This pamphlet appears to be very rare; neither Thomson nor Lawrence discuss it. It has not to my knowledge been digitised yet, but a copy can be found at NLS, Shelfmark 5.1113(36).

⁶⁷ *Ibid.*, 15.

⁶⁸ *Ibid.*, 16.

⁶⁹ *Ibid.*, 17-18.

⁷⁰ *Ibid.*, 18.

⁷¹ MS Cullen 1081. Besides the fact that the topic is the same as the address (Cullen's teaching qualifications), there is a similar line in both about the increasing number of students that have attended the Chemistry lectures, since Cullen began teaching. Compare MS Cullen 1081 to Anon, *Address to the Citizens of Edinburgh*, 15.

Cullen's own handwriting.⁷² Even if Cullen did not write it, he was directly involved in its composition. Therefore, it was not simply the unbidden plea of a former pupil of Cullen's, who had only the interests of the University in mind. It was, instead, a carefully crafted document—with Cullen's input and editorial advice—calculated to convince the public and the patrons of the University that Cullen was the most suitable candidate to fill the vacant chair of the Practice of Physic. And this calculated appeal places great emphasis on Cullen's popularity and success as a teacher of medicine.

It is unclear what effect this pamphlet had on the debates surrounding Rutherford's successor. But we do know that the Rutherford camp—or someone supportive of Rutherford—responded directly to it in another anonymous pamphlet, entitled *A Letter from a Citizen of Edinburgh, to Doctor Puff* (1764). The writer presumes, with some justification it now turns out, that Cullen himself was behind the *Address*, so he addresses his pamphlet to 'Doctor Puff', for "no body can be so credulous as to believe, that a pupil of your own, daily in your house, would publish any thing on a subject, in which you are so much interested, without first advising with you; or would rehearse facts, which happened many years ago, unless you had prompted."⁷³

The author responds directly to a number of claims made in the original *Address* about Cullen's teaching abilities. In a way, he turns them on their head. The author takes issue with the fact that Cullen had supposedly taught in every branch of Physic in Glasgow. And he also wonders about the propriety of Cullen's delivering lectures in English, for Latin was the language at Edinburgh. The students of Glasgow may have applauded the lectures, but citizens can only judge their merits if they had been published, which they have not.⁷⁴

⁷² For instance, the author initially wrote: "So much that last year his Lectures were attended by one hundred & forty five Students above three times the number that usually attended such lectures before his time." Cullen edited this to read: "The number of his Students has been every year increasing and last year his Lectures were attended by one hundred & forty five Students which is above three times the number that usually attended such Lectures before his time." See MS Cullen 1081, 1r.

⁷³ Anon, *Doctor Puff*, 4.

⁷⁴ *Ibid.*, 12.

Regardless of the controversy these pamphlets generated, Cullen and his supporters were not able to secure the Practical Chair at this time. Instead, in early 1766 Rutherford chose the Aberdonian physician John Gregory—a more worthy and less objectionable candidate than Francis Home. Rutherford finally resigned once James Stewart, the Lord Provost, agreed to back Gregory.⁷⁵

By this point, Cullen must have lost all hope of obtaining the Practical Chair for the remainder of Gregory's life. The Great Affair seemed to be over; he had lost.

Phase 2: April 1766-1769

But no sooner had the dust settled than Robert Whytt died on April 15 of that same year.⁷⁶ This opened up the Chair in the Institutes of Medicine. Cullen seems to have had misgivings about applying for it because he had to be convinced to do so. Certainly, switching Chairs meant a monetary sacrifice of sorts, for the number of chemistry students was greater than the number for the Institutes.⁷⁷ And he was also quite frustrated with the appointment process, after he had been snubbed for the Practical Chair.⁷⁸

Nonetheless, at least four of his medical colleagues—the elder and younger Monro, John Hope, and Thomas Young—hoped to convince him to accept the new position, especially as it would give him more time to spend on teaching clinical lectures at the Royal Infirmary. They sent him a letter—which was likely made

⁷⁵ Emerson, *Academic Patronage*, 305. Rutherford's resignation was officially ratified by the Edinburgh Town Council on February 12, 1766 and John Gregory was given an interim appointment. See Andrew Dalzell, *History of the University of Edinburgh From Its Foundation. Vol. II—History* (Edinburgh: Edmonston and Douglas, 1862), 436. Gregory was given a permanent appointment a month later on March 5, 1766. Consult AUL, MS 2206/7/8 for this Commission.

⁷⁶ Whytt died after a fit of coughing, though he had become steadily more ill since 1765, after his wife died. Roger French describes Whytt's final illness in Roger K. French, *Robert Whytt, the Soul, and Medicine* (London: Wellcome Institute, 1969), 12-13.

⁷⁷ It is tricky to estimate student numbers, but all estimates suggest that the number of students who attended chemistry lectures was greater than the number who attended the theory or Institutes of Physic lectures. Once again, see the appendices in Rosner, *Medical Education*, and Emerson, *Academic Patronage*.

⁷⁸ We do not have a letter by Cullen to this effect, but we do have letters from William Hunter to Cullen, empathising with his ill-treatment, as the affair dragged on. See, e.g. MS Cullen 1136, 1147 & 1149.

public—imploing him to consider the open position.⁷⁹ They argued that the vacancy left by the death of Dr. Whytt ought to be filled “by a physician of extensive genius, learning and established reputation, and who has given unquestionable proofs of his Talents as a teacher” and they were convinced that Cullen was the most qualified in these terms.⁸⁰ Thus they thought it “a duty they owe the Town, the University, the Students of Physic and themselves, to request of him, in this publick and not earnest manner, that he will resign the Profession of Chemistry, and offer himself, to the Honourable Patrons of this University, as a Candidate for the profession of the Theory of Physic.”⁸¹

They also noted that this would have the happy consequence of giving Cullen more leisure time—“freed from the burden of an experimental college, and which a person otherwise less engaged in business might prosecute wth [with] still greater benefit to the Art and to the students”—to dedicate to the clinical lectures at the Royal Infirmary.⁸² The professors were of the opinion:

that it woud [*sic*] be so much for the improvement of the Students, that he was engaged still farther in explaining to them this immediately useful & Practical part, and in pointing out to them the application of the Theory and principles of Medicine in treatment of the Sick, that they think it their duty to request of him also, that, on the event of his being elected Professor of the Theory of Physick, he will bestow as much time on the CLINICAL LECTURES as his other avocations will admit.⁸³

In short, just like the medical students, Cullen’s colleagues—at least the ones who supported him—cited his teaching abilities as a primary reason for him to switch to a new academic position.

Address of the Students of Medicine

Sensing an opening with the death of Robert Whytt, the Cullen camp made another public plea for Cullen’s suitability for the Practical Chair. This time, instead

⁷⁹ I have not come across a published version of this letter, but I think it very likely that one exists.

⁸⁰ MS Cullen 1168, 1r. This is a handwritten, formal document on a single folio.

⁸¹ *Ibid.*, 1r.

⁸² *Ibid.*, 1r.

⁸³ *Ibid.*, 1r.

of alluding to the wishes of the students of medicine in an anonymous pamphlet, medical students themselves signed and subsequently published a plea directly to the Provost of the University, advocating Cullen's promotion.⁸⁴ In their *Address of the Students of Medicine, to the Right Hon. the Lord Provost, Magistrates, and Town-Council of the City of Edinburgh* (1766), they argued that the death of Robert Whytt deprived them of an excellent 'Preceptor' and thus were "humbly of opinion, that the reputation of the University and Magistrates, the good of the City, and our improvement, will all, in an eminent manner, be consulted, by engaging Dr. GREGORY to relinquish the Professorship of the Practice for that of the Theory of Medicine, by appointing Dr. CULLEN, present Professor of Chemistry, to the Practical chair, and by electing Dr. BLACK Professor of Chemistry."⁸⁵ The students insisted that their own private interests coincided with the public good for "We have no private enmity to gratify, nor successful rival to oppose. Though we should profess to have been guided only by private interest, our private interest, in this affair, is intimately and inseparably connected with the publick good."⁸⁶

Sometime after their original address was approved and signed in late April, however, they became aware of another plan, suggested (they claimed) by the Professors of Medicine themselves, which they also found agreeable. In this scenario, Cullen and Gregory would be appointed *conjunctly* as professors of both the Theory and Practice of Medicine, while Black would become the Professor of Chemistry.⁸⁷

⁸⁴ This pamphlet has been digitised; a copy can also be found at NLS, Shelfmark 5.1815(3). Though not strictly accurate, I list as authors the four students who were in charge of the committee appointed to present it. More than 150 students signed it.

⁸⁵ James Blair, Alexander Monro Drummond, James Maddocks, and Thomas Smith, *Address of the Students of Medicine, to the Right Hon. The Lord Provost, Magistrates, and Town-Council of the City of Edinburgh* (1766), 3-4. A copy can be found at NLS, Shelfmark 5.1815(3).

⁸⁶ *Ibid.*, 6.

⁸⁷ *Ibid.*, 7-8. Now that we know of Cullen's involvement with the earlier *Address* (1764), it would be worth investigating the extent to which he was responsible for the composition of this pamphlet as well. For what it is worth, the four students in charge of presenting the address were eager, in an addendum, to refute a rumour that Cullen himself had authored it: "A report having been malignantly propagated, that the framing and presentation of this address were suggested and conducted, not by the Students of Medicine themselves, but by one of the Professors of Medicine; we, the committee appointed for presenting it. . . hereby declare, in the most solemn manner, that such report is entirely without foundation" (8). I think it unlikely that Cullen had *direct* involvement in it, but he may have played some role behind the scenes.

Yet this new push by the Cullen camp, after the death of Whytt, seems to have failed as well, at least if the criterion for success was Cullen's immediate appointment to the Practical Chair, in conjunction with Gregory. We know, of course, that the joint arrangement was eventually agreed to and ratified by the Town Council on April 12, 1769.⁸⁸ But what transpired in the intervening three years?

The only relevant development I am aware of in this period was Cullen's decision—at the request of former pupils—to offer a summer course on the Practice of Physic in 1768. Interestingly, Cullen advertises this course in a public manner, though he was careful not to step on Gregory's turf. In a draft of this announcement that has survived, Cullen wrote that "I have within these few days received Several letters Subscribed by a number of Gentlemen to whom I Should perhaps have given a written answer but as most of them are here present & several reasons make it proper for me to give my answer very publickly I hope the Gentlemen subscribing will excuse my giving an answer by word of mouth & other Gentlemen will excuse me for incroaching [*sic*] a little on their time."⁸⁹ Despite the pleas of these gentlemen, Cullen was cautious and agreed to gratify their demands only after obtaining Dr. Gregory's consent. But he wanted it to be clear that his lectures "are neither intended to Supply nor to Supersede Dr Gregorys [*sic*] Course. I know pretty well what that Course is, as compleat [*sic*] I believe as any that ever was given..."⁹⁰

Although Cullen carefully avoids antagonising Gregory in this public announcement, he does mention the possibility of the alternate teaching arrangement: "...G[entlemen] are pleased to put questions about alternate teaching to which I can give no answer[.] I cannot give you the opinion of either the University or the Town of Edinburgh on this Subject as neither of them have been consulted on the Subject

⁸⁸ See MS Cullen 612/14 for an extract from the Town Council minutes that confirms this.

⁸⁹ MS Cullen 320, 1r. This is a draft copy of the announcement (from which, incidentally, Thomson quotes). I have not been able to locate a published version, so this should be treated with some caution. It is possible it was never published, although we do know that Cullen gave the course in the summer of 1768, so it seems plausible that he made some kind of public announcement about his upcoming summer lectures.

⁹⁰ *Ibid.*, 1v.

that I know of & in the meantime it would be preposterous & improper for me to give any opinion of my own.”⁹¹

It is unclear whether Cullen’s public announcement about teaching the Practice was meant to put pressure on the parties involved to do something further about it. New evidence that I discuss below suggests, I think, that this was Cullen’s intent (if he in fact went public with his announcement). Regardless, once again Cullen reminded the public of his experience teaching and, if nothing else, kept the issue alive.

The Joint Arrangement

If, as late as the summer of 1768, no alternate teaching arrangement between Cullen and Gregory had been agreed to, what changed by April of 1769? And what was the final impetus for Gregory’s agreeing to it?

There is no clear-cut answer but new evidence sheds light on how Cullen obtained joint possession of the Chair. It is worth noting first that the traditional explanation, suggested by Thomson, for how the joint arrangement came about is unconvincing. Thomson wrote that “Dr Gregory, after delivering three courses of lectures on the Practice of Physic... was at length induced to comply with the general wish of those interested in the prosperity of the University, that Dr Cullen should be permitted to lecture upon that subject.”⁹² It seems unlikely that Gregory, on account of the pressures of the students (and perhaps others), finally agreed to think of the general well-being of the university and, against his own interests, consented to give Cullen permission to lecture on the Practice of Physic.⁹³

⁹¹ *Ibid.*, 2r-2v. Clearly, by the summer of 1768, the alternate arrangement suggested in 1766 had not yet been implemented.

⁹² TLC, 1:161. Commentators, since Thomson, have largely accepted his explanation of the joint arrangement.

⁹³ It is ironic that Thomson, who was himself so familiar with university politics, should propose this explanation for the joint arrangement. He likely had no other information than that given in the Minutes of the Town Council, which gave this very explanation (see MS 612/14). But the Town Council was simply echoing the petition Cullen gave to them, which—and here I can only conjecture—he may have worked out with Gregory beforehand, to put a positive spin on the unusual arrangement.

Other commentators have offered slightly different explanations for Gregory's remarkable about-face. Craigie, for instance, in his review of Thomson's biography, suggested that "so many efforts were made by the students to enjoy the advantage of Dr Cullen's instructions as a teacher of the practical course, that in the beginning of 1769, Dr Cullen, having at length obtained the consent of Dr Gregory, and the approbation of the other members of the Faculty, presented to the Patrons a petition...."⁹⁴

Bower, hinting that he had access to other sources, claimed that the reason the arrangement was agreed to was because both men realised the extent to which they were promulgating truly incompatible doctrines: "A full explanation of the reasons for this transaction was never publicly given by either of the parties. It has been well understood in private, however, that it was in consequence of the different theories they had espoused upon some leading medical doctrines, which both professors could not avoid mentioning in their lectures."⁹⁵

Despite these suggestions, a plausible explanation for the joint arrangement remains elusive because none of them explain why Gregory would have agreed to give up his sole Professorship. It may have been—as most commentators seem to concede—that the pressure from students, as well as from Cullen and other colleagues, was quite great. Yet something is missing: why would Gregory agree to sacrifice his own interests for someone he did not much like, without getting something in return?

Most of the story I have sketched so far has been known since Thomson's biography. But new documents illuminate how the joint arrangement came about. They still leave a good many questions unanswered, but they at least show that Gregory did not simply agree, out of goodwill, to let Cullen share the Practical Chair

⁹⁴ David Craigie, "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson", *The Edinburgh Medical and Surgical Journal* 38, no. 113 (1832): 404.

⁹⁵ Bower, *History of the University*, Vol. 2, 385. Bower's source was almost certainly Alexander Smellie (1770-1850?), Bower's printer-publisher and the son of William Smellie, one of Cullen's detractors. Thus Bower's material about Cullen needs to be treated with some caution, given Smellie's overt dislike of Cullen. For more on William Smellie and his criticisms of Cullen, see my Chapter 4, especially Appendix 4C.

with him. He wanted financial compensation in return, and he even appears to have been, in some sense, against the joint arrangement, even if he ultimately agreed to it. In fact, the evidence we have provides rare insight into some of the private negotiations that must have been a part of many academic appointments, but which do not often show up in the historical record. These kinds of negotiations, in Emerson's words, "were not put on paper but were the stuff of conversations and face-to-face meetings in Edinburgh, Glasgow, St Andrews, Aberdeen or London. Those dealings left little record but were a large part of the story, a part now not recoverable."⁹⁶ We are fortunate to be able to recover some of it.

The new details are contained in some letters by John Bostock (1744?-1774), a close pupil of Cullen's (Edinburgh M.D. 1769).⁹⁷ Bostock often wrote to his friend, Charles Blagden (Edinburgh M.D. 1768), describing his life in Edinburgh, as well as recent news about the medical school, especially if it involved their revered teacher, Dr. Cullen.⁹⁸

Sometime in late March or early April 1769, Bostock had an exciting message for Blagden. He tells him that he is writing to him while sitting in Robert Cullen's

⁹⁶ Emerson, *Academic Patronage*, 5.

⁹⁷ After obtaining his M.D., Bostock eventually settled as a physician in Liverpool, where he became physician to the Royal Infirmary. Unfortunately, Bostock died prematurely in 1774. See Norman Moore, "Bostock, John (1744?-1774)", rev. Kaye Bagshaw, *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/2940> [Accessed 30 July, 2014]. Bostock is not to be confused with his son, also John Bostock (1772-1846), who wrote a popular history of medicine, including an appraisal of Cullen. For that, see John Bostock, *A Sketch of the History of Medicine, From Its Origin to the Commencement of the Nineteenth Century* (London: Sherwood, Gilbert, and Piper, 1835), 202-215.

⁹⁸ After obtaining his M.D., Blagden had an illustrious career in medicine and science, particularly in London. He was elected a fellow of the Royal Society in 1772, became an assistant to the eccentric natural philosopher and chemist Henry Cavendish, and in 1784 was elected secretary of the Royal Society, working closely with its current president, Joseph Banks. For more on Blagden, see David Philip Miller, "Blagden, Sir Charles (bap. 1748, d. 1820)", *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/2553>, [Accessed 7 April, 2013]; Frederick H. Getman, "Sir Charles Blagden, F.R.S.", *Osiris* 3 (1937): 69-87; G. De Beer, "Sir Charles Blagden's First Visit to Switzerland", *Gesnerus* 11, no. 1-2 (1954): 17-35; Ernest Heberden, "Correspondence of William Heberden, FRS with the Reverend Stephen Hales and Sir Charles Blagden", *Notes and Records of the Royal Society of London* (1985): 179-189; and Danielle M. E. Fauque, "An Englishman Abroad: Charles Blagden's Visit to Paris in 1783", *Notes and Records of the Royal Society* 62, no. 4 (2008): 373-390. For a short summary of Blagden's life, and his relationship with Cavendish, see Christa Jungnickel and Russell McCormach, *Cavendish* (Philadelphia: American Philosophical Society, 1996), 212-16.

rooms at the Cullen house, eagerly waiting to hear about the fate of Dr. Cullen.⁹⁹ He returns to his letter, after going downstairs to hear the news:

I am returned—& now comes the clearing up of y^e Plot—Dr Cullen & Dr Gregory had had a meeting—Dr Gregory has resigned his Chair—& the Sum Dr Cullen is to pay is fixed—& the proportion of that sum that Dr Black is to advance is fixed—you see y^e reason of Dr Blacks taking a Part—This week y^e Consent of y^e Col[lege] is to be asked which you may be certain will not be denied & then the Town Council is to be consulted & their leave if obtained fixes the whole—This is the only Part where there can be the least rub—& then my friends we shall see if things fall out as God grant they may our Master & Father at the head of Physick—now do me justice I did but hear this 10 minutes ago, & I am sure I have told the story with astonishing Tranquility. God God—Cullen Professor of y^e Practice of Physick[.]¹⁰⁰

In a subsequent letter a few weeks later, Bostock had more news about the ‘Great Affair’ for Blagden: “I was resolved not to write till I could give you the Great Affair in such Terms as would afford you full satisfaction. Know then my friend the Matter is fixed & our Master gives y^e practice alternately with D^r Gregory while they two live—& if he should happen to survive him he may I dare say give it every Year.”¹⁰¹

That was the exciting development, but Bostock felt obliged to summarise the previous twists and turns in the Great Affair:

You are not unacquainted that when Whytt died, & Rutherford in reality ceased to exist, the Voice of y^e Students called Cullen to y^e Practice, Gregory to y^e Institutions & Black to succeed his Old Preceptor[.] Unfortunately (nay perhaps I am wrong there) Rutherford w^d not be succeeded by Cullen; & indeed friend Charles between thee & me who the Devil has disinterestedness enough to bear the Thoughts of such a Comparison[.] The Affair in Consequence of this was put on another footing, & the Town Council resolved at any rate to get shut of a Man [Rutherford] who had but 14 Pupils &...gave Gregory y^e Practical Chair; & Cullen tho’ not wthout much persuasion was engaged to make room for

⁹⁹ I have decided to quote liberally from the letters that follow because they have not, to my knowledge, been printed before.

¹⁰⁰ RSL, CB/1/2/178, 2r (alternative classification: BLA.B.322d). The RSL gives the date of this letter as c.1770, but it had to be written before April 12th, 1769 when the Town Council confirmed the joint arrangement. Incidentally, Bostock does not explicate here what he means by “Dr Blacks taking a Part”. But in a subsequent letter, he spells it out: “... since it was impossible that Black could ever have got a footing in this University wthout Cullens quitting [*sic*] the Chemistry, a step he never w^d have taken had y^e Enjoyment but of half y^e Practical Chair been attended wth any great Expende—is it not proper Black should pay a share of y^e Money advanced to Old Rutherford?” See RSL, CB/1/2/175, 1v (alternative classification: BLA.B.322a), [April] 1769.

¹⁰¹ RSL, CB/1/2/175, 1r. This was likely written in mid-to-late April 1769—or in any case, on or after April 12, 1769.

Black[.] But he did not even do this till in Consequence of a meeting of Students & the repeated applications of y^e other Professors (chiefly Monro) the other two Gentlemen were persuaded to give Cullen a promise of that Change w^{ch} has this day taken place[.] To defeat this measure it is probable many Efforts have been made, but in vain—& this day we heard it denounced from y^e Professorial Chair that by Order of the Town Council, the Patrons of y^e University[.] D^r Cullen & D^r Gregory give y^e Practice of Physick & Institutions alternately & that Dr Cullen gives y^e Practice y^e next Year[.]¹⁰²

Cullen & the Power of Student Advocacy

These documents show that Gregory was only willing to allow Cullen to teach alternately with him, after he was assured of adequate compensation. Despite Bostock's shock at Gregory's behaviour, this was not in itself unusual; certain emoluments (laboratory equipment, say) came along with the various Chairs, and incumbents who resigned expected to be compensated for them by their successors. Since Gregory had paid Rutherford for the Chair, he expected to be compensated for his loss of half the Chair, when Cullen took over a share of the responsibilities.¹⁰³ The arrangement for Black to pay part of Cullen's share is more interesting: it appears to have been Black's way of compensating Cullen for vacating the Chemistry Chair for him in 1766.¹⁰⁴ But again, it was not unusual for an incumbent to be compensated in some way by his successor. And, with the exception of the joint arrangement between Cullen and Gregory, such manoeuvrings were not unheard of at Edinburgh.¹⁰⁵

¹⁰² Ibid., 1r.

¹⁰³ Bostock thought that Gregory paid Rutherford to obtain the Chair: "Now observe Charles—Rutherford could not be deprived of his Place as long as he could speak—he was bought out of it—Gregory paid y^e Money." See RSL, CB/1/2/175, 1v.

¹⁰⁴ The most recent edition of Black's correspondence sheds no further light on this. See *The Correspondence of Joseph Black*, ed. R. G. W. Anderson and Jean Jones (Farnham: Ashgate, 2012). But perhaps we should not expect Black's correspondence to reveal much; after all, these discussions were mostly conducted face-to-face.

¹⁰⁵ The horse-trading that occurred to secure the Chair of Moral Philosophy for Adam Ferguson is a good example of this. Hugh Blair bragged to David Hume: "In our Colledge [*sic*], we are making a great improvement. In Consequence of a Bargain made with J. Russel Bruce the Professor of the Law of Nature & Nations goes out, Balfour of Pilrig moves into his place, Fergusson into the Chair of Moral Philosophy, and Russel into that of Natural. Is not this Clever?" Quoted in Iris Fleßenkämper, "From Aristocratic Support to Academic Office: Patronage and University in the Scottish Enlightenment," in *Scholars in Action: The Practice of Knowledge and the Figure of the Savant in the 18th Century. Volume I*, ed. Andre Holenstein, Hubert Steinke, Martin Stuber and Phillipe Rogger (Leiden: Koninklijke Brill NV, 2013), 119.

Still, questions remain. If the principles (though not the details) of the joint arrangement were agreed to (with Monro as intermediary) prior to Cullen's decision to vacate the Chemistry Chair in April, 1766, as Bostock says, why was it not implemented until three years later? Was there a precipitating event in early 1769? Perhaps Cullen's success in teaching the Practice in the summer of 1768, as well as continued pressure from students and other faculty members, finally induced Gregory to give way? But why did Gregory ultimately agree to it if, as Bostock claims, he denounced the Town Council's decision after it was finalised? Did he receive something more from Cullen, beyond financial compensation? It is possible, even likely, that Gregory had far fewer students than Cullen, so that agreeing to a joint arrangement was actually in his financial interest.¹⁰⁶ Whether this is sufficient to explain his change of heart is unclear. We know too little at this point about Gregory, and the financial details of the joint arrangement, to offer anything but conjectures.

Whatever we determine about the joint arrangement, what is clear—and more to the point in this chapter—is that we must allow a substantial role for the influence of the wishes of the medical students. And these, in turn, were shaped by Cullen's powerful and engaging pedagogical persona. Cullen's influence was not just indirect: he used his popularity as a teacher to encourage his pupils' support for his academic promotion. Indeed, at least with respect to the initial jockeying in 1764, it appears Cullen even molded the content and rhetoric of their advocacy for his professional advancement. Thus, Cullen deliberately used his pedagogical success to advance his professional interests by securing a more prestigious position at the Edinburgh Medical School, even in the face of opposition.

If, in this chapter, I have focused on Cullen's pedagogical persona, I want next to consider the content of Cullen's pedagogy. Chapter 3 explores what Cullen taught his students about how they should approach the study of medicine, and in so

¹⁰⁶ I thank Dr. John Henry for suggesting this possibility to me.

doing, reveals what I am calling his 'philosophy of medicine'. This serves as a helpful bridge into the intellectual world of Cullen's medical thought.

We turn, then, to Cullen's philosophy of medicine.

CHAPTER THREE

PHILOSOPHY OF MEDICINE

I think it is the merit of the present age, that generally more liberal Sentiments are entertained, that some degree of Scepticism prevails, or at least that the slow consented Academick doubt, prevents men from [*sic*: being] bigotted to a particular System, and leaves them open to be constantly corrected by observation of facts and further reflection.

-William Cullen, c. 1780s
[RCPE, CUL/2/1/9, Insert T, 1v]

CHAPTER 3: PHILOSOPHY OF MEDICINE

The significance of one's philosophy of medicine cannot be overstated. Cullen thought his pupils were generally unprepared to consider the topic, but it was no less important for that. It determined, or could determine, how one cultivated the study and practice of medicine. It was also part of one of the longest-standing—some might say 'interminable'—debates in medicine; that is, whether the study of medicine, in Cullen's words, "is to be pursued on an Empiric or a Dogmatic Plan, that is, whether we are to be guided by Experience alone, or if we must have Recourse to Reasoning & may derive some Advantages from it."¹ Cullen told his pupils that it was "a Question which as I have told you was long ago agitated among Physicians, has often since been discussed, and still subsists among them."²

For all its inescapability, this dispute was not an idle one. As Cunningham has observed about aspects of the debate in early modern Britain, "*reason* and *experience* are constantly argued over. Everyone is on the side of both reason and experience, and reason and experience are on the side of everyone, but they mean different things to different people... The terms are important because they are, in all cases, believed to be the basis of whatever medical practice is in question, and proper medical practice is a matter of life and death."³

Cullen's philosophy of medicine emerges most clearly during his discussion of this debate, which he provided to his students as a propaedeutic to his course on the Practice of Physic—the capstone of the medical curriculum. His medical philosophy contained two strands: at its core was his medical epistemology, or what I

¹ RCPE, CUL/2/1/9, GPL, 45 (hereafter I only refer to the section abbreviations, e.g. only to 'GPL, 45', dropping the 'RCPE, CUL/2/1/9' which is to be assumed in this chapter). Most of the primary sources in this chapter come from Cullen's lectures, in his own handwriting, on the history of medicine, as well as his General Plan (both contained in CUL/2/1/9). I follow Cullen's own use of the term 'General Plan', which he generally uses in discussion of this topic. See CUL/2/1/9, GPP, which is entitled, 'General Plan Of a Course of Lectures on the Practice of Physic'. For more details on these sources, as well as a guide to the abbreviations I use to refer to them, please see Appendix 3A: Source Material.

² Ibid., 45.

³ Andrew Cunningham, "The Transformation of Hippocrates in Seventeenth-Century Britain," in *Reinventing Hippocrates: The History of Medicine in Context*, ed. David Cantor (Aldershot: Ashgate, 2002), 107.

am calling his *inductive Dogmatism*. It was a species of Dogmatism, to be sure, but one which Cullen thought “will also comprehend the whole of the Empiric.”⁴ More specifically, Cullen encouraged his students, following the ideal of Thomas Sydenham, to collect a large stock of accurate facts and, through careful induction, unite them into a more general theory.

Less explicit but no less pivotal for Cullen’s philosophy of medicine was the other strand, his medical ideology.⁵ This was Cullen’s *systematic Eclecticism*, which was similar to other versions of Enlightenment eclecticism in its anti-sectarianism, scepticism, and advocacy of independent thinking. But, unlike some other versions of eclecticism, it also saw the utility of System, or systematic method, as part of one’s intellectual toolkit.

In this chapter, I explicate both strands of Cullen’s philosophy of medicine and show how his epistemology allowed him to provide a robust defence of learned medicine, while his ideology offered him pedagogical and professional benefits. It may have also resonated with him personally, given his unorthodox religious views.

Previous Interpretations

A concern with Cullen’s philosophy of medicine has been a part of most Cullen scholarship, even if it has not been understood in those terms. Early on, John Thomson skillfully portrayed Cullen as a fact-focused clinician, who was exceedingly cautious with his speculations, and, though he professed himself to be a Dogmatist, was actually, “in every thing which related to the practice of physic, a strict empiric.”⁶

Sir William Hamilton, in his review of Thomson’s biography, thought that “Cullen’s mind was essentially philosophic. Without neglecting observation, in

⁴ DPP, 19.

⁵ My use of the term ‘ideology’ here is not to be taken too literally; that is, I am not referring to a set of related political or cultural beliefs that Cullen held. What I am simply suggesting is that there is another strand to his philosophy of medicine, a set of beliefs beyond his epistemology that have broader implications.

⁶ TLC, 1:112.

which he was singularly acute, he devoted himself less to experiment than to arrangement and generalization.”⁷ Yet, though Cullen was no experimental philosopher, his philosophy “was strictly a philosophy of experience. The only speculation he recognised as legitimate was induction. To him theory was only the expression of an universal fact; and in rising to this fact, no one, with equal consciousness of power, was ever more cautious in the different steps of his generalization.”⁸

Christopher Lawrence has underscored Cullen’s desire to teach medicine ‘by system’ but one characterised by “scepticism and speculation.”⁹ Cullen had a “willingness to theorize freely,” guided as he was by a philosophy of science that “represented the new sceptical, deterministic, naturalistic philosophy flowing from Hume.”¹⁰

Barfoot, more than any other recent commentator, has directly tackled the thorny issues that surround Cullen’s philosophy of medicine. He describes Cullen as a ‘sceptical dogmatist’¹¹ whose conception of facts in medicine “was strikingly different from the majority of his contemporaries...Cullen was distinctive, possibly even alone, in rejecting the theory-free conception of facts in medicine which was part and parcel of the orthodox view.”¹² This places his methodological approach in the same family, Barfoot thinks, as those of Bryan Robinson, David Hartley, Le Sage and Joseph Priestley.¹³

Thus, previous interpretations have focused on where Cullen fit on the spectrum between theory and observation, System and experience, Dogmatism and

⁷ Sir William Hamilton, “Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson, M.D”, *The Edinburgh Review* 55, no. 110 (1832): 461.

⁸ *Ibid.*, 462.

⁹ Christopher Lawrence, “Medicine as Culture: Edinburgh and the Scottish Enlightenment” (PhD Thesis, University of London, London, 1984), 312.

¹⁰ *Ibid.*, 313.

¹¹ Michael Barfoot, “Philosophy and Method in Cullen’s Medical Teaching,” in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 123.

¹² *Ibid.*, 120-1.

¹³ *Ibid.*, 130-1, n. 62.

Empiricism. There has also been some question about the role of scepticism in Cullen's general approach to medicine.

While Cullen's medical epistemology has been the focus of previous research, I add another dimension, his medical ideology, which is no less important. Here, as a kind of balance to his medical epistemology, Cullen encouraged his pupils to cultivate eclecticism in their studies, warning them against the dangers of sectarianism in medicine and highlighting the need for some degree of scepticism and independence of thought.

I. Cullen's Medical Epistemology: Inductive Dogmatism

At the beginning of his history of medicine, Cullen explained to his students what he meant by Empiricism and Dogmatism.¹⁴ He noted that, in the study of medicine, two kinds of approaches had generally been adopted by different groups at different times. The first approach was one whose adherents believed that “by various means and accidents we have acquired experience of many remedies for the cure of diseases, and some Physicians are of opinion that a student is only to enquire after what experience has already taught, that the improvement of the art depends solely upon the increase of that experience and that the practice should consist solely in the imitation of [it].”¹⁵ The other group, while not rejecting the lessons of experience, believed that “by the study of the nature of the human body, and of the various powers that can affect it, [we can] find out remedies more quickly than experience could suggest.”¹⁶ These were the two sects that divided physicians from the beginning of their art, and the first group “were called Empirics, and their method

¹⁴ For general discussions of this debate in medicine, see Lester S. King, “Rationalism in Early Eighteenth Century Medicine”, *Journal of the History of Medicine and Allied Sciences* 18 (1963): 257-71; Lester S. King, “Medical Theory and Practice at the Beginning of the Eighteenth Century”, *Bulletin of the History of Medicine* 46, no. 1 (1972): 1-15; Lester S. King, *The Philosophy of Medicine: The Early Eighteenth Century* (Cambridge: Harvard University Press, 1978), Ch. 10; and Richard H. Shryock, “Empiricism Versus Rationalism in American Medicine”, *Proceedings of the American Antiquarian Society* 79 (1969): 99-150.

¹⁵ HPb, 2.

¹⁶ *Ibid.*, 2.

Empiricism, while those of the other sect, were called Dogmatists, and their method Dogmatism.”¹⁷

Before we see how Cullen situated himself on the spectrum between Empiricism and Dogmatism, we need to understand the context for the debate. The question of whether medicine should be pursued according to the lessons of experience, or the conclusions of reason, that is guided by an Empirical or Dogmatic plan, had been debated since the time of Hippocrates.

Celsus, looking back on his predecessors and surveying the state of medicine in his day, noted that there were differences of opinion among physicians, “some holding that the sole knowledge necessary is derived from experience, others propounding that practice is not efficient enough except after acquiring a reasoned knowledge of human bodies and of nature...”¹⁸

Galen, not long after Celsus, saw a similar state of affairs. It was no longer agreed upon how one comes by the knowledge of what is healthy and what is unhealthy.¹⁹ “Some say that experience alone suffices for the art, whereas others think that reason, too, has an important contribution to make.... The one proceeds by means of experience to the discovery of medicines, the other by means of indication. And thus they have named their sects empiricist and rationalist. But they also

¹⁷ Ibid., 3. Cullen had various topics in mind when he discussed Dogmatism and its emphasis on the ‘study of the nature of the human body’ and of the powers in nature that affect it. The content of the Dogmatic plan encompassed, unsurprisingly, the major topics of academic medicine. Thus one had to know, by virtue of the mechanical and chemical philosophies, “the Nature of all the several Powers that can act upon the human Body;” the structure of the human body as learned through anatomy; “the general Laws by which the animal Oeconomy is governed” as found in physiology; “the Deviations from a healthy State which the Body is capable of” explained by pathology; the changes necessary to restore an ill-body to health, i.e. the ‘Indications’, via a comparison of physiology and pathology; and finally, how to preserve health and prevent disease using our knowledge of the powers that act upon us (GPL, 75). The Dogmatic plan, in other words, is taking our knowledge of the Institutions of Medicine, and applying it to the Practice, by “Directing the Application of these general Doctrines to particular Diseases” (GPL, 76).

¹⁸ Celsus, *On Medicine. Books I-IV*, trans. W. G. Spencer, The Loeb Classical Library (Cambridge: Harvard University Press, 1935), 9, I.12. For a discussion of Celsus’ contributions to ancient medicine, see Vivian Nutton, *Ancient Medicine* (London: Routledge, 2004), Ch. 9.

¹⁹ Galen, “On the Sects for Beginners,” in *Three Treatises on the Nature of Science*, trans. R. Walzer and M. Frede (Indianapolis: Hackett Publishing Co., 1985), 3, I.2. For a wider discussion of Galen, and his understanding of sects in medicine, see G. E. R. Lloyd, “Galen and His Contemporaries,” in *The Cambridge Companion to Galen*, ed. R. J. Hankinson (Cambridge: Cambridge University Press, 2008).

customarily call the empiricist sect observational and relying on memory and the rationalist sect dogmatic and analogistic.”²⁰

Thus, the terms of debate were laid down early and guided discussions well into the early modern era.

Sydenham and the Rise of Neo-Hippocratism

In considering the seventeenth and eighteenth century context for this long debate, it is easier to trace the fate and popularity of Empiricism in medicine, for the Dogmatic approach was always part of the picture, at least in the Schools. And the fortune of Empiricism in this period is well illustrated by the fate of medical neo-Hippocratism, i.e the revival of interest in Hippocratic medicine.

Although Dogmatism, in all its guises, had largely prevailed in the Schools since the time of Galen, a shift occurred once Galen went out of favour. One of the figures that took his place, though he had never fallen completely out of view, was Hippocrates. Hippocrates’ replacement of Galen is significant because, in the words of Harold Cook, “Galen’s reputation had come to rest on his medical rationalism, while that of Hippocrates stemmed from his empiricism...and by the middle of the seventeenth century that is how most people thought of him: the collector of case studies, the compiler of medical details, the inductivist, the early founder of the true methods of natural history whose achievements had been devalued by the rationalist practitioners following him.”²¹

Thus, with the decline of Galenism and the rise of Hippocratism, the Empiricist gained ground on the Dogmatist. This was a change “from the glorification of the rational and academic in medicine, to the foregrounding of the

²⁰ Galen, “On the Sects” 3-4, I.2.

²¹ Quoted in Andrew Cunningham, “The Transformation of Hippocrates in Seventeenth-Century Britain,” in *Reinventing Hippocrates: The History of Medicine in Context*, ed. David Cantor (Aldershot: Ashgate, 2002), 91. The original comes from Harold J. Cook, *The Decline of the Old Medical Regime in Stuart London* (Ithaca: Cornell University Press, 1986), 185. For the Hippocratic tradition in medicine, see Wesley D. Smith, *The Hippocratic Tradition* (Ithaca: Cornell University Press, 1979). For neo-Hippocratism in early modern medicine, see *Reinventing Hippocrates: The History of Medicine in Context*, ed. David Cantor (Aldershot: Ashgate, 2002), esp. Chs. 5-8. My discussion largely follows Cunningham’s.

empirical and practical...”²² Learned physicians, who used “to speak with authority on medical matters because of their possession of *scientia* and *theoria*, came to be dismissed by those unlearned or anti-learned persons who professed empiricism, quackery and trial-and-error.”²³

The perpetual debate between Empiricists and Dogmatists thus took on new significance in the mid 17th century. It led to disputes that were, in many cases, between university-educated physicians and medical practitioners who had no such background. It manifested itself “as conflicts between the learned and the unlearned, between elite and popular social and intellectual forms, between theoretical and manual, between rational and empirical, and between Latin and English.”²⁴

One of the most significant figures to pave the way for neo-Hippocratism was the English physician, Thomas Sydenham (1624-1689).²⁵ Sydenham elevated Hippocrates to the top of the pedestal in medicine. According to Cunningham, “More than anyone else [Sydenham] represented Hippocrates as having been empirical and averse to theory, as a practitioner who observed, who built cures on what he could see and not on what he could not, who considered the effects of the environment on the appearance and nature of diseases. In particular, Sydenham celebrated Hippocrates as the *historian of diseases*.”²⁶

This was to be especially important for neo-Hippocratism in eighteenth-century Scotland because Sydenham’s version of Hippocrates was popularised by

²² Cunningham, “Transformation of Hippocrates”, 92.

²³ *Ibid.*, 92.

²⁴ *Ibid.*, 92-3.

²⁵ There is an increasingly large body of work on Sydenham. For the classic biographical study, see Kenneth Dewhurst, *Dr. Thomas Sydenham (1624-1689): His Life and Original Writings* (London: Wellcome Historical Medical Library, 1966). For some studies of his influence, see R. R. Trail, “Sydenham’s Impact on English Medicine”, *Medical History* 9, no. 4 (1965): 356-364; F. N. L. Poynter, “Sydenham’s Influence Abroad”, *Medical History* 17, no. 3 (1973): 223-234; Andrew Cunningham, “Sydenham Versus Newton: The Edinburgh Fever Dispute of the 1690s Between Andrew Brown and Archibald Pitcairne”, *Medical History* Supplement No. 1 (1981): 71-98; and Peter Anstey, “The Creation of the English Hippocrates”, *Medical History* 55, no. 4 (2011): 457-478. I discuss various interpretations of Sydenham’s medicine later in this chapter.

²⁶ Cunningham, “Transformation of Hippocrates”, 102.

Hermann Boerhaave (1668-1738), whose works were championed by many in Britain.²⁷

Like Sydenham before him, Boerhaave believed that the older the writer, the purer the doctrine. Thus Hippocrates was “the equivalent for Boerhaave of the Bible, and just as pristine: ‘he quickly realised that the later authors owed to Hippocrates everything that was good in their work; therefore to Hippocrates alone he devoted a long time, reading him, summarizing and analysing him.’”²⁸

Only Sydenham, after Hippocrates, appeared to be worth studying.²⁹ And Boerhaave’s Sydenham was significant precisely because of his elevation of Hippocrates. Boerhaave “made Sydenham into one of the great masters of the history of medicine... What Boerhaave put into the vast space that Galen had occupied, was Thomas Sydenham. This Sydenham was restoring the practice of Hippocrates. That Hippocrates, naturally enough, looked remarkably like Sydenham himself...”³⁰

The success of Sydenham’s medicine in England, and thus of Hippocrates, made its way to the Netherlands and, via Boerhaave and his many English-speaking students, to Scotland.³¹ It was part of the fabric of eighteenth-century Scottish medicine, not only through Boerhaave’s teachings themselves, but through many of the pioneering figures of early eighteenth-century Scottish medicine, who had also

²⁷ Ibid., 104-5. For the influence of Boerhaave on his pupils and in Great Britain, see G. A. Lindeboom, *Boerhaave and Great Britain: Three Lectures on Boerhaave with Particular Reference to His Relations with Great Britain* (Leiden: E. J. Brill, 1974); and E. A. Underwood, *Boerhaave’s Men: At Leyden and After* (Edinburgh: Edinburgh University Press, 1977). For a recent re-evaluation of Boerhaave’s influence, see Harold J. Cook, “Boerhaave and the Flight From Reason in Medicine”, *Bulletin of the History of Medicine* 74, no. 2 (2000): 221-240. An important early study is William Burton, *An Account of the Life and Writings of Herman Boerhaave. 2nd Edition* (London: Henry Linton, 1746). The classic biography remains G. A. Lindeboom, *Herman Boerhaave, the Man and His Work* (London: Methuen & Co Ltd, 1968). More recently, see Rina Knoeff, *Herman Boerhaave (1668-1738): Calvinist Chemist and Physician* (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2002); and John C. Powers, *Inventing Chemistry: Herman Boerhaave and the Reform of the Chemical Arts* (Chicago: University of Chicago Press, 2012).

²⁸ Andrew Cunningham, “Medicine to Calm the Mind: Boerhaave’s Medical System, and Why It Was Adopted in Edinburgh,” in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and Roger K. French (Cambridge: Cambridge University Press, 1990), 46-7. Cunningham is quoting here from Boerhaave’s autobiographical fragments (the *Commentariolus*), where Boerhaave describes himself in the third person. An English translation can be found in Lindeboom, *Herman Boerhaave*.

²⁹ Cunningham, “Medicine to Calm the Mind”, 47.

³⁰ Andrew Cunningham, “Thomas Sydenham: Epidemics, Experiment and the ‘Good Old Cause’,” in *The Medical Revolution of the Seventeenth Century*, ed. Andrew Wear and Roger K. French (Cambridge: Cambridge University Press, 1989), 189-90.

³¹ Ibid., 189.

been Boerhaave's students. For instance, a reverence for Hippocrates was apparent in the outlook and institution-building of Robert Sibbald (1641-1722), one of the founders of the Royal College of Physicians of Edinburgh.³² According to Cunningham, "The centrality of Hippocrates in the many schemes of Sibbald and his allies in Edinburgh is striking. It was a Hippocrates who was historically the basis of medicine and who served as a model both in natural history and in observation in medicine."³³

Thus, by the time Cullen came to Edinburgh to teach medicine, the lingering influence of Boerhaave had ensured the continued popularity of neo-Hippocratism, at least outside the universities, and with it, an aversion to Dogmatism.³⁴

Defending 'the Study of a Dogmatick System' in General

Perhaps this was one of Cullen's motivations to defend the study of Dogmatism to his students, for he witnessed the influence that an aversion to theory had upon them, when they began their studies. Generally, he observed, "The Schools are every where dogmatical, & seemingly from Necessity, whilst the most part of Practitioners at least profess Empiricism."³⁵ But non-learned medical practitioners "have occasion so often to declare against Theory that they either influence the Opinion of Students on this Subject or at least render them undetermined."³⁶

Cullen therefore used his General Plan "to destroy all prejudices that might subsist in the minds of Gentlemen against the study of a Dogmatick System...."³⁷ For

³² For more on Robert Sibbald and early Scottish medicine and science, see Roger L. Emerson, "Sir Robert Sibbald, Kt, the Royal Society of Scotland and the Origins of the Scottish Enlightenment", *Annals of Science* 45 (1988): 41-72; J. Boyes, "Sir Robert Sibbald: A Neglected Scholar," in *The Early Years of the Edinburgh Medical School*, ed. R. G. W. Anderson and A. D. C. Simpson (Edinburgh: Royal Scottish Museum, 1976); and Charles W. J. Withers, "Geography, Science and National Identity in Early Modern Britain: The Case of Scotland and the Work of Sir Robert Sibbald (1641-1722)", *Annals of Science* 53, no. 1 (1996): 29-73.

³³ Cunningham, "Transformation of Hippocrates", 97.

³⁴ I do not mean to suggest here that the influence of neo-Hippocratism was the only, or even the primary, factor in creating an aversion to theory in eighteenth-century Scottish medicine. Certainly Newton's injunction against feigning hypotheses in the second edition (1713) of his *Principia* also has a role. But this is outside the scope of this chapter.

³⁵ GPL, 45-6.

³⁶ *Ibid.*, 46.

³⁷ Insert P, 1r.

the general prejudice was for observation over theory, to the point where “Every one nowadays pretends to neglect theory, and to stick to observation...”³⁸ Cullen began by outlining for his students a series of arguments in defence of the general Dogmatic approach to the study and practice of medicine.³⁹

Cullen’s first argument was that theory is unavoidable. This is because “there is in human Nature a strong propensity to seek for Causes,” and while men are often poor reasoners, “I imagine the propensity is incoercible.”⁴⁰ Cullen cites his own experience with practitioners of physic in support of this. He says he has never known any physician “who did not upon many occasions use Reasoning concerning it & what may fairly be called Theory.”⁴¹ Practitioners could easily see, in their patients, the propensity to reason about anything, but even among themselves, “tho’ they can declare that Paracelsus was a Knave, that Helmont was a Madmen, & Descartes a Fool, & that all Theory is Nonsense, yet I find themselves constantly employing it. This Man is plethoric & therefore must be blooded, This Man’s Stomach is foul & he must be vomited, a third Man’s Blood is full of Acrimony & he must be purged.”⁴² While practitioners may not be aware that they are reasoning in this way, Cullen insists that, at least as far as his own experience goes, “there is not any one practitioner or the most professed Empiric who does not upon many Occasions use Theory, From a Tincture of the School in which he was bred, or from the Books he has read.”⁴³

Because theory is unavoidable, those who are not accustomed to it or have not had practice using it, are only able to form very imperfect speculations when, as is inevitable, they must have recourse to it. These “can be no better nor less dangerous than random experiments.”⁴⁴

³⁸ HPe, 34.

³⁹ Insert P, 1r-v.

⁴⁰ GPL, 48b.

⁴¹ Ibid., 48d.

⁴² Ibid., 48d-48e.

⁴³ Ibid., 48e-48f.

⁴⁴ DPP, 16.

If the propensity to seek for causes is in fact incoercible, then the study of medical theory in its full extent is necessary if we are to protect ourselves from its abuses. “The only Remedy for the Abuse that we know of is the making Men better Reasoners, the exercising them much on the particular Subjects they are to be employed in, & directing their Attention to every Consideration that may influence their Determinations.”⁴⁵ Only someone who is acquainted with the fallacy of other people’s reasoning is able to restrain his own use of theory.⁴⁶

The second argument Cullen makes in defence of the Dogmatic plan is that it has been, and will continue to be, the best way to obtain facts in medicine, facts which themselves are the foundation for any Empirical plan.⁴⁷ The history of physic shows us, Cullen thinks, that only Dogmatists have attended to, and preserved facts, in their quest to apply them to theory; they have also discovered new ones through experiments that were suggested to them by the System they adopted: “It is therefore the dogmatic Systems to which we are chiefly obliged for the facts we have already acquired...”⁴⁸ He thinks it is “Our Attempts in System,” that have allowed us “to enlarge our Stock of Facts...”⁴⁹

The importance of theory and system to progress in medicine was well illustrated by the significance of morbid dissection. “It is now agreed,” Cullen said, “that the Dissection of morbid Bodies is one of the best Means of improving us in the Distinction of Diseases...”⁵⁰ And if dissection is a critical component of any nosological system—any system founded on the distinction of diseases—then it further argues for the usefulness of theory and system in medicine, because our knowledge of morbid bodies depends on our knowledge of them in a healthy state, and so dissection “has become more accurate exactly in Proportion to the Progress in

⁴⁵ GPL, 48c.

⁴⁶ Ibid., 48g.

⁴⁷ Ibid., 49.

⁴⁸ Insert E, 1r.

⁴⁹ GPL, 54.

⁵⁰ Ibid., 54. For a short history of the autopsy, see Lester S. King and M. C. Meehan, “A History of the Autopsy. A Review”, *The American Journal of Pathology* 73, no. 2 (1973): 514-44. For an overview of pathology and morbid anatomy, see Russell C. Maulitz, “The Pathological Tradition,” in *Companion Encyclopedia of the History of Medicine, Vol. 1*, ed. W. F. Bynum and Roy Porter (London: Routledge, 1993).

Anatomy...Anatomy owes it's [*sic*] Progress to the Study of the Use of the Parts, and the Study of the Use of the Parts is inseparable from the Study of the Whole Oeconomy."⁵¹ In Cullen's choice phrase, "the Study of Physiology by proposing Enquiries has contributed as much to direct the Knife and Microscope of the Anatomist as the Facts produced by these have contributed to give us a System of Physiology."⁵² In fact, "we do & must assume that the Facts of Physic are more frequently the Inferences of Reason than the simple Objects of Sense..."⁵³ Observing and understanding that certain facts are necessary, or significant, is thus a function of "our Advances in the Knowledge of System, and that truly an empiric System can hardly be perfect till the Dogmatic is also nearly so."⁵⁴

Cullen's third argument in defence of Dogmatism is an attack on Empiricism. He wanted to make Dogmatism more appealing and acceptable for his students, and one way of doing this was to highlight the weaknesses of Empiricism itself.⁵⁵

Cullen describes the Empiric plan as composed of Observation, History, and Analogy, each of which were beset with methodological difficulties.⁵⁶ First of all, observation itself is far from straightforward. It requires knowledge of things that are often hidden or concealed from us by their very nature. And even with respect to those things that are apparent, observation demands "an attention to such a variety and series as few men are equal to; and, from both considerations, Observation is so difficult, that, at any time, few good ones, that is compleat [*sic*] ones, have been made. It is plain, that they can be rendered compleat [*sic*] only by opportunitys [*sic*] of being frequently repeated."⁵⁷

This is where History becomes important. Because observations must be repeated, one lifetime is not enough to produce progress—"the work of one man's life can go but a little way in this business"—so the Empiric plan is based upon the

⁵¹ GPL, 55.

⁵² Ibid., 55-6.

⁵³ Ibid., 59.

⁵⁴ Ibid., 59.

⁵⁵ The Empiric plan by itself, he says, is "difficult, fallacious, and insufficient..." (DPP, 3).

⁵⁶ DPP, 3.

⁵⁷ Ibid., 4.

work of whole eras of history.⁵⁸ Unfortunately, this does not limit the difficulties associated with observation; it compounds them. For observations cannot be readily communicated between people, due to the problems inherent in our senses and in language itself, so that “history not only conveys on the inaccuracy of Observation, but also greatly increases [*sic*] it’s [*sic*] imperfection.”⁵⁹ Considering how false history itself has usually been in so many particulars, Cullen concludes “that Observation and History afford a very precarious foundation for the practice of Physic on an Empiric Plan.”⁶⁰

The problems with Analogy, in turn, could be reduced to those of Observation and History. In fact, “however the Empirics may boast the general use of their Analogy[,] it is sufficiently obvious that it never can be of certain application till, by many and repeated observations, every case shall be brought to be nearly a case of simple imitation...”⁶¹ Even then, Analogy could not avoid the problems that faced the practice of simple imitation—problems which arose from “the number and diversity of diseases[,] the difficulty of observation[,] and the fallacy of history...”⁶² With these difficulties, it is no surprise “that simple imitation has seldom been practised.”⁶³

Cullen concludes, then, “that an empirical System is at present impossible, and that a dogmatical Plan in the Study of Physic is absolutely necessary.”⁶⁴ Or, as he puts it more colourfully in his 1766-67 lectures, “What we know has been intirely [*sic*] from Dogmatism; & strip the profess’d Empyric of what he gets from the

⁵⁸ *Ibid.*, 4.

⁵⁹ *Ibid.*, 5.

⁶⁰ *Ibid.*, 5. Cullen’s particularly sceptical tone here, with respect to the veracity of history, is best seen in his History of Chemistry lectures (RCPE, CUL/2/1/1). They are outside the scope of this chapter, but they provide a more detailed picture of Cullen’s sceptical attitude towards historical sources. For instance, Cullen dismisses the supposed antiquity of chemistry (alchemy in particular) by arguing that early chemical writings were “probably interpolations of a much later date and also that the greek Treatises on the Subject of Alchemy pretendedly many of them of great Antiquity are however all of them forgeries of Christian monks in the 13th or 14th Centuries and that upon the whole there was no proper evidence of Chemistry’s being known in the Eastern Empire or any part of Europe till it was Communicated to the people of both by the Arabians” (HCa, 40-41). For an analysis of Cullen’s historiography of chemistry, see J. R. R. Christie, “Historiography of Chemistry in the Eighteenth Century: Hermann Boerhaave and William Cullen”, *Ambix* 41, no. 1 (1994): 4-19.

⁶¹ DPP, 9.

⁶² *Ibid.*, 5-6.

⁶³ *Ibid.*, 6.

⁶⁴ GPL, 68.

Dogmatist, he will appear a naked unfledg'd [*sic*] Animal, a shapeless unlicked Cub. While I acknowledge that Dogmatism has done much mischief I say it has done good upon the whole & the Falacies [*sic*] attending it may be guarded against by the Means I have pointed out..."⁶⁵

For all these reasons, the most reasonable approach, Cullen thinks, is that "we are to cultivate Medicine upon a dogmatic Plan, taking in the most Valuable parts of the Empyric Plan... There is no building upon a Foundation of Empyricism, without Dogmatism."⁶⁶

For Cullen, then, there was in fact no useful separation between Empiricism and Dogmatism. Embracing one to the exclusion of the other was why the debate had never been properly resolved. Echoing the eclectic, Cullen suggests that the debate "has hitherto been treated as a controversy between partys [*sic*], who always embrace or reject by the lump; but it will appear that there are advantages and disadvantages in either plan; and that therefore we should endeavour to employ the useful parts while we carefully avoid & reject the faults of both."⁶⁷ The essential point was that "while Gentlemen pretend to distinguish the Provinces of Reason and Experience, and to determine with Regard to the Importance of the one or of the other, I wish they wou'd [*sic*] once for all observe that they are truly inseparable, or at least that separately they have never been of much Service."⁶⁸

Cullen's preferred version of Dogmatism was therefore founded upon a core of Empiricism, in the form of a great number of medical facts, generalised through induction. It was a Dogmatic plan, to be sure, but one that would "also comprehend the whole of the Empiric."⁶⁹

The Dogmatism of Sydenham

⁶⁵ WUSL, 1:59-60.

⁶⁶ *Ibid.*, 1:57; 1:59.

⁶⁷ DPP, 3.

⁶⁸ GPL, 56.

⁶⁹ DPP, 19.

Cullen explained his version of Dogmatism with reference to Thomas Sydenham. It was Sydenham who, in Cullen's view, showed how to resolve the impasse between observation and theory.⁷⁰ Thus, after discussing the dispute between the Empirics and Dogmatists, Cullen concludes by saying that he hoped to cultivate the Dogmatism of Sydenham "and only proceed further than he has done as Anatomy and Pathology improved since his Time shall allow us, and I hope to give a Specimen of Dogmatism little known in the Schools of Physic, and which when understood will not be refused by the professed Empiric."⁷¹

But what was the Dogmatism of Sydenham? The traditional view of his legacy was, and continues to be, that he was the empiricist *par excellence*, the clinical observer, who eschewed theory and wrote immensely influential case histories of diseases. Lester King noted that "Sydenham has a definite popular image as the empirical physician who insisted on facts and not speculation, who believed in observation and rejected theoretical elaboration."⁷² Cunningham, more recently, also highlights (though he does not condone) the traditional image: "Our view of Sydenham is of an *empirical* practitioner (rather than an 'empiric'), sensibly rejecting Galenic theory while embracing anew the Hippocratic approach...To us Sydenham is the restorer of clinical, bedside-medicine."⁷³ But, while King largely upholds this traditional picture, Cunningham questions it in interesting ways.⁷⁴

Sydenham is still, for Cunningham, a physician who consciously, and against academic tradition, allied himself with the empirical approach to medicine.⁷⁵ But, largely on account of the influence of Robert Boyle, Sydenham incorporated the new understanding of the notion of experiment into medicine. Thus, for Sydenham, "an experiment at the bedside consisted of nothing more sophisticated than *trial and*

⁷⁰ MS Cullen 326, 2v. MS Cullen 326 is Cullen's handwritten introductory lecture to his 1781-2 course on the Practice of Physic.

⁷¹ GPL, 78.

⁷² Lester S. King, "Empiricism and Rationalism in the Works of Thomas Sydenham", *Bulletin of the History of Medicine* 44, no. 1 (1970): 1.

⁷³ Cunningham, "Thomas Sydenham", 188.

⁷⁴ For instance, Cunningham assumes that Sydenham's "attempt to reform medicine was a continuation of politics by other means...If we do not understand the politics we will not understand the medicine." See *Ibid.*, 165.

⁷⁵ Cunningham, "Thomas Sydenham", 182-3.

error in the administration of drugs and of medical techniques such as bleeding or purging. If a treatment seemed to be working, it was continued with, if not it was dropped. *Experimentum* thus meant making up, or working out, a sequence of cure as one went along!”⁷⁶ This was a purposeful rejection of traditional, learned medicine, in the mould of Galen. Sydenham was “seeking to redefine what a medical method ought to be: it ought to be ‘built on one’s own observations’, it ought to be a way of discovering *new* cures...”⁷⁷

In contrast to Cunningham, Donald Bates has argued that Sydenham is better seen as part of another tradition altogether—medical methodism—one which was as concerned with the principles of reasoning as it was with empirical facts: “However much a reformer, however much an advocate of the value of new experience over old tradition, Sydenham was a ‘methodical’ physician concerned with the reform from within, not with an overthrow of professional medicine.”⁷⁸ Thus, Bates puts more emphasis on Sydenham’s approach to method rather than observation or experience: “In the very first paragraph, as befits a methodical physician, he promised to set forth two Principles upon which his method is built, since ‘my therapy is not totally empirically based, but depends...upon the solid support of reasoning’.”⁷⁹

Whether Sydenham was truly Cullen’s inspiration on this topic or not, he certainly co-opted Sydenham’s prestige to defend his own medical epistemology. Bates has picked up on some of the same strands that Cullen saw in Sydenham’s work, for Cullen rejects the interpretation of Sydenham as a great Empiric, one who relied exclusively on experience and observation, rather than theory.⁸⁰ Cullen highlights instead Sydenham’s Dogmatism, and claims that he, like Sydenham, will

⁷⁶ Cunningham, “Thomas Sydenham”, 186.

⁷⁷ *Ibid.*, 188.

⁷⁸ Donald G. Bates, “Sydenham and the Medical Meaning of Method”, *Bulletin of the History of Medicine* 51, no. 3 (1977): 336. Bates offers a more extensive discussion of his interpretation of Sydenham in his PhD thesis, Donald G. Bates, “Thomas Sydenham: The Development of his Thought, 1666-1676” (PhD Thesis, The Johns Hopkins University, Baltimore, 1975).

⁷⁹ Bates, “Sydenham and Method”, 336. Bates is excerpting from Sydenham’s *Methodus curandi febres: Propriis observationibus superstructa* (London, 1666).

⁸⁰ Cullen acknowledges this interpretation of Sydenham but disputes it: “But if I was to say further I wou’d [*sic*] refuse that Sydenham proceeds upon an Empiric plan. His Processus Integri may seem to be such, but whoever looks into his larger Work must perceive that it was the Result of dogmatical Studies and Conclusions” (GPL, 60).

teach medicine upon a Dogmatic plan, one that is “little known in the Schools of Physic.”⁸¹ Cullen was clearly aware of the rhetorical value of enlisting Sydenham in support of Dogmatism.

Cullen was particularly impressed with Sydenham’s ability to control the abuses of theory by adjusting his conclusions on the basis of observation and experiment. Indeed, he first showed us, Cullen thinks, “that there might be a great deal of theory in a man’s head without affecting his practice.”⁸² His approach was to seek “for Theory to unite his observations under some general heads, [rather] than for facts to confirm his Theory....”⁸³ This encouraged Sydenham to be “more employed in observation than any person that we know of from the time of Hippocrates, and tho’ he had always some theory in view he was less governed by it than any of his predecessors.”⁸⁴ He “gave us the example of attending to facts more than to reasonings. He reasoned indeed very often and not always more correctly than his predecessors; but it is obvious that he trusted little to his reasonings and had facts always chiefly in view. The whole of his Study was to render facts more exact and to increase the number of them...”⁸⁵

In the context of describing Sydenham’s approach, Cullen would sometimes refer his students to a passage from Sydenham’s dissertation on dropsy, which supported Cullen’s interpretation.⁸⁶ In that passage, Sydenham wrote that hypotheses

⁸¹ GPL, 78. Cullen attached some importance to his interpretation of Sydenham and had even hoped to write a biography of him. For more on this, see Appendix 3B: Cullen on Sydenham.

⁸² HPd, 33

⁸³ HPe, 33.

⁸⁴ *Ibid.*, 33.

⁸⁵ MS Cullen 326, 2v. In his ‘General Plan’, Cullen suggests that “we have more false Facts obtruded upon us & subsisting in our Books than false Reasonings. That the Stock of true Facts in physic is very small, & far short of the Demands which the practice of Physic has for them” (GPL, 47-8).

⁸⁶ In Cullen’s notes, he wrote: “This is the peculiarity of his conduct — [Sydenham] sought rather for Theory to unite his observations under some general heads, than for facts to confirm his Theory (See the Diss. de hydrope p. 493)” HPe, 33. However, I think Cullen’s reference here is mistaken and that he meant to refer to p. 394 of the Pechey edition (in English) of Sydenham’s works (1740), which does contain the dissertation on dropsy, and the very set of passages that Cullen likely had in mind. Cullen had a copy of Pechey’s translation in his library See Anon, *A Catalogue of Medical Books* (Edinburgh: Royal College of Physicians of Edinburgh, 1792), 124 (Held at RCPE, Strong Room, SN 6.3). For the passage in Pechey, see Thomas Sydenham, *The Whole Works of That Excellent Practical Physician, Dr. Thomas Sydenham. The Tenth Edition*, trans. John Pechey (London: W. Feales, R. Wellington, J. Wellington, A. Bettesworth, F. Clay, 1734), 393-4. In my text, I use Latham’s more accurate translation from 1850.

which were derived from facts themselves, as opposed to philosophical conjectures, are ‘stable and permanent’. In fact, “although the practice of medicine, to one who looks at the arrangement of writers only, appears as if it arose out of hypotheses, the truer view is that the hypotheses themselves, so far as they are true and genuine, themselves originated in practice...”⁸⁷ Sydenham says that this was his own approach, for he formed his hypotheses from the phenomena, not the other way around. This shows that, in fact, theory and observation go hand-in-hand. “Had I begun with my hypotheses,” Sydenham writes, then “I should have shown the same want of wisdom that a builder would show who began with the roof and tiles, and ended with the basement and foundation. But it is only those who build castles in the air that may begin at either end indifferently.”⁸⁸ Cullen thought that, like Sydenham, the good practitioner must seek for theory to unite observations and facts. And furthermore, every conclusion and rule must be disciplined by the results of observation and experiment; judicious practitioners ought, in Cullen’s words, to “be directed by Observation to correct every Part of their System.”⁸⁹

Observations are united into theory by the method of induction, which involves reasoning “from a number of facts, relating to the Same Subject, as all agreeing in one particular, taken together to form a general conclusion, which we may employ as a principle in our after reasonings.”⁹⁰ And if induction is the preferred method of medical reasoning, then the truth of its conclusions “must depend upon the exactness of the facts and especially upon the number of them being tolerably compleat [*sic*] with respect to the Subject of the conclusion.”⁹¹

⁸⁷ Thomas Sydenham, *The Works of Thomas Sydenham, M.D. Translated From the Latin Edition of Dr. Greenhill with a Life of the Author by R. G. Latham, M.D. In Two Volumes. Vol. II* (London: Sydenham Society, 1850), 173.

⁸⁸ *Ibid.*, 173.

⁸⁹ HPa, 33.

⁹⁰ MS Cullen 326, 1r-1v. Cullen sometimes refers to the method of induction as the Synthetic method, e.g. in his 1766-67 lectures on the Institutions, he tells his students “We must employ more or less of the Sunthetic [*sic*: Synthetic] Method, & mus[t] unite our Facts; It will be necessary [*sic*] in any Event but more so at the present.” See WUSL, 1:59. For some thoughts on the history of scientific methodology, including hypotheses and induction, see Larry Laudan, *Science and Hypothesis: Historical Essays on Scientific Methodology* (Dordrecht: D. Reidel, 1981).

⁹¹ *Ibid.*, 2v.

In fact, the state of medicine has always been a function of the accuracy and number of facts available and highlighted as significant.⁹² It is now generally agreed, Cullen told his students, especially in light of the example of Sydenham, that “in all medical reasonings we must proceed by the method of induction for which facts more easily acquired are necessary and for which as we have said before a large Stock of facts is especially the necessary foundation.”⁹³ Cullen admits that we do not yet have a large enough collection of reliable facts “to form a tolerably compleat [*sic*] and perfect System. None such indeed is to be hoped for; but I still maintain that a System as well as we can make it is to be attempted...”⁹⁴ This is because forming a System out of available facts is still the best way to collect and remember them. In addition, it makes them useful by leading us “to that diligence and attention in observation and experiment that are the only means of Supplying our deficiencies.”⁹⁵

Judicious practitioners like Sydenham could practice without being under the sway of theory because, according to Cullen, they also cultivated broad and comprehensive views of the animal economy. They knew where theory was reliable, and where it was shaky; where speculation was unavoidable and where unacceptable. In contrast, “weak men who have had little extent or experience in reasoning are most liable to be attached to frivolous Theories,” whereas “the truly Judicious Practitioners & good Observers are such as have the most extensive views of the Animal Oeconomy, & know best the true amount of the present state of Theory and therefore know best where to stop in the Application of it...”⁹⁶

Features of Cullen’s Inductive Dogmatism

Cullen’s interpretation of Sydenham provides us with the essential features of his own medical epistemology, what I am calling his *inductive Dogmatism*. It was a species of Dogmatism, to be sure, but one which Cullen thought “will also

⁹² Ibid., 1v.

⁹³ Ibid., 2v.

⁹⁴ Ibid., 3r.

⁹⁵ Ibid., 3v.

⁹⁶ HPe, 34.

comprehend the whole of the Empiric.”⁹⁷ For Cullen, the “Provinces of Reason and Experience”—Dogmatism and Empiricism—were truly inseparable.⁹⁸ Like Sydenham, the ideal practitioner would collect a large stock of accurate facts and, through careful induction, unite them into a more general theory. This was the product of broad and comprehensive views of both the present state of medical theory, as well as of the accurate and significant facts available.

At least in general outline, Cullen’s epistemology was not so different from that of some of his fellow professors of medicine, even those with whom he disagreed on many other subjects. Take, for instance, John Gregory. He also espoused, at least nominally, a kind of inductive Dogmatism. Gregory wrote that “I am therefore of opinion, that the best method of teaching [medicine], is to unite the synthetic method, which is most commodious for communicating knowledge, with the analytic one, which leads to improvements and inventions.”⁹⁹ And, like Cullen, he did not think that poor reasoning was cause to give up theory in medicine, for “false reasoning is not more common in physic than in law, in divinity, or in the common conduct of life; yet no one ever insinuated, that we ought to abandon the use of our reason in any of these subjects.”¹⁰⁰

Both Gregory and Cullen, being academic physicians themselves, had an interest in defending the value of learned medicine and thus a form of Dogmatism. This is not to say they agreed on the particulars; Cullen was surely more willing to defend Dogmatism than Gregory. And Gregory was much more of an advocate of the popularisation of medicine, outside the hands of the profession, than Cullen was.¹⁰¹

⁹⁷ DPP, 19.

⁹⁸ GPL, 56.

⁹⁹ John Gregory, *Lectures on the Duties and Qualifications of a Physician* (London: W. Strahan, T. Cadell, 1772), 203.

¹⁰⁰ *Ibid.*, 147-8. Lawrence has also noted both Gregory and Cullen’s support of Dogmatism in medicine. See Christopher Lawrence, “Ornate Physicians and Learned Artisans: Edinburgh Medical Men, 1726-1776,” in *William Hunter and the Eighteenth-Century World*, ed. William F. Bynum and Roy Porter (Cambridge: Cambridge University Press, 1985), 170.

¹⁰¹ Gregory thought, in fact, that the slow progress of medicine was due “partly from the manner in which it has been usually taught, and partly from its having been confined to a set of men who lived by it as a profession.” See *Lectures on the Duties and Qualifications of a Physician*, 197. Cullen did not agree with Gregory here, especially his second claim. For more on this, see my discussion in Chapter 5.

Nonetheless, Gregory and Cullen's shared assumptions here are instructive, for they show that, at least with respect to medical epistemology, differences among learned physicians were less notable than the chasm that separated them from other medical practitioners.

Still, even compared to his colleagues, Cullen's inductive Dogmatism—at least his presentation of it—was distinctive. He offered a much more detailed and full-throated philosophical defence of Dogmatism. This derived from two sources: first, his awareness of the pervasiveness of reasoning in medicine and natural philosophy, even in the simple act of collecting facts. For Cullen, “the Facts of Physic are more frequently the Inferences of Reason than the simple Objects of Sense...”¹⁰² It was a product, as well, of his fairly rigorous (if not absolute) scepticism about the acquisition of knowledge, including the epistemological difficulties inherent to any kind of Empiricism. Dogmatism was, of course, not without its fallacies; yet there was no avoiding reasoning, and thus some Dogmatism was always necessary.

He wanted to impress upon his students the difficulties inherent to both approaches, while also underscoring the necessity of Dogmatism. He told them that “Every body admits the Use of Experience, and the Necessity of consulting it, but few are aware of its being exposed to much Fallacy, and that we have more false Facts obtruded upon us & subsisting in our Books than false Reasonings.”¹⁰³ On the other hand, while everyone claimed to know the fallacies of theory, “very few are aware that while they declare against it in general they themselves employ it on particular Occasions too freely, and with more Mischief because of their general Prejudice.”¹⁰⁴ This was the broad, balanced approach to medical epistemology that Cullen taught to his many students.

A Defence of Learned Medicine

¹⁰² GPL, 59. This feature of Cullen's epistemology has been especially emphasised by Barfoot. See “Philosophy and Method”, 120-1.

¹⁰³ GPL, 47.

¹⁰⁴ *Ibid.*, 48.

Now that we know the features of Cullen's medical epistemology, we are in a better position to see its attraction for him. In other words, what did it allow him to do? If nothing else, it gave him the ammunition to launch a robust defence of the authority and value of learned medicine. In the context of his pedagogy, and the introduction to his course, he wanted to convince his students that this approach to medicine would transform them into more valuable physicians.

He had some competition. Cullen was defending learned medicine against attacks from a number of quarters. He was, after all, initiating young men into the profession of medicine, and he, as a senior figure and authority of learned medicine, wanted to inculcate a healthy respect in them for learned medicine against its opponents, which included, among others, uneducated practitioners and medical popularisers.

§1. Against Common Practitioners

Cullen had the basic task of explaining to his students why they should study learned, or university medicine, in the first place. How would it distinguish them from the common Practitioner? He stated, in a number of places, that he hoped to turn his pupils into “not only more ornate but also more skillful Physicians.”¹⁰⁵ This required extensive knowledge of Dogmatic medicine, and a certain amount of erudition, so that his pupils would avoid the pitfalls that so many uneducated practitioners fell into, by not being able to think for themselves, or thinking they could avoid theory, when they engaged in it. Thus, in a broad sense, Cullen used Dogmatism to defend learned medicine against the claims and practices of the non University-educated practitioner.

Cullen depicted common practitioners as those who were often “incapable of any Theory & who can therefore follow no other Measure but that of imitating as

¹⁰⁵ DPP, 19. For more on the trope of ‘ornate physicians’ in Edinburgh, see Lawrence, “Ornate Physicians and Learned Artisans”.

well as they can the Fashion established by others.”¹⁰⁶ They followed general rules and established practices “because they either have the same Theory or none at all.”¹⁰⁷ Indeed, the ‘Common Run of Practitioners’ “have neither the Capacity, the Application nor therefore the Erudition, that is necessary to the Study of a System, but they can learn somewhat of the Routine that is for the Time in Fashion, & this they think is learning the established Practice.”¹⁰⁸

But the learned physician would know, in contrast, that “the established Practice has been established by Dogmatism & cannot be understood or applied without understanding the dogmatical Foundation of it...”¹⁰⁹ The trained physician, rather than following established practice, Cullen seems to imply, could dictate fashion and practice by knowing its foundation in Dogmatism.

One of the points of teaching his students the history of medicine was to cultivate in them a certain amount of medical erudition. “To Gentlemen entering upon any study, it seems sufficiently proper for them to have at least a general idea of the former and present state of the Study they are to engage in.”¹¹⁰ Cullen thought “medical erudition is in danger of being neglected,”¹¹¹ and yet his students would need such erudition after they left university as they continued to improve themselves as medical practitioners.¹¹² For them to become ornate physicians, medical erudition and an acquaintance with the history of physic were essential.¹¹³

For all these reasons, University-educated physicians who diligently studied the Dogmatic plan would be in a better position to show their patients that they, compared to common practitioners, were the more skillful, ‘ornate’ practitioner.

¹⁰⁶ GPL, 69-70.

¹⁰⁷ Ibid., 70.

¹⁰⁸ Ibid., 72.

¹⁰⁹ Ibid., 72.

¹¹⁰ HPb, 1.

¹¹¹ Ibid., 1.

¹¹² Insert J, 1v.

¹¹³ “...it is absolutely necessary,” he says, “to study the literary history of Physic, to learn the character of authors and therefore the period at which they lived, the schools they belonged to, and the systems they were engaged in. These particulars are to be learned only from the history of Physic and it is a study therefore that I earnestly recommend to all my pupils [*sic*]” (Ibid., 1v).

§2. *Against Popularisers*

The common practitioner, who did not know learned medicine, was not the only opponent of Dogmatic, learned medicine. Some physicians, learned or otherwise, had begun to popularise aspects of learned medicine, especially for the literate, middling ranks of society, which constituted a burgeoning reading public in Great Britain.¹¹⁴ This concerned Cullen because he did not think that medicine was an art open to everyone. It required more study and effort than most were capable of, and trying to popularise it risked more than it promised.

In his General Plan, Cullen ridiculed the Swiss physician and writer, Samuel-Auguste Tissot (1728-1797), for his popularisation of medicine in popular works like *Avis au peuple sur sa santé* (1762) and *De la santé des gens de lettres* (1768).¹¹⁵ “Mr Tissot or others may attempt to make old Women Physicians themselves if they please on Such a plan but they will never in that way make real physicians or practitioners.”¹¹⁶ In another lecture, Cullen made the same point, including criticism of women who read Tissot, as well as a thinly veiled dig at the Scottish author of the very successful *Domestic Medicine*, William Buchan: “The Painters have a maxim that the man who taught himself had a fool for his master. I will not apply this to the Gentlemen of the English Universities but I think it will apply very well to many good Ladies nowadays who think they can learn Physic and become Practitioners merely by reading Tissot’s *Avis au peuple* another such system of Domestic medicine.”¹¹⁷

¹¹⁴ Melton’s description of reading in the eighteenth century is illustrative: “As a social and cultural act, however, reading underwent a fundamental transformation in the eighteenth century. Not only did the production of print rise significantly; what readers read also changed. Not only did more people read; people also read more... Even as Enlightenment writers and critics assigned this public unprecedented importance as an arbiter of taste, they also grappled with the intractable problem of how to shape, control, and even define it” (81). See James Van Horn Melton, *The Rise of the Public in Enlightenment Europe* (Cambridge: Cambridge University Press, 2001), Ch. 3. For an assessment of literacy in Enlightenment Europe, see Robert Allan Houston, *Literacy in Early Modern Europe: Culture and Education 1500-1800* (London: Longman, 2002).

¹¹⁵ For more on Tissot, see my discussion in Chapter 5.

¹¹⁶ GPL, 61.

¹¹⁷ MS Cullen 325, 2r (my italics). This is the handwritten (probably in Robert Cullen’s hand) introductory lecture to Cullen’s 1779-80 course on the Practice of Physic. There is no date attached to this lecture, but from internal evidence 1779-80 seems most likely.

Cullen was a traditional defender of medical expertise and the authority of learned medicine. In his unpublished *Treatise of the Preservation of Health*, he was apparently willing to popularise the principles of hygiene, but not how to treat and cure disease.¹¹⁸ Cullen worried that other physicians might think he was “endeavouring to give a great part of the System of physic to all men promiscuously...[producing] a Set of Smatterers in physic who may presume upon their imperfect and incompleat [*sic*] knowledge to prescribe to themselves and others with the great hazard of both or with the utmost impertinence to dispute with physicians and to turn aside their best advice.”¹¹⁹

But Cullen did not think this would happen because he was hardly providing much knowledge of the principles of medicine, and what he did explain would only show his readers how much more there was to know.¹²⁰ He might be able to help these readers learn how to preserve their health, but “with regard to all smattering in that business I assure my readers that it is a dangerous measure and that there is no part of art or Science to which the following distich is more applicable than to the art of curing diseases.”¹²¹ Then he quotes one of his favourite couplets from Pope, which well illustrates his stance on the popularisation of medicine: “A little learning is a dangerous thing / Drink deep or taste not the Pierian Spring”¹²²

Cullen’s point was that Dogmatism—the core of learned medicine—was not open to all; it required intensive training and expertise, both of which conferred a certain amount of authority on the learned physician. Cullen warned his students that those who tried to circumvent this authority and open medicine up to everyone were creating a perilous situation. Learned medicine was in the hands of trained, erudite physicians—and ought to remain so.

There may have been other reasons for Cullen’s adoption of inductive Dogmatism, but at the very least, it allowed him to underscore the authority of the

¹¹⁸ See Chapter 5 for more on this. Cullen’s unfinished and unpublished draft for his *Treatise of the Preservation of Health* can be found at MS Cullen 335 & 336.

¹¹⁹ MS Cullen 335, 14.

¹²⁰ *Ibid.*, 14.

¹²¹ *Ibid.*, 15.

¹²² *Ibid.*, 15. The original couplet comes from Part II of Pope’s *An Essay on Criticism* (1711).

kind of learned medicine that he taught and practiced. And this, in turn, showed his pupils why they were paying to learn from him.

II. Cullen's Medical Ideology: Systematic Eclecticism

In addition to his medical epistemology, Cullen also taught his pupils a medical ideology. This ideology, which I refer to as his *systematic Eclecticism*, was not unrelated to his inductive Dogmatism. Although Cullen wanted his pupils to use observation and experience to check the excesses of theory, this was not enough. By studying theory and System, they were at risk of becoming too attached to a favoured one, while they neglected the virtues of others. Only by approaching their studies with a healthy dose of eclecticism would they be able to form their own System, composed of the most accurate facts from a variety of approaches. In this way, they would avoid the dangers of sectarianism.

Cullen's systematic Eclecticism was a fairly typical variety of eclecticism in the Enlightenment, possibly derived from earlier German debates on the topic. It was anti-sectarian, encouraged a degree of scepticism, and emphasised the ability to think for oneself, especially by comparing the merits of previous opinions. Yet it was slightly unusual in that it placed a high value on Dogmatism; that is, it was 'systematic', whereas more traditional versions were anti-System. It was also coloured by its particular anxiety about religious sectarianism; Cullen's eclecticism was largely secular in tone.

Cullen's medical ideology served a variety of purposes. Pedagogically, I suggest it was an insightful way to encourage his students to become more involved in their learning. Professionally, Cullen's eclecticism allowed him to manage the consequences of some of his more controversial views. And finally, for Cullen personally, I speculate that eclecticism was especially dear to him, on account of his unorthodox religious views, views he may have developed while growing up in the unsettled religious atmosphere of early eighteenth-century Glasgow.

In order to explicate Cullen's medical ideology, we first need to understand eclecticism during the Enlightenment.

Eclecticism in the Enlightenment

Recent work on eclecticism has focused on its popularity in late seventeenth- and early eighteenth-century Germany, especially as advocated by a handful of German professors, including J. C. Sturm, C. A. Heumann, Christian Thomasius, and J. J. Brucker, among others. While no comparable amount of work has been done on the Scottish context, there is reason to believe, as I show below, that Cullen was familiar with the German discussions.

U. J. Schneider has argued that eclecticism, at least during the early Enlightenment in Germany, "was used by those who did not want to be regarded as dogmatic, sectarian, or systematic thinkers."¹²³ Eclectics advocated "a special way of philosophizing on the basis of the avoidance of dogmatism..."¹²⁴ Donald Kelley links eclecticism with the notion of the 'liberty of philosophizing'; its adherents "rejected the notion of 'Magister dixit' in favor of the old Horatian motto, 'I am not bound over to swear as any master dictates' (*non jurare in verba magistri*)."¹²⁵ As the German professor of law, Christian Thomasius (1655-1728), put it in 1688 in his *Introductio ad philosophicam aulicam*, "I call eclectic philosophy not what depends on the teaching of an individual or on the acceptance of the words of a master, but whatever can be known from the teaching and writing of any person on the basis not of authority but of convincing arguments."¹²⁶

Eclecticism was less a coherent philosophical doctrine than an intellectual point of view.¹²⁷ The eclectic, at least in early Enlightenment Germany, was against sectarianism, dogmatism, and overly systematic philosophical doctrines. He valued

¹²³ Ulrich Johannes Schneider, "Eclecticism Rediscovered", *Journal of the History of Ideas* 59, no. 1 (1998): 174.

¹²⁴ *Ibid.*, 177.

¹²⁵ Donald R. Kelley, "Eclecticism and the History of Ideas", *Journal of the History of Ideas* 62, no. 4 (2001): 581.

¹²⁶ Quoted in *Ibid.*, 584.

¹²⁷ Schneider, "Eclecticism Rediscovered", 177.

independence of thought and the freedom to philosophise, without blindly submitting to the words and teachings of any one individual. J. J. Brucker (1696-1770) crystallised this point of view in his influential *Historia Critica Philosophiae* (1742-44),¹²⁸ when he wrote that:

Many independent and exalted geniuses have arisen, who, despising the servile prejudice of yielding implicit deference to the decisions of the ancients, have determined, by the vigorous exertions of their own faculties, to investigate certain and universal principles for themselves, and upon this foundation to frame a system of opinions, which should be truly and properly their own. They have not, indeed, disdained to consult the records of ancient wisdom, but they have admitted nothing as true which their reason and judgement have not approved...¹²⁹

Eclecticism was also, depending on its context, connected to wider issues and disputes. Schneider links it to German debates about “freedom of teaching and research; independence from authority, both political and theological; and the conditions for forming responsible judgements and reasonable forms of discussion...”¹³⁰ Adherents used their eclecticism “as an additional weapon in the fight against prejudice.”¹³¹ This meant fighting against restrictions on religious perspectives or rejections of critical, secular scholarship, both of which eclectics had advocated.¹³² Finally, eclecticism served various purposes in the university setting:

¹²⁸ For more on Brucker and his work, see Michael Albrecht, *Eklektik: Eine Begriffsgechichte Mit Hinweisen Auf Die Philosophie-und Wissenschaftsgeschichte* (Stuttgart-Bad Cannstatt: Frommann-Holzboog, 1994); and Jacob Brucker (1696-1770): *Philosoph Und Historiker Der Europäischen Aufklärung*, ed. Wilhelm Schmidt-Biggemann and Theo Stammen (Berlin: Akademie Verlag, 1998).

¹²⁹ William Enfield, *The History of Philosophy, From the Earliest Times to the Beginning of the Present Century: Drawn Up From Brucker's Historia Critica Philosophiae. In Two Volumes. Vol. II* (London: J. F. Dove, 1819), 468. This is not a literal translation of Brucker's work. Enfield's aim was, instead, to provide the ‘general meaning and spirit’ of it. As he says in the preface to Volume I, “In regard to language, I have found it wholly impracticable to follow my author... Instead of *translating* the original, I have, therefore, endeavoured to give a faithful *representation* of its general meaning and spirit.” See William Enfield, *The History of Philosophy, Vol. I* (London: J. F. Dove, 1819), iv. I would prefer to use an accurate, literal translation here, of course, but for my purposes, I think Enfield is sufficient—my argument does not depend on a close reading of Brucker's word choice. In any case, Donald Kelley quotes from Enfield in his own discussion; in this context, that is enough of a vote of confidence for me.

¹³⁰ Ulrich Johannes Schneider, “Eclecticism and the History of Philosophy,” in *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*, ed. Donald R. Kelley (Rochester: University of Rochester Press, 1997), 86.

¹³¹ *Ibid.*, 86.

¹³² *Ibid.*, 95.

Schneider notes its popularity among young academics especially and suggests that it may have helped them navigate the hierarchy of university politics.¹³³

This is not to suggest that eclecticism was a monolithic, widely-agreed-upon set of assumptions, or that it did not change over time. Especially because it was more of an intellectual stance than a body of substantive doctrines, it is hard to identify, at any particular time, what its most prominent features were. And they were not set in stone.

Outside of Germany, many of these features of eclecticism were adopted. In the seventeenth century, the English physician Walter Charleton (1619-1707) highlighted some of the assumptions of the eclectic school. They “adore no Authority, pay a reverend esteem, but no implicate [*sic*] Adherence to Antiquity, nor erect any Fabrick of Natural Science upon Foundations of their own laying: but, reading all with the same constant Indifference, and aequanimity [*sic*], select out of each of the other sects, whatever of Method, Principles, Positions, Maxims, Examples, &c. seems in their impartial judgements, most consentaneous to *Verity*...”¹³⁴

The French *philosophe* D’Alembert, in the mid-eighteenth century, provided a prominent definition of *Eclectisme* in the *Encyclopédie* entry under that title:

The eclectic is a philosopher who, trampling underfoot prejudice, tradition, antiquity, general agreement, authority—in a word, everything that controls the minds of the common herd—dares to think for himself, returns to the clearest general principles, examines them, discusses them, admits nothing that is not based on the testimony of his experience and his reason; and from all the philosophies he has analyzed without respect and bias he makes for himself a particular and domestic one which belongs to him...¹³⁵

¹³³ Ibid., 96.

¹³⁴ From his *Physiologia Epicuro-Gassendo-Charltoniana: or a Fabrick of Science Natural, upon the Hypotheses of Atoms* (London, 1654), 4. Quoted in Stephen Gaukroger, *The Emergence of a Scientific Culture: Science and the Shaping of Modernity 1210-1685* (Oxford: Oxford University Press, 2006), 218. For recent work on Charleton, see Emily Booth, ‘*A Subtle and Mysterious Machine*’: *The Medical World of Walter Charleton (1619-1707)* (Dordrecht: Springer, 2005).

¹³⁵ This article comes from *Encyclopédie, Ou Dictionnaire Raisoné Des Sciences, Des Arts Et Des Métiers. Vol. 5*, ed. Denis Diderot and Jean Le Rond D’Alembert (Paris, 1755). The translation is by A. A. Long, as provided in Pierluigi Donini, “The History of the Concept of Eclecticism,” in *The Question of “Eclecticism”*: *Studies in Later Greek Philosophy*, ed. John M. Dillon and A. A. Long (Berkeley: University of California Press, 1996), 19. Some commentators (e.g. Donini) suggest that the article in question was written by Diderot. Gaukroger thinks D’Alembert wrote it in draft form, and I follow his suggestion in my discussion.

In this high Enlightenment version of eclecticism, which was ultimately derived from Brucker's work, there is a bias against all prejudice, antiquity, tradition, and authority, with an accompanying reverence for the philosopher who thinks for himself.¹³⁶ This philosopher is one who returns to general principles, and after suitable examination and discussion, perhaps even some scepticism, embraces only those that adhere to experience and reason. Indeed, being eclectic, he ought to construct his own philosophy, one that belongs to him alone, out of all the philosophies he has analysed. As we shall see, it is this model of the eclectic that Cullen held up to his students as an example to be emulated.

Routes of Eclecticism: From Germany to Scotland

It is unclear to what extent Cullen was familiar with the German debates about eclecticism. There is evidence that he was: the catalogue of his library, compiled shortly after his death, contains J. J. Brucker's abridgement of his influential critical history of philosophy, which spread the notion of eclecticism far beyond Germany.¹³⁷ And it is likely Cullen was also familiar with J. C. Sturm's (1635-1703) chemical work and thus possibly his eclectic sympathies.¹³⁸

Of course, discussions of eclecticism could have found their way to him via other routes. Cullen may have been more familiar with the Dutch context. Indeed, he specifically praises Boerhaave for being a fair-minded eclectic and, as Cullen describes in his history of medicine lectures, Boerhaave maintained the eclectic habit of avoiding sectarian prejudice. This 'judicious Eclectic,'¹³⁹ Cullen noted, who "had

¹³⁶ Donini suggests that the article "Eclectisme" was "in fact derived from, or almost translated from, Brucker" (19). He says it is comparable to Brucker's *Historia Critica*, 4.2, p. 4. Though I have not verified this myself, a comparison of the Enfield 'translation' with D'Alembert's article does suggest the latter was derivative from Brucker's original.

¹³⁷ The catalogue entry reads: "Brucker (J.) *Institutiones Historiae Philosophicae*, 8vo, Lips 1756." See Anon, *A Catalogue of Medical Books*, 20. Incidentally, for his own understanding of the history of philosophy, Goethe used 'der kleine Brucker' as well. See Humphry Trevelyan, *Goethe & the Greeks* (Cambridge: Cambridge University Press, 1981), 24.

¹³⁸ The catalogue of Cullen's library lists one work by Sturm: "Sturmius (J. C.) *Collegium Experimentale*, 4to, fig. perf. comp. Nor 1676." See Anon, *A Catalogue of Medical Books*, 124.

¹³⁹ HPd, 35.

neither the attachments to nor the prejudices of a Sectary”¹⁴⁰ managed to combine the doctrines of “the Mechanicians, Cartesians and Chemists and admitted also the doctrine of Plethora, the only remains of the Galenists which the discovery of the Circulation tended to support.”¹⁴¹ Cullen praises him by agreeing with Quesnay’s description of Boerhaave as the “Le Restorateur de la Medicine collective, ou de la Medicine d’Hippocrate.”¹⁴² Indeed, Cullen says he “would give Dr Boerhave [*sic*] as the best Model in Physic.”¹⁴³ His system was as complete as the state of knowledge and times would allow, so that “he is justly allowed to have had the greatest share and the greatest merit in forming our present system,” even if he was not without faults, for “perfection is not given to man; and it is no disparagement to Dr Boerhaave to say that he had it not.”¹⁴⁴

This was not idle praise, even if Cullen rejected Boerhaave’s principles of medicine. For there do seem to be similarities between Cullen’s views and Boerhaave’s, especially regarding sectarianism.¹⁴⁵ Boerhaave, in his orations, warned against the evils of sectarianism and the temptations to prejudice. His eclecticism shines through when he describes, for instance, the ideal physician who is able to avoid uncertainties and follow the guide that Nature provides. But who can be this ideal physician? “Only he...” Boerhaave says, “who is free from all sectarianism, unfettered by any preconceived ideas, devoid of all leanings towards prejudice; he who merely learns, accepts, and relates what he actually sees.”¹⁴⁶ Cunningham argues that Boerhaave’s message was fairly consistent on this topic; Boerhaave believed that “if pursued in an open-minded and disinterested way, the truths of medicine are everywhere accessible; but if one brings in *preconceptions*, if one tries

¹⁴⁰ HPe, 37.

¹⁴¹ HPd, 35.

¹⁴² HPe, 37.

¹⁴³ *Ibid.*, 38.

¹⁴⁴ HPd, 35.

¹⁴⁵ Yet Boerhaave was in some ways more eirenic than eclectic, more concerned with reconciling religious disputes than Cullen was. Cullen wanted freedom *from* religious interference, as I discuss later in this chapter.

¹⁴⁶ Quoted in Cunningham, “Medicine to Calm the Mind”, 50. The original comes from Boerhaave’s oration ‘On Commending the Study of Hippocrates’ (1701). See Herman Boerhaave, *Boerhaave’s Oration*, ed. Antonie M. Luyendijk-Elshout and E. Kegel-Brinkgreve (Leiden: Leiden University Press, 1983), 69.

to make nature and medicine fit the dreamt-up principles of some sect or other, then one perverts the truth and stops the progress of the sciences.”¹⁴⁷

The point here is not to determine the precise origins of how Cullen first learned of eclecticism but simply to show that there is a plausible route from the early Enlightenment debates to Cullen. What we would like to know now are what aspects of it he accepted and which he rejected. What were the features of eclecticism that he praised for the benefit of his students?

Features of Cullen’s Systematic Eclecticism

Cullen’s eclecticism contained a number of familiar features: it was anti-sectarian, valued some degree of scepticism, and encouraged students to think for themselves. Yet it was still Systematic. Cullen encouraged his pupils to form their own System, from the best of what was concluded in the past, properly restrained by observation and reflection. It was, that is to say, quite similar to the Bruckerian formulation of the true eclectic, the *Eclectisme* D’Alembert had popularised in the *Encyclopédie*, but with a System-friendly twist.

§1. Anti-Sectarianism

If we return to Cullen’s portrait of Sydenham, we see that he depicts him as free from the perils of sectarianism. It was Sydenham’s great merit that he was never educated into a particular System and thus not presented with sectarian thinking at a young age. Instead, “Dr. Sydenham was bred to Physic, rather by his own Industry than by any instruction, & therefore entered upon it free from the Attachments or Prejudices of any Sect.”¹⁴⁸ While he was aware of the writings of many authors, he was not satisfied with most of the theories he encountered, “Thus it is, that from the example of Sydenham & the general Method of Philosophizing now established, the practice of Physic is now, for the most part, cultivated free from the attachments or

¹⁴⁷ Cunningham, “Medicine to Calm the Mind”, 55.

¹⁴⁸ HPa, 32.

prejudices of any Sect. Even our Systems are much enlarged in their general plan, & however they may differ from each other in particulars, this affects only weak Minds with the spirit of a sect.”¹⁴⁹

Cullen praised the anti-sectarian leanings of Sydenham because he wanted to emphasise the dangers of medical sectarianism. He does this, in part, through his history of medicine: for instance, he noted that by the middle of the 17th century, “Physicians were divided between the two Sects of Chemists and Galenists, & as they took to one party or the other, they exhibited a different state of the Practice of Physic.”¹⁵⁰ Cullen describes the basic biases of both sects—whether they were partial to remedies or System, for instance—and then notes how things could have been resolved. The Galenists could have adopted the more effective chemical remedies advocated by the Chemists, but they did not. Instead this compromise “was again defeated by the violence of the Sectaries, who became not only bigots to the peculiarities of their own Sect, but also violent enemies to every particular of the other...”¹⁵¹ But, as mentioned above, the Chemists were a sect, like their rivals. “They never were men of liberal and comprehensive views & they formed only a short imperfect System of Acid & Alkali, which neither led to the study of diseases, nor to the improvement of remedies.”¹⁵² Thus, they were “still within the very narrow Bounds of a sect...”¹⁵³

Indeed, Cullen thought that “for the most part [the Practice of Physick] has always been in the hands of Sectaries, and therefore guided by persons of narrow views, and who have therefore retarded its general improvements. I will not say as Dr Boerhaave does, that it is yet absolutely *ab omni secta liberam*, for there will

¹⁴⁹ HPe, 34-5.

¹⁵⁰ *Ibid.*, 28. It is worth pointing out that Cullen structures his discussion of the history of medicine around the debate between the Empiricists and Dogmatists. In fact, it provides its underlying structure, for Cullen divides the history of Physic into seven different periods, “at each of which,” he tells his students, “I suppose the art to have been in a different State” (HPd, 1). That is, each period ends with a ‘Revolution’ that produces a new state of Physic. And, within this, Cullen characterises the state of medicine in a particular period by whether medicine was cultivated primarily on an Empirical or Dogmatic plan.

¹⁵¹ HPe, 29.

¹⁵² *Ibid.*, 31.

¹⁵³ *Ibid.*, 31.

always be weak prejudiced [men?], in favours [*sic*] of their particular System, & even bigotted to it and averse to every thing that differs from their own opinions.”¹⁵⁴

In the current era of Physic, the prime example of sectarian thinking was, Cullen thought, the Stahlian System of medicine.¹⁵⁵ The German chemist and physician, Georg Ernst Stahl (1659-1734), thought that the body was directed and governed by the rational Soul “and by this he established the notion of a compleat [*sic*] intelligence and absolute power in the Soul with respect to the body.”¹⁵⁶ Cullen was not satisfied with this, however. He thought that Stahl’s “general principle truly [*sic*] supersedes all reasoning concerning the human body. Accordingly we truly [*sic*] find that the Stahlians have been remarkably negligent in Anatomy, and have declared absolutely against all Mechanical reasoning; and it is in proof of the opposition to Mechanic[al] reasoning that they admit of sympathetic remedies, & such like that were received no where but in the school of Helmont.”¹⁵⁷ Further, their trust in the healing power of nature meant that “they have had always a feeble practice; and they are noted enemies of the Bark, Opium, and other powerful remedies which they judge may interrupt the operations of nature.”¹⁵⁸ In general, Stahlian theory was a bane on their practice: “See the bad influence of Theory on the Practice of the Stahlians...But when Men give way to it, there is no bound to

¹⁵⁴ Insert T, 1r.

¹⁵⁵ The literature on Stahl is growing quite large, but only a small portion of it is in English. To begin, see the short overview in Irene Strube, *Georg Ernst Stahl* (Leipzig: B.G. Teubner, 1984). For the classic study, see Johanna Geyer-Kordesch, *Pietismus, Medizin Und Aufklärung in Preussen Im 18. Jahrhundert: Das Leben Und Werk Georg Ernst Stahls* (Tübingen: Max Niemeyer Verlag, 2000). For an overview of some of these themes in English, see Johanna Geyer-Kordesch, “Georg Ernst Stahl's Radical Pietist Medicine and Its Influence on the German Enlightenment,” in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and Roger K. French (Cambridge: Cambridge University Press, 1990). Other English language studies of note include L. J. Rather, “G.E. Stahl's Psychological Physiology”, *Bulletin of the History of Medicine* 35 (1961): 37-49; Lester S. King, “Stahl and Hoffmann: A Study in Eighteenth-century Animism”, *Journal of the History of Medicine and Allied Sciences* 19 (1964): 118-130; Roger K. French, “Sickness and the Soul: Stahl, Hoffmann and Sauvages on Pathology,” in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and Roger K. French (Cambridge: Cambridge University Press, 1990). For more recent work, see Ku-Ming Chang, “Motus Tonicus: Georg Ernst Stahl's Formulation of Tonic Motion and Early Modern Medical Thought”, *Bulletin of the History of Medicine* 78, no. 4 (2004): 767-803; Francesco Paolo de Ceglia, “The Blood, the Worm, the Moon, the Witch: Epilepsy in Georg Ernst Stahl's Pathological Architecture”, *Perspectives on Science* 12, no. 1 (2004): 1-28; and Francesco Paolo de Ceglia, “Hoffmann and Stahl. Documents and Reflections on the Dispute”, *History of Universities* XXII/1 (2004): 98-140.

¹⁵⁶ HPe, 35.

¹⁵⁷ HPd, 37.

¹⁵⁸ *Ibid.*, 37.

fanaticism & Superstition: & the Stahlian System has introduced a great variety of specificks, founded only on Superstition & vague Impossibilities...”¹⁵⁹

Their attention to nature did, however, have a redeeming feature: they were led “to study the history of diseases more diligently than any other modern school, and in many respects they have a great deal of Empiricism.”¹⁶⁰ Nonetheless, Cullen’s overall assessment of Stahl and his effects on medicine was quite negative, and he says so in strong terms: “In short the Stahlians have been liable to the greatest abuses of Theory, and both in their Theory & practice, have been affected with all the narrowness and prejudices of a Sect, and accordingly in their disputes with others have discovered all the Acrimony of Bigots. It is hoped that such a sect cannot subsist in these days, & happily two other Systems [of Boerhaave and Hoffmann], on a more liberal footing, have prevailed among us.”¹⁶¹

As Cullen pointed out in his *History*, medical sects and men of limited views hurt the cultivation of Physic. It led to imperfect, narrow Systems, like the one of the Chemists who “never were men of liberal and comprehensive views”, which ensured that they made only limited progress in the study and cure of diseases.¹⁶² Sectarian thinking “shuts out Experience” when experience ought to correct our theories.¹⁶³

§2. *Some Degree of Scepticism Necessary*

Cullen’s praise of Sydenham for being free from the attachments to any sect, as well as his suspicion of sectarian thinking, implies a scepticism of System in general, even though Cullen advocates Dogmatism. Some degree of scepticism is inherent to the eclectic stance, at least with respect to authority, received opinion, and sectarianism.¹⁶⁴

¹⁵⁹ NLS, MS 3535, 166-167. Note here Cullen’s aversion to superstition in medicine as well.

¹⁶⁰ HPd, 37.

¹⁶¹ HPe, 36.

¹⁶² Ibid., 31.

¹⁶³ Ibid., 31.

¹⁶⁴ There was, at times, a tension between eclecticism and a more radical kind of scepticism, at least in early Enlightenment Germany. See Martin Mulrow, “Eclecticism or Skepticism? A Problem of the Early Enlightenment”, *Journal of the History of Ideas* 58, no. 3 (1997): 465-477.

A corollary of this was that Cullen urged his students to be sceptical even of his own teaching, in part so that they could form a System for themselves. He emphasised that though having a System was useful, “still it is with a constant distrust of it as Such and that distrust too is always greater as the System is more general.”¹⁶⁵ Nonetheless, “How much So ever G[entlemen] I may seem to employ a System I assure you it is with a constant attention to the facts which form and establish it...I shall always give you the facts which may occasion any doubts of my System...But I shall thus give you the whole of the facts to be employed as your own judgement Shall think best.”¹⁶⁶

In what appears to be a preface of sorts to one set of his history lectures, Cullen tells his pupils that though university students were to learn the system that was delivered to them by their Professor, they should not simply receive it without some scepticism or awareness of how it compares to other points of view: “I should have a mean opinion of the genius of a student who should be satisfied with that, who should implicitly receive the opinion of his master without enquiring after those of others, without considering what doubts might be raised or what objections might be made to the system he had first imbibed. I maintain that such a Student would never understand even his own System sufficiently.”¹⁶⁷

Cullen pushed this scepticism a bit farther than some, though his was not an absolute, Pyrrhonian scepticism but one tempered by the demands of medical practice. Barfoot notes that Cullen's scepticism was “always of the mitigated kind” rather than absolute.¹⁶⁸ Citing some of Cullen's lecture notes, Barfoot depicts him as someone who was keenly aware of the limits of scepticism in daily life. In those notes, Cullen imagines himself sitting at home in his bedchamber, wondering whether to get dressed for work or not. He says that while he might be aware of the persuasiveness of the doctrines of sceptics, still, when his wife comes in and tells

¹⁶⁵ MS Cullen 326, 3v.

¹⁶⁶ *Ibid.*, 3v-4r.

¹⁶⁷ Insert J, 1-2. Note also the eclectic language used here, e.g. ‘who should implicitly receive the opinion of his master’, etc

¹⁶⁸ Barfoot, “Philosophy and Method”, 124.

him to fulfill his duties at the College, he realises his “Engagements are strong both in honour [and] interest[.]” So he decides to get dressed and go.¹⁶⁹

This is why, though it may initially appear otherwise, there is no tension between Cullen’s advocacy of Dogmatism and eclecticism (and the scepticism that goes with it). For while the eclectic would often rail against dogmatism, Cullen carefully and explicitly distinguished between Dogmatism and dogmatism. As he told his students in a clinical lecture from early 1774:

Every wise physician is a [D]ogmatist, but a dogmatical physician is one of the most absurd animals that lives...I have known none who were not dogmatists except those who seemed to be incapable of reasoning, or who were too lazy for it. On the other hand, I call him a dogmatical physician who is very ready to assume opinions, to be prejudiced in favour of them, and to retain and assert very tenaciously, and with too much confidence, the opinions or prejudices which he has already taken up in common life, or in the study of the sciences.¹⁷⁰

In the context of this distinction, Cullen described himself as “a [D]ogmatist, but I should be sorry if any person thought me dogmatical; for there are but few theoretical opinions which I have received or offered to communicate, with regard to diseases concerning which I am not ready to doubt, and to admit grounds for doubting, as soon as they are offered to me.”¹⁷¹

Scepticism, for Cullen, was a way of limiting the influence of sectarianism (and the dogmatism—lower ‘d’—that went with it) in medicine. Although the practice of medicine had usually been practiced by sects, Cullen had hope that the present era was different, “that generally more liberal Sentiments are entertained, that some degree of Scepticism prevails, or at least that the slow consented Academick doubt, prevents men from [*sic*: being] bigotted to a particular System, and leaves

¹⁶⁹ Ibid., 124. Barfoot is citing from CUL/2/1/8 (formerly catalogued as RCPE MS 28).

¹⁷⁰ TLC, 1:111. I am excerpting from Thomson here because I have not found the original notes in Cullen’s handwriting (though I am confident they exist). We know that this excerpt comes from a clinical lecture because Thomson’s extracts from those lectures indicate as much. See MS Cullen 714/06, 1r. Thomson implies here that Cullen’s clinical lecture from Jan. 31, 1774 is the source of the quotation.

¹⁷¹ Ibid., 1:111-12.

them open to be constantly corrected by observation of facts and further reflection.”¹⁷²

§3. System Still a Necessity but A System of One's Own

Being free from the attachments to any particular sect and cultivating some degree of scepticism did not mean abandoning System altogether, of course. That was impossible; we all reason. In any case, the most forceful objections against Dogmatism applied to all sciences, and no one was arguing that we should abandon them entirely. As Cullen says in his 1766-7 lectures, “The several parts of Dogmatism turn so much in a Circle that we are said not to know any of the Parts till we know the whole; but this Objection is common to it with all the Sciences. Tho’ I admit then general Objections yet we are masters of many usefull [*sic*] particulars in System, & I think we are at liberty to Cultivate it.”¹⁷³

The way forward was not to abandon System in general but to form one's own System, culled from the most exact facts, with as large a collection as possible, creating a broad base for a proper induction. Sydenham himself had done this. He “was bred in the schools of England wh^h [which] have always given little attachment to System; and partly from hence, and partly from his own good judgment, perceiving that the theories he had got gave him little assistance, he deserted them almost intirely [*sic*] and formed one of his own.”¹⁷⁴

This advice is echoed in a letter Cullen sent to one of his favourite pupils, Balfour Russell. He tells ‘Fourie’ that, in order to improve his knowledge of medicine, he should study various systems of Physic, in order to create his own System from his studies: “The System may be what you please but I would prefer the practice of physic as connected with your daily employment[.] I do not mean

¹⁷² Insert T, 1v.

¹⁷³ WUSL, 1:60.

¹⁷⁴ HPd, 32.

Boerhaave's System or Hoffmann's System or any other but a System which you are to make for yourself out of all of them."¹⁷⁵

III. The Appeal of Eclecticism

Cullen's systematic Eclecticism was a fairly typical version of Enlightenment eclecticism, though it did contain characteristics that did not fit the usual mould. First, as I have emphasised above, though the traditional eclectic was anti-System, Cullen was not; indeed he provided a robust defence of the need for System. He was, in other words, a *systematic Eclectic*. There was nothing contradictory in his support for both Dogmatism and Eclecticism, so long as we realise he was also a strong advocate of maintaining some degree of scepticism towards any particular System, as well as System in general (even if it was ultimately necessary). In fact Cullen's emphasis on the necessity of System connects his inductive Dogmatism to his systematic Eclecticism.

Another distinctive feature of Cullen's eclecticism was his worry about the intrusion of religious prejudices into the domain of medicine (and natural philosophy). His leanings were secular, or at least Deistic, in this regard. I speculate in more detail about his religious views near the end of this chapter, but suffice it to say that he held unorthodox opinions that would have been controversial in Calvinist Scotland. Perhaps for that reason he was especially attuned to the demands of religious authority. For Cullen, religious sectarianism led to superstition, enthusiasm and even fanaticism in medicine, as illustrated by the bad effects of the Stahlians.¹⁷⁶ Thus, unlike Boerhaave, who was as much an eirenecist as he was eclectic, Cullen

¹⁷⁵ MS Cullen 156, 1v.

¹⁷⁶ Cullen was hostile to anything that smacked of superstition. This hostility is apparent in his history of medicine lectures, when he is discussing the early history of physic. For instance, he ridiculed the 'natural state of Physic' for the use of "many charms, Incantations, Talismans, Amulets and other superstitious Remedies. But whatever propensity Mankind may be supposed to have to Superstition, I am still persuaded that those superstitious remedies will never have much place, but where the real and efficacious are unknown" (HPE, 6-7). In another formulation, Cullen linked priests to superstition directly: "It appears that the ministers of religion became the Sole possessors of this knowledge and as in most parts of the world the priests modelled every thing to the purposes of Superstition So they also managed the affairs of physic in a manner that could not very usefully promote the real knowledge of it. It is curious to observe the tenacity with which men adhere to every mode of Superstition" (Insert F, 1r).

was less concerned with reconciling different religious opinions and more worried about the intrusion of religious concerns into the medical domain.

Consider his worries about discussing the powers of the soul in the functions of the animal economy. He told his students in 1766-67 that “The supposition of the soul is very agreeable to the human heart, but it has on many occasions suspended, intercepted & disturbed our theory. I am cautious of admitting [*sic*] it because I do not know its operations; and I am for admitting [*sic*] mechanism as far as it will go.”¹⁷⁷ Indeed, when theorising about the human body, Cullen insisted that we consider laws of mechanism, non-perceptible causes, and the laws of perception itself before having recourse to the soul.¹⁷⁸ For, “If we resolve any of these into the arbitrary motions of the soul, we speak unintelligible [*sic*] Jargon.”¹⁷⁹

In his 1767-8 lectures, he provided some more general considerations about the role of religious principles in medicine and natural philosophy. Cullen believed that mechanical operations were the only ones we conceived of regarding the behaviour of matter in nature. There were also the operations of Spirit, to be sure, and we must ultimately “have recourse / to this as the foundation / of all energy & power”.¹⁸⁰ But we also must be cognisant that we are tempted to assume the Spiritual when we cannot perceive the mechanical¹⁸¹ and that it is particularly difficult, ‘perhaps impossible’, to trace the series of causes in nature back to the Spirit or prime mover.¹⁸² To say otherwise, “to Say that it / is impossible at any time to / go farther is checking Inquiry / & hurting Philosophy to no / purpose.”¹⁸³

Take the example of Cohesive Attraction. It has been “improperly referred to the Deity when / we have reason to believe only a link / of a very long chain.”¹⁸⁴ Or consider our knowledge of thunder. The Ancients would have thought it absurd “to

¹⁷⁷ WUSL, 1:287.

¹⁷⁸ WUSL, 2:5-6.

¹⁷⁹ *Ibid.*, 2:6.

¹⁸⁰ See CUL/2/1/5 (unpaginated), ‘Nervous System Recapitulation of No 4 & 5’, 4r (counting from the heading).

¹⁸¹ *Ibid.*, 4r.

¹⁸² *Ibid.*, 4r-5v.

¹⁸³ *Ibid.*, 5v.

¹⁸⁴ *Ibid.*, 5v-r.

Suppose thunder / without a Jupiter & they would / have considered it as highly im- / pious to Speak of wresting / the bolt out of his hands but / ...I Say we now know to do it / ...Let us not therefore doubt / of at length obtaining me- / chanical explanation[s] of every / circumstance of the material / System.”¹⁸⁵

The point is that, by prematurely assuming the workings of Spirit or a Deity in nature, we are checking the progress of medicine and Philosophy. This is a careful call by Cullen to secure medicine and natural philosophy from religious interference. It is a plea for secular inquiry.

Pedagogical, Professional, and Personal Considerations

Eclecticism may have appealed to Cullen for a variety of reasons. Pedagogically, eclecticism naturally lends itself to a teacher who wants to encourage his pupils to consider contrasting viewpoints, and it may also encourage the study of the history of a discipline.¹⁸⁶ Cullen certainly used it in his lectures with these aims, encouraging his students to consider the development over time of the profession they were joining, as well as enticing them to form their own System from what they studied.

From a professional point of view, eclecticism also had benefits. Eclecticism itself, like scepticism, is notoriously vague when it comes to the advocacy of specific doctrines. It is not a substantive position but an intellectual stance towards what one rejects. Thus, by portraying himself as an eclectic, Cullen could avoid linking himself to any one set of doctrines, especially if they were controversial ones. It gave him a way to manage unwanted controversy, for he could always backtrack and claim that he was just providing his students with a description of the views of others.

And, indeed, he sometimes retreated to just that position. For instance, during the Aether controversy (which I discuss in detail in the next chapter), Cullen defended himself by saying that his discussion was just an attempt to provide his

¹⁸⁵ Ibid., 6v-r.

¹⁸⁶ Schneider has written that “To a far greater degree than all others, eclectics developed an affinity with the historian’s attitude and even with an empirical and historical conception of thought itself.” See Schneider, “Eclecticism and the History of Philosophy”, 94.

students with the conjectures of others.¹⁸⁷ For “I, as a professor of physiology, thought myself obliged to give you the Conjectures concerning the Nervous System.”¹⁸⁸ This suggests a similarity to the German context, where—as Schneider (following Albrecht) suggests—academics could use eclecticism to help them navigate the pitfalls of university politics in their ascent of the academic ladder.¹⁸⁹ Cullen, very often embroiled in controversy himself, sometimes used it to deflect accusations from his opponents.

Finally, from a personal point of view, we might wonder what circumstances in Cullen’s own life and background may have planted the seeds of his preference for eclecticism. There is little space here to determine anything concrete, and it is necessarily speculative at this point, but Cullen’s experience of religious disputes in Glasgow between 1725 and 1750 does suggest some possibilities.

We know that Cullen was a student at the University of Glasgow in the mid-to-late 1720s, around the time of the John Simson Affair. John Simson (1667-1740) was a Church of Scotland minister and professor of divinity at the University of Glasgow (beginning in 1708).¹⁹⁰ He was also the brother of Robert Simson (1687-1768), professor of mathematics at the University of Glasgow, who taught Cullen.¹⁹¹ John Simson got into trouble with more orthodox figures in the Scottish Kirk by attempting to make his interpretation of the benevolence of God “conform to late seventeenth-century Scottish Presbyterian orthodoxy.”¹⁹²

¹⁸⁷ See Chapter 4 for more on this episode.

¹⁸⁸ YML, Inst., 2:243.

¹⁸⁹ About the German context, Schneider writes that “University teachers might have had another reason for favoring eclecticism, one which stemmed from their very practice of teaching...It is highly probable that the success of early eighteenth-century eclecticism can at least partly be explained by ‘the structure and the needs of school-philosophy as taught in universities’.” See Schneider, “Eclecticism and the History of Philosophy”, 96.

¹⁹⁰ For more on John Simson and the Simson Affair, see Anne Skoczylas, *Mr. Simson's Knotty Case: Divinity, Politics, and Due Process in Early Eighteenth-century Scotland* (Montreal: McGill-Queen's University Press, 2001), and Anne Skoczylas, “Simson, John (1667-1740),” in *Oxford Dictionary of National Biography*, Online Edition, Oct 2009 (Oxford: Oxford University Press, 2004), <http://www.oxforddnb.com/view/article/25604> [Accessed 29 June, 2014].

¹⁹¹ According to John Thomson, Cullen’s name can be found in the list of students who attended Robert Simson’s lectures in 1727 (TLC, 1:2).

¹⁹² Skoczylas, “Simson, John (1667-1740)”.

Simson was charged by the Edinburgh minister, James Webster, with unsound teaching in 1710, and in 1714 the General Assembly of the Church of Scotland appointed a committee to look into Simson's teachings. Simson was supported by the presbytery of Glasgow, as well as his academic colleagues, who were "united in their political allegiance to the squadrone" faction, whereas James Webster, the accuser, was an Argathelian who supported the Campbells of Argyll.¹⁹³ The proceedings were thus as much political drama as religious. In any case, the Assembly ruled in 1717 that Simson "had merely been guilty of imprudent expressions, which he should avoid in the future"—a mild punishment.¹⁹⁴

But in 1726 more serious charges were levelled against him by the presbytery of Glasgow, formerly his supporter. He was accused of teaching and lecturing on doctrines that "seemed to have an Arian tendency".¹⁹⁵ The subsequent debate led to a pamphlet war and a good deal of division in the Church of Scotland. Eventually a compromise decision was reached in 1729, in which it was agreed to suspend Simson, without deposing him. The disputes surrounding the Simson affair had far-reaching consequences on the Church of Scotland in the rest of the century.¹⁹⁶

The details of the Simson affair are less important than the realisation that Cullen was in the thick of it, as a student in the late 1720s at the University, and one who was, it seems, on good terms with Robert Simson, John's brother.¹⁹⁷ It is hard to imagine that Cullen was ignorant of the affair, and it may have showed him how disruptive and acrimonious religious disputes could be, even within the confines of

¹⁹³ Ibid.

¹⁹⁴ Ibid.

¹⁹⁵ Ibid.

¹⁹⁶ Ibid.

¹⁹⁷ There is little evidence of this from Cullen's student days (beyond his attendance of Simson's course), but we know that he was considered friendly enough with Simson to be asked, by David Clerk in 1749, whether a book Clerk came across (the only edition of the second book of Pappus) might "be of service to Mr Robert..." (MS Cullen 63, 1r). Thomson interprets this as referring to Robert Simson (see TLC, 1:537). And, as late as 1758, we know Cullen had given his potential patron, Lord Kames, a copy of Simson's recent Latin edition (1756) of Euclid's *Elements*—which Kames, in his usual eccentric way—spoke poorly of. He wrote to Cullen that "This is a cruel oppression upon novices, and which by all means ought to be avoided. In short, the old man is fond of money, and wants to pick pockets. I dislike such an attempt, and therefore wish to be rid of the copy you gave me..." (TLC, 1:600).

the College. He would have seen a hard-line faction of orthodox believers attempt to depose a professor who allowed his students too much ‘freedom of debate’.¹⁹⁸

Cullen's Religious Views: Some Speculations

The religious tensions of the Simson Affair may not have had the significance they did for Cullen, were his religious views unobjectionable. But they were not. Although it is unclear when he developed his religious outlook, we do know from various sources that his views were unorthodox, if not outwardly so.

Benjamin Rush, himself a devout Christian, praised everything about Cullen in his Edinburgh Journal, except for Cullen's critical stance toward revealed religion:

There is One thing however wanting in Dr: Cullen to constitute his Character a complete One viz: a Regard to Religion...I am not fully acquainted wth Dr: Cullen's Principles, nor do I believe he has formed any regular System for himself. [H]e beleives [*sic*] in y^e Immateriality & Immortality of the Soul. This I have heard him frequently declare in his Lectures. But wth regard to revealed Religion he professes himself a Sceptic, Altho' he never was heard to say anything disrespectful Against it in a public Manner.¹⁹⁹

¹⁹⁸ Skoczylas, “Simson, John (1667-1740)”. I am focused here on Cullen's early days, when he seems to have developed his religious outlook, but a later episode in his life may have confirmed his suspicions of religious authority in Scotland. Cullen lent his support to David Hume's candidacy to become a professor at the University of Glasgow in the early 1750s. But Hume's religious views were too controversial, and he did not obtain the post, despite his obvious qualifications. Hume never forgot Cullen's help in the venture. He wrote to Cullen that “The part which you have acted in the late project for my election into your college, gave me so much pleasure...We have failed, and are thereby deprived of great opportunities of cultivating that friendship which had so happily commenced by your zeal for my interests...Whatever the reverend gentlemen may say of my religion, I hope I have as much morality as to retain a grateful sentiment of your favours...” Quoted in TLC, 1:72.

¹⁹⁹ EUL, Mic. M.28, 66-69. For more on Rush's life, see David Freeman Hawke, *Benjamin Rush: Revolutionary Gadfly* (Indianapolis: Bobbs-Merrill Co., 1971); and Alyn Brodsky, *Benjamin Rush: Patriot and Physician* (New York: St. Martin's Press, 2013). For his moral philosophy, see Lisbeth Haakonssen, *Medicine and Morals in the Enlightenment: John Gregory, Thomas Percival and Benjamin Rush*, *Clio Medica* 44: Wellcome Institute Series in the History of Medicine (Amsterdam: Rodopi, 1997). For Rush's religious views, in particular, see Donald J. D'Elia, “The Republican Theology of Benjamin Rush”, *Pennsylvania History* 33, no. 2 (1966): pp. 187-203. For the role of Scottish medicine (especially the towering influence of Cullen) in Rush's autobiographical writings, see Catherine Jones, “Benjamin Rush, Edinburgh Medicine and the Rise of Physician Autobiography,” in *Scottish Medicine and Literary Culture, 1726-1832*, eds. David E. Shuttleton and Megan J. Coyer (Amsterdam: Rodopi, 2014).

Very little is known beyond this about Cullen's private religious views, and all I can offer here is some speculation.²⁰⁰ There is a very slender piece of evidence to suggest that Cullen thought highly of the English freethinker and Deist, Matthew Tindal (c. 1657-1733).²⁰¹ This is found in an early letter (unfortunately incomplete), c. mid-1730s, written by Cullen when he was a surgeon in the town of Hamilton. In the letter he asks a bookseller to procure for him various items, including a full human skeleton. He was particularly keen to obtain a set of good Mezzo 'Heads' or engravings of (what appear to be) people he admired. He asked for the usual medical luminaries, including Hippocrates, Bacon, Locke, Boyle, Newton, Harvey, Mead, Cheyne, Bellini, Baglivi and some others. He wanted engravings of Shakespeare, Milton, Virgil, Pope, etc. as well. None of this is very surprising, but stuck in the list is a more curious request: an engraving of 'Matthew Tindal L. L. D.'²⁰² Since the other figures all seem to be people whom Cullen admired (and only people he admired), it is not outlandish to assume that Cullen likewise admired Tindal, at least in the 1730s. If this is the case, it provides us with a way to speculate about Cullen's religious outlook at that time.

First, it might be significant that Cullen ordered this engraving of Tindal in the 1730s, perhaps shortly after Tindal's death (1733) and the ensuing disputes that arose from the publication of his controversial final work, *Christianity as Old as the Creation* (1730).²⁰³ In this context, it is notable that Tindal was "one of the principal

²⁰⁰ My discussion below is based on a very meagre amount of evidence. But, given that it is a new piece of evidence and, as far as I am aware, we have little else to go on (besides Rush's account), I thought it worthwhile to offer some speculations. It is worthy of further study.

²⁰¹ For more on Tindal and his writings, see Stephen Lalor, *Matthew Tindal, Freethinker: An Eighteenth-Century Assault on Religion* (London: Continuum, 2006); Dmitri Levitin, "Matthew Tindal's Rights of the Christian Church (1706) and the Church-State Relationship", *The Historical Journal* 54, no. 03 (2011): 717-740; J. A. I. Champion, *The Pillars of Priestcraft Shaken: The Church of England and Its Enemies, 1660-1730* (Cambridge: Cambridge University Press, 1992); and John Redwood, *Reason, Ridicule and Religion: The Age of Enlightenment in England, 1660-1750* (London: Thames and Hudson, 1976). For an early assessment, see Edmund Curll, *Memoirs of the Life and Writings of Matthew Tindal, L.L.D.: With a History of the Controversies Wherein He Was Engaged* (London: E. Curll, 1733).

²⁰² MS Cullen 009, 1r.

²⁰³ See Matthew Tindal, *Christianity As Old As the Creation: Or, the Gospel, a Republication of the Religion of Nature. Volume 1* (London, 1730).

propagandists during the anti-clerical warfare that dominated the 1730s.”²⁰⁴ In previous works, Tindal had also laid bare his anti-clericalism, attacking the “High-Flown Clergy”, “high-churchmanship”, and Roman Catholicism.²⁰⁵ He also argued “for the rights of dissenters to worship as they pleased” and he thought the essential role for religion was “promoting the Publick Good.”²⁰⁶

In his final work *Christianity as Old as the Creation*, which was in the form of a dialogue, Tindal offered, in the words of Brian Young, “a detailed argument for the supremacy of natural over revealed religion. For Tindal, reason was to be employed first to discover, and then to put into practice, the obligations of morality which flow from discovering the existence of a beneficent creator...”²⁰⁷ While Tindal ‘paid lip-service’ to Christianity, he clearly thought that natural religion superseded revealed religion.²⁰⁸ This sounds, in general terms, like Rush’s description of Cullen’s views.

We do not know what Cullen may have admired in Tindal, but if it had to do with his substantive religious claims, it suggests that Cullen was partial to anti-clericalism and valued the insights of natural religion over those of any of the other revealed religions. Cullen was thus not a Christian, but more akin to a Deist, who privileged the use of reason in learning and discovering truths about the Creator. Though not an atheist, Cullen’s *Weltanschauung* was, for the most part, secular.

Of course this was during the 1730s and we do not how Cullen’s views changed over time. Clearly more research needs to be done, but I would be surprised if Rush’s assessment were to be overturned. He was basically right that Cullen was sceptical about revealed religion and preferred natural religion instead. This was an unorthodox and controversial religious position in staunchly Calvinist Scotland, and

²⁰⁴ B. W. Young, “Tindal, Matthew (bap. 1657, D.1733),” in *Oxford Dictionary of National Biography, Online Edition, May 2005* (Oxford: Oxford University Press, 2004), <http://www.oxforddnb.com/view/article/27462> [Accessed 29 June, 2014].

²⁰⁵ Ibid.

²⁰⁶ Ibid.

²⁰⁷ Ibid.

²⁰⁸ Ibid. The argument for Chap. VI, for instance, as summarised by Tindal himself, was “That the Religion of Nature is an absolutely perfect Religion; and that external Revelation can neither add to, nor take from its Perfection, and that True Religion, whether internally, or externally reveal'd, must be the same.” See Tindal, *Christianity As Old As the Creation*, vi.

it adds significance to Cullen's experience of the tense religious atmosphere in Glasgow, where he spent his youth and early adulthood.

Conclusion

In the course of this chapter, I have explored Cullen's philosophy of medicine, which consisted of his medical epistemology (inductive Dogmatism) and his medical ideology (systematic Eclecticism). I have argued, as well, that each strand of his philosophy was put to good purpose: in the former, Cullen used it to mount a full-throated defence of learned medicine, modelled after his own approach. And in the latter, Cullen found pedagogical and professional virtues to promulgating eclecticism to his students; his ideology may have had added personal significance for him, given his unorthodox religious views.

Cullen's philosophy of medicine was delivered to his students as an introductory part of his course on the Practice of Physic. In that way, it had pedagogical value, but it also served as a bridge into the more technical content of his course. It has a similar purpose here: while still connected to his pedagogy, it also guides us into a discussion of Cullen's medical theory (Ch. 4) and an aspect of his practice (Ch. 5).

We begin with the most significant doctrine of Cullen's medical theory: his understanding of the nervous system.

CHAPTER FOUR

THEORY OF THE NERVOUS SYSTEM

After a *disagreeable Preamble* I proceed to my Theory of the nervous System—a work of much difficulty & concerning which there are a variety of opinions. It is of an abstruse nature nor can we expect to complete it. The disquisition is however necessary & has been esteemed so by every Physiologist for there are few of the most eminent that have not attempted it, and we shall have an opportunity at least of rejecting their Errors.

-William Cullen, March 1769
[YML, Inst., 2:246]

CHAPTER 4: THEORY OF THE NERVOUS SYSTEM

Cullen interpreters, going back to John Thomson, have seen Cullen’s focus on the nervous system as fundamental to his understanding of the human body in health and sickness.

Cullen himself encourages this interpretation. In a number of different contexts, he is unequivocal about the centrality of the nervous system in our understanding of how the body works. In his 1772-3 lectures on the Institutes of Medicine, for instance, he told his audience that “it is obvious that we must trace every function of the Body to y^e general Laws of Motion in the System, and we shall find that these are in the Nerv. System, & therefore, that it is actually a fundamental Study in the Oeconomy[;] tho I say this may commonly be apprehended by you, I would wish to inculcate this Subject as the most important Object of your Attention.”¹

In addition, Cullen suggests that his own views about the nervous system were distinctive. In his 1761-2 lectures on the materia medica, he told his auditors that in Boerhaave's *De viribus Medicamentorum*, that celebrated Dutch physician began by premising “some physiological doctrines that are necessary with respect to the whole.”² Cullen thought it wise to follow the same plan for his own lectures on the materia medica, “especially, as I have some peculiar notions on the subject [of physiology], which, as they are not common in our schools, it is necessary for me to explain.”³ He then went on to provide a concise overview of his understanding of the nervous system.⁴

So Cullen’s views on the nervous system, his ‘peculiar notions on the subject’, are of the utmost significance in our interpretation of his approach to medicine more generally. Most interpreters of Cullen’s work have understood this. Nonetheless,

¹ NLM, MS B 4, 2:2 (hereafter I omit the identifier ‘MS B 4’ and just use ‘NLM’ and the volume number to refer to this seven volume manuscript).

² William Cullen, *Lectures on the Materia Medica, As Delivered by William Cullen, M.D. Professor of Medicine in the University of Edinburgh. Now Published by Permission of the Author, and with Many Corrections From the Collation of Different Manuscripts by the Editors* (London: T. Lowndes, 1773), 2.

³ *Ibid.*, 2.

⁴ *Ibid.*, 2-31.

there has been both disagreement over the extent of his originality, if any, and differing interpretations of his approach.

I. Cullen & the Nervous System

John Thomson devotes a large portion of volume I of his Cullen biography to a summary of Cullen's medical theory, especially his views on the nervous system.⁵ It was Thomson's view that Cullen regarded the nervous system as "constituting the fundamental and most important part of the study of the animal economy."⁶ Cullen synthesised and extended the views of his predecessors and contemporaries on this topic, especially those of Haller, Gaubius, Whytt and Hoffmann, "and, certainly, in no part of his labours do the powers of his mind appear to have been more successfully exerted."⁷

Thomson also emphasised, as Lawrence would later, Cullen's interest in pointing out, and arranging, the laws of sensation, which he did, says Thomson, "with greater brevity, perspicuity, and accuracy, than had been done by any preceding physiologist."⁸

But the essential component of Thomson's interpretation of Cullen's neurophysiology was his stress on Cullen's notion of the *excitability* of the nervous system. This manifested itself in two ways: in Cullen's heavy use of the concept of the Animal Power or Energy of the Brain, and his distinctive theory of Excitement and Collapse.

⁵ Thomson, after admitting that "It is difficult to comprise, in a narrow compass, the various and extensive views which Dr Cullen was accustomed to take of the functions of the Nervous System..." breaks down Cullen's ideas on the nervous system into the following six categories. It is still a good summary: (1) "Of the Nervous System considered as the connecting medium between the soul and body, or the Immaterial and the Material parts of man"; (2) "Of the Nervous System considered as the organ of Sensation"; (3) "As the organ of our Intellectual operations, Memory and Judgment"; (4) "As the organ of the Voluntary, Involuntary, Mixed, and Sympathetic motions of the animal economy"; (5) "Of the different conditions of the Nervous System in the states of Sleeping and Waking, and the doctrine of Excitement and Collapse" and (6) "The effects of Custom upon our corporeal and mental functions" (TLC, 1:269). Thomson's discussion, which is still very much worth consulting (albeit with caution about his editorial practices), can be found at pp. 264-325.

⁶ TLC, 1:264.

⁷ Ibid., 1:264-5.

⁸ Ibid., 1:277-8.

In §88 of the 1772 edition of his textbook on physiology, Cullen defined the Animal Power to be the power in the brain that determined the motions of the nervous fluid throughout the nervous system.⁹ It facilitated, indeed was necessary for, the many communications between all the different parts of the nervous system and was usually determined by the Will. When the Will was definitely connected to the Animal Power, Cullen referred to it as the Energy of the Brain.¹⁰ Thomson noted that Cullen's ideas about this were connected to everything he taught in physiology and pathology, "and they may be said to constitute a most important part, if not the sole basis, of that system of the Practice of Physic, which he made the subject of prelection, as well as of study, for a period of nearly forty years before he ventured to give it to the public."¹¹

Cullen's theory of Excitement and Collapse, in contrast, was a way for him to express the different states of mobility of the nervous fluid—the fluid responsible for the communication of motion in the nervous system.¹² Thomson thought that this theory was original to Cullen and "the foundation of those doctrines which have since been considered as peculiar to the Medical School of Edinburgh, and usually designated, by Continental writers, under the appellation of the *Theory of Excitement*."¹³

These two aspects of Cullen's neurophysiology—the Animal Power of the brain and the theory of Excitement and Collapse—were related, insofar as they both depended on the existence of an aetherial fluid operating throughout the nervous system. Thomson argued that Cullen considered this nervous fluid to be purely hypothetical, but one which he postulated on account of his great respect for Newton, who had originally proposed it.¹⁴

⁹ William Cullen, *Institutions of Medicine. Part 1, Physiology. For the Use of the Students in the University of Edinburgh* (Edinburgh, 1772), 67-8, §88.

¹⁰ See his explanation at NLM, 2:183, which is part of his commentary on §88.

¹¹ TLC, 1:265.

¹² NLM, 3:15.

¹³ TLC, 1:310.

¹⁴ *Ibid.*, 1:310-11.

John Thomson's younger contemporary, David Craigie, had a very different interpretation. In his contributions to the second volume of Thomson's biography, Craigie downplayed Cullen's contributions to physiology, and thus also his teachings on the nervous system.¹⁵ This was because "Cullen could not be considered an anatomist" and as a physiologist he was admittedly "inferior both to Haller and to Whytt."¹⁶

In more recent interpretations, other areas of Cullen's discussion of the nervous system have been front and centre. Christopher Lawrence has underscored Cullen's intellectual debt to Scottish philosophers, especially his friends Adam Smith and David Hume.¹⁷ Like Thomson before him, Lawrence also believed that Cullen's account of sensation was noteworthy. Indeed, Lawrence goes further by suggesting that sensation was really the core of Cullen's entire physiological framework¹⁸—indeed, it "might be regarded as the foundation of his whole system."¹⁹

In the same vein as Craigie, Lawrence highlights Cullen's debt to the work of Robert Whytt.²⁰ At least with respect to explaining the operations of the mind or soul, Cullen "retained all the characteristics of Whytt's sentient principle—purposeful action, coordinating ability, and, most importantly, unconscious feeling—without introducing second substances in physiology."²¹

John Wright, in contrast to Lawrence, has taken pains to show how Cullen's views on a variety of topics actually contrasted sharply with Whytt's. Wright thinks,

¹⁵ See my discussion of Craigie in my review of the historiography in Chapter 1.

¹⁶ TLC, 2:675.

¹⁷ Christopher Lawrence, "Medicine as Culture: Edinburgh and the Scottish Enlightenment" (PhD Thesis, University of London, London, 1984), 312-13.

¹⁸ *Ibid.*, 330.

¹⁹ *Ibid.*, 325.

²⁰ *Ibid.*, 323.

²¹ Christopher Lawrence, "The Nervous System and Society in the Scottish Enlightenment," in *Natural Order: Historical Studies of Scientific Culture*, ed. Barry Barnes and Steven Shapin (London: Sage, 1979), 26.

for instance, that “Cullen rejected the basic principles underlying Whytt’s conception of the sentient principle.”²²

Mike Barfoot, on the other hand, is one of the few interpreters to point out Cullen’s vehement rejection of Stahlian physiology.²³ He has also stressed Cullen’s “cephalocentric conception of the living organism” where the brain was given an especially central role in the coordination of the nervous system.²⁴ Indeed, the two are linked, for Cullen wanted to convince his audience that perception took place only in the brain, which would go some way “towards destroying the Stahlian system in its foundations.”²⁵

Finally, Bynum has taken an entirely different facet of Cullen’s approach and argued for its centrality. This is Cullen’s advocacy of the more traditional view that the nerves and muscles were part of one interconnected system. Thus “Cullen’s neurophysiology was actually a neuromuscular physiology”²⁶ because, for him, “there was no clear distinction between the nervous system and the muscles.”²⁷ Like Craigie, Bynum thinks Cullen’s neurophysiology was that of a clinician and nosologist—not of an innovative, experimental physiologist.²⁸

The Fundamental & Unifying Doctrine

²² John P. Wright, “Materialism and the Life Soul in Eighteenth-Century Scottish Physiology,” in *The Scottish Enlightenment: Essays in Reinterpretation*, ed. Paul Wood, Rochester Studies in Philosophy (Rochester: University of Rochester Press, 2000), 190. On this point, see also John P. Wright, “Metaphysics and Physiology: Mind, Body and the Animal Economy in Eighteenth-Century Scotland,” in *Studies in the Philosophy of the Scottish Enlightenment*, ed. M. A. Stewart (Oxford: Clarendon Press, 1990), 294-5. Wright is closer to the mark here than Lawrence, as I show near the end of the chapter, when I compare Whytt’s and Cullen’s approach to mechanism in medicine.

²³ Michael Barfoot, “James Gregory (1753-1821) and Scottish Scientific Metaphysics, 1750-1800” (PhD Thesis, University of Edinburgh, Edinburgh, 1983), 208.

²⁴ *Ibid.*, 212.

²⁵ Quoted in *Ibid.*, 211. Barfoot refers to Thomson’s *Works* for the quotation, but a more direct source can be found at NLM, 2:253-4, where Cullen tells his audience that “one Step towards destroying the Stahlian System in its foundation is establishing that the whole medullary Origin of the Nerves is a Sensorium commune.”

²⁶ W. F. Bynum, “Cullen and the Nervous System,” in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 156.

²⁷ *Ibid.*, 157.

²⁸ *Ibid.*, 160.

It is clear, then, that previous interpretations of Cullen's approach to the nervous system discuss a variety of aspects of this large and critical topic in eighteenth-century physiology. But is there one topic, more than others, that illuminates Cullen's 'peculiar' views and original contributions—if he can be said to have contributed anything original at all? In other words, is there a *fundamental doctrine* that is essential to understanding his neurophysiology?

Indeed, there is. The key to understanding Cullen's neurophysiology is his conception of the nature and function of the nervous fluid, or what Cullen calls his 'Theory of the Nervous System'. Cullen's theory—that there was a subtle, elastic fluid that inhered in the nerves and was somehow derived from the universal Aether—was the central, fundamental doctrine in his understanding of the nervous system.

Cullen's theory was also his unifying doctrine. This is because the most distinctive features of his understanding of the nervous system—the continuity of nerves and muscles, the multi-directionality of communication, and the Brain as principal part—are consequences of, or emerge from, his underlying theory of the properties and functions of the nervous fluid.

As for its content, Cullen's theory was decidedly Newtonian. It fits squarely in the tradition of physiological theories that drew their inspiration from Newton's speculations on the Aether. Beyond that, it is hard to determine precisely how original Cullen's theory was, without a more careful study of his ontology of matter and a wider survey of theories of the nervous fluid in eighteenth-century physiology. For what it is worth, he thought his emphasis on the inherence of a subtle fluid to the medullary substance of the nerves was distinctive. And it may well have been, at least in the context of the most popular theories advocated by physicians.

It was certainly unusual, and controversial, among the medical faculty at Edinburgh. It attracted derision from his antagonists and rebuttals from his colleagues. Virtually none of his fellow professors at Edinburgh had any patience for aetherial speculations in physiology, and Cullen's views marked him out as an unorthodox, controversial thinker. His understanding of the nervous system was more heterodox, especially in the Scottish context, than has ordinarily been assumed.

I suggest that the reasons for this have to do with Cullen's unabashed embrace of mechanical explanation, whereas his colleagues rejected mechanistic accounts, partially on account of their theological implications.

My plan for the chapter, then, is as follows: in Part II, I provide a general overview of Cullen's understanding of the nervous system. This will allow us to appreciate both some of the peculiarities of his approach, as well as the role of the nervous fluid in his model.

In Part III, I provide some essential context for understanding Cullen's Theory of the Nervous System by considering two kinds of theories of the nervous fluid in the eighteenth century.

In Part IV, we come to Cullen's Theory of the Nervous System itself. Until recently, there was little detail on Cullen's theory available. But on at least one occasion, Cullen defended and explained his theory in detail, and I use that opportunity (and the sources that describe it) to explicate his theory.

In Part V, with our knowledge of his Theory, we are able to compare his views to those of his colleagues at the Edinburgh Medical School. I show that almost all of them rejected Cullen's aether theory and were suspicious of Cullen's embrace of mechanism in his approach to medicine.

II. 'A General View of the Nervous System'

Cullen's discussion of the nervous system is multi-faceted, complex and too extensive to be considered here in its entirety. But we can make some concrete claims about Cullen's general model. In fact, Cullen provided his students with just such a 'General View' as a way of introducing his discussion.²⁹

He began by emphasising the centrality of the nervous system. Not all physicians did this; why give it pride of place? Cullen liked to point out that when he

²⁹ I intentionally draw primarily (but not exclusively) from Cullen's 1768-9 text and accompanying lectures. I do this for two reasons: the 1768-9 text and lectures have not yet been discussed in print, and most of the story I wish to tell in the rest of the chapter draws from the lectures Cullen gave in 1768-9. If my choice highlights the importance of viewing Cullen's views dynamically, changing from year to year (significantly or not), all the better. For a more detailed discussion of the sources I have used in this chapter, see Appendix 4A: Source Material.

was a medical student, it was *not* considered the fundamental part of the animal oeconomy. Instead, he “found the Schools of this Country entirely occupied by the followers of Dr Boerhaave, who considered Diseases as depending upon the Affections of the Hydraulic System, or upon the State of the fluids, hardly taking any notice of the primary powers by which we were moved.”³⁰ But, after reading Baglivi and especially the work of Friedrich Hoffmann,³¹ Cullen was persuaded that the primary or fundamental powers of the human body “are lodged in what I call the Nervous System.”³²

To illustrate this, he noted that the functions of the body were essentially a set of motions and these motions “will be found every where to depend, upon the Action of the Muscles or Muscular fibres, and these are particularly connected with Nerves, so that indeed their Motions can be excited by Applications to the Nerves, and when the Nerves are destroyed Muscular Motion very commonly ceases...”³³ But, going further, we find that the nerves are connected to the brain, and the brain is connected to other nerves. And, in fact, “the beginning of all Motion is from Sense, which depends upon certain impulses upon the Nerves, and by ‘em communicated to the Brain, occasioning that in consequence of which the Motions are excited that are concerned in every function.”³⁴

With this view in mind, we see the necessity of studying the “general Laws of Motion in the System” which we do by studying the nervous system: the organ of Sense and Motion in the animal oeconomy. Therefore, this study “is actually a fundamental Study in the Oeconomy.”³⁵

This is why his 1768-9 text on the nervous system opens with the following paragraph (§1): “As the functions of Sense and Motion which comprehend so many of the functions of the Animal OEconomy depend on the Nervous System, the study

³⁰ NLM, 2:1.

³¹ For the influence of Hoffmann on Cullen’s thought, see Inci A. Bowman, “William Cullen (1710-90) and the Primacy of the Nervous System” (PhD thesis, Indiana University, Bloomington, 1975).

³² NLM, 2:1.

³³ *Ibid.*, 2:2.

³⁴ *Ibid.*, 2:2.

³⁵ *Ibid.*, 2:2.

of this must be of the utmost importance in the study of the general OEconomy and it's [*sic*] particular Functions."³⁶

The Components of the Nervous System

The nervous system is composed of the parts of the animal oeconomy that contain the medullary substance.³⁷ Anatomically, this means the brain, cerebellum, medulla oblongata and medulla spinalis, as well as the nerves themselves, distributed throughout the body.³⁸

Functionally, Cullen divides the entire nervous system into four parts: first, the medullary substance in the Cranium and vertebral cavity. Unless he notes otherwise, Cullen uses the word *Brain* to refer to “functions that may be in common to every part of this...”³⁹—a broader term than the 21st-century reader expects. Second, the *Nerves*, which are the continuation of the same medullary substance in the Brain, but divided into individual fibres, each enclosed in a membrane that separates them from each other. Third, the *Sentient Extremities* of the Nerves, which are again a continuation of the medullary substance but lack the enveloping membrane of the Nerves. They are “so situated as to be exposed to the action of certain external bodies, and perhaps so modified as to be affected by the action of certain bodies only.”⁴⁰ And fourth, the *Moving Extremities* of the Nerves, which are, like their

³⁶ YLM, Inst., 1:126, §1. Compare this to §27 of his 1772 textbook. Cullen also refers to the nervous system as the ‘vital solid’ of animals (after Gaubius), in contrast to the simple solids.

³⁷ YML, Inst., 1:167. According to Haller’s anatomy and physiology textbook, *Primae Lineae Physiologiae*, which Cullen often referenced, the medullary substance was best seen in the inward part of the brain. From the brain, the medullary fibres travelled to all the parts of the body. Haller described the medullary substance itself as “almost perfectly white, but redder in the foetus; in many places, it is perforated by red arteries, which are more simple and perpendicular, or straight, than in other parts. This medulla is more solid and more capable of sustaining its figure, notwithstanding it is very soft, and abounds in a greater quantity than the cortex.” See Albrecht von Haller, *First Lines of Physiology, by the Celebrated Baron Albertus Haller, M.D. &c. Translated From the Correct Latin Edition Printed Under the Inspection of William Cullen, M.D. And Compared with the Edition Published by H.A. Wrisberg, M.D. Professor at Gottingen. To Which Are Added, the Valuable Index Originally Composed for Dr Cullen's Edition; And All the Notes and Illustrations of Prof. Wrisberg, Now First Translated Into English. In Two Volumes. Vol. I* (Edinburgh: Charles Elliot, 1786), 197, §341.

³⁸ YML Inst., 1:167, §3.

³⁹ Ibid., 1:127, §4.1.

⁴⁰ Ibid., 1:127, §4.3.

Sentient counterparts, also a continuation of the medullary substance of the Brain and Nerves. Their distinguishing characteristic is that they are “so modified as to be capable of a peculiar Contractility, and in consequence of their situation and attachments by Contraction to be capable of moving most of the Solid and Fluid parts of the body.”⁴¹ Their ability to contract is intriguing, for “their Contraction may be excited by Powers that we do not know to act upon any other Fibre so as to give this effect of Contractility.”⁴² Cullen says they are commonly referred to as moving or muscular fibres, and he usually refers to them as such. We know them as muscles.

Thus, the nervous system is composed of four parts: the brain (including the medulla of the brain and spinal column); the nerves; their sentient extremities, and finally their moving extremities, otherwise known as muscles.

This division is relatively straightforward, except for Cullen’s redefinition of the muscles as extremities of the nerves, which is highly significant.⁴³ I flag it here as one of Cullen’s critical assumptions, distinctive of his approach. It was not uncontroversial: Cullen admits that anatomists had not shown the muscles to be a continuation of the medullary substance of the brain and nerves, nor is the fact “universally admitted by the Physiologists; but we suppose it now and hope to render it sufficiently probable hereafter.”⁴⁴ Elsewhere he describes it as “a bold Proposition.”⁴⁵

In case his point is not clear, Cullen re-iterates in §5 that these four components of the nervous system “are every where the same continuous Medullary Substance, uniform in it’s [*sic*] mixture and general aggregation[.]”⁴⁶ And it is precisely because of the “Continuity, Contiguity, and Uniformity”⁴⁷ between the four parts that

⁴¹ Ibid., 1:127-8, §4.4.

⁴² Ibid., 1:173.

⁴³ Bynum has already made this point in Bynum, “Cullen and the Nervous System”.

⁴⁴ YML Inst., 1:128, §4.4. Though there may have been some dispute about it, Cullen’s view was neither original to him nor unprecedented. Boerhaave held a similar view, though Haller certainly did not. See, for instance, Herman Boerhaave, *Dr. Boerhaave’s Academical Lectures on the Theory of Physic. Vol. III. Containing the Structure and Action of the Spleen, Omentum, Liver, Kidneys, Bladder, Muscles and Skin; With the Nature of Sweat, Perspiration and Nutrition* (London: W. Innys, 1744), 175-183, §395-6.

⁴⁵ NLS, MS 3535, 76.

⁴⁶ YML, Inst., 1:128, §5.

⁴⁷ Ibid., 1:176.

“Motion may be propagated from any one part of it to every other while the continuous substance remains in the same condition.”⁴⁸ If this is the case, Cullen will have a basis for explaining the Laws of Motion in the animal oeconomy. To be clear: he has said nothing yet about how or why the medullary substance is particularly suitable for propagating motion. And in his 1768-9 text, he says little more about this topic at this point, except that he does not want to ‘anticipate’ the various opinions about the nature of the nervous fluid and how motions are communicated by means of it.⁴⁹

But, perhaps realising that he needed to at least introduce a concept that would explain these motions, Cullen later expanded this proposition, in his 1770 and 1772 texts, by adding here: “The condition fitting the medullary substance for having motion propagated in it, we suppose to be the presence of a certain fluid; which we therefore name the *nervous fluid*, without meaning however at present to determine any thing with regard to its source, nature, or manner of acting.”⁵⁰

In summary, the nervous system consists of four parts, all of which—including the muscle fibres—consist of the same continuous, uniform medullary substance (seemingly derived from the Brain, the origin of the nerves). And this medullary substance contains a nervous fluid—of unspecified nature—that allows it to propagate motion from one part of itself to another.

Connecting the Parts Together

Now that we know the parts of the nervous system, how do they work together to create sensation and motion? Cullen liked to provide his audience with a concrete example of a typical case of how the nervous system worked in action:

My Eyes are opened in a Flower Garden. The Rays of Light are reflected to my pupil and strike the Retina, and immediately there arises a sense of

⁴⁸ Ibid., 1:128, §5.

⁴⁹ Ibid., 1:178.

⁵⁰ This is part of the note to §30 in his 1770 and 1772 texts. See, e.g. Cullen, *Institutions of Medicine*, 29. §30 is the revised version of §5 from his 1768 text, so it is clear that he has specifically added this paragraph to the earlier proposition.

colour. This Sensation which arises is *Pleasant*. I desire to enjoy it more fully, and bring more near to my Eye the Object (or Flower). This makes me will to stretch forth my hand, by which means the bending the body (if occasion requires) and plucking the flower follows.

In the same manner the Effluvia strikes the Sentient Extremities of the Nerves in my Nose, & if disagreeable determines my hand to put away the Flower.⁵¹

In this example, which Cullen takes to be a typical case, the “impulse of external bodies in Motion”—the light rays or odorous effluvia of the flower—impinge upon the sentient extremities of the nerves, either in the retina or the nose, thereby giving “occasion to Thought, and this we call Sensation.”⁵² Depending on the kind of sensation that arises, whether pleasant or disagreeable, this in turn “gives occasion to volition or willing the motion of certain parts of the Body; and this volition gives occasion to the Contraction of the Muscular Fibres by which the motion of the part desired is produced.”⁵³

Cullen warns his audience that there is some metaphysics here that might be confusing. What does he mean by ‘Thought’ as opposed to ‘Sensation’? He says that metaphysicians have ordinarily used the term *Thought* “to signify recollecting or effecting any operation”, normally one of the three operations of Perception, Intellect, & Volition.⁵⁴ But Cullen wanted “to have one word to express them all, and

⁵¹ YML, Inst., 1:186-7.

⁵² Ibid., 1:129, §7.

⁵³ Ibid., 1:129-130, §7. One is struck by Cullen’s Cartesian language here, e.g. ‘giving occasion to’ an event rather than producing or causing it. But this is probably not a sign of Cartesian influence. Instead, it is a way for him to avoid the language of materialism. As he clarifies in his 1772-3 course, “[T]he language is very much the same with that of the materialists often, and it is not easy to guard against misinterpretations, if people are so disposed, I have however in several places endeavoured to guard against these, e.g. in the page I was last considering, I say that motions excited in the N.S. give occasion to thought I do not say they produce thought which w^d have been the language of the materialists, but I say give occasion to thought, using the language of the Cartesians, without implying the manner, and again I say, that thought, however occasioned, gives occasion to new motions in the N.S.” (NLM, 2:34-5).

⁵⁴ YML, Inst., 1:187. Cullen later modifies his use of terms here, e.g. by 1772 they become, respectively, Sensation, the Brain, and the Moving Fibres. He seems to have become dissatisfied with their initial imprecision, and it would be interesting to examine how and why his metaphysical terms change over time. I do not have the space to do so here.

therefore I have used the term *Thought*.”⁵⁵ With that distinction, Cullen then defines Sensation as “Thought arising in the Mind from a previous change in the Body.”⁵⁶

Cullen treats ‘Volition’—the second half of the process—as essentially equivalent to the act of willing.⁵⁷ But he does not mean to suggest, he says, that it is the only mode of communication because “there may be a communication between several parts of the Nervous System without volition, or even Sensation, accompanying them, and may proceed from a Mechanical Cause.”⁵⁸

The critical piece connecting sensation and volition is the Brain, the corporeal organ of the immaterial Mind. In fact, we can conclude from various ligature experiments, Cullen says, that Sensation and Volition, to the extent they are corporeal, “are functions of the Brain alone...”⁵⁹ The central role of the Brain (as the corporeal organ of the Mind or Soul) in the succession of motions in the nervous system is another characteristic feature of Cullen’s model of the nervous system. Cullen made a point of highlighting “the particular share the Brain has in the Nervous System...”⁶⁰ In his 1772-3 lectures, Cullen told his audience that “in 999 cases of 1000, the Communication is by the intervention of the Brain, and it is with a certain modification depending upon the action of the brain, and we therefore justly conclude that the Brain is the principal part of the nervous System.”⁶¹

⁵⁵ Ibid., 1:187.

⁵⁶ Ibid., 1:187. The notetaker puts an asterisk next to Cullen’s definition of Sensation and then provides a reference to §556 from Haller’s *Primae Lineae*. Cullen’s definition certainly suggests Haller’s influence. We know, from a later lecture, that Cullen refers to Haller in this very context (see NLS, MS 3535, 80). In speaking of sensation here (and in subsequent lectures), Cullen also makes a rare explicit reference to the work of David Hume, applauding him for revising Locke’s too broad a use of the term ‘Idea’, but nonetheless declining to use Hume’s terminology for his purposes (YML, Inst., 1:187-8).

⁵⁷ Another important feature of Cullen’s concept of volition, which he does not bring out at this point in his 1768-9 lectures (though it is implicit in §7 and he usually brings it up at this point in later lectures) is that while we may be conscious of willing the ends of actions or motions we are not usually conscious of the means. As he puts it in his 1770-71 lectures: “In using the Term Volition it may be proper to observe, that I do not say we are conscious of willing the motion of the muscles, which are said to be subject to the will, but the Action design’d to be perform’d by them” (NLS, MS 3535, 80).

⁵⁸ YML, Inst., 1:188. This claim is meant to distance Cullen’s views from those of the Stahlians.

⁵⁹ Ibid., 1:130, §8.

⁶⁰ Ibid., 1:189.

⁶¹ NLM, 3:37.

This may seem obvious, but it was a matter of dispute among eighteenth-century physicians. Cullen contrasts his view with those of the Stahlans who “consider the Soul connected with every part of the Body.”⁶² Others, he says, think the Soul or Mind is connected to the nerves, either in the whole nerve or just its sentient extremities. “But, contrary to both, we maintain with Gaubius that the Soul is only properly connected with the Brain, the immediate Organ of the Soul.”⁶³ Cullen’s nervous system then is, as Barfoot has rightfully noted, heavily cephalocentric—the Brain is its principal part.⁶⁴

The Functions of the Parts

It is now rather clear what the primary functions of the four parts of the nervous system are. The Sentient Extremities receive impressions from external bodies and, as a result, “propagate determined motions along the Nerves, which communicated to the brain give occasion to Sensation.”⁶⁵ Once the motions reach the Brain, “Sensation and the whole consequent operations of Thought” are occasioned.⁶⁶ So the Brain serves as a kind of central communication station, “fitted to perform a Communication between the motions excited in the Sentient and those arising in the moving extremities of the nerves” however distant they are from each other in the body.⁶⁷ The Brain subsequently, in the typical case, propagates motion to the moving extremities or muscles, thereby exciting contraction and movement.⁶⁸

Finally, as is clear by now, the nerves (as opposed to their extremities) primarily serve as the channels of communication between the other parts of the nervous system. A point of interest here is that Cullen allows for the nerves to communicate motion dual-directionally, from the extremities to the Brain “or

⁶² YML, Inst., 1:189.

⁶³ Ibid., 1:189. Cullen is implicitly distancing his position from that of Whytt here.

⁶⁴ Barfoot, “James Gregory”, 212.

⁶⁵ YML, Inst., 1:131, §9.1.

⁶⁶ Ibid., 1:131, §9.2.

⁶⁷ Ibid., 1:131, §9.2.

⁶⁸ Ibid., 1:131, §9.3.

contrariwise.”⁶⁹ The orthodox view was that motion was communicated one-way; that is, that sensory nerves only communicated from their extremities to their origin (the brain), while ‘motory nerves’ (i.e. muscles) simply transferred communication from the brain to their extremities. Muscles did not propagate motion back to the brain, and the brain did not propagate motion back to the sentient extremities. But Cullen assumed two-way motion and noted that this was different from the “most common opinion of Physiologists... We admit it as a proposition here, which we hope to make sufficiently clear hereafter.”⁷⁰

This view of the parts and functions of the nervous system suggests to Cullen a way to organise his subsequent investigation. For it appears that the motions of the animal body generally begin with, or are connected to, Sensation, and that the ultimate effects of these motions, are connected with the contraction of the moving fibres.⁷¹ So he too will discuss Sensation, the moving fibres, and the central communication between these two parts, i.e. the functions of the Brain.⁷²

Distinctive Features

I have outlined the four principal components of the nervous system, in terms of both their structure and particular functions. I have detailed how they mutually interact with each other in a typical case of Sensation and Motion. Any one of these

⁶⁹ Ibid., 1:132, §9.4.

⁷⁰ Ibid., 1:191. This proposition is a consequence of Cullen’s understanding of the oscillatory, elastic nature of the nervous fluid.

⁷¹ Ibid., 1:132, §10.

⁷² Ibid., 1:132, §10.3. Like other aspects of his study of the nervous system, this organisational scheme developed over time. Prior to his 1768 text, Cullen did not divide his investigation into the three parts of Sensation, Moving Fibres, and the Brain. In fact, he says he got his division, initially, from Gaubius who had divided the principal functions into irritation, perception and contraction. Cullen modified this for his first Institutions course, using Impression, Perception and Contraction. For his 1767-8 course, he changed this again to Impression, Thought, and Contraction. He settled on the order (and terms) of Sensation, the Moving Fibres, and the Brain when he sat down to write his 1768 text. Incidentally, this provides a way of dating some of the undated sets of lecture notes in Cullen’s hand, held largely at the RCPE (esp. CUL/2/1/5 & 6). For if the heading of a series of notes reads ‘Perception’ we know they belong to 1766-7, whereas if they read ‘Thought’, they belong to his 1767-8 course. This is clear evidence of the dynamic content of Cullen’s lectures from year-to-year.

topics admits of a great deal more discussion.⁷³ And, indeed, Cullen's 'General Overview of the Nervous System' only comprises the first 10 propositions of his 1768 text, which contains 120 in total.

Nonetheless, what I wish to underscore are a few of the distinctive features of Cullen's understanding of the nervous system. First, and most critically, Cullen claims that muscles, or moving fibres, are actually the moving extremities of nerves. This is because, like the nerves and the brain, they are part of the continuous, medullary substance that comprises the nervous system.⁷⁴ It is true that muscles are peculiar in their power to contract, something the nerves do not do, even though they are comprised of the same substance. There is a tension here that Cullen will have to explain—and he knows this.

Second, the motions that are propagated along the nerves are multi-directional rather than one-way, whether they originate in the brain or begin in the extremities.

Third, the brain, which is the corporeal organ of the immaterial Soul or Mind, is the principal part of the nervous system. Sensation and Volition, to the extent they are corporeal, are functions of the brain, and the brain alone. The brain, as the origin of the nerves, serves as the communications centre, or *sensorium commune*, of the various functions of the nervous system.

It is not apparent on the face of it, but these distinctive features all emerge from Cullen's underlying theory of the nervous system. They are consequences of his belief that the nervous fluid is subtle and elastic in nature, inherent to the medullary substance itself. This theory is truly the unifying and fundamental doctrine.⁷⁵ In a way, this should not be surprising because it is the nervous fluid, as I pointed out above, that enables the medullary substance to propagate motion in the nervous system. And if the nervous system is the organ of sense and motion, then the nature

⁷³ Also, I have intentionally avoided discussing Cullen's views on the interaction between mind and body. Cullen's views are quite interesting and certainly worthy of discussion, but limitations of space prevent me from doing so here.

⁷⁴ Near the end of his lectures on the nervous system during his 1772-3 course, after discussing his theory of sleep & watching, Cullen says to his audience that "you know what pains I have formerly taken to prove that the Muscular fibres are of the same kind of matter [as the nerves], and this is a new proof of it..." (NLM, 3:45).

⁷⁵ I do not have space to defend this point here, but I do so in Appendix 4B: The Unifying Doctrine.

and *modus operandi* of the nervous fluid is what we would most like to explain. Cullen confirms this, in tantalising fashion, in the very last paragraph of his discussion of the nervous system in his 1772 textbook, before he moves on to his next major topic (the circulation of the blood). He writes that “The whole [i.e. the nervous system] might perhaps be illustrated, and more exactly ascertained by a more particular inquiry into the nature of the nervous fluid; but we are not so confident in our opinion on this subject, or of the application it will admit of, as to deliver it here.”⁷⁶

But Cullen *did* deliver his opinion on the subject three years before, near the end of his 1768-9 lectures on the Institutes of Medicine. He felt compelled to do so, on account of a thinly-veiled, anonymous attack on his doctrines, published in one of the early pamphlets that would later comprise the first edition of the *Encyclopaedia Britannica*. This controversy encouraged Cullen to scrub his later lectures and texts of most instances of the word ‘Aether’ and to avoid publicly discussing his more detailed views on the Theory of the Nervous System.⁷⁷

Cullen’s response to the attack on his views, which he delivered during the course of his lectures in early 1769, provides us with invaluable insights into these very topics.

III. 18th-Century Theories of the Nervous Fluid

Before exploring the details of Cullen’s theory, we need to consider, more widely, medical disputes in the eighteenth century about the nature of the nervous fluid.⁷⁸ It is only against this backdrop that we can contextualise Cullen’s thinking.

⁷⁶ Cullen, *Institutions of Medicine*, 115, §145.

⁷⁷ I discuss this controversy, and other relevant background knowledge, in Appendix C: The Aether Controversy. This appendix is the most substantive of the appendices that accompany this chapter (and the thesis in general) and is less a supplement than it is a detailed discussion of issues that shed light, and background material, on the topics in this chapter.

⁷⁸ I am using the term ‘fluid’ here loosely. Physiologists and natural philosophers referred to the medium of nerve function in a variety of ways, including ‘nervous fluid’, ‘nervous force’, and ‘nervous power’. Since the two groups I consider below both interpreted it as some kind of fluid, I generally use that term, though I sometimes use ‘nervous power’, especially when talking about Cullen’s own views.

There were a variety of different theories used in eighteenth-century physiology to explain the causes of sensation and muscular motion in the human body.⁷⁹ While almost all of them had recourse to some concept of a nervous fluid, there was disagreement about its nature.⁸⁰ The more traditional conception invoked the ancient theory, usually associated with Galen, of ‘animal spirits’; these supposedly flowed within the nerves (usually conceived as tubular and canal-like), acting as the agent of the rational soul.⁸¹ This hydraulic model was probably the most popular among physicians, well into the eighteenth century. I refer to this kind of theory as a *secretion theory* because it assumed that the brain secreted the animal spirits, or Nervous juice, into the nerves (tubular in nature) to be distributed throughout the body. Boerhaave, and later Haller, both adopted variations of this theory, dressed in modern form.

⁷⁹ There is not as much historical research on this topic as one might expect, given the stature of neuroscience today. Some points of entry are Eugenio Frixione et al., *The Animal Spirit Doctrine and the Origins of Neurophysiology* (Oxford: Oxford University Press, 2012); Sidney Ochs, *A History of Nerve Functions: From Animal Spirits to Molecular Mechanisms*. (Cambridge: Cambridge University Press, 2004); Edwin Clarke and L. S. Jacyna, *Nineteenth-Century Origins of Neuroscientific Concepts* (Berkeley: University of California Press, 1992); Mary A. B. Brazier, *A History of Neurophysiology in the 17th and 18th Centuries: From Concept to Experiment* (New York: Raven Press, 1984); J. D. Spillane, *The Doctrine of the Nerves* (Oxford: Oxford University Press, 1981); *The Human Brain and Spinal Cord: A Historical Study Illustrated by Writings From Antiquity to the Twentieth Century. Second Edition, Revised and Enlarged*, ed. Edwin Clarke and Charles Donald O'Malley (San Francisco: Norman Publishing, 1996), Ch. 3; Max Neuburger, *The Historical Development of Experimental Brain and Spinal Cord Physiology Before Flourens*, ed. and trans. Edwin Clarke (Baltimore: Johns Hopkins University Press, 1981); and Thomas S. Hall, *Ideas of Life and Matter: Studies in the History of General Physiology, 600 B.C.—1900 A.D. In Two Volumes* (Chicago: Chicago University Press, 1968). More focused studies include John W. Yolton, *Thinking Matter: Materialism in Eighteenth-Century Britain* (Oxford: Blackwell, 1983), Ch. 8; Roger K. French, “Ether and Physiology,” in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981); R. W. Home, “Electricity and the Nervous Fluid”, *Journal of the History of Biology* 3, no. 2 (1970): 235-251; and Edwin Clarke, “The Doctrine of the Hollow Nerve in the Seventeenth and Eighteenth Centuries,” in *Medicine, Science and Culture: Historical Essays in Honor of Owsei Temkin*, ed. Lloyd G. Stevenson and Robert P. Multhauf (Baltimore: Johns Hopkins University Press, 1968). I would be remiss if I did not also mention historical research on the wider culture of nerves and sensibility during the Enlightenment. It provides critical details about far-reaching cultural concerns that were shaped by, and shaped, the intellectual concerns I discuss here. Exemplary in this regard has been the interdisciplinary work of George S. Rousseau. For a recent collection of his essays (along with Rousseau’s own reflections on his work), see George S. Rousseau, *Nervous Acts: Essays on Literature, Culture and Sensibility* (Basingstoke: Palgrave Macmillan, 2004). Especially relevant as background to my discussion is Rousseau’s discussion of Cullen’s importance to these cultural interests (see, for instance, pp. 34-36).

⁸⁰ There are different ways of grouping these theories. For two different conceptions, see Yolton, *Thinking Matter*, Ch. 8; and French, “Ether and Physiology”, 115.

⁸¹ French notes that this explanation “remained the physicians’ traditional subtle matter of physiology until at least the beginning of the eighteenth century, and was indispensable in explaining body-mind interaction in voluntary motions.” See French, “Ether and Physiology”, 111.

Opposed to secretion theories, was a newer type of theory, inspired by Newton's speculations about the Aether. This *aether theory* usually presupposed that various physiological functions, including sensation and muscular motion, were a result of the vibrations of the aetherial medium 'flowing through' or passing along the nerves (solid and uniform in nature) to be distributed throughout the body. While not as popular among physicians, this understanding of the nervous fluid gained wide currency, at least outside of medicine, on account of Newton's stature.⁸²

This dichotomy—secretion vs. aether theories—is a simplification of the variety of theories that existed. Nor should one simply assume that supporters of one rejected everything advocated by supporters of the other. Not to mention that, even in the types I have highlighted, there was disagreement about the specifics.

Nonetheless, there is a sense in which these theories, in general terms, were at odds with one another, and Cullen certainly sets up his own discussion as a dichotomy of this kind. So, for the purposes of understanding Cullen's discussion, we can usefully distinguish between the two groups, with the caveat that this is not meant to be a comprehensive survey of the lie of the land.

Newton's 'most Subtle Spirit': Aether Theories of the Nervous Fluid

Newton's publications had implications for physiology and medicine.⁸³ Some physicians took particular inspiration from his *Opticks*, but his *Principia* was not neglected either. In fact, at the very end of that work, in the General Scholium,

⁸² Christopher Smith thought that "The theory, partly due to misunderstandings, never found favor with mainstream anatomists and physiologists, although Hartley's associationist psychology was immensely influential." See Frixione and others, *Animal Spirit Doctrine*, 144. The best overview of ether theories in the eighteenth century remains G. N. Cantor and M. J. S. Hodge, *Conceptions of Ether: Studies in the History of Ether Theories, 1740-1900* (Cambridge: Cambridge University Press, 1981).

⁸³ Scholarship on Newton is vast. Some works that touch upon Newton's influence on medicine and physiology that I have found helpful include P. M. Heimann, "Nature Is a Perpetual Worker: Newton's Aether and Eighteenth-Century Natural Philosophy", *Ambix* 20, no. 1 (1973): 1-25; R. W. Home, "Newton on Electricity and the Aether", *Contemporary Newtonian Research* (1982): 191-213; Anita Guerrini, "James Keill, George Cheyne, and Newtonian Physiology, 1690-1740", *Journal of the History of Biology* 18, no. 2 (1985): 247-66; Anita Guerrini, "The Tory Newtonians: Gregory, Pitcairne, and Their Circle", *Journal of British Studies* xxv (1986): 288-311; and Anita Guerrini, "Isaac Newton, George Cheyne and the 'Principia Medicinae'," in *The Medical Revolution of the Seventeenth Century*, ed. Andrew Wear and Roger K. French (Cambridge: Cambridge University Press, 1989).

Newton speculated about a “most subtle Spirit, which pervades and lies hid in all gross bodies...”⁸⁴ This spirit was responsible for a number of natural properties, but it might also explain some critical physiological functions. With respect to the latter, he thought that “all sensation is excited, and the members of animal bodies move at the command of the will, namely, by the vibrations of this Spirit, mutually propagated along the solid filaments of the nerves, from the outward organs of sense to the brain, and from the brain into the muscles.”⁸⁵

Newton expanded on these thoughts in his *Opticks*. In Queries 23 & 24 of the 1718 edition, Newton speculated that the Vibrations of an ‘Aetherial Medium’ were the cause of vision, hearing, and the other senses.⁸⁶ Animal motion too was “perform’d by the Vibrations of this Medium, excited in the Brain by the power of the Will, and propagated from thence through the solid, pellucid and uniform Capillamenta of the Nerves into the Muscles, for contracting and dilating them.”⁸⁷ Newton assumed that the ‘Capillamenta of the Nerves’ were solid and uniform so that the “vibrating Motion of the AETHERIAL Medium may be propagated along them from one end to the other uniformly, and without interruption...”⁸⁸

Newton’s physiological queries were adopted by many later thinkers. Not long after Newton’s death, Stephen Hales (1677-1761), whom Cullen was fond of quoting in his chemical lectures, had suggested that muscular motion, that “wonderful and hitherto inexplicable Mystery of Nature,” was due to a force controlled by the Nerves. He wondered whether this force was “confined in Canals within the Nerves, or acts along their Surfaces like electrical Powers...”⁸⁹ He thought the latter was possible for he had shown, through a number of experiments, that “a vibrating

⁸⁴ Isaac Newton, *The Mathematical Principles of Natural Philosophy. Translated Into English. Vol. II* (London: Benjamin Motte, 1729), 393. Newton introduced the concept of the ‘most subtle Spirit’ in the 1713 Latin edition of his *Principia* but I have used the 1729 English edition for convenience.

⁸⁵ *Ibid.*, 393.

⁸⁶ Isaac Newton, *Opticks: Or, A Treatise of the Reflections, Refractions, Inflections and Colours of Light. The Second Edition, with Additions* (London: W. and J. Innys, 1718), 328, Query 23.

⁸⁷ *Ibid.*, 328, Query 24.

⁸⁸ *Ibid.*, 328, Query 24.

⁸⁹ Stephen Hales, *Statical Essays: Containing Haemastatics; Or, An Account of Some Hydraulick and Hydrostatical Experiments Made on the Blood and Blood-Vessels of Animals* (London: W. Innys and R. Manby, 1733), 58-9. For more on Hales, see D. G. C. Allan and Robert E. Schofield, *Stephen Hales, Scientist and Philanthropist* (London: Scholar Press, 1980).

electrical Virtue can be conveyed and freely act with considerable Energy along the Surface of animal Fibres, and therefore on the Nerves...”⁹⁰

Around the time that Cullen began teaching at Glasgow, Browne Langrish (d. 1759), in his Croonian lectures on Muscular Motion, had taken it for granted that “we have an *aetherial Medium* in the Brain, Spinal Marrow, and all the *Capillamenta* of the Nerves, ever ready to be convey'd into the muscular Fibres, by the Power of the Will, and which *Medium* consisting of the most refined Matter in Nature....”⁹¹

Bryan Robinson (1680-1754), in his *A Dissertation on the Aether of Sir Isaac Newton* (1743) tried to solidify a number of implications from Newton’s speculations about the Aether.⁹² For instance, he adopted Newton’s account of muscular motion, as given in Query 24 of the *Opticks*.⁹³ Thus, in Robinson’s words, animals could move their own bodies, so long as they had “a power of raising a vibrating Motion in the *AEther* contained within the Fibres of the Muscles. And this Power they have by the Mediation of the Nerves, which are solid uniform Threads arising from that part of the Brain to which the Soul is present, and terminating in the Muscles.”⁹⁴ Although Cullen did not simply adopt Robinson’s interpretation of Newton, he did tell his auditors that his own speculations on the Aether were well illustrated by Robinson’s work.⁹⁵

Finally, David Hartley (1705-1757) also formulated an influential aether theory of the nervous fluid—his *Doctrine of Vibrations*—inspired by Newton’s work.⁹⁶ Hartley claimed at the very beginning of his *Observations on Man, His Frame, His Duty, and His Expectations* (1749) that his Doctrine of Vibrations is “taken from the

⁹⁰ Hales, *Haemastaticks*, 59.

⁹¹ Browne Langrish, *The Croonian Lectures on Muscular Motion* (London: C. Davis, 1747), 32.

⁹² For Robinson’s interpretation of Newton’s ideas, see the discussions in, among others, Heimann, “Nature Is a Perpetual Worker”; and Cantor and Hodge, *Conceptions of Ether*.

⁹³ Bryan Robinson, *A Dissertation on the Aether of Sir Isaac Newton* (Dublin: Geo. Ewing and Wil. Smith, 1743), 110.

⁹⁴ *Ibid.*, 110.

⁹⁵ In his chemical lectures, delivered c.1761, Cullen told his audience that his aether theory “is not new, you may collect it from S^r Isaac Newtons [*sic*] own works but more particular f^m [from] Bryan Robinsons [*sic*] treatise on the Aether of Sr Isaac Newton.” See CUL/2/2/1 (unpaginated), ~p. 87.

⁹⁶ For Hartley’s life, see Richard C. Allen, *David Hartley on Human Nature* (Albany: State University of New York Press, 1999). For Hartley’s psychology, see C. U. M. Smith, “David Hartley’s Newtonian Neuropsychology”, *Journal of the History of the Behavioral Sciences* 23, no. 2 (1987): 123-136.

Hints concerning the Performance of Sensation and Motion, which Sir *Isaac Newton* has given at the End of his *Principia*, and in the *Questions* annexed to his *Optics*....”⁹⁷ Hartley’s doctrine proposed that “External Objects impressed upon the Senses occasion, first in the Nerves on which they are impressed, and then in the Brain, Vibrations of the small, and, as one may say, infinitesimal, medullary Particles.”⁹⁸ And these vibrations “are excited, propagated, and kept up, partly by the Aether, i.e. by a very subtle and elastic Fluid, and partly by the Uniformity, Continuity, Softness, and active Powers of the medullary Substance of the Brain, spinal Marrow, and Nerves.”⁹⁹ Indeed, Hartley was well aware of the tension between his kind of account and that of secretion theorists, like Boerhaave. “If we admit the foregoing Account of the uniform continuous Texture of the medullary Substance,” he wrote, “it will follow, that the Nerves are rather solid Capillaments, according to Sir *Isaac Newton*, than small *Tubuli*, according to *Boerhaave*.”¹⁰⁰ The influence of Hartley on Cullen has not been investigated, but Cullen does not appear to have adopted Hartley’s Doctrine of Vibrations. In 1769 he told his auditors, about Hartley, that “perhaps he may have failed [sic] in his general Application but no one has treated his fundamental proposition as absurd.”¹⁰¹

Cullen was clearly an aether theorist about the nervous fluid, as we shall see. He accepted the main propositions of the theory, as outlined by Newton: that there was a subtle Spirit, or Aetherial Medium, that, on account of its vibrations, explained most of the phenomena of sensation and motion in the animal economy. It passed along the solid substance of the nerves, to be distributed throughout the body. Still, it remains to be seen what version of this theory Cullen actually endorsed; Newton, and a number of his followers, had still to work out many of the details and implications of the aether theory, especially in the context of medicine.

⁹⁷ David Hartley, *Observations on Man, His Frame, His Duty, and His Expectations. In Two Parts* (London: S. Richardson, 1749), 5.

⁹⁸ *Ibid.*, 11.

⁹⁹ *Ibid.*, 13.

¹⁰⁰ *Ibid.*, 17.

¹⁰¹ YML, Inst., 2:245.

'Animal Spirits': Secretion Theories of the Nervous Fluid

The 'Animal Spirits' doctrine, or what I am calling the secretion theory, could be traced back to Galen, but we are concerned here with its eighteenth-century manifestations.¹⁰² It was the favoured theory among 18th-century academic physicians, at least up to mid-century. That is to say, most physicians believed that the brain was a gland that secreted the nervous fluid into tubular, canal-like nerves, where it was distributed throughout the body.

Boerhaave was probably the most famous adherent of the secretion theory.¹⁰³ In his *Institutiones Medicae* (first published in 1708), Boerhaave laid out his view of the nervous fluid and how it worked in the body. On account of a variety of anatomical and physiological arguments, he concluded that "the medullary Fibres are small pervious Tubuli, receiving the most *subtile* Juice of any in the whole Body; which being prepared and separated in the wonderful Fabric of the Cortex, is thence propell'd from every Point thro' these Tubuli into the Medulla oblongata, and there collected."¹⁰⁴ The Brain thus contains a "secretory Apparatus" that 'secerns', or secretes, the nervous Juice into the nerves where it is distributed throughout the body.¹⁰⁵

¹⁰² For a history of the doctrine, see Frixione and others, *Animal Spirit Doctrine*. The eighteenth-century is discussed in Chapters 9-12.

¹⁰³ For more on Boerhaave, see, most recently, John C. Powers, *Inventing Chemistry: Herman Boerhaave and the Reform of the Chemical Arts* (Chicago: University of Chicago Press, 2012); and Rina Knoeff, *Herman Boerhaave (1668-1738): Calvinist Chemist and Physician* (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2002). For the classic study, consult G. A. Lindeboom, *Herman Boerhaave, the Man and His Work* (London: Methuen & Co Ltd, 1968). For aspects of Boerhaave's physiology, see G. A. Lindeboom, "Boerhaave's Concept of the Basic Structure of the Body", *Clio Medica* 5 (1970): 203-208; François Duchesneau, "Physiological Mechanism From Boerhaave to Haller," in *L'Homme Et La Nature*, ed. Roger L. Emerson, Gilles Girard and Roseann Runte (Ontario: Faculty of Education, University of Western Canada, 1982); and John P. Wright, "Boerhaave on Minds, Human Beings and Mental Disease", *Studies in Eighteenth-Century Culture* 20 (1990): 289-302. For Boerhaave's influence in Edinburgh in particular, see Andrew Cunningham, "Medicine to Calm the Mind: Boerhaave's Medical System, and Why It Was Adopted in Edinburgh," in *The Medical Enlightenment of the Eighteenth Century*, ed. Andrew Cunningham and Roger K. French (Cambridge: Cambridge University Press, 1990).

¹⁰⁴ Herman Boerhaave, *Dr. Boerhaave's Academical Lectures on the Theory of Physic. Vol. II. Containing the Structure and Action of the Vital or Sanguificative Organs; Viz. The Heart, Lungs, Blood and Its Vessels, Glands, Brain and Nerves, &c* (London: W. Innys, 1743), 285, §274.

¹⁰⁵ *Ibid.*, 284, §274.

We do not know very much about the nervous juice itself, Boerhaave thinks, because it is not observable to our senses. But from its effects we can conclude that its particles “are the most simple, *dense or firm*, subtile and *moveable* of any Juice throughout the whole Body” akin to very pure and refined water.¹⁰⁶

How does the nervous Juice function? By the force of the heart and circulatory apparatus, it is pushed through the nerves to every part of the body.¹⁰⁷ Eventually, the nervous juice returns to the brain “so that there seems to be a Circulation of the nervous Juice not unlike that of the Blood and other grosser Humours of the Body.”¹⁰⁸ This continuous circulation of the nervous Juice moves in a “constant, gentle, and *equable*” Flux.¹⁰⁹ However, it is still able to act with great speed, almost instantaneously, “because all the nervous Tubuli being full, an Impulse communicated to the Liquor at one End of the Tube will thrust out its Globules at the other End in the very same Instant of Time...”¹¹⁰

This is, in a nutshell, the secretion theory of the nervous fluid, as supported by Boerhaave. It had other implications that were interpreted differently by adherents of the theory. Two examples of particular importance were its role in muscular motion and sleep.

Boerhaave thought that the nervous liquor must be, and was, “every way adapted to be the Cause of Motion in a Muscle”¹¹¹, i.e. “the Cause of Motion in the Muscles is contained in the Nerves.”¹¹² Sleep was caused by “a Paucity or *Deficiency* in the most subtile Spirits, which being now spent or exhausted require a long time and great Apparatus to prepare and recruit the same...”¹¹³ So Boerhaave linked the exhaustion of the supply of the nervous Juice to the onset of sleep.

¹⁰⁶ Ibid., 290, §275.

¹⁰⁷ Ibid., 313, §286.

¹⁰⁸ Ibid., 313, §286.1.

¹⁰⁹ Ibid., 315, §288.

¹¹⁰ Ibid., 317, §288.1.

¹¹¹ Boerhaave, *Boerhaave's Lectures, Vol. III*, 222, §403.1.

¹¹² Ibid., 223, §403.3.

¹¹³ Herman Boerhaave, *Dr. Boerhaave's Academical Lectures on the Theory of Physic. Vol. IV. Containing the Oeconomy of the External and Internal Senses, Sleep, and Respiration* (London: W. Innys, 1745), 302-3, §594.

Haller's Secretion Theory

The Swiss physician and polymath, Albrecht von Haller (1708-1777), like his teacher Boerhaave, rejected the view that the nerves are akin to solid elastic cords that propagate motion by vibrating.¹¹⁴ Instead, Haller claims that “there is a liquor sent through the brain, which, descending from thence through the nerves, flows out to all the extreme parts of the body; the motion of which liquor, quickened by irritation, operates only according to the direction in which it flows through the nerve...”¹¹⁵ Thus, like Boerhaave, he thinks the nerves are hollow tubes, through which a nervous liquor flows.¹¹⁶

About the nervous liquid itself, he thinks it is probably “incompressible and watery, but of a lymphatic or albuminous nature.”¹¹⁷ It must also be “exceedingly moveable, so as to carry the impressions of sense, or commands of the will, to the places of their destination, without any remarkable delay: nor can it receive its motions only from the heart. Moreover, it is very thin and invisible, and destitute of all taste and smell; yet reparable from the aliments.”¹¹⁸

Haller's rejection of the electrical-like nature of the nervous fluid is noteworthy because Cullen engages with it at a later point. Haller thought the nervous fluid could not be an electrical matter because “then it is not confinable within the nerves, since it penetrates throughout the whole animal to which it is communicated, exerting its

¹¹⁴ There is a growing literature on Albrecht von Haller, spurred in part by his Jubilee in 2008. The best general introduction to his medical theory is Hubert Steinke, *Irritating Experiments: Haller's Concept and the European Controversy on Irritability and Sensibility, 1750-90*, Clio Medica/The Wellcome Series in the History of Medicine 76 (Rodopi, 2005). A shorter point of entry is Shirley A. Roe, “Anatomia Animata: The Newtonian Physiology of Albrecht Von Haller,” in *Transformation and Tradition in the Sciences: Essays in Honor of I. Bernard Cohen*, ed. Everett Mendelsohn (Cambridge: Cambridge University Press, 1984). For Haller's physiology in particular, a classic study is Lester S. King, “Introduction,” in *First Lines of Physiology by the Celebrated Baron Albertus Haller M.D. &c. Two Volumes in One. A Reprint of the 1786 Edition with a New Introduction by Lester S. King, M.D.*, The Sources of Science (New York: Johnson Reprint Corporation, 1966). For French readers, Duchesneau's work is significant, especially François Duchesneau, *La Physiologie Des Lumières: Empirisme, Modèles et Théories*, International Archives of the History of Ideas (The Hague: Martinus Nijhoff, 1981).

¹¹⁵ Haller, *First Lines*, Vol. I, 220, §377.

¹¹⁶ See, e.g. *Ibid.*, 221, §378.

¹¹⁷ *Ibid.*, 221, §379.

¹¹⁸ *Ibid.*, 222, §381.

force upon the flesh and fat, as well as upon the nerves.”¹¹⁹ But in living animals, only the nerves are moved by irritation. So the nervous fluid must be such that it will “flow through, and be contained within, the small pipes of the nerves. And a ligature on the nerve takes away sense and motion, but cannot stop the motion of a torrent of electrical matter.”¹²⁰

Haller’s general conclusion, then, about the nervous fluid is that it is separated out of the cortex and runs through the small tubuli of the nerves to everywhere it is needed, “so as to be the cause of both sense and motion.”¹²¹ Haller does not endorse full circulation of this fluid, like Boerhaave. He thinks some of it is exhaled, and some of it reabsorbed, so that it does not dissipate too quickly.¹²²

Haller’s secretion theory thus overlaps with Boerhaave’s but is not the same. They both share the view that the nervous fluid was a liquor, secreted by the brain, into the hollow tubes of the nerves. But Haller differed from Boerhaave both in his account of sleep, and more influentially, in his theory of muscular contraction.

According to Haller, sleep arose “either from a simple deficiency of the quantity and mobility of the spirits, or a compressure of the nerves; but always from a more difficult motion of the spirits through the brain.”¹²³ It may not be obvious how this depends upon secretion in the brain of the nervous fluid, but Haller refers vigilance, or waking, explicitly to secretion. The nervous juice accumulates in the brain and eventually fills the collapsed nerves. This accumulation is the cause of vigilance, or the waking state.¹²⁴

¹¹⁹ Ibid., 221, §378.

¹²⁰ Ibid., 221, §378.

¹²¹ Ibid., 223, §383.

¹²² Ibid., 223, §385.

¹²³ Albrecht von Haller, *First Lines of Physiology, by the Celebrated Baron Albertus Haller, M.D. &c. Translated From the Correct Latin Edition Printed Under the Inspection of William Cullen, M.D. And Compared with the Edition Published by H.A. Wrisberg, M.D. Professor at Gottingen. To Which Are Added, the Valuable Index Originally Composed for Dr Cullen's Edition; And All the Notes and Illustrations of Prof. Wrisberg, Now First Translated Into English. In Two Volumes. Vol. II* (Edinburgh: Charles Elliot, 1786), 52, §585.

¹²⁴ Ibid., 54, §589.

Haller's theory of muscular contraction—which I sketch below—was original and widely influential.¹²⁵ He thought the nervous fluid played a role in muscular motion, but other forces were at work as well, of which Boerhaave had not taken notice. Haller's theory thus diminished the importance of the nervous fluid as the primary cause of muscular contraction.

Haller's Theory of Muscular Contraction

Haller's explanation of motion in the animal economy is founded on his identification of three forces operating in the muscle: the *vis Mortua*, *vis Nervosa*, and *vis Insita*. It is the interaction between these (especially the latter two) that accounts for muscular motion. It is important to see how these work in order to understand how Cullen's model contrasts with Haller's—a contrast that Cullen himself often made explicit.

The dead force, or *vis Mortua*, was something shared with other animal fibres, but it was not particularly important to understanding living bodies. More relevant was the inherent force, or *vis Insita*, which “is more proper to life, and the first hours after death, and disappears much sooner than the dead one.”¹²⁶ The *vis Insita* “acts by alternate oscillations” and is quicker and more forceful than the dead force.¹²⁷ It is excited in a number of different ways (by pricking, by inflated air, by water, etc) and is “proper to the muscular fibre, and is found in no other part of the human body with the qualities abovementioned.”¹²⁸

¹²⁵ For considerations of Haller's influence on muscular physiology in particular, see Guido Giglioni, “What Ever Happened to Francis Glisson? Albrecht Haller and the Fate of Eighteenth-Century Irritability”, *Science in Context* 21, no. 4 (2008): 465-493; Eugenio Frixione, “Irritable Glue: The Haller-Whytt Controversy on the Mechanism of Muscle Contraction,” in *Brain, Mind and Medicine: Essays in Eighteenth-Century Neuroscience*, ed. Harry Whitaker, C. U. M. Smith and Stanley Finger (New York: Springer, 2007); Steinke, *Irritating Experiments: Haller's Concept and the European Controversy on Irritability and Sensibility, 1750-90*, Chs. 4-5; and Owsei Temkin, “Albrecht Von Haller, ‘A Dissertation on the Sensible and Irritable Parts of Animals’”, *Bulletin of the History of Medicine* 4 (1936): 651-99.

¹²⁶ Haller, *First Lines*, Vol. I, 232, §400.

¹²⁷ *Ibid.*, 232, §400.

¹²⁸ *Ibid.*, 232-3, §400.

The *vis Insita* also “resides constantly in the muscle itself” and is not destroyed by tying a ligature to a connected nerve, or ingesting opium, or damaging the brain.¹²⁹ It even remains intact in intestines that are taken out of the body and cut into pieces. And it cannot be said to have feeling, nor does the Will have any control over it.¹³⁰ The *vis Insita* is the reason why muscles contain *irritability*. Indeed, a muscle is able to contract from the force of the *vis Insita* alone, without being connected to the nerves.¹³¹

This is in contrast to the third force that Haller discusses, the *vis Nervosa* or nervous force. The *vis Nervosa* does not reside in the muscles but may flow into them from without. The nervous force ends when life does and is interrupted by tying a ligature around the nerve, or damaging the brain, or ingesting opium. Moreover, the Will can control it.¹³²

We can now put the latter two forces together to explain muscular motion in a living body. Haller seems to be thinking of two primary instances of muscular contraction: those that involve the nervous force and those that do not. In both cases, the *vis Insita* is necessary and the primary cause of muscular motion.

We have already seen how Haller thinks the *vis Insita* is responsible for the irritability of animal fibres, without the involvement of the Will (i.e. involuntary motion). But he must also account for voluntary muscular contraction as well. And here is where he invokes the nervous force. If the nervous liquor enters the muscular fibres, it stimulates them to contract. A muscle, then, “is contracted which in a given time receives more of the nervous fluid, whether that be occasioned by the will, or by some irritating cause arising in the brain, or applied to the nerve.”¹³³ Haller suggests he had conducted many experiments to confirm this series of events. So he concludes that “the nerve alone has feeling; this alone carries the commands of the soul; and of

¹²⁹ Ibid., 235, §404.

¹³⁰ Ibid., 235, §404.

¹³¹ Ibid., 234, §402.

¹³² Ibid., 235, §404.

¹³³ Ibid., 237, §408.

these commands there is neither intimation nor perception in that part, whose nerve is either tied or cut, or which has no nerve.”¹³⁴

To summarise Haller’s model: there is an inherent force, the *vis Insita*, that resides in the muscle alone and is responsible for its irritability. Nonetheless, the nervous force or *vis Nervosa* (in the form of the nervous liquor) is able to stimulate the muscular fibres to contract by entering into them. This influx model of muscular contraction is reminiscent of, but not identical to, Boerhaave’s secretion theory; yet it also includes Haller’s distinctive notion of the *vis Insita* that resides inherently in the muscular fibres, almost independent of the rest of the system. This latter claim was something Cullen rejected.¹³⁵

IV. Cullen’s Inherence Theory of the Nervous System

Cullen’s theory can now be seen in the context of the various disputes about the nervous fluid I have canvassed above, and it contains claims that are clearly his attempt to improve upon the many drawbacks, as he saw them, of the secretion theories then prevalent. In a sense, this is not surprising, given Cullen’s adoption of an aether theory of the nervous fluid. His theory was unquestionably Newtonian at heart, though it is more difficult to state the extent to which he modified, or extended, the basic claims of the aether theory to suit his purposes. Some ‘translation’ was necessary, given the medical context in which he adopted it. We will return to this question below, once we know the details of his theory.

Cullen offered the most detailed and explicit formulation of his theory of the nervous system in a set of lectures delivered in March of 1769. These were in response to an attack on Cullen’s views, contained in a small pamphlet published in late 1768. This pamphlet would later become part of the first edition of the *Encyclopedia Britannica*, under the article entitled ‘Aether’.¹³⁶ The anonymous

¹³⁴ Ibid., 234, §403.

¹³⁵ For more on this, see Appendix 4B: The Unifying Doctrine, especially my sketch of Cullen’s theory of muscular contraction.

¹³⁶ For details about this controversy, please see Appendix 4C: The Aether Controversy. I am only providing an overview here in order to explain the context for Cullen’s remarks.

author of this broadside (and general compiler of the *Encyclopedia*) was William Smellie (1740-95), Edinburgh printer and writer, who had grown tired of Cullen's popularity at the Edinburgh Medical School. He used the article to attack Cullen's views indirectly; Cullen's name was never mentioned. Instead Smellie critiqued an inaugural medical dissertation entitled, *De ortu animalium caloris*, written by a recently-graduated Edinburgh medical student, Gustave Richard Brown. In this dissertation, Brown enthusiastically endorsed Cullen's ideas about Aether and the nervous fluid. Smellie used his 'Aether' article to dismiss Brown's claims. This attack provoked a rare public outburst from Cullen in 1769, at the tail-end of his lectures on the nervous system, in which he outlined and defended his theory.

In those lectures, Cullen loosely structures his discussion in the form of a set of propositions and supporting arguments for those propositions. He is not entirely consistent in this, at least as far as the extant notes indicate. Nonetheless, I have tried to bring out Cullen's propositions in such a way that we can see the overall structure of his theory.

Cullen's first and most fundamental proposition is that there is an elastic power in the nervous system, and that the vibrations of this elastic power (in common with other 'Oscillatory Elastics') produce the motions in the nervous system.¹³⁷ There is, in short, "an Elastic power in the Nerves" of Animals.¹³⁸

At the outset of his discussion, Cullen says that he does not (yet) claim that this elastic power is the result of the behaviour of a solid or a fluid, just that it is an *elastic* power. But it becomes clear rather quickly that he thinks this elastic power must be attributable to a fluid, and he spends little time refuting the alternative view because he thinks it has been universally rejected. So I will treat this assumption as part of his first and most fundamental proposition: that there is an elastic fluid that operates in the nerves of Animals. Cullen also does not say much about why he considers this elastic fluid to be *subtle*, but he often refers to it as such, and the assumption seems to be that it must be exceedingly subtle or minute, given both its

¹³⁷ YML, Inst., 2:247.

¹³⁸ Ibid., 2:256.

high velocity and the difficulty of seeing its particles, even with the most powerful microscopes of the time.

Cullen's second proposition is lesser known but even more essential to his theory. He claims that this elastic fluid is *inherent* in, rather than secreted into or by, the medullary substance of the nervous system; that is, it is not subject to variations in its quantity, as a secretion would be. This is why I refer to his theory as an *inherence theory*, in contrast to the secretion theories of Boerhaave and Haller. The notion of 'inherence' could be seen as an implication of any Newtonian aether theory, though perhaps not a necessary feature. It depended on how one conceived of the relationship between the Aether and the substance of the nerves.

Cullen's third proposition is that the nervous elastic fluid, inherent to the nervous system, is a modification of Newton's universal pervading Aether, analogous to other subtle, elastic fluids in nature, including Magnetism, Electricity, Light and Heat. Cullen thinks the nervous fluid shares affinities with these other phenomena, though it is nonetheless *sui generis*, subject to its own laws. We can now summarise the principal components of Cullen's theory of the nervous system as follows:¹³⁹

Proposition 1: [the "**elasticity proposition**"] That there is a subtle, elastic fluid in the nerves of animals that is responsible for the phenomena of sense and motion.

Proposition 2: [the "**inherence proposition**"] That this elastic fluid is not a secretion, external to the nerves, but an elastic fluid that is *inherent* to, or within, the medullary substance of the nervous system.

Proposition 3: [the "**Aether proposition**"] That this nervous elastic fluid is a modification of Newton's universal pervading Aether (a general elastic fluid in nature), subject to its own laws, analogous to other modifications of the universal Aether in nature, including Magnetism, Electricity, Light, and Heat.

¹³⁹ I will refer to the propositions, in my discussion that follows, by the shorthand names I have placed in brackets above. Note that these are my names for them; *not* Cullen's.

§1. A Nervous Elastic Fluid: The Elasticity Proposition

Cullen tells us that the elasticity proposition is, in fact, the fundamental proposition of the theory and, in his mind, not as subject to dispute as the inherence proposition. It is one he “thought of most importance, & which most clearly admitted of proof—that there is an elastic power in the nerves of Animals, and that this is an Elastic fluid.”¹⁴⁰ Indeed, by the end of his discussion he thinks it is one that “I have clearly established & is now a generally received opinion, & I flatter myself that the physiologist of the 19th Century will receive it universally.”¹⁴¹

Cullen provides a variety of arguments to support his elasticity proposition. The first set comes from our knowledge of communications in general, as well as the very great velocity of such communications in the nervous system. We know that where “motion is communicated from one body to another by the intervention of a third it must either be by the local motions of the whole mass or by the particles of the intervening body vibrating by means of an Elastic Oscillatory principle in it.”¹⁴² Cullen tells his audience to consider what happens when we strike one billiard ball among three, or one among 12. If we place three balls separately from each other in a direct line, and strike the first against the second, which then hits the third, the latter’s motion is due to the “local motion of the intervening ball.”¹⁴³

But now consider the case of 12 balls lined up in a direct line and in contact with each other (so that we can be sure of transferring motion to the 12th ball). When we strike the first ball, all the remaining ones stay in place, while the 12th flies away. In this case, we do not witness local motion but “Elastic Oscillations communicated

¹⁴⁰ YML, Inst., 2:257. For the purposes of my own discussion, I have grouped these together as Cullen’s ‘elasticity’ proposition, though Cullen is in fact making a two-part claim. But since he makes no attempt to establish the second proposition—that the elastic power is attributable to a fluid rather than a solid—I have compressed the claims into one proposition.

¹⁴¹ Ibid., 2:278.

¹⁴² Ibid., 2:247.

¹⁴³ Ibid., 2:247.

thro' the whole of these to the last ball.”¹⁴⁴ Now, is the communication of motion in the nervous system via local motion or these kinds of elastic oscillations?

Elasticity is highly probable, Cullen thinks, on account of the very high velocity of the nervous fluid. Haller has given us many examples of this.¹⁴⁵ And while these do not amount to a proof, they, collectively, are “a strong presumption for the presence of an Elastic fluid in the Nerves of Animals.”¹⁴⁶ This is because mathematicians have shown that the velocity is in proportion to the elasticity & rarity of the medium taken together.¹⁴⁷ So if the velocity is very great, as Haller has shown, we may presume that the elasticity and rarity of the nervous fluid is also very great. And where “we observe the Velocity of the communication of motions propagated thro’ two bodies without the intervention of a third we conclude it to be by elasticity where the motion first impressed is much too small to move the whole mass.”¹⁴⁸

From this and other considerations, he concludes that there is an elastic fluid in the Nerves.¹⁴⁹ Taken collectively, these observations “support one another & prove to me an Elastic power in the Nerves of Animals. These Phaenomena have determined Physiologists in all ages to inferr [*sic*] an Elasticity in the Nerves, but they imagined it to be the Elasticity of a Solid like Catgut, but to this opinion there are many insuperable objections, & the supposition of a Solid Elasticity is now universally renounced.”¹⁵⁰ Therefore, the elastic power in the nerves is the elasticity of a fluid.¹⁵¹

§2. *An Elastic Fluid Inherent in the Nerves: The Inherence Proposition*

¹⁴⁴ Ibid., 2:248.

¹⁴⁵ Ibid., 2:251.

¹⁴⁶ Ibid., 2:252.

¹⁴⁷ Ibid., 2:249.

¹⁴⁸ Ibid., 2:251.

¹⁴⁹ Cullen thinks at least two other observations support his proposition: (i) our impressions, and the impulses upon our senses, are of an oscillatory nature (see, e.g. WUSL, 1:215-16) and (ii) motions in our nerves remain even after the impressing power has ceased (YML, Inst., 2:254).

¹⁵⁰ YML, Inst., 2:256.

¹⁵¹ Ibid., 2:256.

Cullen felt that his assumption of inherence was most distinctive and original to his own kind of theory, one which solved certain outstanding physiological problems in a way that secretion theories did not.

Having established the elasticity proposition, Cullen had to adjudicate between competing theories of the nature of this elastic fluid in the nerves. The most prevalent theory, with the authority of Boerhaave and Haller, was that the nervous elastic fluid was a secretion from the brain that was alternatively exhausted and replenished, as it circulated through the nerves. Cullen took this secretion theory seriously for he spends a good deal of time rejecting it. In fact, in his lectures proper for 1768-9 (that is, those lectures prior to his defence of his theory of the nervous system) he is much more concerned with rejecting the secretion theory than advocating any theory to replace it, though he certainly insinuates what his own opinion is, without trying to defend it. He tells his audience, for instance, that “I take not charge of this or any other opinion I am only concerned in refuting the notions of a secreted fluid.”¹⁵²

Cullen clearly thought that refuting the notion of secretion also provided strong evidence for its only alternative: inherence. Either the nervous fluid is secreted from the brain and acts via local motion, or it is not a secretion and therefore must be inherent to the nerves. If he can reject the secretion theory, he thinks, given only those two options, he has thereby rendered the inherence proposition highly probable.

He associates the secretion theory primarily with Boerhaave. In a commentary on his (Cullen’s) §99, Cullen admits that the notion of a secretion in the Brain, at least one which could be the cause of various important phenomena in the nervous system, is an attractive one.¹⁵³ In fact, “it was the opinion of Boerhaave who had taken particular pains to prove this Secretion, & to establish it, by insinuating that the

¹⁵² Ibid., 2:37.

¹⁵³ In what follows, I interweave Cullen’s remarks on this topic from his ‘Theory of the Nervous System’ lectures with a similar but more extended (and often more lucid) discussion he provided earlier in the same academic session (see YML, Inst., 2:31-70 for this).

Brain had a secondary apparatus. If there be a secretion there is a fluid distributed by the Nerves...” but there have long been controversies about this.¹⁵⁴

Interestingly, Cullen does not reject all secretion theories whatsoever. He concedes, right at the beginning, that there is plenty of evidence that a fluid is secreted in the Brain.¹⁵⁵ This is because nerves are responsible for nutrition of the body, and nerves “are the primary fundamental staminal parts of the body from w^{ch} all parts originally proceed & to whom all subsequent secretion & growth of the System is manifestly owing...I admit then of Secretion...”¹⁵⁶ and “it is probable there is a secretion in the Brain” on account of this.¹⁵⁷

But this nutritional secretion is fundamentally different from the one responsible for the primary phenomena of the nervous system, like sleep, sensation, and muscular motion. We know this, in part, because of our knowledge of the nutritious fluid in vegetables. The “manner in w^{ch} the Nutritious Juices in Veget^s are carried along their fibres, or even in Animals makes the supposition of another fluid for the vehicle of Sense & Motion more necessary, as the nutritious fluid cannot perform functions so very different.”¹⁵⁸ So Cullen agrees with Boerhaave “that if nutrition is performed by the Nerves it must be by an aqueous albuminous fluid...”¹⁵⁹

But what Cullen gives with one hand, he takes with the other, for the secretion theory of the nervous fluid, as outlined by Boerhaave, assumes that this very same fluid is also responsible for sensation and motion. But this is precisely what Cullen rejects, for the inelastic, aqueous Boerhaavian nervous fluid is “unfit for the motions that occur [*sic*] in Sensation & muscular contraction.”¹⁶⁰ The inelastic nutritious fluid is simply incapable of being the vehicle for the very rapid communications of sensation and motion that we observe in the animal economy. Haller and others have

¹⁵⁴ YML, Inst., 2:31. Cullen told his audience that “The whole labours of Boerhaave on this subject turn on there being an appearance of a Secretory apparatus in the brain, a peculiar distribution of the blood, a peculiar structure in the extremities of Vessels...” (2:31)

¹⁵⁵ Ibid., 2:259.

¹⁵⁶ Ibid., 2:32.

¹⁵⁷ Ibid., 2:260.

¹⁵⁸ Ibid., 2:32-3.

¹⁵⁹ Ibid., 2:33.

¹⁶⁰ Ibid., 2:33.

shown these communications must exceed 9000 feet per minute.¹⁶¹ And “almost all Physiologists imagine that such velocity cannot take place but in a fluid highly elastic.”¹⁶²

Cullen thus thinks there are two kinds of fluids in the nerves: “I. The Elastic w^{ch} is the Instrument of Sense & Motion. II. The Nutritious secreted fluid. The former I call the Nervous; the latter the nutritious fluid.”¹⁶³

Incompatible with Muscular Motion & the Subsistence of the Nervous Power

There are further reasons why the secretion theory of the nervous fluid will not account for the phenomena. Cullen emphasises two in particular. First, a nervous fluid secreted from the brain cannot explain “the motions of Muscles cut out of the body & cutt [*sic*] into several pieces.”¹⁶⁴ That is, it cannot account for all the phenomena of muscular motion. Recall that Boerhaave (though not Haller) argued that the nervous fluid, secreted from the brain, was responsible for muscular contraction. But how can one then account for muscular contraction in muscles that have been removed from the body and cut off from the brain? Cullen thinks this objection to the secretion theory is a very forceful one, for “what embarrasses every Theory that takes in an accessory fluid [i.e. any secretion theory] is to determine how that accessory quantity is taken out on the relaxation of the Muscle. But if it be liable to waste I can think of no opinion that is reconcileable [*sic*] to the irritability of Muscles long cut out from the body, detached from the brain & divided into several pieces.”¹⁶⁵ Therefore, a secretion theory cannot explain the phenomena of sense and motion.

Cullen makes a similar point in the context of Haller’s muscle experiments. After describing some of Haller’s experiments from his *Opera Minora* (esp. Experiments 140 and 141), Cullen highlights “the long subsistence of the Inherent

¹⁶¹ Ibid., 2:33.

¹⁶² Ibid., 2:34.

¹⁶³ Ibid., 2:261.

¹⁶⁴ Ibid., 2:38.

¹⁶⁵ Ibid., 2:42.

power in Animals[,] much longer than we can reconcile with the view of Secretion & its concomitant circumstances of waste & supply.”¹⁶⁶ This is in fact “the strongest Argument against Secretion & consequently against local motion”, i.e. the fact that “the Nervous power remains after the communication with the secretory organ is cut off.”¹⁶⁷ Haller’s many experiments to this effect are thus highly significant for Cullen.¹⁶⁸

A similar problem, as Cullen sees it, is that the secretion theory assumes some kind of reabsorption or circulation of the nervous fluid. This is because the nervous fluid would otherwise be exhausted by muscular motion and other functions in the body. The nervous fluid, as a secretion, would thus require a constant supply, for there is “no proof of a locomotion of the Nervous fluid...resembling circulation.”¹⁶⁹ Thus, under the secretion theory, the nervous fluid “must be constantly wasting at the ends of the Nerves” for no one has shown how it can return again to its origin.¹⁷⁰

Incompatible with Sleep & Watching

The second major objection Cullen has with the secretion theory is its account of sleep and watching (i.e. waking). One might initially suppose that the alternate supply and exhaustion of a nervous fluid (e.g. by exercise, or intense thinking, etc) would fit the phenomena of sleep and watching quite well. And, in fact, says Cullen, “It is the phaenomena of Sleep and watching that have afforded Physiologists the chief Arguments for a secreted fluid[.]”¹⁷¹ But Cullen wants to turn this on its head by showing that “the considerations of Sleep and Watching are to me among the chief proofs of the nonexistence of a secreted fluid concerned in these functions.”¹⁷²

¹⁶⁶ Ibid., 2:266.

¹⁶⁷ Ibid., 2:265.

¹⁶⁸ One can find Experiments 140 and 141 described in Albrecht von Haller, *Opera Minora Emendata, Aucta, Et Renovata. Tomus Primus. Anatomica; Ad Partes Corporis Humani, Vitales, Animales, Naturales* (Lausannae: Francisci Grasset, 1763), 361. I am not certain, however, that this is the same edition of Haller’s *Opera Minora* that Cullen had in mind.

¹⁶⁹ YML, Inst., 2:263.

¹⁷⁰ Ibid., 2:263.

¹⁷¹ Ibid., 2:272-3.

¹⁷² Ibid., 2:273.

First, there is no proof of the exhaustion of the nervous fluid, e.g. by exercise or thinking—“there is not the smallest conjecture.”¹⁷³ Neither do we have any evidence for how the nervous fluid might accumulate in the brain, as is also necessitated by the secretion theory.¹⁷⁴ In fact, “there is no evidence of any inequality taking place in the secretion of the brain...the notion is purely Theoretical & made up in consequence of the other opinion.”¹⁷⁵

Beyond these anatomical issues, the phenomena are incompatible with the exhaustion and accumulation of nervous fluid that is supposed to explain sleep and watching. Although sleep and watching periodically return, they do not do so strictly according to how tired or exhausted the body happens to be: “Watching is often prolonged when the body is much wasted, & Sleep occurs when there has been no exhausting.”¹⁷⁶ This is true, as well, of the periodicity of excretion and appetite, which, although to some extent periodical, also “return under considerable vicissitudes & are only rendered uniform as to time by habit & are totally independant [*sic*] of this circumstance[.]”¹⁷⁷ Thus, Cullen concludes that “Sleep and Watching must depend on a law of the Nervous fluid independant [*sic*] of Secretion.”¹⁷⁸

Cullen thinks his arguments are all the more forceful given that they turn the traditional arguments about sleep and watching on their head: “[T]hese I have rendered incompatible with their doctrine...and therefore the considerations of Sleep and Watching are to me among the chief proofs of the nonexistence of a secreted fluid concerned in these functions.”¹⁷⁹ We see, then, why Cullen attaches so much importance in his physiology to an accurate account of the functions of sleep & watching.

¹⁷³ Ibid., 2:43.

¹⁷⁴ Ibid., 2:43.

¹⁷⁵ Ibid., 2:44.

¹⁷⁶ Ibid., 2:272.

¹⁷⁷ Ibid., 2:272.

¹⁷⁸ Ibid., 2:272.

¹⁷⁹ Ibid., 2:273.

Embracing Inherence

After marshalling the arguments above to reject the secretion theory of the nervous fluid, Cullen is ready to defend his preferred alternative: that the nervous fluid is inherent in, or to, the medullary substance of the nerves themselves.

Cullen offers a number of arguments for inherence, but there is a set of considerations that seem to outweigh all the others. These are the results of ‘nerve division’ experiments by Haller, especially. Cullen sums up his reasoning as follows: “if a Nerve be ever so minutely divided, & of consequence cut off from all communication with the brain it still communicates motions[,] hence we conclude it [the nervous power] to be inherent, & if it is inherent it cannot be a secreted fluid which necessary [*sic*] supposes local motion.”¹⁸⁰ This is the key insight for Cullen: if nerves can be divided into tiny segments, unable to communicate with the brain, and still retain their ability to communicate motions, then their power to do this must be inherent to the nerves themselves, in some fashion or other, rather than the result of a secretion from the brain.¹⁸¹

This also implies, Cullen thinks, that the elastic fluid cannot be confined in canals, as opposed to being inherent to the medullary substance itself. This is because when a nerve is cut into tiny pieces, “in every piece the inherent power shall remain in vigour & can be excited by Stimuli for many days[,] but if an Elastic fluid is confined in Canals it must immediately escape from an excision of the Canal, and consequently can have no duration of its inherent power.”¹⁸²

One reason why Cullen spends a good deal of time rejecting the secretion theory and defending inherence is because he believes his theory of the nervous system—in particular what I am calling his *inherence proposition*—was more or less distinctive to his own views (only Gaubius comes close). “You will see that I have made considerable variations in my system from that of others,” he told his students, “different from Boerhaave & all other Physiologists by mantaining [*sic*] that it [the

¹⁸⁰ Ibid., 2:279.

¹⁸¹ See, in particular, Cullen’s discussion at Ibid., 2:265-7.

¹⁸² Ibid., 2:266-267.

nervous fluid] is inherent in the Nerves.”¹⁸³ Of course, Cullen was aware of other aether theorists, and he acknowledges that his own understanding of the aether was ultimately derived from Newton. What he is likely claiming is a certain amount of originality in the way he has applied the principles of the aether theory to physiology and the nervous system in particular. Cullen’s claim becomes more plausible if we treat it as a claim about his theory of the nervous system, in the context of medicine. As I mentioned above, although aether theories were nothing new, they were not particularly popular among physicians and physiologists. That is perhaps why Cullen says that his theory “puts us in a train of Investigation very different from that of former Physiologists.”¹⁸⁴ In particular, he thinks he has, thus far, “established two great & important propositions in the Nervous System. 1. That there is an elastic fluid in the Nerves. 2. That this fluid is inherent in the Nerves & is not liable to occasional variations of it’s [*sic*] quantity.”¹⁸⁵

Given that he often refers to Haller’s experiments in support of his views, Cullen expresses surprise that Haller did not see the virtues of his inherence theory. He suspects that Haller’s Boerhaavian prejudices, especially for the secretion theory, had blinded him to a Cullen’s own solution. Like Richard Mead and Senac, Haller was fettered with ancient prejudices on this topic and could not see his way to the better theory. Although Haller “adduces all his Arguments that it [the nervous fluid] is tenuissimum & mobilissimum...[he] dares not conclude it he is so fettered by his opinions in the other parts of his System. He thinks it must be confined in Canals but does not reflect that it may be conveyed within or without these[.] [H]e thinks it must be a gross fluid because it is intercepted by a ligature, but the ligature prevents the communication of motion[.]”¹⁸⁶

Of course, Cullen has not answered all objections to his theory, nor solved every riddle. Still, he thinks he has offered proofs of ‘two great & important propositions’. And while he might refuse to go further into his theory, he will do so

¹⁸³ Ibid., 2:274.

¹⁸⁴ Ibid., 2:278.

¹⁸⁵ Ibid., 2:273-4.

¹⁸⁶ Ibid., 2:275.

in this instance in order to accompany gentlemen who “set no bounds to their enquiries, & aim at a solution to almost every Phaenomenon”; he will thus continue by showing “what limits are to be made to the prosecution of this study.”¹⁸⁷

And these limits have to do with Cullen’s third and most controversial proposition, to which we now turn.

§3. The Nervous Fluid as a Modification of the Universal Aether: The Aether Proposition

The most controversial proposition of Cullen’s theory has to do with the nature and origins of the nervous fluid. How can we understand how this inherent elastic fluid works? To explore this, Cullen ends his defence of his theory by investigating, via analogy, what the laws “of this inherent Elastic fluid” are. “I shall proceed farther,” Cullen tells his students, “to satisfy those whose enquiries cannot be limited till every difficulty is removed.”¹⁸⁸

The reason we can proceed by analogy is that there are other subtle, elastic fluids that we know of in nature, the most important being the magnetic fluid, the electrical fluid, heat, and light.¹⁸⁹ By knowing as much as we can about these other subtle, elastic fluids—how they work and the natural laws they appear to follow—we can elucidate, via analogy, the nervous fluid, which shares a strong affinity to these other kinds.

Cullen does not go into great detail here—nor will I—about the nature of these other fluids. But a few observations are in order. First, he notes that magnetism or the magnetic fluid “is what Philosophers term a *cosmical* quality—a matter in nature diffused over the whole of our Earth. The Aurora Borealis tho’ at such an immense distance has great influence on the Magnetical qualities of bodies, it is every where present & is a particular modification of the Universal AETHER.”¹⁹⁰

¹⁸⁷ Ibid., 2:259.

¹⁸⁸ Ibid., 2:279.

¹⁸⁹ Ibid., 2:279.

¹⁹⁰ Ibid., 2:280.

Electricity, even more than magnetism, clearly looms large in Cullen's thinking. We have already seen how he has, at various points, likened the nervous fluid to the electrical fluid (without, it should be emphasised, equating them or saying that the nervous fluid was a kind of electrical fluid). It provides him with an excellent analogy, especially on account of its movement: it adheres to bodies, like the nervous fluid, and is also "communicable from one body to another."¹⁹¹

Heat is also, like the fluids above, "a subtile pervading universal fluid." When matter is expanded, "it must be imputed to the powers of heat acting in it's [*sic*] pores."¹⁹² Cullen thinks it unnecessary to settle the various disputes about the nature of heat here but he thought that "every body allows the obvious properties of heat and that is sufficient for our conclusions."¹⁹³

Finally, there is the phenomena of light. Cullen actually spends most of his time discussing it, compared with the other fluids; he evidently felt that this was a particularly noteworthy analogy, or at least one requiring the most discussion. He suggests there are two opinions about light as an elastic fluid (between which he does not adjudicate; he wants to be able to encompass both): it is constituted by either (i) vibrations in a fluid, a fluid which then "must certainly be universal in the whole System of Nature extending between us & the Sun & the whole fixed Stars"¹⁹⁴ or (ii)

¹⁹¹ Ibid., 2:280. For relevant discussions about electricity and physiology in the eighteenth century, see Home, "Electricity and the Nervous Fluid"; Home, "Newton on Electricity and the Aether"; Margaret Rowbottom and Charles Susskind, *Electricity and Medicine: History of Their Interaction* (San Francisco: San Francisco Press, 1984); W. Cameron Walker, "Animal Electricity Before Galvani", *Annals of Science* 2, no. 1 (1937): 84-113; and E. T. Whittaker, *A History of the Theories of Aether and Electricity: From the Age of Descartes to the Close of the Nineteenth Century* (London: Longmans, Green, and Co., 1910), Ch. 2. For broader discussions of the role of electricity in the Enlightenment, see J. L. Heilbron, *Electricity in the 17th and 18th Century: A Study of Early Modern Physics* (Berkeley: University of California Press, 1979); and Patricia Fara, *An Entertainment for Angels: Electricity in the Enlightenment* (New York: Columbia University Press, 2003).

¹⁹² YML, Inst., 2:280.

¹⁹³ Ibid., 2:280. Cullen's theory of heat or fire is quite important but somewhat disputed. The most complete description of his theory is Georgette Taylor, "Unification Achieved: William Cullen's Theory of Heat and Phlogiston As An Example of His Philosophical Chemistry", *The British Journal for the History of Science* 39, no. 04 (2006): 477-501. Worth consulting as well are Arthur L. Donovan, *Philosophical Chemistry in the Scottish Enlightenment: The Doctrines and Discoveries of William Cullen and Joseph Black* (Edinburgh: Edinburgh University Press, 1975), Ch. 6; J. R. R. Christie, "Ether and the Science of Chemistry: 1740-1790," in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981); and J. R. R. Christie, "William Cullen and the Practice of Chemistry," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993).

¹⁹⁴ YML, Inst., 2:281.

an “emanation from the Sun & Stars” in the form of rays “that are continually emitted.”¹⁹⁵ Since these would be so great in number, “the whole expanse must be filled with a subtile fluid.”¹⁹⁶ From the whole phenomena of light falling on, and then passing through, the pores of bodies—according to either of these opinions—“we have a proof of an universal fluid surrounding & continued in all bodies.”¹⁹⁷

Cullen notes a few more phenomena of light, especially with respect to reflection and refraction and suggests that since “Motion is only communicated by the contact of one body to another there must be a matter contained in the pores of Solids that gives occasion to the Phaenomena” just discussed.¹⁹⁸ All this “amounts to a demonstration that there is a subtile Elastic fluid on the surfaces & contained in the pores of all bodies[.] These phaenomena therefore evince us of the presence of another subtile & elastic fluid.”¹⁹⁹

Given these other subtle, elastic fluids pervasive in nature, e.g. magnetism, electricity, heat, and light, it is not unreasonable to investigate, Cullen thinks, “the existence of a subtile Elastic fluid in the Nervous System of Animals.”²⁰⁰

Particular Portions of Matter or Modifications of One Universal Matter?

Another query that has bearing on this topic, Cullen thinks, is whether the natural phenomena that arise from all these subtle, elastic fluids are the result of their

¹⁹⁵ Ibid., 2:281. Although Cullen does not take sides in the dispute about the nature of light here—he wants his theory to be able to work on either assumption—elsewhere he seems to endorse Euler’s theory of light and colours, against the more traditional Newtonian view of emanation (see, e.g. WUSL, 1:210, where his support of Euler’s theory is implied, or MS Cullen 260/1, 4v, where he says Euler’s theory of colours is ‘not without foundation’.) This may have been a somewhat recent development in his thinking, depending on when he became aware of Euler’s theory of light and colours (at least as early as 1766-67, likely earlier). It shows, as well, that Cullen was willing to abandon the Newtonians, when it suited him. For more on theories of light during the Enlightenment, see especially G. N. Cantor, *Optics After Newton: Theories of Light in Britain and Ireland, 1704—1840* (Manchester: Manchester University Press, 1983); R. W. Home, “Leonhard Euler’s ‘Anti-Newtonian’ Theory of Light”, *Annals of Science* 45, no. 5 (1988): 521-533; and Casper Hakfoort, *Optics in the Age of Euler: Conceptions of the Nature of Light, 1700-1795* (Cambridge: Cambridge University Press, 2006).

¹⁹⁶ YML, Inst., 2:281.

¹⁹⁷ Ibid., 2:281.

¹⁹⁸ Ibid., 2:282.

¹⁹⁹ Ibid., 2:282.

²⁰⁰ Ibid., 2:282.

being “connected with particular portions of matter” or whether, instead, they are the product of “one universal matter liable to different Modifications from the state of matter to w^{ch} it is connected.”²⁰¹ One’s opinion on this has, *ipso facto*, ramifications for what one thinks about the nervous elastic fluid in the nerves.

Cullen endorses the latter opinion. He thinks, on account of the simplicity of nature, all the subtle, elastic fluids—including the nervous fluid—are modifications of one universal matter that pervades all of nature.²⁰² His reasons for this have to do with the strong affinities between the subtle, elastic fluids he has already mentioned above. First, Cullen argues that the matter of Magnetism & Electricity are the same thing. For proof of this, he cites Aepinus’ argument (as Cullen interprets it) that both “are governed by laws in common to each & therefore we may suppose the fluid which causes them is the same differently modified in it’s [*sic*] operations from it’s [*sic*] union with different matter.”²⁰³

Secondly, electricity and heat have great affinity. Not only does heat accumulate electricity but “Electricity shews [*sic*] the phaenomena of heat & light & philosophers use the term fire to [refer to?] Electricity, commonly denominating it the Electric fire.”²⁰⁴

Thirdly, “Heat & Light are certainly the same” irregardless of the opinion (of the two mentioned above) we take of the nature of light. Either way, “heat & light must be supposed to be different vibrations of the same elastic fluid.”²⁰⁵

Finally, heat and cohesion—which is a property of the nervous elastic fluid—also have an affinity: “The state of Cohesion must depend on the state of this fluid in

²⁰¹ Ibid., 2:282.

²⁰² Ibid., 2:282-3.

²⁰³ Ibid., 2:283. The notetaker seems to have garbled the name, for it is written ‘Epumis’; nonetheless, the name is followed by a reference to Aepinus’ work. It is generally reckoned that Aepinus’ influence on British natural philosophy showed up later than the late 1760s. Nor has Cullen usually been included among those whose ideas were influenced by Aepinus’ work. Perhaps this requires emendation. See, for more on this, Franz Ulrich Theodor Aepinus, *Aepinus’s Essay on the Theory of Electricity and Magnetism. Introductory Monograph and Notes by R. W. Home*, ed. R. W. Home, trans. Peter James Connor (Princeton: Princeton University Press, 1979), and the collection of essays in R. W. Home, *Electricity and Experimental Physics in Eighteenth-Century Europe* (Hampshire: Variorum, 1992). For a broader discussion of debates about physics in the eighteenth century, see Heilbron, *Electricity in the 17th and 18th Century*.

²⁰⁴ YML, Inst., 2:283.

²⁰⁵ Ibid., 2:284.

the pores of bodies which is so much affected by heat, & if there is an Elastic fluid in the Nerves of Animals it is much connected with heat to w^{ch} it owes it's [*sic*] first Excitement."²⁰⁶

From all these strong affinities between the different subtle, elastic fluids in nature:

we may presume that there is in nature one common elastic fluid w^{ch} is different as modified by different states of other matter. The term Aether is applied to this universal matter & of late called Sir Isaac Newton's Aether, because (tho the notion was started long before) he gave the world the most certain proofs of it's [*sic*] existence, and this term sh^d only be applied to the general fluid not to the different modifications of it in Magnetism Electricity &e [etc].²⁰⁷

Applications to the Nervous Fluid

How do we apply this conclusion to the nervous elastic fluid in particular? How is the Newtonian Aether modified in the nerves of animals, by virtue of the nature of the matter—the medullary substance—to which it is connected? Cullen observes that the other subtle, elastic fluids like magnetism, electricity and light, in their own ways, depend “on the particular state of the matter in which [they are] found.”²⁰⁸ To take but one example regarding electricity: certain bodies allow the electric fluid to pass along them and others prevent it from doing so readily, thereby accumulating it. “This property of conducting or not conducting is connected with a peculiar arrangement of the particles of matter. Every elastic fluid conducts, but every dry solid (the Metallic substances excepted) does not conduct. This property of Liquids generally conducting, & all dry solids ([Metallic Iron] excepted) not conducting is very general & the reason must be imputed to a variation in the state of the matter.”²⁰⁹ There are further examples of this, but together they show that “it is merely the consistence of bodies that determines the whole phaenomena of Electricity... The Modifications of Electricity depend so much on the particular state

²⁰⁶ Ibid., 2:284.

²⁰⁷ Ibid., 2:284.

²⁰⁸ Ibid., 2:287.

²⁰⁹ Ibid., 2:285-6.

of other bodies that we may suppose it an universal fluid always dependant [*sic*] on the peculiar state of the matter in which it is found.”²¹⁰

Cullen, endorsing the pre-existent germ theory of development, suggests that the generation of the nervous fluid of animals might be understood along the same lines. In the animal germ, once heat is applied to the nervous fluid it “can have it’s [*sic*] Elasticity excited, so as to admit of Oscillations from one part to another, and this depends on the peculiar construction of the matter & it’s [*sic*] Modification by Heat. Where the circumstances of heat and this matter are given[,] the Elastic fluid in the Nerves is produced being a Modification by these of the Universal AEtherial fluid.”²¹¹

Cullen’s general conclusion, then, is that:

there is in Nature an universal Subtile Elastic matter which by it’s [*sic*] connection with other matter is variously modified, exhibits different Phaenomena & is under different laws—in consequence of which Magnetism, Electricity, Light, Heat, &c are produced—and there may be a peculiar Elastic fluid in the nervous Medullary Solid, variously affected by the surrounding matter, and on which supposition we explain all the Phaenomena of Sense & Motion.²¹²

Cullen, ever the Systematist, derives his theory of the nervous system from his more fundamental views about the basic building blocks of matter and the workings of Nature, whether these be chemical or mechanical. Everything was connected to everything else, as in a big circle of cause and effect that was hard to unravel. This is why we can be confident that his understanding of the nervous fluid is the core principle in his theory of the nervous system: it is the link between his physiology and his underlying natural philosophy, grounded as it was in his ontology of matter.²¹³ With the example of Newton before him, Cullen hoped to encompass all of

²¹⁰ Ibid., 2:286-7.

²¹¹ Ibid., 2:289.

²¹² Ibid., 2:288.

²¹³ Cullen’s ontology of matter has not been explored in detail, though the following works touch upon it in the context of his chemical doctrines: Taylor, “Unification Achieved”; Christie, “Ether”; and Donovan, *Philosophical Chemistry*, Ch. 6. This would be an interesting subject for further study. Cullen’s discussion about Aether and Atoms, as well as his hypothesis for the attraction of cohesion (and a diagram that illustrates his hypothesis), have not, to my knowledge, been discussed before. See YML, Inst., 1:35-42.

natural knowledge using a few basic but explanatorily powerful assumptions, and his theory of the nervous system was part and parcel of—truly inextricable from—his grand System of Nature.

V. The Scottish Context: Cullen and His Colleagues

Now that we know the details of Cullen's inherence theory of the nervous system, we can ask what his predecessors and contemporaries at Edinburgh made of it. Were they favourable, neutral, or hostile to aether theories in physiology? Or did they prefer versions of the secretion theory—or other theories entirely? I have space to point out only what they rejected, but that is enough to show that almost none of Cullen's predecessors or colleagues on the medical faculty endorsed his aetherial explanation of the nature of the nervous fluid. In fact, most were hostile to it. Members of the medical faculty held a variety of views, but Cullen's were noticeably different from his colleagues' and may have made him more defensive and reticent on account of this. I suggest that the tension between Cullen and his colleagues had to do with their opposing views on the role of mechanical explanation in one's approach to the nervous system, and medicine more generally.

Alexander Monro *primus* (1697-1767), who served for so long on the medical faculty at Edinburgh, rejected aetherial explanations of the phenomena of the nervous system, largely on account of his devotion to Boerhaavian principles.²¹⁴ He did not think we knew enough about “the Properties of an *AEther* or *electrical Effluvia* pervading every Thing, to apply them justly in the Animal OEconomy; and it is as difficult to conceive, how they should be retained or conducted in a long nervous Cord. These are Difficulties not to be surmounted.”²¹⁵

²¹⁴ For more on Monro *primus*, see Rex E. Wright-St Clair, *Doctors Monro: A Medical Saga* (London: Wellcome Historical Medical Library, 1964); Christopher Lawrence, “Alexander Monro Primus and the Edinburgh Manner of Anatomy”, *Bulletin of the History of Medicine* 62 (1988): 193-214; D. W. Taylor, “‘Discourses on the Human Physiology’ by Alexander Monro Primus (1697-1767)”, *Medical History* 32, no. 1 (1988): 65-81; and more recently Anita Guerrini, “Alexander Monro Primus and the Moral Theatre of Anatomy”, *The Eighteenth Century* 47, no. 1 (2006): 1-18.

²¹⁵ Alexander Monro *primus*, *The Anatomy of the Human Bones, Nerves, and Lacteal Sac and Duct. Corrected and Enlarged in the Seventh Edition* (Edinburgh: G. Hamilton and J. Balfour, 1763), 350, §52.

Monro instead stuck to Boerhaave's secretion theory. He believed that the nerves were akin to small pipes that conveyed the nervous liquor to its intended destinations in the body.²¹⁶ The framework of his master, Boerhaave, was still critical to his views, as late as 1763, when he wrote that "if we have any Notion of an Animal, it is its being an Hydraulick Machine, which has Liquors moving in it as long as it has Life...."²¹⁷

Robert Whytt, who shared little in common with his elder colleague, nonetheless also rejected aetherial explanations. These were among the false hypotheses that attempted to explain how various stimuli could "excite the muscles of living animals into contraction."²¹⁸ If we suppose the existence of animal spirits, according to Whytt, they must act according to mechanical principles or not. But they could not be explained mechanically for they seemed to react disproportionately to powers that acted upon them. But if their motions were, on the contrary, "ascribed to some unknown active properties, this will be found to be not only a mere *hypothesis*, but such a one as will hereafter be proved utterly irreconcilable [*sic*] with the phenomena of muscular contraction from *stimuli*."²¹⁹

Whytt did not mince his words. The supposition of "an elastic *aether*" simply could not explain muscular contraction because its oscillations "must always follow the laws of vibration observed in other elastic bodies, which yet are utterly inconsistent, as we shall have occasion of proving below, with the alternate and vibratory-like contractions of muscular fibres occasioned by irritation."²²⁰

²¹⁶ *Ibid.*, 335, §30.

²¹⁷ *Ibid.*, 341, §39.

²¹⁸ Robert Whytt, *An Essay on the Vital and Other Involuntary Motions of Animals. The Second Edition, with Corrections and Additions* (Edinburgh: John Balfour, 1763), 256. For more on Whytt's views, see Roger K. French, *Robert Whytt, the Soul, and Medicine* (London: Wellcome Institute, 1969); John P. Wright, "Whytt, Robert (1714-66)", *Continuum Encyclopedia of British Philosophy* 4 (2006): 3423-3425; Julius Rocca, "William Cullen (1710-1790) and Robert Whytt (1714-1766) on the Nervous System," in *Brain, Mind and Medicine: Essays in Eighteenth-Century Neuroscience*, ed. Stanley Finger, C. U. M. Smith and Harry Whitaker (New York: Springer, 2007); and Nima Bassiri, "The Brain and the Unconscious Soul in Eighteenth-Century Nervous Physiology: Robert Whytt's *Sensorium Commune*", *Journal of the History of Ideas* 74, no. 3 (2013): 425-448. See also Lawrence, "Medicine As Culture", Ch. 4.

²¹⁹ Whytt, *Vital and Other Involuntary Motions*, 260.

²²⁰ *Ibid.*, 265.

Whytt was hostile to all purely mechanical explanations of the motions of the nervous system.²²¹ This was the basis for much of his dispute with Haller's theory of irritability.²²² For example, he rejected mechanical explanations of the heart that assumed it acted according to the laws of elastic bodies by insisting they obeyed totally different laws.²²³ In fact, "every attempt to account for these motions, from elastic powers of whatever kind, supposed to reside in the heart, must be vain and fruitless; and can only serve to shew [*sic*], that the authors or supporters of such opinion were either ignorant of the nature of elastic vibrations, or unacquainted with the *phaenomena* recited above..."²²⁴ Cullen must have felt that some of Whytt's discussion applied directly—and critically—to his own views, given that he assumed a mechanical explanation via a subtle, elastic nervous fluid.²²⁵

While we might not be surprised by Whytt's hostility to aetherial explanations, it is to be expected that John Gregory could spare little patience for them.²²⁶ Indeed, Gregory made a particular point of dismissing Cullen's views, without naming him. In a set of lecture notes for the upcoming academic year (1773-4) that John Gregory may have been working on when he died, he wrote that several physiological hypotheses presupposed the existence of a subtle Aether that, in addition to being the cause of gravity, magnetism, elasticity and the like, also comprised the nervous

²²¹ This included hostility to mechanical explanations of muscular contraction. Famously he thought, instead, that the contractions of muscular fibres "are owing to an active sentient PRINCIPLE animating these fibres." See *Ibid.*, 269.

²²² For the Whytt-Haller debate, see French, *Robert Whytt*, esp. Ch. 6, and Frixione, "Irritable Glue".

²²³ Whytt, *Vital and Other Involuntary Motions*, 406. Whytt, in reference to these views, cites the work of Hoffmann, Lancisi, Lieutaud and Senac.

²²⁴ *Ibid.*, 409-10.

²²⁵ The stark differences between Cullen and Whytt have been obscured by the use of Cullen's later (post-1770) lecture notes, in which he downplays his differences with Whytt, perhaps to avoid further controversy. But in his first course on the *Institutions* in 1766-67, shortly after Whytt's death, he is more critical. For instance, he dismisses Whytt's use of the sentient principle in parts cut out from the body, simply and bluntly: "And to apply the sentient principle cut out of the Body as White [*sic*: Whytt] does is highly improper" (WUSL, 1:316).

²²⁶ John Gregory warrants more historical study. The best we have at the moment is still Lawrence, "Medicine As Culture", Ch. 7. But see also Paul David Lawrence, "The Gregory Family: A Biographical and Bibliographical Study, to Which is Annexed a Bibliography of the Scientific and Medical Books in the Gregory Library, Aberdeen University Library" (PhD Thesis, University of Aberdeen, Aberdeen, 1971); Lisbeth Haakonssen, *Medicine and Morals in the Enlightenment: John Gregory, Thomas Percival and Benjamin Rush*, *Clio Medica* 44: Wellcome Institute Series in the History of Medicine (Amsterdam: Rodopi, 1997); and Laurence B. McCullough, *John Gregory and the Invention of Professional Medical Ethics and the Profession of Medicine* (Dordrecht: Kluwer Academic Publishers, 1998).

spirits.²²⁷ But in regard to Aether, “it has been supposed not to be contained in the Nerves but to envelope them in the way of their circumambient Atmosphere. This is a mere Hypothesis and so incapable of being demonstrated by experiments that it is not of consequence to follow it any further.”²²⁸

Gregory, like some of his fellow Aberdonians, seems to have embraced nescience about the more obscure features of the nervous system.²²⁹ He told his students, concerning the nature of the nervous fluid, that “all we know of the matter is that if an impression is made upon the Body by an external object in consequence of this and if there is no disease in the Nerve and if the Brain is in a sound state certain sensations arise but we know of no motion taking place...”²³⁰ Indeed, the nature of the nervous fluid is “perfectly unaccountable” and even when he uses the word ‘motion’, Gregory tells his students, “I do not mean any such thing as real Motion takes place.”²³¹

Alexander Monro *secundus* (1733-1817), the son of the elder Alexander Monro, was a contemporary of Cullen’s and on more friendly terms with him than John Gregory was.²³² Still, he too has little patience for aetherial explanations of the nervous fluid. He thinks that “experiments do not certainly prove that the nervous

²²⁷ EUL, Gen.2106D, p. 97 (within the first ‘volume’ of a book that binds together two volumes as one, though they are paginated separately). This volume, written in what appears to be Gregory’s hand, is dated 1773 and covers the topics normally delivered in Gregory’s course on the Institutions of Physic. Since Gregory died in early 1773 and was at that time teaching a course on the Practice of Physic, I am guessing that this volume was to be the basis for his lectures for the upcoming 1773-4 academic year, when he would have taught the Institutions again.

²²⁸ Ibid., p. 98 (within the first volume). It is striking, once one knows Cullen’s own theory, how explicitly Gregory is dismissing it here, without naming him directly.

²²⁹ Thomas Reid, for one, was impressed with Whytt’s attack on mechanism and rejected aetherial explanations in physiology of the kind Cullen favoured. See Paul Wood’s discussion in Thomas Reid, *Thomas Reid on the Animate Creation: Papers Relating to the Life Sciences*, ed. Paul Wood (Edinburgh: Edinburgh University Press, 1995), 25.

²³⁰ EUL Gen.2106D, p. 98 (within the first volume).

²³¹ Ibid., p. 99 (within the first volume).

²³² There is precious little on Monro *secundus*. The best introduction to his thought is Lawrence, “Medicine As Culture”, Ch. 5. See also D. W. Taylor, “The Manuscript Lecture-notes of Alexander Monro, Secundus (1733-1817)”, *Medical History* 22, no. 2 (1978): 174-86; and Mark M Ravitch, “Invective in Surgery: William Hunter Versus Monro Primus, Monro Secundus, and Percival Pott”, *Bulletin of the New York Academy of Medicine* 50, no. 7 (1974): 797-816.

energy is very subtle and moveable.”²³³ Indeed, he thinks we do not even have solid proof that a nervous fluid exists.²³⁴

But Monro *secundus*' arguments also affect a different part of Cullen's model of the nervous system, one which was a consequence of his underlying theory. Monro rejects neuromuscular physiology, denying that “the muscular fibres are the continuation of, or are formed by the nerves....”²³⁵

Moreover, he could not abide mechanical explanations of the motions of the human body. Like Whytt, he thought the very nature of these explanations was misguided: “The account which some of the most eminent authors have given of the cause of these functions, on mechanical principles, or principles which may be called mixed, as including certain feelings with mechanism, must, when duly considered, appear unphilosophical in the highest degree.”²³⁶

After reviewing the views of most of Cullen's medical colleagues who taught the nervous system, it is rather clear that Cullen could not count on their agreement. Virtually none of his Edinburgh colleagues had much patience for aetherial explanations of the nervous fluid.²³⁷ Indeed, most were openly hostile to it. James Gregory, who was witness to a lot of these debates, later wrote that during the entire time Cullen taught at Edinburgh:

there never was a time when even *one* of his Colleagues admitted those theories; nor do I believe they ever were admitted by the other Physicians, Fellows of the Royal College in this City, who had not been his pupils, or by any great number of Physicians, if by any, in the three kingdoms, who were his seniors or cotemporaries [*sic*], and not his pupils. And I had good

²³³ Alexander Monro secundus, *Observations on the Structure and Functions of the Nervous System. Illustrated with Tables* (Edinburgh: William Creech, 1783), 81.

²³⁴ *Ibid.*, 81.

²³⁵ *Ibid.*, 90. Monro references Cole, Santorinus & Boerhaave, but *not* Cullen, though it clearly applies directly to him. This omission may have been out of professional courtesy.

²³⁶ *Ibid.*, 103.

²³⁷ The only positive voice in this chorus of rejection is the exception that proves the rule: Cullen's pupil-turned-colleague, Joseph Black. While we do not know much about Black's physiology, we do know he followed Cullen, at least early in his career, in endorsing aetherial explanations in chemistry. See, for instance, the discussions in David B. Wilson, *Seeking Nature's Logic: Natural Philosophy in the Scottish Enlightenment* (University Park: Pennsylvania State University Press, 2009), 143; and Arnold Thackray, *Atoms and Powers: An Essay on Newtonian Matter-theory and the Development of Chemistry* (Cambridge: Harvard University Press, 1970), 223-30. Cullen (and Black) may have been predisposed to the virtues of aether theories in medicine too, given their background in chemistry. None of Cullen's colleagues were steeped in chemistry to the extent he (and Black) were.

occasion to observe, between fourteen [1789] and nine and twenty years ago [1774], that in London his doctrine, which Mr John Bell says had enslaved the Medical world, was treated with great contempt.²³⁸

The Threat of Mechanism

Why was there such hostility to Cullen's theory of the nervous system? It is easiest to explain in the older generation. *Monro primus* still had a strong attachment to the Boerhaavian system of medicine and was thus predisposed to the virtues of the secretion theory. But what about Cullen's contemporaries?

Here Paul Wood's observation that certain topics in physiology, like muscular motion, had obvious theological overtones is apropos. Claims about muscular motion, and by implication the nature and function of the nervous fluid, were put to theological use.²³⁹ While "physiologists who assumed the passivity of matter struggled to find a convincing naturalistic explanation of muscular motion, Christian apologists could exploit the phenomena for their own ends."²⁴⁰ We can see this in both Whytt and Gregory's mistrust of aether theories.

Whytt dismissed explanations of the animal economy that presumed mechanical action. He thought that "it clearly follows, that the human body ought not to be regarded (as it has too long been by many Physiologists) as a mechanical machine, so exquisitely formed, as, by the mere force of its construction, to be able to perform, and continue, the several vital motions; things far above the powers of mechanism!"²⁴¹ Indeed, Whytt believed that mechanistic and materialistic accounts of the body led to atheism, while his system, based on an active, immaterial principle, "leads us up to the FIRST CAUSE and supreme AUTHOR OF ALL, who is ever to be adored with the most profound reverence by the reasonable part of his creation."²⁴² For Whytt, not only were aether theories like Cullen's based on empty speculation, but they were rightfully suspected of being irreligious.

²³⁸ James Gregory, *Additional Memorial to the Managers of the Royal Infirmary* (Edinburgh: Murray & Cochrane, 1803), 193-4.

²³⁹ Thomas Reid, *On the Animate Creation*, 20-1.

²⁴⁰ *Ibid.*, 21.

²⁴¹ Whytt, *Vital and Other Involuntary Motions*, 360-1.

²⁴² *Ibid.*, 437.

It is probable that John Gregory held a similar view. I have already mentioned Gregory's nescience about the nature of the nervous fluid above. But we know that he also shared a theological and philosophical outlook concordant with Thomas Reid's. And Reid spoke favourably of Whytt's physiology. In Paul Wood's interpretation, Reid embraced Whytt's "intense anti-mechanism and anti-materialism...[He] would have whole-heartedly endorsed Whytt's conclusion that 'true physiology' both proves the existence of an immaterial soul, and 'leads us up to the first cause and Supreme Author of all.'"²⁴³ Gregory, like Reid and Whytt, was uncomfortable with too much mechanism in medicine. And aether theories like Hartley's or Cullen's could be construed as accounting for the operations of the nervous fluid (and thus, by implication, the mind itself) on mere mechanism alone.²⁴⁴

Despite Alexander Monro *secundus*' broad similarities to Cullen, he shared Whytt's (and Gregory's) rejection of mechanism. Like Whytt, Monro thought that attributing a power of motion to inert matter was not only physiologically suspect but theologically so as well, for an only immaterial principle, or spirit, could create motion.²⁴⁵ Monro's own conclusion, in his *Observations on the Structure and Functions of the Nervous System* (1783), gives some indication of what he thought the proper relationship between physiological and theological principles was: "...does it not appear, that the most just, as well as most becoming conclusion we can draw, is, that the Power which created all things, which gave life to animals and motion to the heavenly bodies," he wrote, "continues to act upon, and to maintain all, by the unceasing influence of a living principle pervading the universe, the nature of which our faculties are incapable of duly comprehending?"²⁴⁶

'I am for admitting mechanism as far as it will go'

²⁴³ Thomas Reid, *On the Animate Creation*, 21.

²⁴⁴ Or so Reid argued about Hartley's theory in his *Essays on the Intellectual Powers of Man* (1785). He wrote that Hartley's "system of vibrations is to make all the operations of the mind mere mechanism, dependent on the laws of matter and motion." Quoted in Yolton, *Thinking Matter*, 184.

²⁴⁵ I am here summarising Lawrence's claim about Monro *secundus*. See Lawrence, "Medicine As Culture", 177.

²⁴⁶ Monro *secundus*, *Functions of the Nervous System*, 104.

Cullen's colleagues, then, appear to have rejected aether theories of the nervous power, not only because they thought there was little evidence in their favour, but also because they were too mechanistic and thus dangerously close to impiety.²⁴⁷ Their suspicion of his views becomes more understandable, when we see that, on the topic of mechanism, Cullen's opinions were diametrically opposed to those of his colleagues. He was not worried about mechanism; he embraced it. He was, in fact, more concerned that it would be abandoned prematurely.²⁴⁸

Consider, for example, his approach to incorporating the soul into physiology. Although Cullen was at pains to insist that he was no materialist and allowed, in a very limited way, for some kind of sentient principle in one's theory of the mind, still the action of the soul had to be explained by the laws of mechanism: "Tho' there is a sentient principle in the soul yet that is invariably connected with the organization of the Body, and the chemical conformation of it. This sentient principle may have a share in the operation and I take it to be a sine qua non; But still it must be determined by the mechanism of the Body."²⁴⁹

Cullen refers to the sentient principle, and this may falsely suggest his similarities to Whytt. But unlike Whytt, Cullen was eager to push mechanical

²⁴⁷ For wide-ranging discussions of mechanism and materialism in 18th-century medical debate, see, among others, Ann Thomson, *Bodies of Thought: Science, Religion, and the Soul in the Early Enlightenment* (Oxford: Oxford University Press, 2008); Robert E. Schofield, *Mechanism and Materialism: British Natural Philosophy in the Age of Reason* (Princeton: Princeton University Press, 1970); Yolton, *Thinking Matter*; Kathleen Wellman, *La Mettrie: Medicine, Philosophy, and Enlightenment* (Durham: Duke University Press, 1992); *Medicine and Religion in Enlightenment Europe*, ed. Ole Peter Grell and Andrew Cunningham, *The History of Medicine in Context* (Aldershot: Ashgate, 2006); *Psyche and Soma: Physicians and Metaphysicians on the Mind-Body Problem From Antiquity to Enlightenment*, ed. John P. Wright and Paul Potter (Oxford: Oxford University Press, 2000); Wright, "Materialism and the Life Soul"; and L. J. Rather, *Mind and Body in Eighteenth-Century Medicine: A Study Based on Jerome Gaub's De Regimine Mentis* (London: Wellcome Historical Medical Library, 1965).

²⁴⁸ I do not have space here to say much about the *kind* of mechanism Cullen embraced. It is clear, however, that it was more capacious than the traditional Corpuscularian mechanism, for Cullen included subtle, elastic fluids. Cullen says many Corpuscularians had erred by thinking "of nothing / but the action of hard & figured bodies upon one another... We have now learned / the defect & also how it is / to be supplied / The present philosophy / gives us an idea of the action / of Subtile elastic fluids in many parts of Nature." See CUL/2/1/5 (unpaginated), 'Nervous System Recapitulation of No 4 & 5', ~p. 404-6.

²⁴⁹ WUSL, 2:4-5. I cite Cullen's lectures from 1766-67 because he appears to have been less guarded in his language and not yet unduly concerned about the controversy his lectures might stir up. But, as the Aether controversy shows, he learned to be more cautious in later years. I do not think this shows a substantive change in his thinking—just a more acute awareness of how what he said in his lectures could be used against him.

explanation to its limit; he was wary of importing theology into physiology, for fear of impeding inquiry: “The supposition of the soul is very agreeable to the human heart, but it has on many occasions suspended, intercepted & disturbed our theory. I am cautious of admitting [*sic*] it because I do not know its operations; and I am for admitting [*sic*] mechanism as far as it will go.²⁵⁰ If we used “the arbitrary motions of the soul” to philosophise about the animal body, we risked speaking “unintelligible [*sic*] Jargon.”²⁵¹ Cullen insisted that “nothing but mechanism can be the foundation of all our reasoning.”²⁵²

Cullen was perhaps even more explicit the next year, in his 1767-8 lectures. In lecture notes, or prompts, we have in his own handwriting, we hear him warning his auditors about general errors that “have affected the Theory of Philosophy & Physic” at various times in its history.²⁵³ One such error is presumptively assuming that various natural phenomena can only be explained by referring to Spirit or the Deity rather than mechanism:

I have said that the mecha- / nical are the only operations / [we?] conceive with regard to matter / the only other in nature we know / of is the operation of Spirit & it / has been at all times natural / [to?] Man when they could not per- / ceive the mechanical to Suppose / the Spiritual. / With regard to this it is / sufficiently evident that at last / we must certainly have recourse / to this as the foundation / of all energy & power & the / only question with regard to / this I would move, is to Say when / we have traced the Series of / Causes to this prime mover / I believe it is difficult per- / haps impossible in any case to / Suppose it. / Between the phenomenon / that we consider there is pro- / bably a long Series of causes / between the first & the last...to Say that it / is impossible at any time to / go farther is checking Inquiry / & hurting Philosophy to no / purpose. We have an instance in the / Case of the Attraction of Cohesion / improperly referred to the Deity when / we have reason to believe only a link / of a very long chain / ²⁵⁴

The lesson here, according to Cullen, is that “we are not rashly to / Suppose that there are any Cases / superseding the attempts / to Mechanical explanation[.]”²⁵⁵ In fact, all things in the material world “are ultimately to be so explai- / ned & I would

²⁵⁰ WUSL, 1:287.

²⁵¹ WUSL, 2:6.

²⁵² WUSL, 2:22.

²⁵³ CUL/2/1/5 (unpaginated), ‘Nervous System Recapitulation of No 4 & 5’, ~p. 397.

²⁵⁴ CUL/2/1/5 (unpaginated), ‘Nervous System Recapitulation of No 4 & 5’, ~p. 399-401.

²⁵⁵ CUL/2/1/5 (unpaginated), ‘Nervous System Recapitulation of No 4 & 5’, ~p. 401.

apply the Same / maxim to philosophy as to the / Republic[:] Nunquam desperandum / ...Let us not therefore doubt / of at length obtaining me- / chanical explanation[s] of every / circumstance of the material / System[.]”²⁵⁶

Thus, for Cullen, prematurely abandoning the search for a mechanical explanation of the nervous fluid was a grave mistake. If the phenomena of the nervous system could be explained on mechanistic principles, and almost all of it could (with the possible exception of certain functions of the human mind), then we should not shy away from doing so. His theory of the nervous system was just such an attempt and supports my claim, in chapter 3, that Cullen’s philosophical outlook was *functionally* secular. Clearly, this would have been controversial and unacceptable to most of his colleagues.

Conclusion

I want to conclude by offering a concise summary of Cullen’s theory of the nervous system, as well as a few general thoughts on the implications of interpreting this theory as the fundamental component of his neurophysiology.

First, let us be clear about the substance of Cullen’s theory of the nervous system: we can now see, after wading into the details, that it is not quite enough to say, as has usually been done, that Cullen believed in a subtle, elastic nervous fluid, aetherial in nature. That description actually leaves out the most distinctive and original aspect to it: the fact that this fluid is *inherent to* the medullary substance of the nervous system. It also obscures Cullen’s thinking about the connection between the nervous fluid and the Newtonian Aether. It is not inaccurate to say that Cullen’s nervous fluid is ‘aetherial’ in nature, but even Roy Porter’s more descriptive characterisation—that Cullen cautiously identified it “with an aetherial fluid which was also the basis of light, heat, magnetism and electricity”²⁵⁷—leaves out Cullen’s careful distinction between the more general Newtonian Aether and other subtle,

²⁵⁶ CUL/2/1/5 (unpaginated), ‘Nervous System Recapitulation of No 4 & 5’, ~p. 401, 403.

²⁵⁷ Roy Porter, *The Greatest Benefit to Mankind: A Medical History of Humanity* (New York: W. W. Norton & Co., 1999), 260.

elastic fluids in nature that were modifications of it—not identical to it. To avoid confusion, we probably ought not to even apply the term Aether to the nervous fluid.

A better summary, then, of Cullen's fundamental doctrine—his 'theory' of the nervous system—is that the nervous power was actually a subtle, elastic fluid, inherent to the medullary substance of the nerves (including the muscles), sharing affinity to other subtle, elastic fluids in the natural world, including electricity, magnetism, heat and light. Each of these, including the nervous fluid, was a modification of the most general subtle, elastic fluid in nature, Newton's universal Aether. And each one, while analogous to the Aether, was subject to its own laws that had to be discovered by observation and experiment. The behaviour of these fluids depended not only on the laws of subtle, elastic fluids in general, but also on how each elastic fluid was modified by the matter to which it was connected, whatever that happened to be, e.g. an electric, magnetic or medullary substance.

Second, Cullen's understanding of the nervous fluid is not only the fundamental doctrine of his approach to the nervous system; it is also its unifying doctrine as well. It elucidates some of its most distinctive features, including Cullen's neuromuscular physiology, the multi-directionality of communication in the nervous system, as well as certain functions of the Brain, as principal organ of the nervous system. In a substantive way, it explains the whole. Cullen wanted a theory of the nervous system that would account for all the phenomena of sense and motion with a few simple but powerful propositions. And these propositions had to agree with how Nature worked at the most fundamental of levels, in chemistry and mechanics.

Without more study of eighteenth-century theories of the nervous fluid, as well as Cullen's ontology of matter, it is hard to say how original Cullen's theory was. He seems to have thought that his emphasis on inherence was most distinctive, and it certainly separates him from the secretion theorists, like Boerhaave and Haller. If Cullen does show originality here, it is not on account of his physiological experimentation and data collection. Rather, it may be in the realm of synthesis and medical theorising: Cullen, the philosophical physician with a deep understanding of

chemistry. And as I noted above, Cullen's adoption of an aether theory was unusual and controversial among professors of medicine, at least in Scotland.

This interpretation supports, and extends, John Christie's claim that Cullen was 18th-century Scotland's most committed aetherial scientist.²⁵⁸ To tweak Christie's formulation, my discussion shows that Cullen was also its most committed aetherial *physician*. I have tried to show how fundamental Cullen's aether theorising (broadly speaking) was to his neurophysiology in the same way that Christie (and others, before and since) have shown it was for his chemistry.²⁵⁹

Yet this same theorising involved him in some embarrassing controversy and lent him an air of unwelcome heterodoxy, at least in the eyes of his colleagues at the Edinburgh Medical School. Virtually no one among the Edinburgh Medical Faculty believed in the Newtonian Aether, let alone founded their physiology upon it. For Cullen, it was not Whytt's physiology that served as inspiration; nor Haller's. Cullen ultimately derived his theory from Newton's speculations on Aether, though he probably adjusted it to account for his own research in chemistry. Following what he took to be Newton's example, Cullen grounded his theory in his knowledge of the fundamental laws of Nature.

Cullen's understanding of the nervous system was the foundation for much of his understanding of physiology and pathology. It shaped his practice of medicine, including a component of it known variously as 'Hygiene', 'Regimen', or the 'Art of Health'. In the next chapter, I explicate Cullen's approach to Hygiene, a subject of long-standing interest to him, as well as the theme of his longest unpublished work.

²⁵⁸ Christie, "Ether", 86. Christie notes, a bit later, that "Cullen's theoretical medicine, like his chemistry, was dominated by ether, which underlay his concept of life and disease..." (96).

²⁵⁹ See, especially, Donovan, *Philosophical Chemistry*, Chs. 5 and 6; Christie, "Ether"; and Taylor, "Unification Achieved".

This page intentionally left blank

CHAPTER FIVE

HYGIENE, OR THE ART OF HEALTH

The Art of curing Diseases is so difficult & uncertain; through the Ignorance & Negligence of Practitioners it so often fails, by the prejudices of Patients & other accidents it is so often frustrated; that if men are anxious to enjoy health & prolong life they must not depend so much on the Art of curing Diseases as on the art of preventing them.

-William Cullen, c.1740s

From "Remarks on The Art of preserving Health"

[MS Cullen 125/1113, 1r/1r/-]

CHAPTER 5: HYGIENE, OR THE ART OF HEALTH

In a letter dated October 16th, 1784, William Cullen praised his former pupil, Benjamin Rush, for overseeing the publication in Philadelphia of the first two volumes of his textbook *First Lines of the Practice of Physic*. He then gave Rush a ‘Literary History’ of his recent activities, concluding with some hints about a new work he was writing:

The only other work that I would be anxious to finish before I die is a Treatise on the Preservation of health but it must be a large one and whether I shall ever be able to finish it to my mind is very uncertain. I have thus given you my own Literary History.¹

In his response later that year, Rush wrote to his former mentor:

I want words to convey to you the pleasure I derived from your very friendly letter by Mr Dobson. It has revived in me all that enthusiasm for Science with which you inspired me in the years 1766, and 1768...I shall not cease to pray that you may not only live to finish your work upon “the art of preserving health”, but that you may stamp a value upon it that shall ensure (not its Sale only) but its immortality, by living ‘till you are an hundred years old — and much longer — if it shall please God to continue to you your powers of Usefulness and happiness.²

The work on the preservation of health that both men refer to in this exchange lay unfinished and unpublished at Cullen’s death in 1790.³ It is mostly a matter of luck—and the efforts of John Thomson to collect materials for his biography of Cullen—that Cullen’s *Treatise on the Preservation of Health* (as I shall refer to it)

¹ HSP/LCP, Rush Papers, Correspondence Vol. 24, pp.56b-c. This letter has been overlooked perhaps because it was not printed in either L. H. Butterfield’s two volume edition of Rush’s letters (Benjamin Rush, *The Letters of Benjamin Rush. In Two Volumes*, ed. L. H. Butterfield (Princeton: Princeton University Press, 1951)) or John Thomson’s life of Cullen. I have provided a transcription of it in Appendix 5A: Source Material.

² MS Cullen 109, 1r (cf. TLC, 1:650-51). Rush’s letter is dated December 22, 1784.

³ It is not clear why Cullen left his *Treatise* unfinished. The most probable explanation is also the most prosaic: he ran out of time. In his final years, his priority was to revise and publish what became his *A Treatise of the Materia Medica* (1789). As he told Benjamin Rush in October, 1784, “If I can have a little leisure next Summer I will endeavour to give a new Edition of my *Materia Medica*, the existence of the last still gives me a great deal of pain and even for the sake of my future reputation I think it necessary to give one more correct but I hope at the same time to give one in consequence of more experience Reading and reflection very greatly improved” (HSP/LCP, Rush Papers, Correspondence Vol. 24, p.56b.) Thus, though he may have intended to return to his *Treatise on the Preservation of Health* at some point, he did not live long enough to do so.

survives at all.⁴ But it does exist, and it, along with a number of other unpublished works, detail a picture of Cullen’s approach to a topic in medicine variously known as ‘hygiene’, ‘regimen’, ‘dietetics’ or the ‘art of health’.⁵

Previous Interpretations

Because none of Cullen’s published works discuss hygiene, except incidentally, it is not surprising that there has been very little secondary literature that examines Cullen’s thoughts on the topic.⁶ Even John Thomson, in an otherwise exhaustive discussion of Cullen’s medical views, says almost nothing about it.⁷

Yet it has not been entirely overlooked. Heiki Mikkeli, in a study of early modern hygiene, depicts Cullen as a physician who thought “the idea of prevention” was “something outside the core of medical studies.”⁸ He suggests that Cullen “reduced the preventive part of medicine to pathology and therapeutics.”⁹ From this observation, he concludes that “Cullen relies on the competence of medicine, and especially on the ability of the physician to cure disease which, in his view, was the main and only proper task of the medical art.”¹⁰ In making this argument, Mikkeli contrasts Cullen’s views with those of James Mackenzie, author of *The History of*

⁴ The title page to Cullen’s unfinished work has not survived—or was never written. We know Cullen’s (working) title only from the first letter from which I have quoted above.

⁵ For a description of the works on hygiene that I have used in this chapter, see Appendix 5A: Source Material.

⁶ To my knowledge, only three scholars have discussed the topic at any length. Their works include, in chronological order, Rosalie Stott, “Health and Virtue: Or, How to Keep Out of Harm’s Way. Lectures on Pathology and Therapeutics by William Cullen c. 1770”, *Medical History* 31, no. 2 (1987): 123-142; Heikki Mikkeli, *Hygiene in the Early Modern Medical Tradition* (Helsinki: Academia Scientiarum Fennica, 1999); and G. B. Risse, “In the Name of Hygieia and Hippocrates: A Quest for the Preservation of Health and Virtue,” in *New Medical Challenges During the Scottish Enlightenment*, *Clio Medica/The Wellcome Series in the History of Medicine* 78 (Amsterdam: Rodopi, 2005). I discuss them below.

⁷ In Thomson’s two-volume edition of Cullen’s works, Cullen’s remarks on the preservation of health are not included, except incidentally in scattered references.

⁸ Mikkeli, *Early Modern Hygiene*, 111. Mikkeli makes the same argument in a slightly earlier publication. See Heikki Mikkeli, “Legitimizing a Discipline: James Mackenzie’s *History of Health* (1758),” in *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*, ed. Donald R. Kelley (Rochester: University of Rochester Press, 1997).

⁹ Mikkeli, *Early Modern Hygiene*, 112. In this, he echoes Stott, from whom he is excerpting.

¹⁰ *Ibid.*, 112-13.

Health and the Art of Preserving It (1758).¹¹ Mikkeli argues that Cullen, unlike Mackenzie, downplayed the importance of hygiene, considering it marginal to proper, scientific medicine.

Rosalie Stott, in contrast, has argued that Cullen hoped to “identify hygiene more sharply as a medical concern” or to make it “more decisively medical”.¹² She believes the “general tenor of Cullen's lectures was the integration of pathology and human behaviour in a manner most suited to promote virtue,” and she identifies some examples from Cullen’s discussion of the non-naturals that seem to support this.¹³

Guenter Risse, following Stott, sees the promotion of virtue as an important element in Cullen’s works on hygiene, as gleaned through his treatment of the non-naturals. According to Risse, Cullen emphasised a practical morality that warned against the dangers of luxurious living.¹⁴ And Cullen believed that knowledge of hygienic principles was “the common sense of mankind”.¹⁵ His discussion of hygiene, Risse argues, was a way of increasing his own authority. It provided Cullen, like other physicians, “with additional moral legitimacy as well as economic advantage and social status—all-important goals for British practitioners who were dependent on the patronage of the wealthy.”¹⁶

In this chapter, I offer a new and more comprehensive interpretation of Cullen’s approach to hygiene, or the art of health.¹⁷ After considering the context for eighteenth-century discussions of hygiene, I show, first, that hygiene was a topic of special importance to Cullen, one which he was interested in, not just at the end of his life, but throughout his career. Having established hygiene’s importance, I argue

¹¹ Ibid., 113.

¹² Stott, “Health and Virtue”, 128.

¹³ Ibid., 140.

¹⁴ Risse, “Hygieia and Hippocrates”, 158.

¹⁵ Ibid., 158.

¹⁶ Ibid., 140.

¹⁷ Though there were a variety of names for the subject I am calling ‘hygiene’ (‘regimen’, ‘dietetics’, etc), I will use this one, or alternatively the ‘art of health’, primarily because Cullen prefers these terms. Although he often spells the term ‘Hygieine’, I use its modern spelling, omitting the second ‘i’.

that Cullen understood it to consist in the prevention of disease and explain why he understood it this way.

Second, I explore his recommendations for preventing disease. In Cullen's view, one did this by avoiding the remote causes of disease, traditionally known as the *non-naturals*. I characterise Cullen's approach to the non-naturals by his emphasis on the virtues of moderation, striking the proper balance between a varied, unregulated manner of living (as recommended by Celsus) and a more strict, sober, regular one (in the manner of Cornaro). This was the basis for Cullen's medical recommendations, but moral concerns were to be accommodated as well. In fact, Cullen thought that "all the virtuous & moderate passions contribute to the health of the Body"¹⁸ and thus encouraged his patients to pursue an active, varied and sociable life, compatible with civic duties and the business of social intercourse.

Third, I show how Cullen used his discussion of hygiene to illustrate and defend medical expertise in contrast to the insights of common sense or individual experience. In conjunction with this, I note Cullen's desire to diffuse medical knowledge of hygiene to a specific audience—the leisured and studious members of the 'middling ranks'—and his defence of the traditional boundaries and functions of the physician as the professional most responsible for curing disease. That is to say, Cullen was willing to lay hygiene open to a broader audience, but at the same time, insisted that the traditional responsibility of the physician to cure disease ought to remain closed to outsiders.

When we step back to consider the portrait that emerges from this chapter, we see that Cullen paid homage to the traditional image of the learned physician. At the same time, he was keen to display his utility to the public and the state. That is to say, Cullen's approach to hygiene displayed an astute reconciliation of his medical beliefs with his professional interests.

I. The Art of Health

¹⁸ MS Cullen 405, 74.

The topic of how to prevent disease and preserve health was as old as Western medicine itself.¹⁹ In the Hippocratic corpus (c. 5th-4th centuries B.C.E.), works such as *On Airs, Waters, and Places* and *A Regimen for Health* explored the connections between health, disease, and an individual's environment.²⁰

In ancient Rome, the 'wealthy amateur' Aulus Cornelius Celsus, who flourished during the reign of the Emperor Tiberius (14-37 C. E.), became famous for his work *On Medicine (De Medicina)*.²¹ Celsus discussed a wide range of medical topics, including diet, surgery and pharmacy. He began book I with some famous advice. "A Man in health, who is both vigorous and his own master," he wrote, "should be under no obligatory rules, and have no need, either for a medical attendant, or for a rubber and anointer. His kind of life should afford him variety...."²² While some later commentators were to emphasise Celsus' disregard for medical attendants, others were struck by his belief that a healthy person should vary his manner of life and not live according to 'obligatory rules'.

Galen (129-216 C.E.), the most important figure in classical medicine after Hippocrates, codified the content of what would become known as hygiene.²³ In his rigorously philosophical *To Thrasyboulos (Ad Thrasybulum)* Galen attempted to answer the question: "Is healthiness [hygiene] a part of medicine or gymnastics?"²⁴ In doing so, he outlined the primary field of activity for the art of the preservation of health—what it would and would not encompass. He highlighted the importance of environmental and constitutional factors, such as the air, sleep and waking, rest and

¹⁹ For general overviews of the history of hygiene, see Mikkeli, *Early Modern Hygiene*; Andrew Wear, "The History of Personal Hygiene," in *Companion Encyclopedia of the History of Medicine: Volume 2*, ed. W. F. Bynum and Roy Porter (London: Routledge, 1993); and Henry E. Sigerist, *Landmarks in the History of Hygiene* (London: Oxford University Press, 1956).

²⁰ For translations of both works, see Hippocrates, *Hippocratic Writings*, ed. G. E. R. Lloyd, trans. E. T. Withington, I. M. Lonie, W. N. Mann and J. Chadwick (London: Penguin Books, 1978).

²¹ The phrase 'wealthy amateur' is Nutton's. See Vivian Nutton, *Ancient Medicine* (London: Routledge, 2004), 5. Nutton discusses Celsus on pp. 166-7.

²² Celsus, *On Medicine. Books I-IV*, trans. W. G. Spencer, The Loeb Classical Library (Cambridge: Harvard University Press, 1935), 43, 1:1. The Rule of Celsus played a large role in eighteenth-century discussions about how to preserve health, as we shall see.

²³ 'Hygiene' (more precisely, its Greek-alphabet equivalent) meant 'health' in Greek.

²⁴ Galen, *Galen: Selected Works*, ed. Peter N. Singer (Oxford: Oxford University Press, 1997), 53. Galen concluded that healthiness, or hygiene, constituted one of the two primary divisions of medicine. The other was therapeutics. Gymnastics was, at best, a subdivision of hygiene. See e.g. *Ibid.*, 98.

movement, and food and drink. These factors—along with a few others—became subsequently known as the *non-naturals* and, beginning in the Middle Ages, became established as the core content of the field of hygiene.²⁵

During the Renaissance, a Venetian nobleman, Luigi Cornaro (c. 1464/67-1566), took a much different view of how to preserve health and lengthen one's life than did his predecessor, Celsus.²⁶ For Cornaro, the enemy was intemperance and irregularity of habits. He lived, according to his own account, a dissolute life for his entire youth, until health problems plagued him. His physicians told him that his health would only return if he lived “a sober and regular life” and so he resolved to do this with as much dedication as he could, living to over 100 years-old (or so he claimed).²⁷ Cornaro's story was full of anecdotes and exhortations that ensured its popularity. For instance, he recounts how, at the age of seventy, he was traveling in a coach which, while speeding along, accidentally overturned. It was some time before the horses could be stopped, “whence I received so many shocks and bruises, that I was taken out with my head and all the rest of my body terribly battered, and a dislocated leg and arm.”²⁸ The physicians, when brought, thought Cornaro would die within three days. “But I, on the contrary, who knew, that the sober life I had led for many years past, had so well united, harmonized, and disposed my humours, as not to leave it in their power to ferment to such a degree refused to be either bled, or purged. I just caused my leg and arm to be set, and suffered myself to be rubbed with some oils, which they said were proper on the

²⁵ For more on the non-naturals, see Mikkeli, *Early Modern Hygiene*, Ch. 1; Luis Garcia-Ballester, “On the Origin of the Six Non-natural Things in Galen”, *Sudhoffs Archiv. Beihefte*, no. 32 (1993): 105-115; J. J. Bylebyl, “Galen on the Non-natural Causes of Variation in the Pulse”, *Bulletin of the History of Medicine* 45, no. 5 (1971): 482-485; Peter H. Niebyl, “The Non-Naturals”, *Bulletin of the History of Medicine* 45, no. 5 (1971): 486-492; Saul Jarcho, “Galen's Six Non-naturals: A Bibliographic Note and Translation”, *Bulletin of the History of Medicine* 44, no. 4 (1970): 372-77; L. J. Rather, “The ‘Six Things Non-Natural’: A Note on the Origins and Fate of a Doctrine and a Phrase”, *Clio Medica* 3 (1968): 337-347; and William Coleman, “Health and Hygiene in the *Encyclopédie*: A Medical Doctrine for the Bourgeoisie”, *Journal of the History of Medicine and Allied Sciences* 29, no. 4 (1974): 399-421.

²⁶ For more on Cornaro, see W. B. Walker, “Luigi Cornaro, a Renaissance Writer on Personal Hygiene”, *Bulletin of the History of Medicine* 28, no. 6 (1954): 525-34; Sigerist, *Landmarks in Hygiene*, Ch. 3; and Gerald J. Gruman, “A History of Ideas About the Prolongation of Life: The Evolution of Prolongevity Hypotheses to 1800”, *Transactions of the American Philosophical Society* (1966): 1-102.

²⁷ Luigi Cornaro, *Discourses on a Sober and Temperate Life* (London: Benjamin White, 1768), 11-12.

²⁸ *Ibid.*, 24-5.

occasion. Thus, without using any other kind of remedy, I recovered....”²⁹ While Cornaro was unsurprised by this turn of events, his physicians were astonished. “Hence we are to infer,” Cornaro wrote, “that whoever leads a sober and regular life, and commits no excess in his diet, can suffer but very little from disorders of any other kind, or external accidents.”³⁰ Cornaro’s writings and example served as one of the touchstones of discussions about hygiene in the eighteenth century.³¹

At the beginning of the eighteenth century, especially in the schools of medicine, hygiene was treated, along with physiology, pathology, therapeutics and semiotics, as a core component of the Institutes or theory of medicine.³² Nonetheless, it was its role in popular medicine, especially in writings intended for a growing reading public that was more significant.³³

Because the topic was the preservation of health, and health had to do with one’s manner of living—how to manage the non-naturals—everyone, sick and healthy alike, had a potential stake in the discussions. As Ginnie Smith has written, although hygiene was one of the five components of the institutions of medicine “... it was also the one most closely associated with the interests of the laity, rather than with the essentially curative function of the physician.”³⁴ What is more, eighteenth-century physicians believed it was a lot easier to prevent diseases than to cure them.³⁵ There was also a shared medical vocabulary between the laity and professionals.³⁶ This set up questions about what might broadly be termed *expertise*: both the kind of

²⁹ Ibid., 25-6.

³⁰ Ibid., 26.

³¹ Even today, Cornaro holds appeal in popular health culture. See, for instance, <http://www.beautifulonraw.com/raw-food-blog/anti-aging-system/luigi-cornaro-lived-to-be-102-years-old-what-can-we-learn-from-him/> [Accessed on June 4, 2014].

³² I say more about the disciplinary status of hygiene below. This five-fold division was increasingly questioned as the eighteenth-century progressed.

³³ There were less conventional publications on hygiene as well, for instance the immensely popular georgic-style poem by the physician John Armstrong, *The Art of Preserving Health* (1744). For more on Armstrong, see John Armstrong, *John Armstrong's the Art of Preserving Health: Eighteenth-century Sensibility in Practice*, ed. Adam Budd (Farnham: Ashgate, 2011).

³⁴ Ginnie Smith, “Prescribing the Rules of Health: Self-help and Advice in the Late Eighteenth Century,” in *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society*, ed. Roy Porter (Cambridge: Cambridge University Press, 1985), 254.

³⁵ For statements to this effect by Cullen and Cheyne, see below.

³⁶ Charles E. Rosenberg, “Medical Text and Social Context: Explaining William Buchan's *Domestic Medicine*,” *Bulletin of the History of Medicine* 57, no. 1 (1983): 31.

knowledge one needed in order to understand hygiene and the authority such knowledge bestowed on those who had it.

These two themes—how to manage the non-naturals and the question of medical expertise—emerge from many of the eighteenth-century discussions of hygiene. They underly Cullen’s approach to the topic as well. Thus, to better understand the context and issues that shaped the subject around the time Cullen studied it, I want to begin by exploring how these themes were debated in some eighteenth-century works on hygiene.

§1. The Non-Naturals, or Counselling Moderation

The non-naturals were the most distinctive and important component of hygiene in the eighteenth century.³⁷ Steven Shapin has argued that it was virtually impossible for physicians to counsel anything other than *moderation* when it came to a regimen of the non-naturals.³⁸ This was for a number of reasons. First of all, the medical and the moral occupied the same cultural and intellectual space, “figuratively in the case of cultural modes, literally in the quotidian management of the body and its transactions with the world.”³⁹

Second, there was long precedent for counselling moderation. It had been recommended since the very beginnings of medicine in ancient Greece. Did not one

³⁷ For the purposes of this discussion, the non-naturals can be defined, in Mikkeli’s words, as the “set of factors external to the body itself but which affect bodily health depending on how they are used. ‘Non-natural’ did not mean ‘unnatural’ but indicated rather a special category of things that are separate from one’s constitution—hence not natural—and causative of either health or sickness.” Mikkeli, *Early Modern Hygiene*, 9. In the eighteenth-century, they almost always included the following six factors: Air (Climate), Diet (Food and Drink), Exercise & Rest, Excretions, Sleep & Watching, and Passions of the Mind.

³⁸ Steven Shapin, “How to Eat Like a Gentleman: Dietetics and Ethics in Early Modern England,” in *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore: Johns Hopkins University Press, 2010), 273. Shapin’s chapter, as reprinted in his collection of essays that I cite here (*Never Pure*) is a slightly edited version of the essay, originally published in 2003. I largely adhere to Shapin’s framework in what follows.

³⁹ Shapin, “Eat Like a Gentleman”, 261.

of Hippocrates' aphorisms read "All things moderately and in measure"⁴⁰ Therefore when educated gentlemen in the early modern period read works from antiquity, they found additional and long-standing support for the wisdom of moderation.⁴¹

Because of these strong precedents and cultural assumptions, it was extremely rare for anyone to suggest that the preservation of health, or indeed virtue itself, could be obtained by an immoderate, or excessive, manner of living.⁴² As Shapin rightfully observes, "The Golden Mean was so thoroughly institutionalized in both ethical and medical canons that its denial would count as a violation of good sense and decency."⁴³ That is not to say there was consensus about the interpretation of that ideal, or its particular manifestation. There was variety, but the ideal of hygienic moderation was remarkably stable over time.⁴⁴

Shapin's interpretation appears to hold well into the eighteenth century. George Cheyne (1671-1743), a famous physician and widely-read medical author, counselled the Golden Mean: "If Men would but observe the *golden Mean* in all their *Passions, Appetites* and *Desires*...they would enjoy a greater Measure of *Health* than they do; have their *Sensations* more *delicate*, and their *Pleasures* more *exquisite*; live with less *Pain*, and die with less *Horror*."⁴⁵

⁴⁰ Ibid., 270. Shapin is quoting the English Renaissance writer, Henry Peacham (the younger) here. Peacham may have been thinking of the Hippocratic aphorism that read (in English translation): "Neither a surfeit of food nor of fasting is good, nor anything else which exceeds the measure of nature." See Hippocrates, *Hippocratic Writings*, 209, Aphorism 4, Section II.

⁴¹ Shapin, "Eat Like a Gentleman", 265.

⁴² Ibid., 273.

⁴³ Ibid., 273.

⁴⁴ Ibid., 273.

⁴⁵ George Cheyne, *An Essay of Health and Long Life* (London: G. Strahan, 1724), 231. For more on Cheyne, see Anita Guerrini, *Obesity and Depression in the Enlightenment: The Life and Times of George Cheyne* (Norman: University of Oklahoma Press, 2000); Steven Shapin, "Trusting George Cheyne: Scientific Expertise, Common Sense, and Moral Authority in Early Eighteenth-Century Dietetic Medicine," in *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore: Johns Hopkins University Press, 2010); Wayne Wild, "George Cheyne: A Very Public Private Doctor," in *Medicine-by-Post: The Changing Voice of Illness in Eighteenth-Century British Consultation Letters and Literature*, *Clio Medica/The Wellcome Series in the History of Medicine* 79 (Amsterdam: Rodopi, 2006); Lester S. King, "George Cheyne, Mirror of Eighteenth Century Medicine", *Bulletin of the History of Medicine* 48, no. 4 (1974): 517-39; Anita Guerrini, "James Keill, George Cheyne, and Newtonian Physiology, 1690-1740", *Journal of the History of Biology* 18, no. 2 (1985): 247-66; and Anita Guerrini, "Isaac Newton, George Cheyne and the 'Principia Medicinæ'," in *The Medical Revolution of the Seventeenth Century*, ed. Andrew Wear and Roger K. French (Cambridge: Cambridge University Press, 1989).

William Buchan (1729-1805), a Scottish physician who gained fame with his popular medical manual, *Domestic Medicine* (1769), was also a defender of moderation in the management of most of the non-naturals.⁴⁶ He wrote, regarding diet & exercise for the studious: "...we see no reason why they should abstain from any kind of food that is wholesome, provided they use it in moderation...[Their exercise] should not be too violent, nor ever carried to the degree of excessive fatigue."⁴⁷ He had similar advice about diet and aliment more generally: "But a scrupulous nicety here is by no means necessary. The best rule is to avoid all extremes... Though *moderation* be the chief rule with regard to the quantity, yet the quality of food merits farther consideration."⁴⁸ The same was true of the proper amount of sleep, even if it were hard to know what that might be.⁴⁹

James Mackenzie (1680-1761), a retired physician, scoured libraries to write up what may be the first history of hygiene, his *The History of Health and the Art of Preserving It* (1758).⁵⁰ In that work, he advised some kind of balance between variety and temperance: "It is the wisest course therefore for persons in health to vary their way of living often, that so, no new change may happen which can hurt them. This diversity, nevertheless, ought to be kept within the bounds of temperance; and Celsus gives too great a latitude, which seems to encourage excess, directly contrary to the first general rule of Hippocrates."⁵¹

As Mackenzie's counsel suggests, while moderation was the critical concept, it could be interpreted in different ways, its boundaries and limits set at different points, even if almost everyone agreed on its virtues and health benefits. There was a tension, for example, between sober, temperate living, according to a strict regimen,

⁴⁶ For more on Buchan, see especially Christopher Lawrence, "William Buchan: Medicine Laid Open", *Medical History* 19, no. 1 (1975): 20-35; Rosenberg, "Explaining William Buchan".

⁴⁷ William Buchan, *Domestic Medicine: Or, A Treatise on the Prevention and Cure of Diseases by Regimen and Simple Medicines. With An Appendix, Containing a Dispensatory for the Use of Private Practitioners. The Third Edition, with Considerable Additions* (London: W. Strahan, T. Cadell; J. Balfour, W. Creech, at Edinburgh, 1774), 65.

⁴⁸ *Ibid.*, 67.

⁴⁹ *Ibid.*, 93-96.

⁵⁰ For more on James Mackenzie, see Mikkeli, "Legitimizing a Discipline", and Mikkeli, *Early Modern Hygiene*, Ch. 5.

⁵¹ James Mackenzie, *The History of Health and the Art of Preserving It* (Edinburgh: William Gordon, 1758), 136, note.

on the one hand, and a life of variety, beholden to few rules, on the other. Of course, moderation, regarding the proper amount of adherence to temperance or variety, was still the metric in these two approaches as well.

The Rule of Celsus provided a touchstone for debates about the limits to moderation and temperance—“its dictates appeared both to accommodate prudential considerations and to fit with much of what counted as reliable physiological knowledge.”⁵² If there was a contrast to Celsus’ Rule, it was exemplified by the example of Cornaro, who advocated regularity, sobriety and temperance. Writers on hygiene, therefore, when discussing the non-naturals tried to strike a balance between encouraging the latitude and variety of Celsus with the strict sobriety of Cornaro. Cullen would do the same.

§2. *Expertise, Audience, & Professional Boundaries*

The second theme that was an inextricable part of most eighteenth-century discussions about hygiene in the eighteenth century had to do with medical expertise. Because there was a shared medical vocabulary between patients and physicians, there was debate about the kinds of knowledge required by experts as well as the extent of authority this conferred.⁵³

Shapin has schematised two different kinds of expertise for early modern medicine: *prudential* and *ontological expertise*. *Prudential expertise* is essentially accumulated experience.⁵⁴ The important point about this kind of expertise is that “it *need not* pretend to flow from knowledge of underlying processes reckoned qualitatively different from, or superior in kind to, lay knowledge.”⁵⁵ *Ontological*

⁵² Shapin, “Eat Like a Gentleman”, 277.

⁵³ For the professional authority of the early modern physician, see Harold J. Cook, “Good Advice and Little Medicine: The Professional Authority of Early Modern English Physicians”, *Journal of British Studies* 33, no. 1 (1994): 1-31. For similar considerations about the eighteenth-century physician, see Malcolm Nicolson, “The Metastatic Theory of Pathogenesis and the Professional Interests of the Eighteenth-century Physician”, *Medical History* 32, no. 3 (1988): 277-300. For the German professional context, see Thomas Broman, “Rethinking Professionalization: Theory, Practice, and Professional Ideology in Eighteenth-Century German Medicine”, *The Journal of Modern History* 67, no. 4 (1995): 835-872.

⁵⁴ Shapin, “Trusting George Cheyne”, 310-11.

⁵⁵ *Ibid.*, 311.

expertise, in contrast, “bases its claims to authority on the possession of special knowledge about the underlying or hidden structures of the world or of the domain in question.”⁵⁶ Using this vocabulary, we can reframe debates about hygiene as one between those who thought the subject was founded on prudential expertise (common sense), while others insisted on the necessity of ontological expertise (medical knowledge).⁵⁷

These debates raised the question about who the proper experts or authorities were. If hygiene were rooted in common sense and the general experience of mankind then anyone could potentially be an authority on preserving their own health. Those of this view could point to the old proverbs that ‘Every Man was his Own Physician’ or that ‘Every Man past Forty is either a Fool or a Physician’, or even to the Rule of Celsus itself, which suggested that when it came to one’s health, one had no need for physicians.⁵⁸

By contrast, if hygienic knowledge were derived from medical knowledge then physicians themselves could claim authority. “If in the eighteenth century you pretended to be a ‘rational’ physician,” Shapin has written, “your identity and worth flowed from some version of ontological expertise whose power was contrasted with the ‘empiric’s’ inadequate, superficial, and unreliable merely prudential knowledge.”⁵⁹ The learned physician did not deny the importance of self-knowledge and understanding on behalf of the patient. That could only help in his treatment at the hands of the physician. But he also demanded respect for his expertise when it

⁵⁶ *Ibid.*, 311.

⁵⁷ Perhaps Shapin’s distinction is too schematic, when applied to individuals. Certainly, the distinction between the two could be blurry, and we need not hold too strictly to it. But, as a way of highlighting some differences, it is helpful.

⁵⁸ For the meaning and use of these kinds of medical proverbs in Renaissance Europe, see John Henry, “Doctors and Healers: Popular Culture and the Medical Profession,” in *Science, Culture and Popular Belief in Renaissance Europe*, ed. Stephen Pumfrey, Paolo L. Rossi and Maurice Slawinski (Manchester: Manchester University Press, 1991). For more on popular medical literature, which often cited these proverbs, see Andrew Wear, “The Popularisation of Medicine in Early Modern England,” in *The Popularization of Medicine, 1650-1850*, ed. Roy Porter (London: Routledge, 1992); Paul Slack, “Mirrors of Health and Treasures of Poor Men: The Use of the Vernacular Medical Literature of Tudor England,” in *Health, Medicine, and Mortality in the Sixteenth Century*, ed. Charles Webster (Cambridge: Cambridge University Press, 1979); and Keith Thomas, “Health and Morality in Early Modern England,” in *Morality and Health*, ed. Allan M. Brandt and Paul Rozin (New York: Psychology Press, 1997).

⁵⁹ Shapin, “Trusting George Cheyne”, 311.

came to determining the existence of sickness, or how to prevent it in the first place.⁶⁰

These questions about hygienic knowledge and authority certainly played out in eighteenth-century discussions of hygiene.⁶¹ George Cheyne, in his popular *Essay on Health and Long Life* (1724), noted that “It is a common Saying, That every Man past Forty is either a *Fool* or a *Physician*....”⁶² In an anonymous response to Cheyne’s essay, the author glosses the saying in this way: “...if it means any thing, it only implys [*sic*], that by so long experience, a Man that is not a Fool, will know what things have best agreed with him; and his Reason will direct him to continue the Use of them, till some alteration in his Constitution makes them hurtful...”⁶³

William Buchan, while speaking about medicine more generally, seemed to side with the Everyman when he advocated stripping the art down to a more plain style, so that it could be understood by all: “...every thing valuable in the practical part of Medicine is within the reach of common sense, and that the Art would lose nothing by being stripped of all that any person endued with ordinary abilities cannot comprehend.”⁶⁴ But he was also quick to say that every man should *not* become his own physician—a ridiculous impossibility. “All we plead for is, that men of sense and learning should be so far acquainted with the general principles of Medicine, as to be in a condition to derive from it some of those advantages with which it is fraught; and at the same time to guard themselves against the destructive influences of Ignorance, Superstition, and Quackery.”⁶⁵

⁶⁰ Shapin, “Eat Like a Gentleman”, 281.

⁶¹ Roy Porter touched upon the basic question in this dispute when he wrote: “Indeed, to put it in a nutshell, how far was it desirable that the common man be encouraged to be his own physician?” See Roy Porter, “Spreading Medical Enlightenment: The Popularization of Medicine in Georgian England, and Its Paradoxes,” in *The Popularization of Medicine, 1650-1850*, ed. Roy Porter (London: Routledge, 1992), 216.

⁶² Cheyne, *Health and Long Life*, 1.

⁶³ Anon, *A Letter to George Cheyne ... Shewing the Danger of Laying Down General Rules to Those Who Are Not Acquainted with the Animal Oeconomy* (London, 1724), 6. But note that the author is not really endorsing this view, for he continues: “...and when that happens, he will find there is something else required to make a Man a Physician, besides living forty Years in the World; for beside Diseases, old Age will alter a Man's Constitution, and bring on Symptoms, which he could have no experience of, when less advanced in Years. Of what use then, can his former Experience be to him, in Circumstances he never was in before?” (6)

⁶⁴ Buchan, *Domestic Medicine*, xiii.

⁶⁵ *Ibid.*, xvii.

One did not need to take the saying ‘Every Man His Own Physician’ literally, even if one preferred prudential expertise as a guide to proper hygienic practice, as Buchan’s example shows. There was some room between claiming that every man could be his own physician and that any man could preserve his own health, once he had enough experience of his own body. As we shall see, Cullen astutely positioned himself in this space.

Questions of Audience

If the questions I have surveyed so far have had to do with expertise, a set of related ones had to do with how *open* or accessible this expertise ought to be. Who was the proper audience for discussions of hygiene? Was it open to everyone or only other experts? And what did this mean for medicine more generally? This was ultimately a dispute about the extent to which, if at all, parts of physic, even physic itself, ought to be open to those outside the caste of physicians.⁶⁶

Eighteenth-century writers on hygiene provided a variety of answers to these questions about audience and professional boundaries. The Swiss physician and medical writer, Samuel-Auguste Tissot (1728-1797), for example, targeted a very large audience with his *Avis au peuple sur sa santé* (1761).⁶⁷ “I have principally calculated it for the perusal of intelligent and charitable persons, who live in the country; and who seem to have, as it were, a call from Providence to assist their less intelligent poor neighbours with their advice.”⁶⁸ This group of ‘intelligent and

⁶⁶ For more on the popularisation of medicine, especially during the Enlightenment, see Roy Porter, “‘A Little Learning’: Knowledge and Health in the 18th Century”, *Gut Fetschrift* 30 (1989): 75-80; Roy Porter, “Lay Medical Knowledge in the Eighteenth Century: The Evidence of the *Gentleman's Magazine*”, *Medical History* 29, no. 2 (1985): 138-68; *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society*, ed. Roy Porter (Cambridge: Cambridge University Press, 1985); and the collection of essays in *The Popularization of Medicine, 1650-1850*, ed. Roy Porter (London: Routledge, 1992).

⁶⁷ For more on Tissot, see Patrick Singy, “The Popularization of Medicine in the Eighteenth Century: Writing, Reading, and Rewriting Samuel Auguste Tissot’s *Avis Au Peuple Sur Sa Santé*”, *The Journal of Modern History* 82, no. 4 (2010): 769-800; Anne C. Vila, “Beyond Sympathy: Vapors, Melancholia, and the Pathologies of Sensibility in Tissot and Rousseau”, *Yale French Studies*, no. 92 (1997): 88-101; and Ludmilla Jordanova, “The Popularization of Medicine: Tissot on Onanism”, *Textual Practice* 1, no. 1 (1987): 68-79.

⁶⁸ S. A. Tissot, *Advice to People in General, with Respect to Their Health* (Edinburgh: A. Donaldson, 1766), 15.

charitable persons, who live in the country' included members of the clergy, "gentlemen of quality and opulence",⁶⁹ "persons who are rich, or at least in easy circumstances",⁷⁰ "Those who are intrusted [*sic*] with the education of youth...",⁷¹ and surgeons and midwives too.⁷² Tissot admitted that he had "more expectation from the care and goodness of the ladies, than from those of their spouses, their fathers, or brothers."⁷³ A fairly large audience, indeed.

Nonetheless, even Tissot, a physician himself, thought there was a proper time and place for the expertise and authority of the physician. He wrote that "All the directions in the following treatise are solely designed for such patients as cannot have the attendance of a physician. I am far from supposing, they ought to supply the place of one, even in those diseases of which I have treated in the fullest manner: And the moment a physician arrives, they ought to be laid aside. The confidence reposed in him should be entire, or there should be none."⁷⁴

George Cheyne made it clear who the audience of his treatise on health and long life was: "But the Sickly and the Aged, the Studious and the Sedentary, Persons of weak Nerves, and the Gentlemen of the learned Professions, I hope, by the divine Blessing on the following Treatise, may be enabled to follow their Studies and Professions with greater Security and Application, and yet preserve their Health and Freedom of Spirits more entire and to a longer Date."⁷⁵ He was also, at the same time, sensitive to potential criticism from his fellow physicians that, by publishing a treatise on health, he might be stepping on their traditional responsibility to cure

⁶⁹ Ibid., 16.

⁷⁰ Ibid., 17.

⁷¹ Ibid., 18.

⁷² Ibid., 20.

⁷³ Ibid., 18. Cullen, among others, found this controversial. In his *General Plan of a Course of Lectures*, he derides the Empirical Plan of physic and suggests that Tissot was a practitioner of it: "Mr Tissot or others may attempt to make old Women Physicians themselves if they please on Such a plan but they will never in that way make real physicians or practitioners" (CUL/2/1/9, GPL, 61).

⁷⁴ S. A. Tissot, *Advice to People in General*, 26.

⁷⁵ Cheyne, *Health and Long Life*, xiv.

disease.⁷⁶ But he claimed that he was “careful not to inroach [*sic*] on the Province of the Physician.”⁷⁷

John Arbuthnot (1667-1735), a respected Scottish physician based in London, in his *An Essay Concerning the Nature of Aliments* (1731), also focused on a particular audience, specifically those “Persons not bred up in the Profession of Physick.”⁷⁸ “I believe a Reader,” he estimated, “with as much Anatomy as a Butcher knows, and moderate Skill in Mechanicks, may understand the whole Essay, provided he goes through it at Leisure, and with Attention....”⁷⁹ Arbuthnot, as well, tried to steer clear of courting the wrath of members of his own profession.⁸⁰

In contrast, William Buchan seemed to invite the anger of his profession with the publication of his *Domestic Medicine* and, later, with his *Observations Concerning the Prevention and Cure of the Venereal Disease* (1796):

While I entertain a full persuasion, that men may derive many and solid benefits from a more general acquaintance with medicine, I shall never cease to give them all the information in my power, both with regard to the prevention and cure of diseases. I know the consequence will be fresh torrents of abuse from the faculty, but I am prepared for the worst they can do. While the rest of mankind are on my side, I can laugh at the malice, and despise the resentment of the faculty...The faculty may then vent their spleen in what manner they please. Their censure will always constitute my highest praise.⁸¹

How an individual thinker conceived of, say, the foundation of hygienic knowledge, did not necessarily determine what they believed about the audience for such discussions or the proper professional boundaries of medicine. One can identify a set of related assumptions that does, in hindsight, seem quite naturally linked

⁷⁶ *Ibid.*, xviii-xix.

⁷⁷ *Ibid.*, xviii.

⁷⁸ John Arbuthnot, *An Essay Concerning the Nature of Aliments, and the Choice of Them, According to the Different Constitutions of Human Bodies: In Which the Different Effects, Advantages, and Disadvantages of Animal and Vegetable Diet, Are Explain'd* (London: J. Tonson, 1735), Sig A. For more on Arbuthnot, see George A. Aitken, *The Life and Works of John Arbuthnot, M.D* (Oxford: Clarendon Press, 1892); and David E. Shuttleton, “‘A Modest Examination’: John Arbuthnot and the Scottish Newtonians”, *Journal for Eighteenth-Century Studies* 18, no. 1 (1995): 46-62.

⁷⁹ Arbuthnot, *Essay Concerning the Aliments*, A3, iii.

⁸⁰ *Ibid.*, A4, v.

⁸¹ William Buchan, *Observations Concerning the Prevention and Cure of the Venereal Disease* (London: T. Chapman, 1796), xxiii, xxxii.

together; for instance, that common sense was the foundation of hygiene; Every Man was thus his Own Physician; hygienic principles should therefore be open to all; thus medicine itself should be more open. Nonetheless, I want to emphasise that this is normally too schematic for particular individuals; even within this set of assumptions, there was a wide variety of possibilities and just because we know how someone felt about one question or issue does not make it inevitable that they agreed with the others, however naturally they seem to follow. Words of counsel, as we begin our discussion of Cullen's views of hygiene.

II. Cullen's Interest in Hygiene

The existence of Cullen's *Treatise on the Preservation of Health* in Cullen's *Nachlass*—almost certainly the longest, unpublished work in Cullen's handwriting that survives—is strong evidence that Cullen found the topic of hygiene, or the preservation of health, to be very important, at least late in his life when he was working on it. We also know, however, that Cullen's interest in the topic began much earlier. Long before Cullen set to work on his *Treatise*, he had shown interest in, and emphasised the importance of, the 'art of preserving health'.⁸²

Cullen's interest spanned his entire career. He was already emphasising hygiene's significance in some of his early lectures on medicine at Glasgow. In one of these, he introduces the topic, by saying that "It is unnecessary to declaim here on the value of health which renders Medecine [*sic*] in general of such importance to mankind but as that is sufficiently evident & intimately felt This particular branch of the Art [Hygiene] must be especially dear to mankind. It will always be more eligible to prevent diseases than to trust to the most certain cure for them[.]"⁸³

⁸² I am suggesting here that, whatever may have been Cullen's economic motivations to write a treatise on the art of health for a popular audience, he also had a long-standing interest in the subject. Cullen was not working on his *Treatise* simply for the sake of money, though that may have been part of his calculation.

⁸³ MS Cullen 445, 1r. The final statement here was not a new sentiment and was likely a common justification for discussing hygiene. Cf. Cheyne: "And yet it is most certain, that 'tis easier to *preserve* Health than to *recover* it, and to *prevent* Diseases than to *cure* them." See Cheyne, *Health and Long Life*, 2.

In an undated (and unpublished) essay entitled “Remarks on The Art of preserving Health”, Cullen echoed this assessment:

The Art of curing Diseases is so difficult & uncertain; through the Ignorance & Negligence of Practitioners it so often fails, by the prejudices of Patients & other accidents it is so often frustrated; that if men are anxious to enjoy health & prolong life they must not depend so much on the Art of curing Diseases as on the art of preventing them. This last Art or what is nearly the same the Art of preserving health is more easily attained & is more certain & agreeable in its effects. I have therefore been always of opinion that in a special manner this deserves the attention of Physicians.⁸⁴

Outside of lectures and an undated essay, we also have Cullen’s very public endorsement of the significance of hygiene. In the 1750s, a few years after he began teaching at the Edinburgh Medical School, Cullen gave a speech in front of an assembled audience to honour the life of his recently deceased patron and friend, Dr. John Clerk (1689-1757). The speech was delivered on June 24th, 1757 to an audience of mutual friends and acquaintances—“a numerous audience composed of persons of the first distinction”—in the Hall of the Royal Infirmary of Edinburgh.⁸⁵ We learn from drafts of the speech that what Cullen initially hoped to do was to compare Clerk to the ideal physician. In an early draft, he writes that he will do this “by considering one branch of his Art that of preserving health which always chiefly turns upon avoiding the Causes of Disease.”⁸⁶ In what appears to be the final draft for the speech, Cullen reiterates this: “In the business of a Physician there is no where an Occasion for a more nice exercise of skill than in that most valuable branch of the profession[,] the Art of avoiding diseases.”⁸⁷

Cullen therefore had a very long and continued interest in hygiene. It was not simply something he stumbled upon late in life to pump out another sellable publication. Hygiene, in Cullen’s view, was ‘that most valuable branch of the profession’ where the ‘excellent physician’ had the opportunity of displaying his skill

⁸⁴ MS Cullen 125/1113, 1r/1r/-. For an explanation of my complex foliation for this source, consult Appendix 5A: Source Material.

⁸⁵ See TLC, 1:12. Appendix B, pp. 525-536, contains Thomson’s edited version of the speech. The quotation and date come from a mention of the talk by *The Scots Magazine*, Volume 19, June 1757, p. 322.

⁸⁶ MS Cullen 302, 1r.

⁸⁷ MS Cullen 288, 14.

and wisdom. It was a subject ‘especially dear to mankind’, that in a special way ‘deserves the attention of Physicians’.

Hygiene, Health, and the Prevention of Disease

Hygiene was a traditional part of the Institutions of Medicine, along with physiology, pathology, therapeutics, and semiotics.⁸⁸ Cullen, especially later in his career, dispensed with this division of the Institutions into five subjects. Instead, he divided it into three: physiology, pathology, and therapeutics.⁸⁹ Within this tripartite division of the Institutions, Hygiene was encompassed in part by Pathology and in part by Therapeutics.⁹⁰

Hygiene itself was traditionally divided into three parts. Cullen explained in an early lecture that “the first treats of the preservation of health, the second of the prevention of Diseases, the third of the prolonging of Life...”⁹¹ But he thought these were redundant: “The rules for preservation of health are mostly such as direct to avoid the causes of Diseases & the same rules are not calculated for one day or one year but for the greatest term of life that the nature of the body allows of So that the first part of Hygieine seems to include the other two.”⁹² Much later, in his *Treatise on the Preservation of Health*, Cullen was less hesitant and simply assumed that the first part encompassed the second, and he neglected the third.⁹³ The “preservation of health Seems to me,” he wrote, “to consist entirely in preventing disease either by

⁸⁸ Cullen notes: “Having thus given my division of my institutions, I wou’d [sic] observe that from the time of Galen to that of Boerhaave the Institutions have been divided into five parts...” (NLM, 1:79).

⁸⁹ NLM, 1:3 (but labeled ‘2’). Cullen sometimes uses an alternative terminology for these subjects. He talks in terms of the “General Doctrines of the Institutions”—the Doctrines of Health, Sickness, and Remedy (NLM, 1:78). For instance: “At the Beginning of our Course I gave you an Idea of the Institutions, & I mentioned the several parts of which it consisted Viz^t 3, and I in some measure explained y^e Nature of these several parts and I say still that the whole of the Study of Physic, in so far as it is the Study of the Institutions, may be referred to one or other of these 3 Heads — HEALTH, SICKNESS or REMEDY” (NLM, 7:1-2). He appears to do so, when he wants to discuss them in more formal, systematic terms. See also NLM, 1:78-80.

⁹⁰ NLM, 1:80.

⁹¹ MS Cullen 445, 1v.

⁹² *Ibid.*, 1v.

⁹³ It might be an interesting question as to why Cullen neglects the third part of Hygiene, that is of the prolonging of life. I cannot pursue this here, but it appears that he associated this with incautious efforts to improve health itself.

avoiding the causes or by correcting the deviations of the System tending to disease before it has formed one.” Cullen equated Hygiene with the art of the preservation of health which, in turn, consisted of the prevention of disease.⁹⁴ To preserve one’s health, one had to prevent disease.

But how was one supposed to do that? It was especially important, Cullen thought, to avoid the *remote* causes of disease, which encompassed both external causes and deviations in the animal oeconomy itself—“certain circumstances in the exercise of the several functions of the animal oeconomy which being either in defect or excess may hurt it.”⁹⁵

The remote causes of disease were none other than the non-naturals. Cullen, like many of his contemporaries and predecessors, did not like their traditional senary division.⁹⁶ “It is obvious” he wrote, “that neither the distribution nor the appellation are very proper and another distribution of the matters under four heads is certainly more Simple and clear.”⁹⁷ He subsumed the non-naturals under four heads but, unsatisfied, he outlined a simple two-part division.⁹⁸ This more simple view, which provides the organising structure for Part 2 of Cullen’s *Treatise*, divides the remote causes into just two kinds: (i) the “Several powers acting on the body” from without⁹⁹ and (ii) the actions of the body itself, i.e. the “circumstances in the exercise

⁹⁴ MS Cullen 336, 1.

⁹⁵ *Ibid.*, 1. It is not essential to our discussion that we understand Cullen’s distinction between the proximate and remote causes of disease. But he did point out to his auditors that the proximate cause is that “condition of the Solids & fluids of the Body, or of its motions upon which the several Phaenomena[,] the several Symptoms that do constitute the Disease[,] do immediately depend...” (NLM, 5:19). Put another way, since “a Scientific Practice of Medicine is founded upon Indications or the Knowledge of the Changes, that are to be produced in the Body to Cure Disease...whatever gives the Indication is a part of the proximate Cause[.]” (NLM, 5:21). A remote cause, in contrast, is a cause further backward in the series of causes that produce a particular state of the body, which in turn produced the disease (NLM, 5:19). Cullen’s discussion about the causes of disease can be found at, e.g. NLM, 5:18-28.

⁹⁶ James Mackenzie was clearly frustrated by both the name and organisation of the non-naturals. See Mackenzie, *History of Health*, 4, note.

⁹⁷ MS Cullen 336, 2.

⁹⁸ *Ibid.*, 2. Cullen gives some sense of which divisions of the non-naturals he has taken notice of, in this comment from his 1772-3 Institutions lectures: “The Senary Division or that into the Six non-naturals is by no propriety of Language that I can perceive, in spite of Gaubius’s attempt to explain them; They are, Air, Diet, Exercise, the State of the Excretories, Passions of the Mind, Sleep & Watching — These perhaps do comprehend every thing, but it is with no very accurate Division[.] Dr. Boerhaave has given the Quaternary in which he has followed D^r. Johnston — They are Ingesta Gesta, Retentia, Applicata; But that of Gaub: is seemingly the most proper...” (NLM, 7:4)

⁹⁹ MS Cullen 336, 2.

of the several functions of the animal oeconomy which being either in defect or excess may hurt it.”¹⁰⁰ Under this division, the six non-naturals would (presumably, for Cullen does not do this in the unfinished treatise) be divided up as follows: Under (i) would fall Air and Diet (“those to which the body is more constantly exposed”);¹⁰¹ under (ii) would fall the remaining ones, i.e. Sleep & watching, Exercise and rest, the Excretions, and the Passions of the mind.¹⁰²

Unfortunately, Cullen’s *Treatise*, especially part 2 on the non-naturals, is fairly incomplete. Cullen does discuss various aspects of Air but does not touch upon the other non-naturals. There is, however, another way of getting some sense of how he might have discussed them. In an unpublished letter on the hypochondriac disease (in the form of a *consilium*, an old medical genre) probably sent to one of his patrons, Baron John Maule, in the late 1740s or early 1750s, Cullen discussed the non-naturals at length.¹⁰³

In Cullen’s letter, after an introduction to the study of medicine, a review of some fundamental physiological principles, and a summary of the hypochondriac disease, he introduces his discussion of the non-naturals, by explaining that he “shall be fuller on the Regimen, as more to be depended on, as more fitted to the knowledge of Patients & often to be left to the guidance of their own proper judgement & discretion.”¹⁰⁴ As in his later *Treatise*, Cullen wants his audience to

¹⁰⁰ Ibid., 1.

¹⁰¹ Ibid., 2.

¹⁰² In his Institutions lectures, however, which were not directed toward an audience with little knowledge of physic, he seemed to have preferred a tertiary division. In this formulation, the non-naturals were divided into those relating to Mind, the Body and Externals: “...accordingly I have referred them to the Mind, the Body, Externals...So that when I say all the powers changing y^e Body, may be referred to the action of other Bodies upon a Man or to the Action of a Man upon himself, It is proper to subdivide this last, as they are the operation of the mind or Body more strictly” (NLM, 7:3).

¹⁰³ The medieval *consilium* (or its eighteenth-century descendant) must have been familiar to Cullen, for it describes fairly well the form and structure of his *Essay on the Hypochondriac Disease*. A *consilium* “was a text in which a learned physician wrote a response to a specific medical question put to him either directly by a patient or indirectly by another physician with a respect to a particular case. A physician need not have been present himself to consult on the case, and many *consilia* were composed in absentia.” See Elizabeth W. Mellyn, “Consilia,” in *Medieval Science, Technology, and Medicine: An Encyclopedia*, ed. Thomas Glick, Steven J. Livesey and Faith Wallis (New York: Routledge, 2005), 143. It was a medical genre that “was well suited to serve as a form of self-advertisement or self-aggrandizement” (144). The *consilium* was generally composed of three parts: the first described the patient and his signs, symptoms, and diagnosis; the second described dietary recommendations and management of the six Galenic non-naturals; and the third part suggested medicines and other treatments (143).

¹⁰⁴ MS Cullen 405, 39-40.

understand the reasons behind his plan for treatment, so “I shall enter upon a pretty general account of the effects of what we call the nonnaturals.”¹⁰⁵

III. The Virtues of Moderation

Cullen’s discussion of the non-naturals conforms well with the interpretation of hygiene in the early modern period I sketched above: his overriding concern, in counselling his patients on the management of the non-naturals, was convincing them of the virtues of moderation.¹⁰⁶ The general rule was “to keep a due medium between an absolutely irregular life & one too scrupulously exact.”¹⁰⁷ Of course, this ‘due medium’ could itself be interpreted in various ways. Cullen offered a careful reconciliation between the variety prescribed by the Rule of Celsus and the sober regimen demanded by Cornaro.

Beyond this, Cullen does not simply recommend moderation in all things; after all, the medical and the moral, health and virtue, were tightly linked.¹⁰⁸ Therefore, he balances his insistence on moderation with moral concerns as well, in particular the need to pursue an active, varied and social life, compatible as much as possible with civic duties and the ‘agreeable commerce of life’. In fact, Cullen explicitly links sociability (friendliness, benevolence, engaging in the business of life) and civic duty (active participation in one’s community, acting for the good of the public, the duties of life) with virtue, and their opposites with vice. Or, at the very least, he wants his audience to believe that he finds these values important. In offering his recommendations for how to manage each of the non-naturals to promote health, these moral considerations were never entirely absent.

Diet

¹⁰⁵ Ibid., 40.

¹⁰⁶ There is not enough space in this chapter to enter into anything like a complete discussion of Cullen’s thoughts on all six non-naturals. I therefore only highlight a few of them, to convey a sense of his overall approach.

¹⁰⁷ MS Cullen 405, 111-12.

¹⁰⁸ Shapin, “Eat Like a Gentleman”, 277.

With respect to diet (food and drink), Cullen's rule of thumb was that one should "observe moderation" in quantity.¹⁰⁹ Cullen thought the quantity of food eaten was "to be determined by the Constitution, Custom, Appetite & Exercise of every particular person."¹¹⁰ When considering particular items of diet, ease of digestion and perspiration were the goals. Animal food, Cullen noted, "light and tender in itself or made so by cookery" had both these qualities.¹¹¹ Vegetable food could be perspired easily enough but for some people was not so easily digested.¹¹² In terms of the digestion of food, another rule of thumb was that "whatever a person has a keen appetite for, or has been much accustomed to eat, is all things considered easier to digest than other food."¹¹³

Cullen thought the most healthful drinks are those which best promote digestion. Common water was "our most natural drink & what the greatest part of mankind have in all ages used & still do use."¹¹⁴ Cullen was not opposed to other kinds of drink per se, but they carried risks. Beer or ale, when not too strong or thick, could be used effectively as a diluter and was allowable, especially for those on an animal diet.¹¹⁵ Something similar could be said of wine, when used in small amounts "but all excess in the use of it is pernicious, it is dangerous even to go so far as to raise the Spirits a little, for the[y] sink proportionally afterwards & the nervous system is at length worn out in that way."¹¹⁶

¹⁰⁹ MS Cullen 405, 54. For diet in the eighteenth century, see Emma C. Spary, *Eating the Enlightenment: Food and the Sciences in Paris* (Chicago: University of Chicago Press, 2012), esp. Ch. 6; Shapin, "Eat Like a Gentleman"; Margaret Pelling, "Food, Status and Knowledge: Attitudes to Diet in Early Modern England," in *The Common Lot: Sickness, Medical Occupations, and the Urban Poor in Early Modern England: Essays* (London: Longman, 1998); Anita Guerrini, "A Diet for a Sensitive Soul: Vegetarianism in Eighteenth-Century Britain", *Eighteenth-Century Life* 23, no. 2 (1999): 34-42; and J. Worth Estes, "The Medical Properties of Food in the Eighteenth Century", *Journal of the History of Medicine and Allied Sciences* 51, no. 2 (1996): 127-154.

¹¹⁰ MS Cullen 405, 54.

¹¹¹ *Ibid.*, 54.

¹¹² *Ibid.*, 55.

¹¹³ *Ibid.*, 57.

¹¹⁴ *Ibid.*, 58-9.

¹¹⁵ *Ibid.*, 59.

¹¹⁶ *Ibid.*, 59.

Exercise & Rest

Cullen thought considerations of exercise and rest particularly important, given his belief that the natural state of Man was one of activity: “Man in the Dispositions of his mind & frame of his body seems to be made for action. The Duties of Society require it, every man’s own interest demands it & health & pleasure are its companions & reward.”¹¹⁷ Therefore, the proper management of exercise “is of the utmost consequence both for preventing & curing Chronic Diseases.”¹¹⁸ In fact, “Exercise is not only a preservative against most Chronic Diseases, but is likewise a cure for them....”¹¹⁹ But what of those people who seem to enjoy inaction? “How strong soever the love of ease may appear in some persons, it is never natural, but always acquired by habit; & so unsuitable it is either to our minds or bodies, that indulging in indolence soon becomes tedious, uneasy & painful, brings diseases on the body & renders the mind peevish splenetic & unhappy...”¹²⁰

Generally, exercise has the ability to “give agility & vigour to the solids; to promote the circulation of the Blood, to promote all the secretions, especially perspiration; to excite the motion of the Spirits & to render the mind cheerful.”¹²¹ But different exercises do this in different degrees. “Exercises” in Cullen’s typology, “are of two kinds only. These in which the body moves itself or those in which it is moved by somewhat [i.e. something] else.”¹²² The first kind—what Cullen calls bodily exercises—have the effects I mentioned above and produce them “more quickly than any other & such exercises are both necessary & useful; but they cannot be carried to

¹¹⁷ *Ibid.*, 62-3. Cullen actually talks mostly about exercise and hardly says anything about rest. For his single observation on rest, see *Ibid.*, 71. There is seemingly little research on exercise in the eighteenth century, but see *Sport and Exercise Science: Essays in the History of Sports Medicine*, ed. Jack W. Berryman and Roberta J. Park (Urbana: University of Illinois Press, 1992), Ch. 1; and *Exercise Physiology: People and Ideas*, ed. Charles M. Tipton (Oxford: Oxford University Press, 2003). For a contemporary view, see Francis Fuller, *Medicina Gymnastica: Or, a Treatise Concerning the Power of Exercise, with Respect to the Animal Oeconomy; And the Great Necessity of It in the Cure of Several Distempers. By Francis Fuller. The Second Edition, with Additions* (London: Robert Knaplock, 1705).

¹¹⁸ MS Cullen 405, 62.

¹¹⁹ *Ibid.*, 63-4.

¹²⁰ *Ibid.*, 63.

¹²¹ *Ibid.*, 64.

¹²² *Ibid.*, 64.

any great length without overheating or fatiguing the body too much....”¹²³ But so long as one engaged in them moderately, they could prove very beneficial. Cullen seemed particularly fond of the “bodily exercises that are joined to any Amusements” like bowls, golf, tennis, fencing, swimming and skating in the winter.¹²⁴

The second kind of exercise—where the body is moved by something else—includes Cullen’s most preferred exercise, especially for valetudinarians: horseback riding.¹²⁵ Riding “is the great Catholicon in all Chronic Diseases the most easily procured & to be managed with the least suite & attendance. It costs little effort to engage in it; & on horseback a man enjoys the freest air; & is carried through the greatest variety of Scenes & Climates with ease & quickness; all which have a great effect in raising the Spirits.”¹²⁶

In general, with respect to bodily exercise, moderation, once again, was key. It “ought always to be moderate & continued only till a glowing warmth is raised over the whole body & then left off by degrees before any sweat breaks out.”¹²⁷

Passions of the Mind

Cullen took particular interest in another non-natural, the ‘passions of the mind’.¹²⁸ “These may seem to be more the business of the Philosopher, than the

¹²³ Ibid., 64-5.

¹²⁴ Ibid., 65.

¹²⁵ For Cullen’s advice to Adam Smith to go riding, see Michael Barfoot, “Dr. William Cullen and Mr. Adam Smith: A Case of Hypochondriasis?”, *Proceedings of the Royal College of Physicians of Edinburgh* 21, no. 2 (1991): 204-14.

¹²⁶ MS Cullen 405, 67-8. From these observations, one suspects that, were Cullen alive today, he would be a strong advocate of bike riding for similar reasons.

¹²⁷ Ibid., 69.

¹²⁸ For discussions of the passions of the mind (or soul), see Thomas M. Dixon, *From Passions to Emotions: The Creation of a Secular Psychological Category* (Cambridge: Cambridge University Press, 2003), Chs. 3-4; Jon Elster, *Alchemies of the Mind: Rationality and the Emotions* (Cambridge: Cambridge University Press, 1999); Steven Shapin, “Descartes the Doctor: Rationalism and Its Therapies,” in *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority* (Baltimore: Johns Hopkins University Press, 2010); *The Soft Underbelly of Reason: The Passions in the Seventeenth Century*, ed. Stephen Gaukroger (London: Routledge, 1998); and Stanley W. Jackson, “The Use of the Passions in Psychological Healing”, *Journal of the History of Medicine and Allied Sciences* 45, no. 2 (1990): 150-75. For an interesting discussion of the emotions in seventeenth-century philosophy, see Susan James, *Passion and Action: The Emotions in Seventeenth-century Philosophy* (Oxford: Oxford University Press, 1999).

Physician, but how little soever it may be in the power of the Physician to regulate them, it is certainly necessary for him to know their effects....”¹²⁹ Cullen thought it clear that “the Soul & Body mutually affect one another....”¹³⁰ The soul affects the body through the passions, for instance “Anger promotes the circulation, raises a sort of fever, invigorates the body & occasions a glowing heat & redness over the whole surface of it... The Effects of the Imagination are no less considerable than those of the passions. This can vomit, purge & sweat as strongly as the most powerful Medicines.”¹³¹ Likewise, the body influences the soul too. This is “obvious in the operations of Wine, Opium & other Narcotic Medicines which in acting on the body often change the whole temper & disposition of the Soul.”¹³²

For physicians, it is particularly important to know the effects of the passions on the body, for “the Passions are the Springs of all actions & a necessary part in the composition of the Soul so do they seem as necessary in regard of the Body. Many of them are useful in preserving its health & the rest serve to guard it against accidents that might be hurtful to it.”¹³³ In general, when we assess the effects of the passions, we must know to what extent “they are pleasant or painful or as they have a tendency to action or the contrary.”¹³⁴ The passions have their effects by means of the motions of the Animal Spirits—what Cullen later calls the nervous power. Thus “Joy & all pleasant Sensations promote the motion of the Spirits very much & may go so far as to waste & exhaust them. Sorrow & all disagreeable Sensations check the motion of the Spirits, & Grief too much indulged may fix them so that they will never move freely again.”¹³⁵

Linking the mind to the motion of the Animal spirits, Cullen thinks that “the exercise of the mind is pleasant & excites the motion of the Spirits. The vacancy of the mind is painful & checks the motion of the Spirits.”¹³⁶ Activity and stimulation—

¹²⁹ MS Cullen 405, 71-2.

¹³⁰ *Ibid.*, 72.

¹³¹ *Ibid.*, 72.

¹³² *Ibid.*, 73.

¹³³ *Ibid.*, 74.

¹³⁴ *Ibid.*, 75.

¹³⁵ *Ibid.*, 75.

¹³⁶ *Ibid.*, 80.

within the bounds of moderation—are central here. This is not to say that there are no dangers to stimulating the mind. In fact, intense, long-continued study, especially on one subject, “wastes & exhausts the Spirits.”¹³⁷ Moderation is, once again, the touchstone.

Cullen makes two further observations about our exercise of the mind. First, when “it is employed about its own thoughts & reflexions, to a mind so disposed, [it] is pleasant, but always tends to exhaust the Spirits. When the mind attends only to things presented to it from without, the Spirits are excited without fatigue. These two observations will shew the effects of different studies & amusements.”¹³⁸ In this vein, learning the Arts & Sciences, so long as there is no intense focus on one subject—so long as we do not “push our inquiries in these”—will not exhaust the Animal Spirits. The same is true of “History & Books of entertainment...”¹³⁹ Cullen thinks, of these kinds of amusements that “cheerful conversation is the most lasting & safest”—high praise of the benefits of sociability.¹⁴⁰ But at the same time: “All Amusements which give a high pleasure are dangerous as they waste the Spirits & proportionally sink the mind afterwards.”¹⁴¹ Another plea for moderation.

Cullen concludes his recommendations about a proper regimen by saying that we generally have a ‘pretty great latitude of health’ and can bear a great variety in the non-naturals. “[I]t is only the frequent repeating of hurtful things, the constant indulgence in irregular manners or the running from one extreme to an opposite that destroys the constitution & brings on diseases.”¹⁴² In short, “The general rule is to keep a due medium between an absolutely irregular life & one too scrupulously exact.”¹⁴³

Reconciling Celsus & Cornaro

¹³⁷ Ibid., 80.

¹³⁸ Ibid., 81. Cullen goes into a bit more detail about his understanding of custom and its effects on the nervous system (see pp. 83-5).

¹³⁹ Ibid., 81.

¹⁴⁰ Ibid., 82.

¹⁴¹ Ibid., 82.

¹⁴² Ibid., 111.

¹⁴³ Ibid., 111-112.

This ‘due medium’ could itself be interpreted in various ways. Cullen offered a careful reconciliation between the variety prescribed by the Rule of Celsus and the sober regimen demanded by Cornaro. Cullen was no stranger to the difficulties and nuances required of the skillful physician in recommending the proper manner of living to preserve health. In a draft of his memorial speech on the death of Dr. John Clerk, Cullen presented his thinking into how to deal with these seemingly incompatible approaches. First, there were drawbacks to the strict regimen of Cornaro, and thus, ‘as long as the Case allows’, the skillful physician should recommend the advice of Celsus. For while it was easy to prescribe the strict, sober regimen of Cornaro to a patient, it would be very difficult for the patient to follow it exactly, and so whenever the patient deviated from its strictures, his health would be put in jeopardy: “It is therefore not only miserable to live merely for the sake of living, but an anxiously exact care very often exposes men more certainly to the causes of Disease. A skillful Physician will therefore, as long as the Case allows, avoid the method, the exact regiment of Cornaro; he will rather follow the advice of the Judicious Celsus.”¹⁴⁴

Yet that was not enough, for the manner of living recommended by Celsus—variety over regimen—was really more applicable to the man of sound health who was in control of his own affairs. But what man was in sound health in all respects? Was there anyone who really had no tendency to disease? Thus, even for men in seemingly robust health, the variety prescribed “must still have its due measure...” In contrast, when a physician was dealing with a sick patient, or one under the approach of disease, the strict regimen of Cornaro was necessary: “Tho [*sic*] most men therefore maybe allowed, in many things, the latitude that Celsus advises; Every man in whatever favours the particular tendency of his constitution, ought to be exact as the followers of Cornaro; and it belongs only to a very skillful Physician to direct the proper temperament in these respects.”¹⁴⁵

¹⁴⁴ MS Cullen 288, 15.

¹⁴⁵ *Ibid.*, 15-16.

Thus, even Cullen's admission that moderation was often called for in the management of the non-naturals did not imply that every man could be his own physician. Quite the contrary: to balance the Rule of Celsus with the strict regimen of Cornaro required skill and expertise that very few outside the medical profession could hope to attain.

Health & Virtue

Cullen's general medical approach to managing the non-naturals, as I have suggested above, was not simply about counselling moderation. Moral concerns could not be entirely disentangled from medical ones. While some of these can be seen in Cullen's recommendations about regimen (e.g. his emphasis on the health benefits of sociability), they emerge even more clearly in his more general discussion about whether an art of health should be pursued at all.

Cullen offers a general defence of the study of hygiene in the introduction to his *Treatise*. Compared to other writers on hygiene, like Cheyne for example, Cullen was no heavy-handed moraliser, and certainly no theological one. Nonetheless, his defence does illustrate some of his moral concerns.

Cullen begins by noting Plato's opposition to studying the art of health, "as it would often interfere with the duties of life..."¹⁴⁶ Cullen is somewhat sympathetic to this: "...we must own that in the present constitution of human affairs they [the duties of life] could not be carried on but by persons who must not only hazard but must even Sacrifice both their health and life to the good of the publick. We allow therefore that on many occasions the Art of health is to be entirely neglected."¹⁴⁷ He points to the example of the lives of the great statesmen and generals, as people

¹⁴⁶ Cullen is here paraphrasing Plato's opposition, as outlined in the third book of *The Republic*. In that book, Plato suggests that a focus on the art of health would have little place in the ideal society. Plato has Socrates argue that Asclepius himself "knew that everyone in a well-regulated city has his own work to do, and that no one has the leisure to be ill and under treatment all his life" (III: 406c). Socrates goes on to say that "excessive care of the body, over and above physical training, is pretty well the biggest obstacle of all. It's troublesome in managing a household, in military service, and even in a sedentary public office" (III: 407b-c). See Plato, *Plato: Complete Works*, ed. D. S. Hutchinson and John M. Cooper (Indianapolis: Hackett Publishing, 1997).

¹⁴⁷ MS Cullen 335, 2.

whose duties did not allow for them to study the art of health. But it is not just the great who must forego this: "...I go further and say that even in the lower and less important Situations of human affairs a Scrupulous attention to the preservation of health will often interrupt the agreeable commerce of life[,] will often withhold the hand of good office and even Suppress those duties which may often be incumbent on us tho [*sic*] at the hazard of health."¹⁴⁸

From this discussion, we glean a few things about what Cullen wants his readers to think are his moral concerns. He is keen to show appreciation for the 'agreeable commerce of life' and the 'hand of good office'. What he condemns is perhaps more interesting: one must not become a 'frivolous unsociable and contemptibly Selfish person' by indulging in 'Scrupulous attention' of the preservation of one's own health, especially if it means neglecting one's duties to society (the 'duties of life'), or the 'good of the publick'.¹⁴⁹ In Cullen's view, the isolated, self-indulgent ('Scrupulous') individual is morally suspect. Of course, he had no desire to encourage this, or teach an art of health that would do so.¹⁵⁰ Instead, duty, sociability, and active participation in the community are to be cultivated.

These values are echoed in one of the few explicit statements Cullen makes connecting the moral with the medical, virtue with health:

Such is the connexion between Virtue, the health of the Soul & the health of the Body that all the virtuous & moderate passions contribute to the health of the Body & all the vicious & excessive are very hurtful to it. If exceptions are to be made to this rule, I believe it will be found pretty generally true, that all the friendly, benevolent, social manly passions contribute to the health of the body & on the contrary that the Angry, malicious, selfish, weak, womanish passions tend to disorder it.¹⁵¹

Cullen links active sociability and civic duty with virtue, and unsociability and selfishness with vice. More than that, he argues that being virtuous was a way of being healthy. Such was the connection between the mind and the body that virtue and health, the moral and the medical, were tightly linked.

¹⁴⁸ Ibid., 2.

¹⁴⁹ Ibid., 2.

¹⁵⁰ Ibid., 2.

¹⁵¹ MS Cullen 405, 74-75.

IV. Medical Expertise & Laying Open the Art of Health

Recall that discussions about hygiene often involved debates about the kind of expertise that was warranted. Was the particular experience of any reflective person enough to know how to preserve one's health? Could every man be his own physician, or was medical knowledge necessary? And who should have access to the principles of hygiene? Should it be popularised to a wide audience, or kept closely guarded among the professionals?

As may already be clear, Cullen was a forceful defender of the importance of medical expertise.¹⁵² Knowing common proverbs or being reflective about one's own particular experience was not enough to master the art of health. Every man could *not* be his own physician, when it came to preserving one's health; medical knowledge was necessary. Cullen, as a leading member of the medical profession, had no hesitation defending his group's claim to authority and respect, in hygiene as in other medical subjects. Yet, Cullen did not simply defend a closed system of expertise. He thought the principles of hygiene should be disseminated to the 'leisured and studious', i.e. largely to the same cohort from which his private patients might come. But he was also careful to insist that not all of Physic ought to be popularised and laid open—just the principles that were germane to the art of health. Knowledge of disease itself, and of the medicines used in its treatment, were to be kept out of untrained hands. Cullen's views, it is clear, were in accordance with his professional status.

In a fascinating, unpublished essay, "Remarks on the Art of Preserving Health", Cullen touches upon many of these issues. In this work, Cullen is interested in settling a debate about the proper foundations for the art of preserving health. Some thought that hygiene was "only to be learned of Physicians", who have "studied the structure & laws of the human System, the effects of its own Actions &

¹⁵² Using Shapin's terminology, Cullen defends ontological expertise and downplays the importance of its prudential counterpart.

of the various impressions that may be made upon it.”¹⁵³ Others believed that physicians “aim too often at unnecessary refinements & in their directions inroach [*sic*] too far on the ease & freedom of Life. Persons of this last opinion at the same time commonly suppose that a nice study & attention is superfluous & that a few general Rules assisted by each mans [*sic*] particular experience is generally sufficient for the art of preserving health.”¹⁵⁴

In order to adjudicate between these two views, Cullen will assess the hygienic advice known as the Rule of Celsus. He has a two-pronged agenda: he will, first, “consider how far this advice may be taken generally or what knowledge may be necessary for the proper application of it”; and secondly, he “shall consider how far each mans [*sic*] particular experience may be usefull in the preservation of his health.”¹⁵⁵

The General Propriety of the Rule but Medical Knowledge Still Necessary

Celsus’ rule about the preservation of health, according to Cullen in his *Treatise*, was as follows: “A Man [Celsus] says who is in good health and is his own master, that is, who can order his life at his own pleasure has no occasion for a physician or those particular artists who were in that age commonly employed in the conduct of health. A man who is thus to conduct himself Should constantly vary his manner of life &c &c.”¹⁵⁶

Cullen makes his general approval of the Rule clear: “The duties of life require a varied exercise of the functions both of the body and mind and both are by their nature accommodated to considerable vicissitudes not only with impunity but even with advantage.”¹⁵⁷ Indeed, Cullen notes how ‘exact uniformity’ in our actions can be dangerous for it is by such uniformity, over time, that we acquire habits which are hard to change. And attempting to break those habits puts our health in

¹⁵³ MS Cullen 125/1113, 1v/1v/-.

¹⁵⁴ *Ibid.*, 1v/1v/-.

¹⁵⁵ *Ibid.*, 1v-2r/1v-2r/-.

¹⁵⁶ MS Cullen 335, 3.

¹⁵⁷ *Ibid.*, 3-4.

jeopardy.¹⁵⁸ It was for this very reason that Celsus created his rule. Cullen thus thinks the Rule of Celsus “is undoubtedly very proper and excellent, & indeed very generally such...”¹⁵⁹

Nonetheless, the Rule of Celsus is not sufficient by itself.¹⁶⁰ It might be generally correct, but it does not take into account the effects of custom or the particular circumstances of an individual’s manner of living. The Rule of Celsus needed to be further detailed in order to apply it to the circumstances of any particular patient.¹⁶¹ But Celsus had unfortunately not done this enough.¹⁶²

Celsus’ advice was, after all, not meant for everyone; it was specifically directed to the man of sound health (*sanus homo*). Cullen thought we should therefore not expect it to be applicable to those who are not in this category; it might even lead to harm.¹⁶³ On top of this, it is often difficult to know when someone is of sound health or not. In his *Remarks*, Cullen says that in fact “the predispositions we speak of are often present in persons seemingly of the most entire health nor can be discerned by the Persons themselves but indeed only by a Person acquainted with the animal Oeconomy & the history of its Diseases.”¹⁶⁴ Here the expertise of a physician is warranted, and Celsus’ advice will not apply.

Cullen puts this another way by saying that “common sense does not always suggest what is necessary here.”¹⁶⁵ Physicians often must tell patients that they cannot simply engage in a life of variety, despite regaining their health, if they are in one of the situations described above, and that in fact, when these situations apply,

¹⁵⁸ *Ibid.*, 4.

¹⁵⁹ MS Cullen 125/1113, 6v/-/20v. But Cullen also emphasises in his *Treatise* that the Rule of Celsus “does not Supersede the Art of health and that judicious author after delivering the above rule has proceeded to give us Some of the most excellent rules for the conduct of health both in general and in the particular circumstances of certain constitutions” (MS Cullen 335, 7).

¹⁶⁰ MS Cullen 125/1113, 6v/-/20v.

¹⁶¹ *Ibid.*, 9r/-/1r.

¹⁶² *Ibid.*, 9r/-/1r.

¹⁶³ MS Cullen 335, 5-6.

¹⁶⁴ MS Cullen 125/1113, 12v/-/4v.

¹⁶⁵ *Ibid.*, 12v/-/4v.

“the accurate exact & uniform manner of Life experienced by Cornaro seems to be more suitable than the varied manner which Celsus advises.”¹⁶⁶

Cullen concludes, therefore, that “few Persons will be sufficiently attentive in applying the advice of Celsus unless they have studied the effects of custom in detail...”¹⁶⁷ And this implies that knowing how and when to apply Celsus’ Rule properly requires “a good deal of discretion & perhaps some degree of medical Knowledge....”¹⁶⁸ Physicians are necessary, after all.

Particular Experience a Poor Guide

The second part of Cullen’s *Remarks* is devoted to inquiring “with what propriety the world pay[s] a great deal of deference to particular experience as the best instructor in the art of preserving health.”¹⁶⁹

Cullen concedes right away that there is a certain kind of experience or knowledge that the patient is in the best position to know—the eccentricities of his own body. It is his own “peculiarities of constitution that every mans [*sic*] own experience is especially usefull to him & must be his cheif [*sic*] guide while the Physician whose directions regard more the circumstances in common to men may possibly mislead him....”¹⁷⁰ But, to temper this, Cullen emphasises that general circumstances in common to everyone are much more prevalent than individual aberrations, and diseases are more frequently due to errors in these general circumstances.¹⁷¹ And with regard to these—the circumstances in common to every constitution—few individuals are able, via their particular experience, to learn much about them.¹⁷²

¹⁶⁶ Ibid., 13r-/5r.

¹⁶⁷ Ibid., 13v-/5v.

¹⁶⁸ Ibid., 14r-/6r.

¹⁶⁹ Ibid., 14r-/6r.

¹⁷⁰ Ibid., 14v-/6v.

¹⁷¹ Ibid., 14v-/6v.

¹⁷² Ibid., 14v-/6v.

What is more, even with regard to their own experience, most men are unable to make accurate observations.¹⁷³ Cullen points, for instance, to the innumerable powers that affect the human body, powers that readily escape all but the most acute observers who have honed their powers of observation through careful study.¹⁷⁴ The difficulties do not end there. The causes of disease often “act upon us by insensible & Slow degrees”¹⁷⁵ so that our own experience is unable to warn us in time to prevent the disease.¹⁷⁶ Indeed, sometimes our experience actively deceives us.¹⁷⁷ On account of considerations like this, Cullen admits that “...I do not at all find that common experience instructs us either to judge of the excesses of these or to avoid the consequences of them.”¹⁷⁸

Cullen’s point is that the ‘art of health’ is rooted in, or founded upon, general medical knowledge and the experience built upon it (ontological expertise) rather than the knowledge that comes from any particular person’s experience (prudential expertise):

it has been the scope of this discourse to shew [*sic*] that few persons are in a condition to apply general Rules or make proper observations upon themselves unless they have acquired some general Knowledge of the animal Oeconomy & have learned from the Physical history of the human Body a number of conclusions established by the experience of different ages & countries. These are still in the hands of Physicians but it is to be wished they were more commonly known.¹⁷⁹

This message is not unique to Cullen’s *Remarks*. The same points are emphasised in the introduction to his *Treatise on the Preservation of Health*. He argues there that although aspects of the art of health “may be considered as matter of common Sense” this is not generally the case because this common sense “is formed into general maxims which are not applicable to particular cases but with a

¹⁷³ Ibid., 15r/-/7r.

¹⁷⁴ MS Cullen 335, 9.

¹⁷⁵ MS Cullen 125/1113, 15r/-/7r.

¹⁷⁶ Ibid., 15v/-/7v.

¹⁷⁷ Ibid., 15v/-/7v.

¹⁷⁸ Ibid., 17r/-/9r.

¹⁷⁹ Ibid., 17v-18r/-/9v-10r.

Skill and discernment that few persons are capable of.”¹⁸⁰ This ‘Skill and discernment’ has, in part, to do with understanding the reasons behind the general rules of health—when they are applicable, when not. Such is the variety of human affairs that the common maxims or proverbs of health are often refuted by daily occurrences. And when men do not know the reasons behind these maxims they do not know how to apply them in particular circumstances.¹⁸¹ For these reasons, the art of health, Cullen thinks, is not like the art of moral prudence; it demands more than common sense and requires some kind of study and ‘particular instruction’. It necessitates, in short, medical expertise.

Cullen’s forceful defence of medical expertise seems to have been of long-standing for the most explicit statement of it actually appears in an early draft for his speech on the death of Dr. John Clerk (1757). It leaves no doubt about his position in the dispute between common sense and medical knowledge, between whether every man could be his own physician or must rely on the expertise of the medical practitioner. In this draft, Cullen wrote:

It is commonly alledged that against a certain time of Life Every man has acquired So much Experience of his own Constitution as to be very capable of directing his own conduct but nothing is more false[.] Where a man has enjoyed very good health he is as much uninstructed at forty as at twenty[.] Where there happens to be Some peculiarities of constitution very Strongly marked the man affected with Such is indeed necessarily led to attend to them & learns what agrees or disagrees with his peculiarities but with respect to all that is in common to other men he is almost ignorant as an infant.¹⁸²

Open to the Leisured & Studios

Given Cullen’s full-throated defence of medical expertise, it is no surprise to hear him suggest that only knowledge of Physic can fit a person for accurate observation and attendance to the non-naturals in order to prevent disease and preserve health. From this it would very naturally follow that Cullen, himself a member of the elite class of learned physicians and professors of the art, would finish

¹⁸⁰ MS Cullen 335, 9.

¹⁸¹ Ibid., 9.

¹⁸² MS Cullen 302, 2v.

his discussion by pointing to the dangers involved when non-physicians try to preserve their health, without the expert help of physicians. This would be a closed system of expertise, as I have described it, unavailable to outsiders. It would also be a clear case of boundary-demarkation and one which would underscore Cullen's own social and professional status. And, indeed, it seems to follow naturally from what he has said so far about the difficulties of obtaining expert knowledge.

But this is not quite Cullen's conclusion. He favours a more open system of expertise. Cullen believed that the art of health "is necessarily the province of the physician but I hope it is not necessarily the province of the physician alone for in that case it would be of much less benefit to mankind than were to be wished, than it is hoped it may be."¹⁸³ That is, Cullen does not wish to limit the art of health to the province of the physician, even if the physician is the only one with the required skill and expertise to instruct others in its practice. Who is his audience and why does he want to diffuse his medical knowledge?

In the introduction to his *Treatise*, Cullen writes that for "the Art of health to be of any extensive use [it] must be in the hands of almost every particular person."¹⁸⁴ But this is difficult because most of mankind is "doomed to constant labour" and are not fit for the study necessary for its practice. "[T]hese persons," Cullen thinks, "must be considered as exposed to the hazards of disease for the good of the whole."¹⁸⁵ Fortunately, Cullen continues, "their manner of life and even their very hardships are the best means of preserving their health."¹⁸⁶ This is not universally true, however, and some people have to work in ways that are "more or less directly pernicious to health but it is necessary for the good of the whole Society and the only compensation the Society can make to them is the taking the greatest care of them in disease and old age."¹⁸⁷

¹⁸³ MS Cullen 335, 11.

¹⁸⁴ MS Cullen 335, 12.

¹⁸⁵ *Ibid.*, 12.

¹⁸⁶ *Ibid.*, 12.

¹⁸⁷ *Ibid.*, 12.

So who, then, has the capacity to study and apply the art of health? It “must therefore be confined to those who relieved from servile labour or very assiduous employments have leisure to bestow on the Study and are capable of learning the principles of it and of applying these to particular cases and occasions.”¹⁸⁸ But is this realistic, especially given what Cullen says about the need for particular ‘Skill and discernment’ to know how to apply general rules to particular cases? And what of the knowledge of physic—of anatomy, physiology, etc—that Cullen mentions above?

This is an objection Cullen himself considers, and it gets to the heart of what Cullen hopes to do by disseminating his knowledge for a popular audience in his *Treatise*.¹⁸⁹ He says that the objection is one which he is eager to answer, for so long as he writes clearly and stays within the reach of common understanding, he hopes “to put persons in a condition to judge for themselves of the propriety of all our doctrines and by giving the reason of our general principles I hope to put every person in a condition of applying them with Skill and discernment.”¹⁹⁰ Cullen will treat “neither the dark[,] the doubtfull[,] nor the intricate parts of these Sciences [physic and natural philosophy] and it is Such a set of principles only as are Simple, sufficiently obvious and universally received and agreed upon. These I hope to deliver in an intelligible language very free from the technical terms of the Science and in a clear and Simple manner free from all very Subtile or intricate reasonings.”¹⁹¹ This is all to show that, being required to go into some detail into the principles of medicine, does not show that the attempt to place the art of health into the hands of persons untrained in physic is futile.

Cullen wants the art of health, or knowledge of hygiene, to be in the hands of the leisured and studious for it to be of general use, for it to be most beneficial to mankind. But why is this? In his *Treatise*, this goes largely unstated, but Cullen’s thinking on this is glimpsed elsewhere. He says, in his early lecture on Hygiene, that he thinks it would be useful to disseminate knowledge of hygiene for when its

¹⁸⁸ *Ibid.*, 12.

¹⁸⁹ *Ibid.*, 12-13.

¹⁹⁰ *Ibid.*, 13.

¹⁹¹ *Ibid.*, 13.

principles and observations are “put into many hands a great number of observations will be got by collating which this branch of medicine may & indeed only can be perfected[.]”¹⁹² Dissemination, on this view, would improve the art itself.¹⁹³

Cullen’s desire to disseminate his expert hygienic knowledge in popular form would seem to agree as well with some of the moral considerations I identified in my discussion of his approach to the non-naturals: civic duty and usefulness to the public, for instance. Of course, these concerns were not peculiar to Cullen. Once again, William Buchan, who was in many ways different from Cullen, also espoused similar sentiments in his rationale for publishing his *Domestic Medicine*: “Diffusing medical knowledge among the people would not only tend to improve the art, and to banish quackery, but likewise to render Medicine more universally useful, by extending its benefits to society.”¹⁹⁴

But, for Cullen, there were also limits to the popularisation of medical knowledge. He was happy to disseminate when it came to teaching his readers how to preserve their own health. But he would not do so when it came to teaching them how to cure disease. Cullen reinforced the traditional professional boundary between the prevention and treatment of disease, preserving the professional status of the latter. This was the province of the physician, and Cullen evidently thought it dangerous to open up this part of Physic to a more popular, untrained audience.

We see this in his decision to address one final objection in the introduction to his *Treatise*, before he begins the body of his discussion. This objection is one which, he claims, “the gentlemen of my profession may allege....”¹⁹⁵ Their worry might be, in Cullen’s words, that “as I am endeavouring to give a great part of the System of physic to all men promiscuously and cannot in this way give it to any one compleatly I Shall produce a Set of Smatterers in physic who may presume upon their imperfect and incompleat knowledge to prescribe to themselves and others with the great hazard of both or with the utmost impertinence to dispute with physicians and to turn

¹⁹² MS Cullen 445, 1v.

¹⁹³ William Buchan makes a very similar claim in his *Domestic Medicine*. See Buchan, *Domestic Medicine*, xviii.

¹⁹⁴ *Ibid.*, xxiv.

¹⁹⁵ MS Cullen 335, 14.

aside their best advice.”¹⁹⁶ Cullen’s thinks this is possible but he hopes it will not happen.¹⁹⁷ This is because he will only discuss “such general views as are necessary to the conduct of health and I can by no means enter into these minute details that are absolutely necessary to the Study of particular diseases....”¹⁹⁸ In addition, Cullen will not discuss medicines and poisons in any detail “but without treating of these my Work will do little towards teaching the cure of diseases[.]”¹⁹⁹

For his part, Cullen defends himself by repeating a rhetorical formulation, taken from Pope, of which he was quite fond. He concludes that:

In short it must be in very weak minds only that my present instructions can do any harm in this way & I can only do harm by making Coxcombs whom nature only meant for fools. Against Such we can take no precautions and to all others I can declare that tho I hope to learn them to preserve health I cannot by the same instruction teach them to cure diseases. This is a deeper affair that costs me much labour in another place²⁰⁰ & with regard to all smattering in that business I assure my readers that it is a dangerous measure and that there is no part of art or Science to which the following distich is more applicable than to the art of curing diseases: A little learning is a dangerous thing / Drink deep or taste not the Pierian Spring.²⁰¹

Ultimately, Cullen’s discussion of hygiene allowed him to defend medical expertise and thus the authority, even the necessity, of the learned physician in the prevention and treatment of disease. He astutely occupied the space between the prevention of disease, which he was willing to open up to a more popular audience, and the treatment of disease, which he was not.²⁰² By positioning himself within this space, Cullen was able to maintain his own professional authority as a learned physician responsible for curing disease, while at the same time accommodating prevalent moral concerns (which Cullen himself claimed to share) of contributing to

¹⁹⁶ Ibid., 14.

¹⁹⁷ Ibid., 14.

¹⁹⁸ Ibid., 14-15.

¹⁹⁹ Ibid., 15.

²⁰⁰ This is presumably a reference to his textbook, *First Lines of the Practice of Physic*.

²⁰¹ MS Cullen 335, 15.

²⁰² This put him at odds with his colleague John Gregory, who argued that “by laying medicine open, and encouraging men of science and abilities, who do not belong to the profession, to study it, the interests of humanity would be advanced, its dignity more effectually supported, and success more certainly secured to every individual, in proportion to his real merit.” See John Gregory, *Lectures on the Duties and Qualifications of a Physician* (London: W. Strahan, T. Cadell, 1772), 236.

one's community and of extending medicine's benefits to a wider audience. In both cases, the expertise and authority of the physician would be preserved. For, even in the case of hygiene, though it would no longer be the 'province of the physician alone', those who wished to preserve their own health still had to learn from physicians how to do so. Expertise, while shared with a larger audience, would remain in the hands of physicians—like Cullen.

Conclusion

In this chapter, I have offered a new and more comprehensive interpretation of Cullen's understanding of, and approach to, the medical topic known as 'hygiene'.

It was evidently a topic of special importance to Cullen, an interest of his that spanned his entire career. I have shown the place it occupied in his *Institutions* and delineated his recommendations for the prevention of disease, both on a general level and more specifically, with respect to some of the non-naturals.

I have offered my interpretation of Cullen's approach to the non-naturals by highlighting his emphasis on moderation, civic duty and what I referred to as 'active sociability'.

Finally, I argued that Cullen was a forceful defender of medical expertise, and I described what this expertise, for Cullen, amounted to. While Cullen was willing to disseminate his knowledge of hygiene to a broader audience, he insisted that the traditional responsibility of the physician to cure disease ought to remain closed to outsiders, indeed that it was dangerous to do otherwise. In this way, he ensured that physicians would remain the authorities on hygiene and medicine more generally, while still heeding moral concerns to disseminate some of medicine's benefits broadly for the 'good of the public'.

The picture that emerges from this chapter is of a physician who strongly identified with the traditional image of the learned physician, but who was also outward-looking and eager to advertise, not just his learning and expertise but his potential usefulness to the public and the state. Given that Cullen was dependent on

the patronage of powerful political and institutional figures for the advancement of his career, and that treating these very same individuals enhanced his own reputation as a physician and increased the size of his medical practice, it is not unreasonable to interpret Cullen's approach to hygiene as, on some level, an astute reconciliation of his medical beliefs with his professional interests.

We have covered a lot of ground in the previous chapters, and it is now time to consolidate some of our conclusions. In the next and final chapter, I consider some of the implications of this study for how we interpret Cullen in the context of eighteenth-century Scottish medicine. I also highlight some topics for further research.

This page intentionally left blank

CHAPTER SIX

CONCLUSION

Your Father [John Thomson] in consequence of his long night picked up a book that has given him more satisfaction than any thing that he has got for a long while in that way. In driving up the Candlemaker Row with his eyes as usual on the Bookstands he spied the name Cullen upon nine large quarto volumes. [H]e sprung out of the Carriage and found them to be the Manuscript Copy of Dr Cullens [*sic*] lectures on the practice of Physic written in Pauls [*sic*] hand, and he has no doubt that it is the very copy of them that Cullen employed Paul to write for him just a short time before he died, and which Mrs Millar used to say had been purloined. He came home with the Book in great spirits.

-A letter from Margaret Thomson (wife of John Thomson)
to her son, William, c.1822
[NLS, MS 9236, 127]

CHAPTER 6: CONCLUSION

In the course of this thesis, I have offered new facts and interpretations of the life and work of William Cullen. In order to clarify the reassessment of Cullen I offer here, I will now review what I take these original contributions to be.

I. A Reassessment

In Chapter 1 (Introduction), I emphasised how significant a figure Cullen was in both chemistry and medicine and therefore how critical it is to unite historical research from the histories of both disciplines. I outlined the Thomsonian interpretation of Cullen in new detail and highlighted the Craigiean interpretation as something worthy of study in its own right. Finally, I pointed to Cullen's understanding of the Newtonian Aether as the fundamental doctrine behind his distinctive approach to both chemistry and medicine.

In Chapter 2 (Pedagogy), I explored Cullen's pedagogical persona, linking it to his time in Glasgow and to the influence of Francis Hutcheson in particular. I downplayed economic explanations of Cullen's success as a teacher and pointed, instead, to the lure of prestige and status in the context of the academic patronage system. In so doing, I showed, using the example of Cullen's pursuit of the Chair of the Practice of Physic at Edinburgh, how truly ambitious he was, explicitly taking advantage of student support to reach the top of his profession.

In Chapter 3 (Philosophy of Medicine), I showed that Cullen had a complex position in the perennial debate between Dogmatists and Empiricists about the proper pursuit of medical knowledge. I pinned down his preferred species of Dogmatism (outlining his particularly robust defence of the use of theory in medical reasoning) and showed how he corralled the example of Sydenham to lend his position lustre. I also added a new dimension to our understanding of Cullen's philosophy of medicine, by explicating what I called his medical ideology. This was an eclecticism rooted in broader Enlightenment ideals, which Cullen thought important to teach to his students. He also used it to manage potential controversy and to climb the

academic hierarchy. Finally, in the course of these discussions, I highlighted Cullen's worries about the influence of religious sectarianism in medicine (and thus his anti-Stahlianism) and speculated about his unorthodox, deistic religious views, possibly inspired by Matthew Tindal's (1657-1733) controversial form of natural religion.

In Chapter 4 (Theory of the Nervous System), I argued that there is a fundamental, unifying doctrine at the foundation of Cullen's neurophysiology: what he called his theory of the nervous system, which posited a subtle, elastic fluid that inhered in the medullary substance of the nerves and was derived from the universal Newtonian Aether. I pointed out how Cullen's theory explains his most distinctive physiological assumptions (e.g. his neuromuscular physiology). Next I showed that Cullen's theory was quite controversial in Edinburgh and that none of his colleagues at the Edinburgh Medical School agreed with his aetherial speculations. This was possibly due to Cullen's embrace of a thoroughgoing mechanism in medical explanation.

In Chapter 5 (Hygiene, or the Art of Health), I pieced together Cullen's rarely-studied views on the 18th-century medical topic known as hygiene, or the art of preserving health. Using new sources, I showed that hygiene was a topic of longstanding importance to Cullen and explored his understanding of some of the non-naturals, highlighting the moral concerns that lay behind his general counsel of moderation. Finally, I provided a detailed picture of Cullen's defence of medical expertise, which underwrote his approach to hygiene.

When we take a step back and consider some of the broader conclusions of this study, a few themes emerge. I have argued that Cullen was a more unorthodox and ambitious figure than he has traditionally been represented. This can be seen in a number of areas: in objections to bringing his kind of pedagogy to the Edinburgh Medical School; in resistance to his career ambitions, especially upon his arrival in Edinburgh and his attempts to secure the Practical Chair; in his unorthodox religious views and unabashed embrace of mechanism in medical explanation; and in the contentiousness of his theory of the nervous system, rejected by all his colleagues and the subject of extramural ridicule (the Aether controversy). Nonetheless, Cullen

ultimately climbed the ladder of success and became one of the most celebrated teachers and physicians of the Scottish Enlightenment.

As I mentioned in Chapter 1, my methodological approach to this study of Cullen has been bio-intellectual. This has had both its virtues and drawbacks. Some of the original contributions I mentioned above are consequences of taking that perspective. I would highlight as well my conscious decision to ensure that my approach was independent of the Thomsonian framework, in both interpretive outlook and choice of sources. It has allowed me, for instance, to highlight the pedagogical context of Cullen's career, as well as to show how his Glaswegian origins structured his life and work.

But the bio-intellectual approach has its drawbacks as well, and it is worth highlighting—without dwelling upon—some of the limitations of this study of Cullen. First, I aimed for depth and detail over broadness. This means there are many areas of Cullen's thought that I had no time to discuss, however relevant they might have otherwise been. For instance, I had no space to discuss his widely influential nosology or his controversial theory of fever, both of which have been important topics of discussion in the historiography.

Second, my concern with depth and detail of Cullen's own intellectual system has meant a sacrifice of sorts. I do not do enough to locate Cullen explicitly within the broader context of the Scottish Enlightenment, particularly with respect to the larger group of Scottish literati and their concern with topics outside of natural philosophy and medicine. To atone partially for this sacrifice in the body of the thesis, I wish now to reflect upon some of the broader implications of this study.

II. Broader Implications

My reassessment of Cullen contains broader implications for our understanding of mid-to-late eighteenth-century Edinburgh medicine. To begin, why was Cullen so contentious among his peers? What kind of threat did he represent? This is not as straightforward as it may initially appear.

'I was called a Paracelsus, a Van Helmont, a whimsical innovator'

First, I think Craigie is right that Cullen's rejection of Boerhaavian medicine cannot be the primary reason why he was controversial and his ideas disputed. True, Cullen was criticised for straying from the Boerhaavian paradigm. Not only did John Rutherford consider him a kind of medical heretic but he was confronted, probably in the late 1750s, by the Lord Provost George Drummond, who requested, as Cullen recalled the conversation, "that I would avoid differing from Dr Boerhaave, as he found my conduct in that respect was likely to hurt myself and the University also. I promised to be cautious; and upon every occasion I spoke very respectfully of Dr Boerhaave...."¹ But Craigie was accurate when he wrote that the notion "that Cullen assailed and overturned the Boerhaavian system of medicine, affords an entirely erroneous view of the matter, and that the system of that learned and ingenious eclectic was already tottering on its foundation from a variety of causes."² Cullen was representative of a generational switch away from the principles of Boerhaave. The old guard in Edinburgh (e.g. Rutherford or Monro *primus*) who had been raised on his System was giving way to the next generation—Cullen, Whytt, Gregory, Monro *secundus*—who questioned Boerhaave's dominance. The critique of Boerhaavian medicine was already under way with Robert Whytt and, as Lawrence has shown, neither Gregory nor Monro *secundus* were Boerhaavians either.³ Cullen

¹ TLC, 1:119. Thomson says he is quoting from an introductory lecture to Cullen's course on the practice of physic given in 1783-4. Cullen made a similar comment as part of his introductory lecture to his 1779-80 course, which survives in the handwriting of his son, Robert, who may have been doing duties as his amanuensis. Cullen told his audience, "In this University I was first imbued with the doctrines of B[oeerhaave]. I received them implicitly and studied them diligently but before I came to be a Professor here I had observed what I thought to be defects and errors in B's system. When I came here I ventured to hold forth my own opinion but was immediately attacked by my brethren of the Faculty. As I was Professor of Chemistry I was called a Paracelsus, a Van Helmont, that is a mad reformer or a fanatical innovator; and a Man of the first rank in this City and my particular friend came and earnestly advised if I would consult my own interest that I should not say any thing against Dr Boerhaave. I however was confident in my own measures and now I believe in this University &c." See MS Cullen 325, insert attached to 4v.

² David Craigie, "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson", *The Edinburgh Medical and Surgical Journal* 38, no. 113 (1832): 399.

³ Christopher Lawrence, "Medicine as Culture: Edinburgh and the Scottish Enlightenment" (PhD Thesis, University of London, London, 1984), Chs. 5 & 7.

was not responsible for this generational switch, even if he hastened Boerhaave's fall from grace in Edinburgh.

It is also not enough to claim that Cullen was simply more speculative and fanciful than his colleagues, and that is why he was so controversial. Again, as the Aether controversy shows, he was indeed criticised for this. But comparing Whytt and Cullen here is instructive: Whytt's theory that the soul inhabited all parts of the body, even after that part was cut out, was just as speculative as anything Cullen taught.⁴ Yet, he was not publicly attacked, as Cullen was. There is thus a sense in which Cullen was a more polarising figure in Edinburgh, regardless of his medical views. Cullen seemed to think so: he complained in a clinical lecture from March 1765, for instance, that he was being ridiculed for some of his notions on fever, while Whytt was not, even though their views were similar on the topic in question: "For these opinions tho' supported by Hoffman[n], Van Swieten, Gaubius &c I was insulted, traduced & abused."⁵ This suggests that, whatever Cullen's medical doctrines, he may have been attacked for other, more fundamental reasons.

I have hinted at what I take some of these to be: first, critical reactions to Cullen probably had as much to do with his fairly naked ambition and outsider status in Edinburgh. For example, he may never have been truly forgiven for the way in which he obtained his initial position in Edinburgh, securing a joint appointment with the ailing Andrew Plummer. The details do not concern us here, but Emerson has emphasised the unhappiness of other faculty members at how Cullen manoeuvred his way into the Chemistry Chair.⁶ Cullen's ambition was a complaint of the Rutherford camp's attack on Cullen in the 1760s as well.⁷

⁴ In his 1766-67 Institutions lectures, Cullen dismissed Whytt's theory this way: "And to apply the sentient principle cut out of the Body as White [*sic*: Whytt] does is highly improper." See WUSL, 1:316.

⁵ MS Cullen 780, 14.

⁶ "The College men did not like the way William Cullen... was being parachuted into their institution without a deal worked out to protect Plummer's interests. They wanted Black but had no votes..." See Roger L. Emerson, *Academic Patronage in the Scottish Enlightenment: Glasgow, Edinburgh and St Andrews Universities* (Edinburgh: Edinburgh University Press, 2008), 300. For Cullen's defence of his actions, see MS Cullen 74.

⁷ See, e.g. Anon, *A Letter From A Citizen of Edinburgh, to Doctor Puff* (Edinburgh, 1764), 7.

In addition to his outsider status and strong ambition, Cullen was controversial for some of his most fundamental beliefs. Again, a comparison to Whytt is revealing: I noted above that Whytt's views were just as speculative, in many ways, as Cullen's. Yet Cullen was ridiculed, while Whytt was not. And here Cullen's methodological differences with Whytt are telling: Cullen embraced mechanism, while Whytt rejected it. Not only that, but Whytt held fairly orthodox religious views, and Cullen did not. Thus, it may have been that Cullen was ultimately controversial on account of what others suspected of his unorthodox religious opinions and his preference for mechanical, functionally-materialistic explanations in medicine. His opponents may even have labeled him a materialist; at least, they insinuated it to the point where Cullen felt the need to announce to his students that he was no such thing. In his 1772-3 Institutions lectures, he told his audience that "It is true the language of Boerh[aave] and such will seem to be the same with the language of the materialists but a very little explanation will always show the difference. I in using their language will seem to talk as a materialist, and very unhappily some persons have understood me so, I have however particularly guarded against it..."⁸ He was keen to "say here once for all that if the words seems [*sic*] to mislead the meaning in general is as I have said expressly exclusive of the notion of materialism..."⁹

Despite the controversies that dogged him, Cullen was not, in the end, a revolutionary but a reformer of learned medicine. And while he may have symbolised, for later generations, the personification of Edinburgh medicine, his path to success was challenged at every step. Cullen's grip on the Edinburgh establishment was never complete.

The Learned Physician

The other theme that emerged in this study, albeit less explicitly, was how Cullen in some ways epitomised the learned physician of the Enlightenment. He both

⁸ NLM, 2:33-4.

⁹ NLM, 2:36.

defended the ideals of the learned physician as well as combated what he took to be threats to his authority as such.

What were those ideals and values? They were fairly standard and conventional for someone in his position as a University professor, ideals he shared with his colleague John Gregory, despite their many differences. They included a belief in the Dogmatic approach to medicine, the defence of erudition and medical expertise, and the claim that natural philosophy was justifiably the foundation for the study of medicine. There were many other components to this ideal, but those are the ones that have emerged in this study. Cullen defended his authority as a learned physician and convinced his students to embrace the values of learned medicine as well.

Defending the ideals of learned medicine also meant combating threats to its authority. Cullen was particularly concerned, it seems, with the dilution of its dominion by those who attempted to lay medicine open to the growing reading public. These popularisers of medicine, learned or not, were more dangerous than helpful, and in any case, the 'art of physick' was not something that could be learned with a little reading. Medical knowledge was not simply common sense, but the product of intense study over many years, one that required the command of many different subjects.

Cullen was also worried about the rise of empiricism and the stigma surrounding the cultivation of theory and hypotheses. These concerns had to do with threats from outside learned medicine but there were threats from within as well. The one Cullen most wanted to combat, it seems, was the influence of medical systems, and figures that were overly sectarian. This blocked the progress of medicine and science. Political and religious interference were troublesome too. Stahl and his followers were the typical example of this approach to medicine, one which Cullen was eager to refute, especially in his lectures on the Institutions. For all these reasons, Cullen advocated eclecticism and fiercely defended the ideals and authority of the learned physician.

Rethinking Medicine During the Enlightenment

If what I have argued about Cullen is true, then we may have to reassess Christopher Lawrence's interpretation of medicine in eighteenth-century Edinburgh. Recall the basics of this interpretation from my discussion in Chapter 1: Lawrence argued that the predominant model of the body among Edinburgh physicians was founded upon a physiology of sensibility and sympathy.¹⁰ This interpretation allowed Lawrence to connect Edinburgh medicine with broader themes in the Scottish Enlightenment.¹¹ Cullen played a critical role for Lawrence; he was not only "the personification of Enlightenment Edinburgh"¹² but his medical theory was rooted in just these widely-shared notions of sensibility, sensation, and sympathy.

Yet, after completing this study, I find it difficult to reconcile the Cullen I have written about with the one Lawrence depicts. Cullen rejected the notion of sympathy, at least Whytt's explanation of it.¹³ Although Lawrence admits this, he still wants to link Cullen together with Whytt, Gregory, and Monro *secundus* so that he can point to a distinctively Scottish approach to medicine. But I have been struck, instead, by the very real differences between Cullen and his colleagues. Not only is it difficult to place Cullen's physiology next to Whytt's and Gregory's—except with respect to a general focus on the nerves—but, as I have argued in Chapter 4, sensation was *not* the fundamental doctrine of Cullen's theory of the nervous system. Instead, it was his mechanistic explanation of the nature and function of the nervous fluid, which in turn depended on his Newtonian interpretation of the aether. It bears repeating that Cullen's approach to the nervous system—his fundamental doctrine—was rejected by all his colleagues. What are we to make of this? Is Cullen in fact *not* representative of Edinburgh medicine after all? And if not, how can we connect Cullen's theory of medicine to broader concerns in the Scottish Enlightenment?

¹⁰ Christopher Lawrence, "The Nervous System and Society in the Scottish Enlightenment," in *Natural Order: Historical Studies of Scientific Culture*, ed. Barry Barnes and Steven Shapin (London: Sage, 1979), 27.

¹¹ *Ibid.*, 35.

¹² *Ibid.*, 26.

¹³ Cullen was generally suspicious of using the notion of sympathy to explain communications in the nervous system, e.g. in his 1772-3 lectures, he concludes that "in many instances we shou'd be Cautious how we have recourse to a mysterious affair, as Sympathy is, and we shou'd rather seek for other Causes of Communication..." (NLM, 2:145).

My reassessment of Cullen—his fundamental heterodoxy and controversial position in Edinburgh—suggests we cannot use his approach to medicine to make generalisations about Scottish medicine more generally. He was, in fact, not representative of Edinburgh medicine, at least in terms of his fundamental doctrines. That is to say, the *core* features of Cullen’s approach to medicine cannot easily be linked to the broader intellectual concerns of the Scottish Enlightenment, if those concerns—in Lawrence’s view—ultimately had to do with sensibility and sympathy. The Cullen that has emerged from this study sits uneasily with many of his medical colleagues and thus may not be representative of Scottish medical concerns more generally. If Cullen was the ‘personification’ of Edinburgh medicine, perhaps medicine at Edinburgh was less cohesive than Lawrence has suggested.

However unsatisfying this realisation may be—after all, what is Scottish medicine without Cullen as its representative?—it is a more accurate reflection of the contentious state of mid-to-late eighteenth-century Scottish medicine. More unifying, essentialist explanations that gloss over the diversity apparent in Edinburgh medicine (let alone Scottish medicine more generally) will have to be revised. And that is by no means a bad thing, for what it demands from historians is further inquiry.

In fact, other more tangential (but still important) features of Cullen’s medicine might offer more robust connections to broader intellectual debates. Indeed, I have some suggestions about what these might be. First, Cullen’s approach to the histories of chemistry and medicine might instructively be compared with other historical analyses by Scottish literati. It is striking that there has been no comparison, for instance, of Smith’s history of anatomy with Cullen’s history of medicine (or chemistry, for that matter).

Second, Cullen’s understanding of custom—though not explored here—might prove a productive site of comparison with, e.g., Hume’s notion, thereby connecting debates in moral philosophy with those in medicine. The same is also true of some of Cullen’s moral concerns, for instance about moderation, active sociability, and civic duty, as exhibited in his *Hygiene*.

Third and finally, I suspect there are intriguing ways to connect Cullen's interest in authority and expertise (as seen in his *Hygiene and Philosophy of Medicine*) to other debates in the Scottish Enlightenment, outside of natural philosophy and medicine.

I wish to emphasise, in conclusion, the richness of studying Cullen. Unlike many physicians, his handwriting is elegant and easy to read (not to be scoffed at), and a very large collection of manuscript material survives. He studied and taught such a great variety of subjects that no single scholar, even over a lifetime, is likely to provide a comprehensive analysis anytime soon. Moreover, Cullen was intimately involved in the debates and institutions of his day, and he provides a revealing portrait of the fascinating times in which he lived.

APPENDICES

APPENDICES

Appendix 1A: Ship Surgeon

John Thomson tells us that Cullen was appointed ship surgeon on a merchant ship, captained by Mr. Cleland of Auchinlee, who was a relative of Cullen's.¹ The ship seems to have been of some importance, for the "Captain has had a levee, like a General's, every day" for parceling out positions on the ship.² It was "engaged in trading to the Spanish settlements in the West Indies" and spent "six months at Porto-Bello."³ But which ship was this, and what was its itinerary? Thomson does not tell us, although it is intriguing that Thomson knows as much as he does about the ship, without—apparently—knowing its name or further details about its itinerary. But let us set this aside for the moment and find out what ship he was on.

A search of the London newspapers for "Captain Cleland" between 1729 and 1731 turns up some interesting results. The most promising is an item from the *London Evening Post*, October 1-3, 1730 (Issue 441):

We hear that at a Court of Directors of the South Sea Company held yesterday, it was resolved, that their Ship Prince William, Capt. Cleland, should (as soon as the Wind permits) proceed for New Spain, in order, if possible, to reach the Fair of Porto Bello; and that upon her Arrival near Carthagena, the Captain do send ashore, or otherwise get Information concerning the Galleons, which if he finds in that Post, then he is to go in with the Ship; but in case they are gone from thence, he is to proceed with her to Porto Bello; and when he arrives there, if he finds the Fair is ended, he is then to proceed from Jamaica, and there wait their further Orders.

It appears, then, that a South Sea Company merchant ship, the *Prince William*, with a captain by the name of Cleland, was charged with sailing to New Spain and Porto Bello. While there may be other possibilities, this ship fits Thomson's description very well.⁴ What else can we learn about its journey?

The Voyage of the Prince William

¹ TLC, 1:4.

² Quoted in TLC, 1:5.

³ *Ibid.*, 1:5.

⁴ Oddly, there appears to have been another ship, the *St. Philip Snow*, also with a Capt. Cleland (likely a John Cleland), which left on the very same day as the *Prince William*, also headed for Porto Bello. In any case, after some digging, I have been able to eliminate the *St. Philip Snow* as Cullen's ship because its Captain (John) Cleland died in 1733, whereas the Captain Cleland (William) who employed Cullen was still alive and well, living at his estate in the parish of Shotts in 1733. See *The London Evening Post* for August 23-25, 1733 (Issue 895), which tells us that "Yesterday the South Sea company receiv'd Advice of the safe Arrival of the St. Philip Snow, at Portsmouth, in six Weeks from St. Jago de Cuba, Capt. Stephens, late Capt. Cleland."

The *London Evening Post* for March 16-18, 1731 (Issue 515) provides us with an update from sea:

The South-Sea Company's Ship, Prince William, Capt. Cleland, which sailed from Spithead the 25th of November, arrived at St. Christopher's the 8th of January, and after ten Day's Refreshment there, sailed for Carthagena; where, no doubt, she would find the Galleons, which, in Letters dated Nov. 5. it is written, were at soonest not to sail before the End of January for Porto Bello, where it was believed the Fair would be held in April.

The *Daily Journal* from May 25, 1731 (Issue 3240), provides us with an unexpected bit of detail—an 'Extract of a Letter from on board the South-Sea Company's Ship Prince William, Capt. Cleland, dated at Porto Bello the 7th of March':

We arrived here from London the 31st of January, having touched at Carthagena, but finding the Galleons were sailed for this Place, we did not stay there 24 Hours. It is expected, that the Fair will begin in about a Month, (till when we shall not be permitted to sell any Goods) and we are in Hopes of being in England about October. The People on board us in general are well; we have bury'd but three Persons since we left Portsmouth.

The *Daily Journal* on September 14, 1731 (Issue 3336) brings more news:

On Sunday Evening came Advice of the South Sea Company's Ship Prince William, Capt. Cleland, having arrived off Dartmouth the 9th Instant.

She came from Porto Bello the 1st of July, and off of that Place was received by the Lyon Man of War, Capt. Perry Maine, which convoy'd her to Dona Maria Bay, on the West End of Hispaniola, where they found the Seaford Man of War, Capt. Laws, which waited there for her, by Order of Rear Admiral Stewart, to convoy her to England. The Lyon returned from thence for Jamaica, and the Seaford and Prince William proceeded homeward, but in the Latitude of Bermuda (32 Degrees and 30 Min.) a violent Storm arose, in which they parted: The Seaford had been leaky [*sic*] before the Storm came on, but as in the Storm, at about a League and a half Distance, she fired a Gun, it is believed she bore away for the first Land she could make, in order to stop her Leaks.

The Prince William has on board, for Account of the Company, 1,500,000 Pieces of Eight, and in Jesuits Bark, Cochineal, Loggood, and Drugs, near the Value of 500,000 Pieces of Eight more.

The Account of the Galleons sailing from Porto Bello the 2d of June, for Carthagena, is confirmed, and that they were to stay there but 14 Days.

There is a lot of wonderful detail here. In any case, it appears the *Prince William* arrived back in England (at least at Dartmouth) carrying quite a lot of cargo. She may have continued to another port in England at that point, but for our purposes, her journey was complete. Indeed, some of the cargo was off-loaded at Dartmouth, along with “some other Gentlemen, who immediately took Post for London.”

The itinerary was then as follows:

November 25th, 1730: Set sail from Portsmouth (Spithead)

January 8th, 1731: Arrived at St. Christopher's

January 18th (or thereabouts): Set sail for Carthagen (but stayed less than 24 hours)
and continued to Porto-Bello

January 31st: Arrived at Porto-Bello. Stayed until July 1st

July 1st: Left Porto-Bello

September 9th, 1731: Arrived at Dartmouth, back in Great Britain

The entire journey was from November 25, 1730 to September 9, 1731.

The 'Affair' of the Prince William

We have now identified both the name of the ship on which Cullen was a surgeon, as well as its route. But we can go further. Clearly this is not the space for a full investigation, but there is just enough to whet the appetite for more. For in 1732, an anonymous pamphlet was printed in London that claimed to describe illicit trade conducted in the West-Indies, involving the *Prince William* during its voyage to Porto-Bello in 1730-31.⁵

An angry Proprietor of the South Sea Company published an anonymous pamphlet in 1732, detailing the affidavits of two Deponents who described some private illicit trade, involving three ships, especially the *Prince William*, during its recent voyage to Porto-Bello.

The first Deponent claims to have served on board the *Prince William*, “belonging to the South-Sea Company, William Cleland Commander, in the Year 1730 and that he...did proceed in the said Ship, William Cleland Commander, from the River of Thames to Carthagen, and Porto-Bello in the Spanish West-Indies, and from thence back again to England.”⁶

Under oath he swore that, on or near the Island of St. Christophers, Captain Cleland and the *Prince William* met up with the “St. Philip, Captain John Cleland, a Snow belonging also to the South-Sea Company.”⁷ During this rendezvous, Cleland and crew loaded “all the remaining Part of the Upper and Lower Deck Guns of the said *Prince William*, with the Carriages, Stores, &c. and all this was done to lighten the said Ship, and give Room for receiving of Private Trade on board, so that in case the said *Prince William* had been attack'd by a Pirate or any other Enemy, she must have been in manifest Danger, we having no more Guns on board to defend her...”⁸

⁵ See **Figure 1** below for an illustration of the *Prince William* from this 1732 pamphlet.

⁶ Anon, *An Address to the Proprietors of the South-Sea Capital. Containing, A Discovery of the Illicit Trade, Carry'd on in the West-Indies; And Shewing the Great Detriment Thereof to the Publick; And the Necessity of Discouraging It with Rigour, Notwithstanding the Pains Taken to Gloss It Over; And to Recommend Your Cautious and Tender Resentments. By a Proprietor of the Said Company* (London: Stephen Austen, 1732), 6.

⁷ *Ibid.*, 6.

⁸ *Ibid.*, 6.

He also claims that Captain Cleland received from another ship, the *James Galley*, “a large Quantity of dry Goods.”⁹ Such was the quantity that once the goods had been loaded on to the *Prince William*, “the Ship was so very full, and so exceeding deep, that the under Cells of the lower Teer [*sic*] of Ports were a considerable Way under Water.”¹⁰ Once the ship got to Porto-Bello near the end of January 1731, Captain Cleland “did put on Shoar [*sic*]...out of our Ship...all the aforesaid Private Cargo of Wax, Cinnamon, and Bale Goods, where they were actually sold, but for what Profit this Deponent cannot say.”¹¹

Perhaps most damningly, the Deponent claims that ‘Hush-Money’ in the amount of about two hundred Pounds “was distributed among the aforesaid Prince William’s Ship’s Company” on the directions of Captain Cleland, “in order that they should not inform, confess, or take Notice of any thing relating to the aforesaid Private Cargoe [*sic*]; the Proportion of which due to this Deponent out of the aforesaid two hundred Pounds, was three Guineas and a Crown.”¹² They were also promised “that they should be all taken Care of, and employ’d in the South-Sea Company’s Service again.”¹³

The other affidavit in the pamphlet was given by someone who served on board the *James Galley*, and his account simply confirmed most of the details given by the first Deponent. He adds that the *Prince William*, after the exchange of cargo, sat so deep in the ocean that all who saw her were greatly surprised and wondered “how they could or would venture to Sea in Such a Condition.”¹⁴

As an addendum to these affidavits, the author of the pamphlet expresses shock that the *Prince William*, because she off-loaded her guns, was left defenceless, in order “to take in Goods on Account of private Trade.”¹⁵ He wonders about justice for those who committed these crimes: “I say, shall these Men who have abused the Trust reposed in them, and hazarded our Estate to Pyrates [*sic*] and the more merciless Waves, had they met with the least bad Winds, shall these meet with any Favour from us? No, on the contrary let us prosecute them with most strict Justice, shewing [*sic*] as little Tenderness for them, as they have done to us.”¹⁶

If these claims are true, or even if only some of them are, it makes for a very interesting episode in Cullen’s early life. And it raises a host of questions that we may never be able to answer, but which are still worth raising: Did Cullen have a role in this, being cousin to Captain William Cleland? Was he also given hush-money, like the rest of the Ship’s company, in order to turn his gaze the other way? Or was

⁹ Ibid., 7.

¹⁰ Ibid., 7.

¹¹ Ibid., 7.

¹² Ibid., 7.

¹³ Ibid., 8.

¹⁴ Ibid., 9.

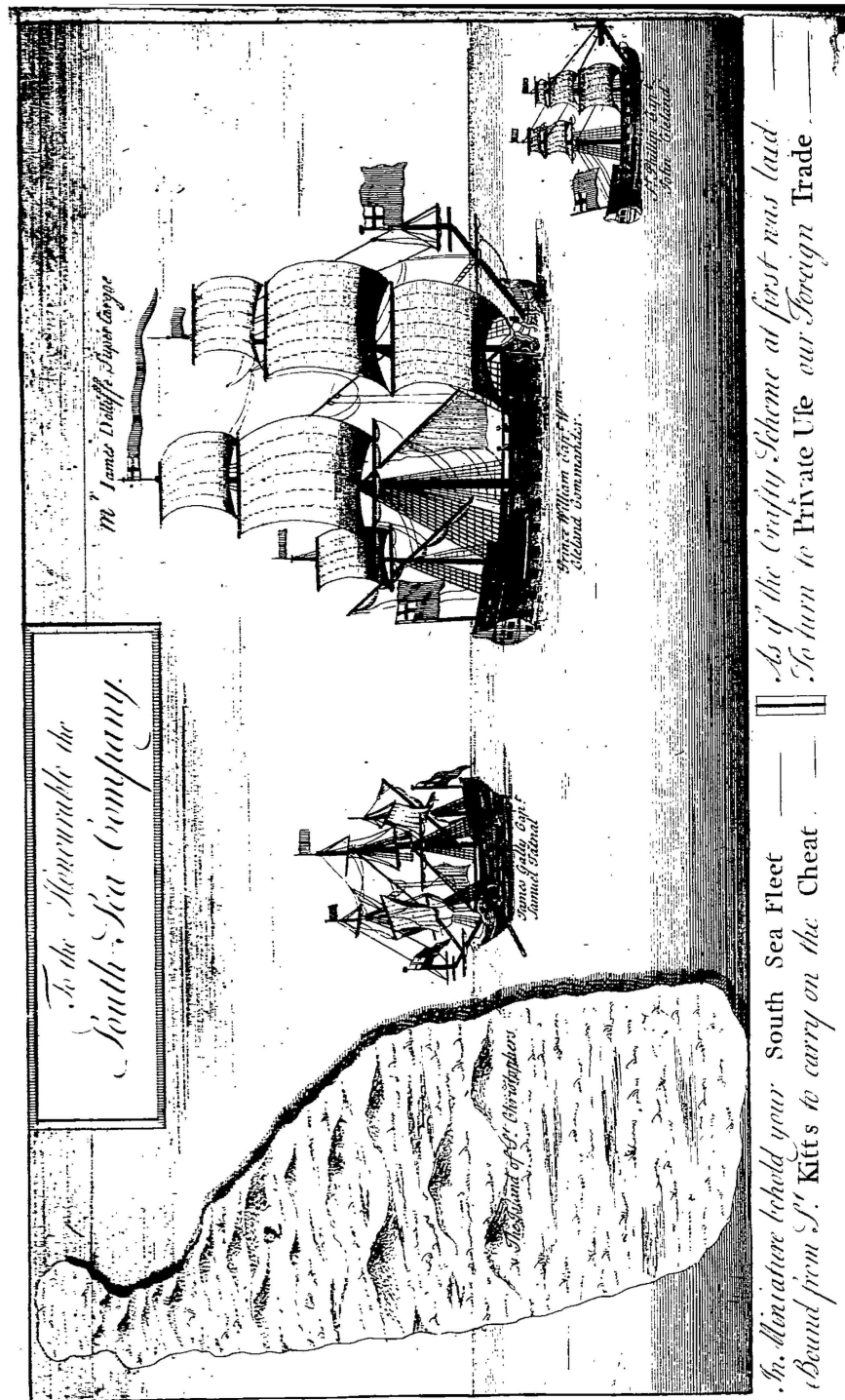
¹⁵ Ibid., 11.

¹⁶ Ibid., 11. A great deal of records relating to the South Sea Company are still extant and much more information about the *Prince William*, in the context of the South Sea Company’s affairs in the 1720s and 1730s, is likely already available. I have not had time to pursue this here, much less contextualise what I have described, but I hope someone does.

he oblivious to the business affairs and trading of the ship? Did Cullen profit from his time aboard the *Prince William*? These questions are worth asking, especially because Cullen's relationship with Captain Cleland did not end when he returned to Great Britain. Indeed, after Cullen returned to Scotland, he stayed with Cleland at his estate and took care of his family.

There are other implications to this controversy that I do not have space to explore here, and we may never know exactly what happened. Nonetheless, we can now at least add Cullen's journey on the *Prince William*, and the controversies surrounding it, to our knowledge of his early years.

FIGURE 1



Line drawing of the three South Sea Company ships involved in the affair of the *Prince William*. Cullen was a ship surgeon (1730-31) on the largest ship, the *Prince William*, whose captain—William Cleland—was his cousin. The image comes from Anon, *An Address to the Proprietors of the South-Sea Capital...* (London: Stephen Austen, 1732).

Appendix 1B: Thomson & the Family Firm

Due to space constraints, I was not able to explore some of the recent historical work that sheds light on John Thomson's life, the constraints he operated under while writing his Cullen biography, or even the biography's complex authorship and manner of composition. All of this, however, is critical to understanding what Thomson hoped to accomplish by publishing his work on Cullen. In this Appendix, I am going to summarise some of this recent work, and what it tells us about Thomson and his milieu.

John Thomson & His Time

Christopher Lawrence, in his discussion of the development of the Edinburgh Medical School between 1790 and 1830, adds to our understanding of Thomson's professional preoccupations, while he was working on his biography of Cullen.¹ He emphasises Thomson's position as an outsider in Edinburgh for most of his career. He was a "stout Whig" while the establishment, patronage network, and a majority of the Edinburgh faculty were Tory. And he was a surgeon trying to break into the academic ranks of the physicians who taught at the Edinburgh Medical School.² Despite his outsider status, he was one of the most significant extramural lecturers in Edinburgh, at a time when these courses were becoming more popular.³ By the 1820s, Lawrence writes, "All the sparkle lay with the extramural teachers."⁴

Lawrence also argues that the reform of medical education was a critical issue for Thomson. He wanted to eliminate the distinction between surgeons and physicians, thus making way for a single, unified medical education.⁵ It was therefore not surprising for Thomson to look across the Channel to France as an exemplar of the kind of medical education that Scotland should adopt.⁶

In a series of works, L. S. Jacyna has built the foundation for a detailed and nuanced understanding of Thomson, his family (the male sons, at least), and the Scottish Whig milieu in which they lived.⁷ Jacyna provides critical biographical details about Thomson that allow him to outline Thomson's professional interests and personal concerns. Like Lawrence, Jacyna shows how Thomson's Whig

¹ Christopher Lawrence, "The Edinburgh Medical School and the End of the 'Old Thing' 1790-1830", *History of Universities* 7 (1988): 268-278.

² *Ibid.*, 268.

³ Lawrence suggests this was because the extramural teachers offered courses in new subjects. See *Ibid.*, 264.

⁴ *Ibid.*, 275.

⁵ *Ibid.*, 269-270.

⁶ *Ibid.*, 270.

⁷ Jacyna's principal works on this topic are L. S. Jacyna, *Philosophic Whigs: Medicine, Science, and Citizenship in Edinburgh, 1789-1848* (London: Routledge, 1994); "Robert Carswell and William Thomson at the Hôtel-Dieu of Lyons: Scottish Views of French Medicine," in *British Medicine in An Age of Reform*, ed. Roger K. French and Andrew Wear (London: Routledge, 1991); and *A Tale of Three Cities: The Correspondence of William Sharpey and Allen Thomson, Medical History, Supplement* (London: Wellcome Institute for the History of Medicine, 1989).

affiliation condemned him as an outsider for most of his career.⁸ Nonetheless, Thomson managed to cobble together some surprising successes, despite opposition.⁹ He became, as one of Jacyna's chapter titles puts it, an "old Chairmaker" on account of his ability to convince others to create teaching Chairs designed for him.¹⁰ He was an educational 'entrepreneur' who produced a special kind of medical knowledge that fulfilled new demand for medical education in Edinburgh.¹¹ Jacyna sketches Thomson's shift of professional identity over time, first as a private teacher of chemistry to "a group of lawyers gathering under the auspices of a member of the aristocracy",¹² then as a military surgeon, and finally as a gentleman physician, eager to cement his legacy by attempting to acquire a chair for his son, William, and continuing to work on his biography of Cullen.¹³

Indeed, Jacyna makes specific claims about the relationship between Thomson's professional life and milieu and the writing of the Cullen biography.¹⁴ He argues that the biography cannot be viewed in isolation of Thomson's other projects and concerns; indeed, it was a continuation of them.¹⁵ It provided material for Thomson to publish his polemics against the establishment, whether it be reforming medical education or outlining the proper responsibilities of the various Chairs of medical subjects at the Edinburgh Medical School.¹⁶ Jacyna shows how Thomson, in his biography, used the authority of Cullen to reinforce his own interests—like the false distinction between physic and surgery—as well as to echo themes in his own life.¹⁷ Thomson portrayed a Cullen that, like Thomson himself, was an outsider in Edinburgh, despite his great talents, someone who faced continual opposition and persecution in his efforts to succeed.¹⁸ Thomson hoped for the same kind of success for himself, even if it ultimately proved more elusive for him than it did for Cullen.

There is another aspect of Thomson's context that deserves our attention, and it has only recently been investigated. This has to do with the pressures and constraints Thomson was under from members of the surviving Cullen family—especially Cullen's daughters—while drafting volume I of his biography. We now know that he was in active conversation with them and that he had to navigate their concerns very carefully. They were part of his audience too, so much so that they even had access to, and occasional veto power over, early drafts of his work.

⁸ Jacyna, *Philosophic Wigs*, 80-81.

⁹ *Ibid.*, 3.

¹⁰ *Ibid.*, 78. This is the title of Chapter 3.

¹¹ *Ibid.*, 78.

¹² *Ibid.*, 12.

¹³ *Ibid.*, 97.

¹⁴ Barfoot has nicely summarised much of this literature on Thomson and pointed out the need for research into the book history of Thomson's biography. See Michael Barfoot, "Introduction," in *An Account of the Life, Lectures, and Writings of William Cullen, Vol. I. John Thomson. With a New Introduction by Mike Barfoot*, *Lives of the Literati* (Bristol: Thoemmes Press, 1997), xiv.

¹⁵ Jacyna, *Philosophic Wigs*, 111.

¹⁶ *Ibid.*, 111.

¹⁷ *Ibid.*, 118.

¹⁸ *Ibid.*, 112.

David Shuttleton, in a recent essay, has used archival evidence to show some of the pressures that Thomson was under in this respect.¹⁹ After completing a draft of what would become volume I, Thomson sent copies to some surviving members of the Cullen family, including Cullen's daughters. But far from giving a *pro forma* to Thomson's account of their father's life, they strenuously opposed some of Thomson's interpretations. For instance, they were unhappy with how Thomson described Cullen's relationship with James Douglas, the fifth Duke of Hamilton. The Cullen daughters insisted that the Duke had made "idle promises to the young Cullen to provide material support for his botanical studies and chemical experiments in order to retain him in Hamilton..."²⁰ But this hurt Cullen's academic career, and making matters worse, the Duke died before paying his medical bills, leaving a not insignificant debt.²¹ Such was the concern with Thomson's account that Robina (1762-1844), the eldest Cullen daughter, insisted that she and her sisters should have the opportunity to rewrite "the passages on the Hamilton connection and other sensitive matters themselves while allowing Thomson to disown these sections. It did not quite come to this but they did exercise editorial control."²² Shuttleton shows how, after some back and forth, Thomson ultimately published the account of Cullen's relationship to the Duke of Hamilton that the Cullen daughters had rewritten for him, even if, as Shuttleton notes, the passage in question does not quite express the "family's real position as privately related to Thomson..."²³

This example—one of a number that Shuttleton highlights—shows that Thomson's biography was far from a disinterested account of Cullen's life and work. Instead, its final published form reflects "the divergent pull of several interested parties, notably the demands of Cullen's bickering descendants with their conflicted desires for repudiation and remuneration and Thomson's own concerns to advance both medical knowledge and his own career through challenging entrenched institutional structures."²⁴

The Thomson Family Firm

There is a final point I wish to make: the authorship of the biography is itself far from straightforward. As Barfoot has rightly emphasised, we are dealing with multiple authors for the two-volume biography—not just John Thomson himself—particularly with Volume II.²⁵

¹⁹ David E. Shuttleton, "An Account Of... William Cullen: John Thomson and the Making of a Medical Biography," in *Scottish Medicine and Literary Culture, 1726-1832*, eds. David E. Shuttleton and Megan J. Coyer (Amsterdam: Rodopi, 2014).

²⁰ *Ibid.*, 256. Some of these details can also be found in Jane Rendall, "Medicine, Politics, Gender, and the Reputation of William Cullen (1710-1790)" (Unpublished paper, November 26, 2012).

²¹ *Ibid.*, 256.

²² *Ibid.*, 256. For some illuminating, recent work on the lives of the Cullen daughters, see the work of Jane Rendall that I have cited in my review of the historiography.

²³ Shuttleton, "Making Medical Biography", 257.

²⁴ *Ibid.*, 260.

²⁵ Barfoot, "Introduction", xiv-xv.

But the question of authorship is even more complex than Barfoot has suggested, for even Volume I cannot be said to be the work of John Thomson alone. It seems that, at various points, almost his whole family had some kind of editorial role, even authorial input. It is possible that some of his pupils or friends, including Donald Macintosh and Ferdinand Becker, also contributed more than is noted by Thomson in his Preface.²⁶

Jacyna's concept of the 'family firm' is apt here and accurately describes the complex and layered authorship of the biography as a whole.²⁷ Perhaps we should no longer see Thomson as the author but more akin to a lead editor and writer, working with a team of assistants. While we may always refer to it as Thomson's work, we cannot ignore the contributions of others.

To provide one intriguing example: John Thomson's eldest daughter, Isabella, who was a product of his first marriage, played a significant role in this endeavour. In a letter (1822) to her younger brother, William, she wrote about her work in the Thomson household back home in Edinburgh (William was then in Paris):

The composition of lectures [John Thomson's] is going on as well I believe as could be expected but it is hard work. Many useful hints for the lect^s on Fever were found in a certain classical work that was much puffed last year...As to my studies they have been sadly interrupted of late in various ways and this business of the lectures keeps us all in rather an anxious sort of state. I still attempt doing a little to the 'Life' [the 'Life of Cullen'] and am become very keen that it should be got out of hands by the end of next summer if possible, so I do not indulge the hopes of seeing Paris for some time to come at least...²⁸

The communal nature of this work—whether it was Dr. Thomson's lectures or his *Life of Cullen*—is clearly assumed here. Much of Thomson's professional work, including his publications, should therefore be seen, not as "wholly John Thomson's work" in Barfoot's words, but as a multi-faceted group production.²⁹

The irony of this—the tragedy of it, really—is that John Thomson never acknowledges, in print, the contributions of family members like Isabella. He does acknowledge, in the Advertisement to Volume 1 of his 'Life of Cullen' "the assistance which has of late years been rendered me by my eldest Son", but that is it.³⁰ This subject admits of a great deal more exploration, but for now it is worth keeping in the back of our minds both the complex authorship and compositional process behind Thomson's biography.

²⁶ TLC, 1:x.

²⁷ Jacyna, *Philosophic Whigs*, 5.

²⁸ NLS, MS 9236, 121v-122. A letter from Isabella Thomson to her brother, William. November 7, 1822. Tragically, Isabella's efforts were cut short when she died young in 1824. For more on Isabella and the Thomson family, see Jane Rendall, "'Women That Would Plague Me with Rational Conversation': Aspiring Women and Scottish Whigs, c. 1790-1830," in *Women, Gender and Enlightenment*, ed. Barbara Taylor and Sarah Knott (Basingstoke: Palgrave Macmillan, 2005), 328-29.

²⁹ Barfoot, "Introduction", xiv.

³⁰ TLC, 1:x.

Appendix 1C: Cullen and Brown

In the body of Chapter 1, I provided a summary of what I take to be the essential elements of the Thomsonian interpretation of Cullen's work and thought. Yet I have not yet explained the critical, even virulent attack upon the medical theory of John Brown (1735-1788), or *Brunonianism*, as it was known.¹ What are we to make of this attack? I am not here concerned with the merits or deficiencies of Brunonian medicine; I want to know why Thomson felt so strong a need to compare the work of Cullen to the work of Brown, in such detail and to such detriment to the latter.

This is an especially interesting question because Thomson freely admits that Brown's theory had relatively little influence on medicine in Great Britain. So, why discuss it at length? Again, the concern with Continental medicine is apparent here: Brown's doctrines, while not particularly popular in France, had a much greater reception in Germany and Italy.² So part of the reason why it merits such full consideration is presumably because the foreign critics took it seriously, and so Thomson, ever concerned with Continental medicine, does so as well.

Thomson wonders why none of Cullen's pupils stepped up to defend Cullen against the attacks of John Brown. "This silence on the part of those who had studied under Dr Cullen, and who had adopted his opinions, may, in some measure, account for the readiness with which Dr Brown's claims to originality and to the improvement of medical science, so confidently urged by himself and his followers, were admitted by many of the Continental physicians..."³ Thomson, then, rushes into this void of silence to defend Cullen, much as he wishes Cullen's own pupils had

¹ For the classic, partisan account of Brown's life and work by his son, see John Brown, *The Works of Dr. John Brown: To Which Is Prefixed a Biographical Account of the Author*, by William Cullen Brown. In *Three Volumes*, ed. William Cullen Brown and Samuel Lynch (London: J. Johnson, 1804). For Brown's first statement (in Latin) of his new system of medicine, consult his *Elementa Medicinae* (1780). Brown's own English translation of his work was published in 1788, but for a more accessible English edition, see John Brown, *The Elements of Medicine of John Brown, M.D. Translated From the Latin, with Comments and Illustrations, by the Author. A New Edition, Revised and Corrected. With a Biographical Preface by Thomas Beddoes*. (London: J. Johnson, 1795). Brown's anonymous explication of Brunonianism is also worth consulting: John Brown, *Observations on the Principles of the Old System of Physic, Exhibiting a Compend of the New Doctrine* (Edinburgh: Apollo Press, by Martin and McDowall, 1787). The best introduction to Brunonianism is the collection of papers in *Brunonianism in Britain and Europe*, ed. W. F. Bynum and Roy Porter, *Medical History*, Supplement (London: The Wellcome Trust Centre for the History of Medicine, 1988). See also Risse's work on Brown, including G. B. Risse, "The Brownian System of Medicine: Its Theoretical and Practical Implications", *Clio Medica* 5 (1970): 45-51; G. B. Risse, "The History of John Brown's Medical System in Germany during the Years 1790-1806" (PhD Dissertation, University of Chicago, Chicago, 1971); and G. B. Risse, "Brunonian Therapeutics: New Wine in Old Bottles?", *Medical History* Supplement, no. 8 (1988): 46-62. For a recent discussion of the debates between Brown's supporters and Cullen's in the context of Edinburgh student life, see G. B. Risse, "The Royal Medical Society Versus Campbell Denovan: Brunonianism, the Press, and the Medical Establishment," in *New Medical Challenges During the Scottish Enlightenment*, *Clio Medica: The Wellcome Series in the History of Medicine* (Amsterdam: Rodopi, 2005).

² Risse has written about the reception of Brownianism in other countries. See Risse, "John Brown's Medical System"; and G. B. Risse, "The Quest for Certainty in Medicine: John Brown's System of Medicine in France", *Bulletin of the History of Medicine* 45, no. 1 (1971): 1-12.

³ TLC, 2:226.

done.⁴ Since it has been so long since Brown first proposed his system, he could now make a sober comparison, he tells us, between Brown's leading principles and those taught by Cullen. This exercise "may afford to those who take an interest in the history of medical opinions, some grounds for judging of the extent and validity of Dr Brown's claims to originality and to improvements in the physiological, pathological, and therapeutical departments of medical science."⁵

Thomson's portrayal of Brown and his ideas is an exercise in demolition (justified or not). His attack consists of two claims: first, that most of the original ideas one finds in Brunonianism were derived either completely or in part from Cullen's own, and second, that whatever may be said of Brown's theories, his practice of medicine was "founded entirely upon speculative views of a practical art..."⁶ Let us take each in turn.

Brunonianism Derived from Cullen

It might be worth pointing out a central tension in Thomson's discussion, before we consider the details. Thomson wants to show, in essence, that everything original and of importance in Brunonianism can be traced back to Cullen's own work, and indeed, that Brown could not have failed to know that he was plagiarising from his old teacher. At the same time, Thomson also wants to show that the elements of Brunonianism considered in Thomson's day to be without foundation were *not* derived from Cullen. This is a delicate task.

Thomson claims that "Dr Brown had attempted to found the whole of medical science upon the basis of a single and universal physiological principle,—Excitability,—from which all the phenomena of life, of health, and of disease, proceed."⁷ Brown thought this was a particularly original observation and, according to Thomson, "frequently compares his own discoveries with those of Sir Isaac Newton..."⁸ Thomson will have none of this:

That Dr Brown had been anticipated by Dr Cullen in the use of the terms Excitability, Exciting Powers, and Excitement, and in annexing to these terms the leading ideas which he employs them to express, has, it is conceived, been sufficiently established by the numerous quotations that have been made from Dr Cullen's lectures and writings, in the view which has been given of his doctrine of Excitement and Collapse...The employment of these terms by Dr Cullen could not be unknown to Dr Brown, who for a series of years had been permitted, as his biographers inform us, to read and comment upon Dr Cullen's lectures to his private pupils.⁹

⁴ See, for instance, TLC, 2:239.

⁵ Ibid., 2:226.

⁶ Ibid., 2:324.

⁷ Ibid., 2:227.

⁸ Ibid., 2:228.

⁹ Ibid., 2:229.

Thomson notes that others have claimed “that Dr Cullen’s idea of excitement has nothing in common with that of Dr Brown.”¹⁰ But he points to various passages in Cullen’s writings which he believes show this to be a misrepresentation, and that in fact Brown derived his central principle from Cullen himself.

This same argument is deployed by Thomson with respect to other principles of Brunonian medicine. The details do not concern us, but Thomson’s strategy does. Just as he had done in Volume I, where he tried to show how Cullen’s own views had been plagiarised by other thinkers, he deploys the same arsenal against John Brown. “It can scarcely be doubted, however,” he writes, “that Dr Brown must have had repeated opportunities of hearing this opinion expressed by Dr Cullen, as it is to be found in the course of lectures on *Materia Medica* delivered by him in 1761, which Dr Brown attended, and in successive courses of his lectures on the *Institutions of Medicine* and on the *Practice of Physic*.”¹¹ Or elsewhere: “. . .it is unnecessary to remark how completely Dr Brown’s opinions on this point were derived from, or modelled upon, those of his preceptor.”¹² Sometimes Thomson points out similarities in language between Brown’s writings and certain passages in Cullen’s own lectures, especially his lectures on *Pathology*.¹³ And sometimes Thomson’s point is less direct, for instance, where he argues that Brown’s understanding of the facts of debility “had been generalized by Dr Cullen, and there remains for Dr Brown only the merit of having applied the term *direct*” to one state of debility and *indirect* to another state.¹⁴

Brunonianism Founded on Speculative Views

The second claim that Thomson hoped to establish about Brunonianism was that, setting aside its derivations from Cullen, the kind of medical practice it encouraged was one “founded entirely upon speculative views of a practical art. . . .”¹⁵ A comparison of the ‘plans of treatment’ recommended by Cullen with those of Brown will show, says Thomson, “how wide a difference there is between universal and unqualified canons, founded entirely upon speculative views of a practical art, and restricted, qualified, and prudent rules, framed in conformity with the general experience of medical practitioners, and corrected or improved by that of their judicious and reflecting suggester.”¹⁶ Thomson compares Cullen and Brown’s use of opium, their indications for treating gout, and their “practical recommendations with regard to the diseases comprehended by Dr Cullen under his class *Neuroses*. . . .”¹⁷ In each case, Thomson highlights Cullen’s sagacity and Brown’s blunders. His contempt for Brown is thinly veiled: “Such are a few specimens of the practical

¹⁰ *Ibid.*, 2:229.

¹¹ *Ibid.*, 2:231-2.

¹² *Ibid.*, 2:237.

¹³ For instance, *TLC*, 2:252-57.

¹⁴ *Ibid.*, 2:256.

¹⁵ *Ibid.*, 2:324.

¹⁶ *Ibid.*, 2:324.

¹⁷ *Ibid.*, 2:341-2.

knowledge of diseases and their treatment possessed by the man whom, on the strength of his own arrogant pretensions and virulent detractions and vituperations of others, some persons of great learning and ability have allowed themselves to regard as the greatest reformer of medical science and practice whom the world ever saw!”¹⁸ Indeed, in addition to Brown’s practical missteps, Thomson finishes his discussion by pointing out Brown’s lack of personal experience treating the sick, and his “gross ignorance of the medical literature”—both of which contrast unfavourably to the Cullen Thomson portrayed in volume 1.¹⁹ Thomson’s harsh assessment of Brunonian medicine culminates in this passage:

Whether Dr Brown was actually the dupe of his own ingenuity, or secretly laughed at the credulity of those who received his vague speculations as the philosophical inductions of ‘a sure and cautious observer of the phenomena of nature,’ I cannot pretend to determine. There can be little doubt, however, that these speculations had their origin in personal spite arising out of wounded vanity; and the malignant and rancorous animosity displayed in the writings in which they are expounded, take away the pleasure which might have been derived from the manifestation of talent such as he has evinced, even in the support of erroneous opinions.²⁰

What is Thomson doing in his demolition of Brunonianism? Among other things—and I do not wish to rule out alternative interpretations or suggest that my assessment here is in any way comprehensive—Thomson uses his comparison of Brown to Cullen to reinforce his most important themes from earlier in the biography, especially his emphasis on Cullen’s originality, as well as his refutation (successful or not) of the criticism that Cullen was a highly speculative teacher of practical medicine. His strategy for doing this, I suggest, is similar to what he did in Volume I: he engages in ‘ownership’ transference. This sounds psychoanalytic, but what I mean is simply that Thomson’s comparison of Brown to Cullen highlights Cullen’s originality by transferring any apparent originality of Brown’s back onto Cullen and deflects the ‘speculative teacher’ criticism of Cullen onto Brown himself. It is as if he is saying: if you want to see the ‘legitimate owner’ of these virtues (originality) or aspersions (unbridled speculation), you need only compare William Cullen to John Brown.

In short, Thomson’s demolition of Brunonianism is used to reinforce the very themes that are at the heart of the Thomsonian interpretation of Cullen himself. No wonder he spilled so much ink on the topic.

¹⁸ *Ibid.*, 2:347.

¹⁹ *Ibid.*, 2:351.

²⁰ *Ibid.*, 2:351.

Appendix 3A: Source Material

The primary sources for this chapter come largely from a folio book entitled, “Lectures by William Cullen on the History of the Practice of Physic.” It is held at the Royal College of Physicians, Edinburgh (RCPE) under catalogue number CUL/2/1/9. This book contains 8 separate manuscripts, with about 21 additional inserts (an insert, in this context, is any document 5 pages or less in length.)

Since I wanted to refer to specific documents within the folio book, I needed a way to refer to them individually, which is why I created the apparatus below. The manuscripts were in the possession of John Thomson and he used a number of them (especially HPd, GPL, and DPP) as his source material for the ‘Introductory Lectures’ section (pp. 364-464) of his edited *Works of William Cullen*, volume 1 (1827). Prior to being deposited with the RCPE, David Craigie—who was one of the authors of the *Life of William Cullen*, Volume 2 (1859)—had them bound (c. May 1861) into the folio book one finds today.

RCPE History of Physic Manuscript Book

‘Lectures by William Cullen on the
History of the Practice of Physic’
CUL/2/1/9

Suggested abbreviations for future reference to the material are indicated in bold before the title name. Anything 5 pages or less in length is considered to be an insert.

CONTENTS

The book contains approximately 300 pages, including inserts.

Insert A: Note by David Craigie (‘D.C.’)

-Dated 14th May, 1861. Provides directions for Messrs Henderson and Bisset, bookbinders, about how the material should be bound

HPa: *History of the Practice of Physic*. Pages numbered 1 to 44 (page 44 is blank). c. early 1780s.

-This MS is not written in Cullen’s handwriting but has been amended and annotated by Cullen. If the inserts (B & C) correctly indicate the date—and there is perhaps no way of knowing that they do—then this places it at the commencement of the 1780-81 academic year. In any case, c. early 1780s seems likely.

HPe (below) appears to be a subsequent version of HPa (that is, it incorporates the corrections made to it).

-Insert B: Dated Nov 1, 1780 (‘Oct. 3’ is crossed out). Page 1 of the insert is in Cullen’s handwriting. It continues in another handwriting (possibly Henry Cullen’s).

It begins: “In tracing the history of physic I have had occasion to give you examples of the diff^t States of practice as it appeared in the hands of the chief leaders in antient times.”

-Insert C: Dated 1780 Nov^r 2. It is on the reverse of the final page of Insert B. It is in Cullen’s handwriting. It begins: “I have now deduced the general history of the practice of physic thro its various fates from the first accounts we have of it to the time of Dr Sydenham who by his excellent example a very great improvement was made in the plan of cultivating it.”

-Insert D: It is in Cullen’s handwriting. It begins: “I have now deduced the history of the practice of physic So far as to give ~~its~~ you Some acco^o of its general form & character at diff^t times. In Asclepiades we have an example of the practice accommodated to a luxurious Age...”

GPL: *General Plan of a Course of Lectures on the Practice of Physic.* Pages numbered 45 to 80. This appears to be a continuation of HPa, c. early 1780s

-This MS is not written in Cullen’s handwriting but has been amended and annotated by Cullen. It seems to be in the same handwriting as HPa, of which it is likely a continuation.

-Insert E: To supplement page 49. It is in Cullen’s handwriting. It begins: “The first part of this proposition is easily maintained for tho chance & accident have given us many facts...”

Insert F: Dated Oct. 31st, 1780. It is in Cullen’s handwriting. On the reverse, there is a short note or letter to Cullen from ‘Jn.^a [sic: James?] Graham’ asking for him to enclose a prescription. The Insert begins: “With a view to introduce you to what I think a very necessary Study that of the literary history of physic I have given you plan for arranging and more easily recollecting the particulars of that history and after giving you a general view of the whole I have begun to what is my proper business at present that is to give a more particular account of the State of the practice of physic at diff^ttimes.” Given the date, this appears to belong with (just prior to) Inserts B & C.

Insert G: It is in Cullen’s handwriting. On the second page the word ‘Copied’ is written in pencil (probably John Thomson’s note). The insert begins: “Whoever considers ~~these circumstances~~ history of Mankind will perceive why physic & Science have been So long of attaining the heights they aim at. But we must observe further that a moderate degree of refinement ~~might~~ even in a small nation might produce Poets Orators Historians & every thing that depends on the general Culture of the human mind...”

Insert H: It is in Cullen's handwriting. It begins: "I am engaged in giving you a Sketch of the History of Physic & I have told you why it must be a Short one. I have proposed to divide the whole into Seven periods as I think the considerable revolutions which Physic has undergone just amount to So many. Three of these periods I have already given you Some account of..."

Insert I: It is *not* Cullen's handwriting (possibly Henry Cullen's), but it has been amended by Cullen. It begins: "We are met here to engage in the Study of the Practice of Physic and I am now to give the ordinary Introduction to it, that is the Literary History of this part of Science..."

Insert J: It is *not* in Cullen's handwriting, but it has been amended by Cullen. On the first page, the word 'Copied' is written in pencil (probably John Thomson's note). The insert begins: "Our business ~~for this Session~~ here is to give a course of Lectures on the practice of Physic; ~~but it would not be proper to enter upon any part of that business today and therefore~~ I am now to give you the ordinary introduction to it; that is, to deliver the literary history of this branch of science."

HPb: *History of Physic*. Pages numbered 1 to 33.

-This MS is not written in Cullen's handwriting but has been amended and annotated by Cullen. It begins: "It has been usual in the university for the Professors of Physic to introduce ~~our~~ their several courses, by delivering the history of that part of science ~~we~~ they were to ~~deliver~~ teach."

HPc: *History of Physic*. Pages are not numbered. Contains 13 pages.

-This is *not* in Cullen's handwriting (possibly Henry Cullen's) but it has been amended by Cullen. It begins: "After giving you a scheme for a general history of Physick I have begun to give the first lines of the History of the Practice and have now deduced it thro several revolutions. The Art begun very early among mankind..."

HPd: *History of Physic*. Pages numbered 1 to 40. c. late 1760s/early 1770s.

-This MS is not written in Cullen's handwriting but has been amended and annotated by Cullen.

-Begins: "I come here to deliver a Course of Lectures on the Institutions of Medecine, but it is not convenient for us to enter upon the proper business of that Course to day, and I shall now only give the usual Introduction to it..."

-**Insert K:** This is *not* in Cullen's handwriting. This may be an insert written by one of Thomson's assistants from another source (perhaps another lecture written by Cullen himself?). It begins: "The seventh period extends from the time of Harvey to the present which you are in a condition to establish as well as I am..."

-Insert L: This is in Cullen's handwriting. It begins: "Till it Should be proper to enter upon the business of our Course I proposed to entertain you with a Short Sketch of the History of Physic a Subject that very much deserves your attention..."

-Insert M: This is in Cullen's handwriting. It begins: "In the end of the 15th and beginning of 16th Century there was a general revival of Literature in Europe and at the Same time it was to be expected that physic should have immediately made a ~~quick~~ great progress but it proceeded Slowly...."

HPe: *History of the Practice of Physic*. Pages numbered 1 to 43. c. early 1780s

-This MS is not written in Cullen's handwriting but has been amended and annotated by Cullen.

-Begins: "We come here to deliver a course of lectures on the practice of Physic, and we shall in the first place make the ordinary introduction to it, by delivering the literary history of our Subject..." A note in pencil at the top of the manuscript reads, "This seems to be a copy [*sic*] of the history in the other Volume as corrected by Dr Cullen with subsequent corrections in his own hand writing." This does indeed appear to be the case, and therefore this is a later—or subsequent—revision of HPa.

-Insert N: The front side of this insert only contains the words "Dr Cullen". But the reverse side, which is in Cullen's handwriting, begins: "To give you a general view of the State of the practice of physic at different times I have now deduced the history of physic through many revolutions and marked the several circumstances which might influence the State of practice..."

-Insert O: This is in Cullen's handwriting. It begins: "Pag. 35. l. 14. After the word Brittain make a new line & insert..." On another sheet, right below this one, also in Cullen's handwriting, the insert continues: "Instead of what is Scored in p. 35, after X insert 'Numberless phenomena lead to the notion of a primary moving power....'"

DPP: *Discourse on the Proper Plan*. There is no title provided; I have chosen the one given here. Pages numbered 1 to 19. Circa early 1780s.

-This MS is not written in Cullen's handwriting but has been amended and annotated by Cullen.

-Begins: "I have given an account of the state of Physic at different times, which I hope you shall find useful upon many occasions; and I shall now endeavour to apply it to a present purpose."

Insert P: This is *not*, for the most part, in Cullen's handwriting (although parts of it appear to be). It begins: "In this matter I would willingly give you all the assistance I can and I have myself considered the subject with great attention but we cannot now afford the time that would be necessary to a full discussion..."

Insert Q: This is in Cullen's handwriting. It begins: "[For] the Sake of some Gentlemen here it may be proper in a few words to explain Dr Stahl's opinion...Supposes that the functions of the body are entirely under the administration of the rational Soul & are directed..."

Insert R: This is not in Cullen's handwriting. It begins: "Dum autem hanc considerationem, Medico imprimis usui commendaturus..."

HPf: *History of Physic*. Entitled 'Continuation of the History from Page 47'. Pages numbered 1 to 8.

-This is not in Cullen's handwriting. It begins: "When I studied Physic in the University about 48 years ago I learned the System of Boerhaave..."

Insert S: In pencil along the left margin, there is a note that reads: "Seems to be the first draft of the preface to the first Edition of the first Lines." The Insert itself is in Cullen's handwriting.

-It begins: "Any attempt to deliver a System of the doctrines and rules necessary for directing the practice of physic I consider as a very difficult undertaking and after forty years experience in that practice and after much Study and reflection..."

Insert T: This is not in Cullen's handwriting (possibly Henry Cullen's). It begins: "I have now endeavoured to give you a Scetch [*sic*] of the history of the Practice of Physick from the first beginnings of the Art to the present Time..."

Insert U: This is in Cullen's handwriting. It begins: "& are more ready to correct it by Experience. Therefore it is that I have added a third article of the merit of the present age which is that they are more attentively constantly employed in observation & experiment..."

End of Volume

I do not discuss the History of Chemistry Manuscript book, or CUL/2/1/1, in any detail in my chapter, but I did review its contents and the following may be helpful to those who wish to consult it for their own work.

RCPE History of Chemistry Manuscript Book

‘Lectures on Chemistry by Dr Cullen
History of Chemistry.
History of Pharmaceutical Chemistry.
History of Paracelus and His Innovations.’
CUL/2/1/1

Suggested abbreviations for future reference to the material are indicated in bold before the title name. Anything 5 pages or less is considered to be an insert.

CONTENTS

The book contains approximately 108 pages, including inserts.

HCa: History of Chemistry. This begins with 3 unnumbered pages. Then pages numbered 1 to 67.

Insert A: Between pages 52 and 53. Entitled ‘Lect. IV.’ Begins: “After searching for the appearances of Chemistry to very little purpose among the Aegyptians...”

Insert B: Between pages 65 and 66. Begins: “I began yesterday to deliver the History of Pharmaceutical Chemistry...” This is written in Cullen’s handwriting.

HCb: History of Chemistry. Entitled Lecture VI. Pages numbered 1 to 31.

Insert C: Seems to continue content from page 31 of HCb. Contains 4 pages. Begins: “Persons by whom these labours have been carried on. I have Said before that hardly any writers on Chemistry before the time of Mr Boyle deserved...” This is written in Cullen’s handwriting.

End of Volume

Appendix 3B: Cullen on Sydenham

In his biography of Cullen, John Thomson tells us that while Cullen was a Professor of Medicine at Glasgow, he planned to publish an edition of Sydenham's works, "with an account, in Latin, of his life and writings."¹ To substantiate this, Thomson prints excerpts from letters exchanged between Cullen and William Hunter in 1751, where Cullen writes: "I have not dropt [*sic*] my scheme with regard to Sydenham...I propose to join to it [the edition of Sydenham] at least two dissertations; one *De Autoris Vita et Scriptis et Methodo Medendi*; and another, *De Causis Morborum Epidemicorum*."² Perhaps on account of his other preoccupations, Cullen eventually did abandon the scheme. And if his extant papers are any indication, he did not make much progress. It seems that no edition of Sydenham was produced and none of the proposed dissertations were written.³ This is unfortunate because an extended discussion of Sydenham by Cullen might tell us more about Cullen's own philosophy of medicine.

There is a wonderful story that shows in another way, I think, how strongly Cullen identified with Sydenham. Dugald Stewart (1753-1828), whom it involves, told it to Thomson. When Stewart was just fourteen or fifteen, he came down with a sickness and was confined to his room. Cullen was his physician. In addition to recommending that Stewart take some time away from his studies, he asked whether the young man had ever read *Don Quixote*? Upon learning that he had not, he insisted to Stewart's father that he obtain a copy of it right away for Dugald to read. Upon subsequent visits to Stewart, Cullen asked him about his progress with the story and reviewed with him all the humorous anecdotes, characters and scenes of that novel, as Stewart made his way through it: "In mentioning these particulars, Mr Stewart remarked that he never could look back on that intercourse without feeling surprise at the minute accuracy with which Dr Cullen remembered every passage in the life of *Don Quixote*, and the lively manner in which he sympathized with him in the pleasure he derived from the first perusal of that entertaining romance."⁴

Thomson does not say so, but Cullen was likely emulating Sydenham here. According to Sir Richard Blackmore, when he (Blackmore) asked Sydenham for advice on what to read when he was just starting out in medicine, Sydenham told him to read *Don Quixote*. Cullen mentions this anecdote in an introductory lecture to his course on the Practice of Physic and offers his own interpretation of it:

¹ TLC, 1:79-80.

² MS Cullen 185, 1r. The letters exchanged between Cullen and Hunter on this matter are, to some degree, still extant at Glasgow University Library, Special Collections (one letter exists; the other is a transcript of a missing letter). For a transcript (likely at the behest of John Thomson) of Cullen's letter to William Hunter, excerpted above, see MS Cullen 185. For Hunter's initial letter, see MS Cullen 1137.

³ There are a few pages of manuscript notes—mostly a chronology from Sydenham's life, with a few interesting critiques of sources—still extant in Cullen's handwriting. Thomson mentions them (see TLC, 1:80). The documents are MS Cullen 299 and 300.

⁴ TLC, 1:136.

The meaning of this advice is not well understood or agreed on but I judge it to imply that in Sydenham's opinion the knowledge of Physic was not then to be acquired by reading, and I do believe that Dr Sydenham thought there was not much to be learned by a young beginner from the incompleat [*sic*] and obscure works of the ancients, indeed from most of the writers before his time and it is certain that he made little use of any of them himself; I believe indeed it will be readily allowed that few writers before the time of Sydenham can be properly studied by a beginner or employed by him for laying the foundation of his knowledge.⁵

⁵ MS Cullen 325, 4r.

Appendix 4A: Source Material

John Thomson has suggested that Cullen's doctrines were developed early in his career and remained fairly static from that point on. In support of this, he quotes the Glasgow surgeon, Dr. Robert Wallace, who told him—from a recollection more than 60 years after the fact—that Cullen, during the late 1740s, gave lectures in which he “delivered the same opinions with regard to the Theory of Fever, the Humoral Pathology, and the Nervous System, which have since appeared in his writings.”¹

But this has always sat uncomfortably with another one of Thomson's claims, that Cullen always tried to keep abreast of current medical news and experiments and would change his lectures from year to year to reflect the very latest developments in his field.² After reading Thomson, one is thus left wondering about the extent to which Cullen's views may have changed over the years.

Historians of chemistry, less dependent on the Thomsonian framework, have not been burdened with this assumption. They assume that Cullen's views *must have* changed over time and try to determine how they did so. Christie assumes, for instance, that “A point requiring initial emphasis is that Cullen's thoughts on such matters [his chemical views] underwent considerable development, as might be expected, between the late 1740s and early 1760s.”³ But Thomson did not make this assumption, and so, while discussing Cullen's physiology, he relied on a set of lectures that comprise Cullen's views from a single academic session (1772-3)—his final one at that. If Cullen's views did not fundamentally change since the 1740s, this would be unproblematic, but we ought not to take Thomson's word for it.

More recent interpreters, in addition to Christie, have not simply imbibed Thomson's static assumptions about Cullen's views. Efforts are made to compare his views from different sets of lectures. So, for example, Wright and Lawrence both use excerpts from multiple sets of lecture notes taken from Cullen's course on the Institutes of Medicine. But, without exception, these sets of lectures have reflected Cullen's lectures from two years, and the two latest years at that, 1770-71 and 1772-3. In some ways, this makes good sense: not only are there more extant notes from these years, but they appear to coincide with, or read as commentaries on, Cullen's 1772 textbook on physiology, a book that has been taken as definitive of his views. Even better, these lectures are particularly detailed and voluminous, and the historian is faced with an almost overwhelming amount of information from just these two academic sessions.⁴ Nonetheless, they are not enough, if we wish to get some sense of how Cullen's views changed over the years.

¹ TLC, 1:25.

² For one example of this sentiment, see TLC, 1:42.

³ J. R. R. Christie, “Ether and the Science of Chemistry: 1740-1790,” in *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*, ed. G. N. Cantor and M. J. S. Hodge (Cambridge: Cambridge University Press, 1981), 98.

⁴ The NLM lecture notes for Cullen's 1772-3 course alone consist of 7 volumes of handwritten material—more than 2,000 pages worth.

A New Approach

Ideally, we would be able to reconstruct what Cullen taught about the nervous system, when he first began teaching at Glasgow and follow his views as he began teaching clinical lectures at Edinburgh, through his time teaching courses on the Institutes of Medicine (where he specifically taught his views about the nervous system), and through his final years teaching the Practice. For this study, I have taken a more limited approach: I have examined Cullen's lectures and writings during his time as Professor of the Institutes of Physic, between 1766 and 1773. Despite this more restricted focus, fascinating new material has come to light.

First, Cullen's 1772 textbook on physiology, universally considered the first edition of this text, is actually not the first edition. Cullen printed a similar but not identical text for the use of his students in the academic session 1770-71.⁵ We have known, from extant handwritten notes, that some kind of text was handed out in 1770, but we have not had a copy until now. Furthermore, it is not identical to its 1772 counterpart. The printing history is even more interesting than this, for the 1770 text itself is not the first text he handed out to his students for use in his Institutions lectures. In fact, he seems to have done so, for the first time, just prior to his 1768-9 course.⁶ I have not, yet, located a printed copy of this text, if one survives at all. But I have found multiple handwritten copies of its content. And this one differs significantly from both the 1770 and 1772 texts, which are very similar to each other. So we have, it turns out, rather good evidence for the development of Cullen's views about the nervous system, even over a period of just a few years when he was lecturing on the topic.⁷ As well, there are very detailed extant lecture notes for his 1768-9, 1770-71 & 1772-3 courses, and extant lecture notes, if less detailed, that cover his earlier courses too. So we have all the material we might wish to form a developmental view of Cullen's lectures and thoughts on the nervous system, at least while he was Professor of the Institutes of Medicine.

In addition to the various early editions of Cullen's physiology textbook, we also have a variety of lecture notes that cover the years when Cullen taught the Institutes. Below, I detail the ones I have used, and a few others of which I am aware, in the hope that they may prove useful to future Cullen scholars. I list them in

⁵ I have only been able to locate a single extant copy, and it appears to be an incomplete one (though the section on the nervous system survives intact). It can be found at UNMC, WZ 260 C967i 1770.

⁶ In a letter dated September 18, 1768 to his former pupil, Dr. John Morgan of Philadelphia (given to Benjamin Rush to deliver to Morgan), Cullen told him that "I shall only add one Piece of News which I would not put into Dr Rush's mouth least in the Event he may appear to be a Liar: it is that I intend to publish this Winter a Text for that Part of the Physiology that relates to the nervous System. I shall be happy to find it [enlisted?] by the College of Philadelphia which in my opinion has a better Chance for transmitting what can or should pass to Posterity than any College on this Side of the Water." See HSP/LCP, Rush Correspondence vol. 24, 54. It is unclear whether Cullen did in fact publish this text; I have only been able to find student copies of the (handwritten?) syllabus.

⁷ It is not usually thought about in these terms, but Cullen actually had a textbook printed for his students in his 1766-7 and 1767-8 courses as well: but it was not one he wrote. Instead, he had an edition of Haller's *Prima Lineae*, with a helpful index, prepared and printed for his students. Cullen's preface is dated November, 1766. See my reference to this text below.

chronological order, by Academic year, and for good measure I also include references to the accompanying syllabus or printed textbook for that year.

The list is not comprehensive, by any means. For instance, I do not include the RCPE MS notes that are in Cullen's own handwriting (see, especially, CUL/2/1/5-6) because they are more difficult to date, are less detailed than many of the transcriptions (they are really just lecture prompts for Cullen's own use) and have to be used with caution. Having said that, they are still invaluable on account of being in Cullen's own hand, and I reference them as necessary in my text.

Academic Year 1766-67

Preferred Physiology Text

Albrecht von Haller, *Primae Lineae Physiologiae, in Usus Praelectionum Academicarum, Ad Editionem Tertio Auctam & Emendatam Expressae. Accedit Rerum Index* (Edinburgi: Kincaid & Bell, 1767).

Extant Lecture Notes

(i) WUSL, Bernard Becker Medical Library, Archives and Rare Books, call number: xxWZ 260 C967L 1767, Vols. 1 & 2.

-These are either Gustave Richard Brown's own notes for Cullen's lectures, or notes that were in his possession. He donated them to the St. Louis Medical College Library. They are my preferred notes for this year.

(ii) NYAM, Collier Rare Book Reading Room, MS. Cullen Lectures on Physiology Edinburgh 1766-67.

-“Manuscript Notes taken by a Medical Student of Edinburgh, Robert Marshall. This is a particularly important record of Cullen's Lectures, as they were taken down during the First Year in which Cullen gave them. They are a fine example of the teaching of one who has been called 'supreme among British teachers of medicine' in his day.” -Taken from the Dedicatory insert that accompanies the volume.

Academic Year 1767-68

Preferred Physiology Text

Albrecht von Haller, *Primae Lineae Physiologiae, in Usus Praelectionum Academicarum, Ad Editionem Tertio Auctam & Emendatam Expressae. Accedit Rerum Index* (Edinburgi: Kincaid & Bell, 1767).

Extant Lecture Notes

(i) HSP/LCP, Rush Family Papers, Series I. Benjamin Rush Papers, Subseries VI. Writings by Dr. Benjamin Rush. [Yi2/7273], Lectures on the Institutes of Physic by William Cullen, M.D., Professor of Medicine in the University of Edinburgh, volumes 1-3, 1767-1768. [Yi2 7274 9-11], Volumes 93-95.

-These are more akin to student notes than to a detailed transcription of Cullen's lectures

(ii) NLS, MSS 2078-80.

-Notes taken down by (the infamous) John Brown from Cullen's Institutions lectures. "Physiology, lectures i-iiii, November 1767, to February, 1768 (ii-iii, xx, xxx-xxxi, xxxv, and perhaps part of xlvi or xlvii missing). i + 379 pp.; 473 pp. + ii ff.; 458 pp. + iii ff."

(iii) WHL, MSS 1928-41.

-Sir Charles Blagden's notes. 14 volumes taken from this set of lectures. "14 volumes. Institutes of Medicine. Taken down by Sir Charles Blagden [1748-1820]. Produced in Edinburgh. 1767-68."

Academic Year 1768-69

Preferred Physiology Text

No printed text found, but the following refer to handwritten copies of the syllabus that Cullen must have handed out to his students. It is variously called "Syllabus to the Nervous System", "Text of the Nervous System", or "Text to the Nervous System"

(i) YML, Call number 'Manuscript 18th cent', Lectures upon the institutions of medicine: in five volumes / by William Cullen. Edinburgh, 1768-1769.

-The "Text of the Nervous System" can be found on the following pages in volumes 1 and 2: 1:125-1:158 [§1-§95], and 2:2-2:11 [§96-§120]. Note that these volumes are not paginated. The pagination is mine, though I believe it to be accurate (it excludes the title page).

(ii) SDL, Special Collections (Dibner). MSS 000210 B.

-"Of the nervous system; of the action of moving fibres; of the functions of the brain (manuscript)"; 50 l. [leaves?]; 20cm.

(iii) NLC, Special Collections. Vault Case MS 5037.

-“Of the nervous system ; Of the actions of moving fibres; Of the functions of the brain [manuscript].” 34, [12] leaves; 24cm. “An outline in 120 sections numbered with Roman numerals.”

(iv) RCSE, MS 0054.

-“Text to the Nervous System 1768-9 by Dr. Cullen Edinburgh”

Extant Lecture Notes

(i) YML, Call number ‘Manuscript 18th cent’, Lectures upon the institutions of medicine: in five volumes / by William Cullen. Edinburgh, 1768-1769.

-These are an excellent resource and my preferred notes for this year

(ii) WHL, MSS 1942-47.

-Sir Charles Blagden’s Notes. 6 Volumes. “6 volumes. Institutions of Medicine. Taken down by Sir Charles Blagden [1748-1820.] Produced in Edinburgh. 1768, ’69”

Academic Year 1770-71

Cullen did not teach the Institutes in 1769-70

Preferred Physiology Text

William Cullen, *Institutions of Medicine. Part I Physiology. For the Use of the Students in the University of Edinburgh* (Edinburgh, 1770).

-A copy can be found at the UNMC, Rare Books Room, call number WZ 260 C967i 1770.

Extant Lecture Notes

(i) NLS, MS 3535.

-“‘Lectures on the Institutions of Medicine, by Dr. Cullen, 1771-72.’ In arrangement and treatment of the subject these lectures are similar to Cullen's printed ‘Institutions’, Edin., 1772: but they were clearly written before the composition of the book. ii + 495 ff. Folio.” -Taken from the Archive’s description of the Manuscript. This MS is an excellent resource and easy to read.

Academic Year 1772-73

Cullen did not teach the Institutes in 1771-72

Preferred Physiology Text

William Cullen, *Institutions of Medicine. Part 1, Physiology. For the Use of the Students in the University of Edinburgh* (Edinburgh, 1772).

Extant Lecture Notes

(i) NLM, HMD Collection, MS B 4, NLM Unique ID: 2931004R.

-7 Volumes. "The institutions of medicine: [Edinburgh] / William Cullen, 1772." These are my preferred notes for this year. They are immensely detailed.

(ii) RCPE, CUL/2/2/8-12.

-Cullen's Institutes of Medicine. 5 volumes. These are quite similar in content to the 7 volumes at NLM above but not as detailed.

Appendix 4B: The Unifying Doctrine

As I mention in the body of the chapter, Cullen's theory of the nervous system was the fundamental doctrine of Cullen's approach. A number of the distinctive features of his System emerge as consequences from his underlying theory. Thus, it can also be seen as a kind of unifying doctrine. What I would like to do here, in defence of this claim, is to show how some of the distinctive features of Cullen's approach—the multi-directionality of communication, the brain as principal part of the nervous system, and his neuromuscular physiology—are direct consequences of Cullen's fundamental doctrine of the nature of the nervous fluid.

§1. The Multi-Directionality of Communication

The multi-directionality of communication in the nervous system was a necessary consequence of Cullen's propositions about the nervous fluid. For, if the nervous power were a subtle, elastic fluid, one that contained oscillatory motion, it could not simply oscillate in one direction only. It had to oscillate, as strings do, throughout its length, in all directions. Indeed, Haller appears to have faulted the kind of explanation Cullen offered for just this reason. In his *Primae Lineae Physiologiae*, at §377, Haller observes “that the force of an irritated nerve is never propagated upward, so as to convulse the muscles that are seated above the place of irritation. This is a consequence altogether disagreeing with elasticity [*sic*]; for an elastic cord propagates its tremors every way, from the point of percussion to both extremities.”¹

This is presumably what Cullen is referring to when he told his audience in 1768-9 that “The most common opinion of Physiologists is, that the Sensation of the Nerves are in different directions. That of the Nerves of Sense from the Extremities to the Brain[;] of Will from the Brain to the Extremities.”² But his own view was different.

He argued, instead, for the multi-directionality of communication in all parts of the nervous system. He noted that there seemed to be agreement among Physiologists about motions along the course of the nerves in specific directions only, but he thought this was too limited for there could be motion from the brain to the sensory extremities of the nerves.³ Consider the simple act of tickling the lip with a feather: “...after the lip has been once tickled the imagination supplies the same sort of motion... There are then Nerves fit for the communication of motion from the brain to any part of the Nervous System, and it is only there they can be supposed to have a

¹ Albrecht von Haller, *First Lines of Physiology, by the Celebrated Baron Albertus Haller, M.D. &c. Translated From the Correct Latin Edition Printed Under the Inspection of William Cullen, M.D. And Compared with the Edition Published by H.A. Wrisberg, M.D. Professor at Gottingen. To Which Are Added, the Valuable Index Originally Composed for Dr Cullen's Edition; And All the Notes and Illustrations of Prof. Wrisberg, Now First Translated Into English. In Two Volumes. Vol. I* (Edinburgh: Charles Elliot, 1786), 220, §377.

² YML, Inst., 1:191.

³ *Ibid.*, 2:14-15.

continuity, and it is this that forms & unites the Nerves into one System.”⁴ Cullen was not deterred by Haller’s objections to multi-directional communication along the course of the nerves.

§2. *The Brain as Principal Part of the Nervous System*

Cullen’s emphasis on the brain as the principal part of the nervous system—his strongly cephalocentric approach—can also be explained, in part, as a result of his theory of the nervous system. I want to emphasise, however, that this feature of his model is highly overdetermined: he seems to have had many reasons for it, and it is not simply a consequence of his particular understanding of the nature of the nervous fluid. Below I point to a few of the reasons he had for elevating the brain to principal organ (I by no means exhaust the list) and then elucidate how two of its most significant properties or functions—its Excitability and Animal Power—are justifiably seen as more direct consequences of Cullen’s underlying theory.

The Brain is the principal part of the nervous system for a variety of reasons. First, it serves as a kind of communications centre for the phenomena of sense and motion, unifying all the operations of the nervous system. This is, in part, related to the multi-directionality of communication that I noted above. The Brain “forms & unites the Nerves into one System” as Cullen puts it.⁵ But the Brain’s role as communications centre goes beyond that; it also intervenes between most of the phenomena of sense and those of motion: “The Brain (IV.1) is a part fitted for and susceptible of these Motions with which Sensation and the whole consequent operations of Thought are connected and thereby or otherwise is fitted to perform a Communication between the motions excited in the Sentient and those arising in the moving extremities of the nerves, often remote and distant from each other.”⁶

The Brain’s connection to Thought suggests another one of its crucial functions. It is the corporeal organ of the soul or mind, where the intellectual faculties reside. Cullen clarified to his students, in 1772-3, that “I mean to say that the Soul acts by means of the Brain, and that it does not act without the Brain...”⁷ This is the thrust of §177 of his 1772 textbook as well: “The brain is thus the sensorium or corporeal organ, more immediately connected with the mind; and, so far as a corporeal organ is employed, all the operations of thought arising in consequence of sensation are operations of the brain, and are modified by its various condition...”⁸ Indeed, when we notice a pathology of the intellectual faculties, “upon dissection in 99 of these Cases we find an Organic affection [in the Brain], and if in the other 1/100 I can’t account for it, it wont [*sic*] disturb the Conclusion.”⁹ On

⁴ Ibid., 2:15.

⁵ Ibid., 2:15.

⁶ YML, Inst. 1:131, §9.

⁷ NLM, 2:254.

⁸ William Cullen, *Institutions of Medicine. Part 1, Physiology. For the Use of the Students in the University of Edinburgh* (Edinburgh, 1772), 81, §117.

⁹ NLM, 2:250.

account of this, “we may assert that every thing we call Imagination or the fancying an object to be present when it is not, is not without the Concurrence of the brain or is from some change in the organization of the brain, and this I insist upon to prove that the brain is the Sensorium Commune, the seat of our Intellectual faculties or, if we use the language of an Organ of the Soul, that the Brain is such an Organ and this is a proof of it.”¹⁰

Cullen even links the Brain to life itself. Life continues, he says, so long as there is some kind of communication between the brain and the rest of the nervous system.¹¹ Indeed, he rather famously defined life in terms of the excitement of the brain: “From what is now said of the Excitement & Collapse of the Brain, it will appear that we suppose **Life**, so far as it is corporeal, to consist in the Excitement of the Nervous System, & especially of the Brain, which unites the different parts & forms them into a whole...”¹²

One further point, not emphasised enough, bears notice: Cullen also elevated the brain to principal status because it was a way of refuting the claims of Stahlian physiology, which he abhorred. This bears much larger discussion, but suffice it to say that in his 1772-3 lectures, Cullen admitted to his students that in drafting up his physiology textbook, “I thought that it was necessary to introduce a very full Confutation [of the Stahlian System], but not only the writers I have mentioned have discovered their attachment to it, but many Physicians at present are influenced in their reasonings, and, in some measure, in their practice by it...leaving you to Consider the matter more fully, one Step towards destroying the Stahlian System in its foundation is establishing that the whole medullary Origin of the Nerves is a Sensorium commune...”¹³ For if the Brain is established as a ‘Sensorium commune’, the claims of the Stahlians that the soul might reside in other parts of the body would be refuted.¹⁴

Excitement, Collapse, & the Animal Power of the Brain

Thus, we see that Cullen had a variety of reasons for considering the Brain as the principal organ of the nervous system. What is more apposite to my argument in this Appendix is that two critical functions, or properties, of the Brain are, in fact, better understood as consequences of his underlying theory of the nervous system. These are the Excitement and Collapse of states of the brain, as well as its Animal Power or energy.

Cullen tells his auditors in his 1770-71 lectures that his theory of Excitement and Collapse was suggested to him by his theory of the nervous system—not the other way around:

¹⁰ Ibid., 2:155.

¹¹ Ibid., 2:194.

¹² NLS, MS 3535, 190v. Emphasis in the original.

¹³ NLM, 2:253-4.

¹⁴ See NLS, MS 3535, 166-7 and NLM, 2:252-4 for some examples of Cullen’s dismissal of Stahlian physiology.

I own when I first employed the above Terms [of Excitement and Collapse], I had a Theory in view, which I was led to from an Analogy I observed in the Phaenomena of Electricity, the amazing rapidity by which motions are propagated thro' the Electric Fluid, similar to those in the Nervous System, & the excited & non-excited state being analogous to the active & inactive, or mobile and immobile states of the Nervous System, which I express by the Terms, **Excitement & Collapse**. Now, a Magnet (being an Ore of Iron) or a piece of Iron solely, has the power of taking on it the power of Magnetism, from a fluid adhering to it. Now, this also seems to be the case with the Nervous Power or Fluid. It adheres only to a particular matter, where it operates in the manner of giving cohesion; & the chief causes of its **Excitement & Collapse** are Heat & Cold.¹⁵

Here, then, is a direct linkage between Cullen's theory of Excitement and his underlying theory of the nervous system (despite his being reticent to discuss it in any detail here).

Finally, since Cullen's concept of the Animal Power or Energy of the Brain was linked to his notions of Excitement and Collapse—he often used the latter to describe the spectrum of states that the Animal Power or energy of the brain might be in—that distinctive concept too is a result of his underlying theory.¹⁶ Thomson already made this connection, linking Cullen's theory of excitement to both the energy of the brain and Cullen's understanding of the nervous fluid, as I mentioned at the beginning of Chapter 4.

§3. *The Neuromuscular Framework*

Cullen was so eager to prove that the muscles—the 'motory extremities of the nerves'—contained the uniform, homogenous medullary substance because, among other things, in this way he could explain muscular contraction by means of the nervous fluid. This was perhaps its real virtue.¹⁷ It was primarily for this reason that Cullen's physiology was a neuromuscular physiology; it was not essentially that of a nosologist or clinician, but the work of a philosophical physician with a deep understanding of chemistry.

This is illustrated by Cullen's theory of muscular contraction. The problem of muscular contraction was an acutely significant one in eighteenth-century physiology (one that I can only touch upon briefly here), and the success of one's model of the animal economy was measured, in some ways, by how it 'solved' this problem. Haller was famous throughout Europe for his notions of irritability and the *vis Insita*, both of which were part of his theory of muscular contraction. Cullen thought explaining muscular motion was one of the most difficult and important problems in

¹⁵ NLS, MS 3535, 185-6. Emphasis in the original.

¹⁶ For a concrete instance of this connection, note how Cullen explains the Collapse of the brain during sleep as a result of its diminished energy, or lack of Animal Power. See, e.g., NLM, 2:146.

¹⁷ And, of course, by having such an explanation, he could use it in his pathology as well.

all of physiology, as did many of his contemporaries.¹⁸ In his 1772-3 lectures, for instance, Cullen told his audience: “[T]here is not a problem we would wish more to solve than Muscular Contraction, it is a fundamental power in the System & Physiologists are commendable for having attempted it in different Shapes, but no one is yet allowed to have had success[;] no one that has been offered by Anatomists or Physiologists is satisfying...”¹⁹ And slightly later: “[T]he consideration of Muscular motion, the Theory of Muscular Contraction is not among the least important, for if we knew it more exactly it wou’d throw light upon every other part of our System...”²⁰ There is no space to go into detail about Cullen’s theory here, but I do want to highlight how Cullen’s theory of muscular contraction was grounded in his understanding of the nervous fluid.

Cullen’s Theory of Muscular Contraction

It is difficult to tease out what Cullen’s theory of muscular contraction actually entails.²¹ The subject was difficult and obscure, and he was constantly reminding his audience that “With regard to theories of muscular Contraction, it is much easier to pull down than to build up.”²² Yet physiological investigations must be carried on, he insisted, even if we must grope in the dark, and this is especially the case with those questions of most importance, like the cause of muscular contraction.²³

I am aware that what follows is a bit obscure and, in some places, difficult to follow. It is just a first attempt to sketch his theory, which he may not have fully worked out himself. The obscurity is compounded by the fact that we can only reconstruct it from different sets of student lecture notes over a number of years, in some of which Cullen was intentionally vague and reticent to discuss his views in any detail.

What, then, was Cullen’s theory of muscular contraction, and how was it grounded in his underlying theory of the nervous fluid? Recall, from my discussion in the body of the chapter, that for Haller, the *vis Insita*, or inherent force, resides in the muscle alone and is responsible for its irritability. The nervous force or *vis Nervosa* (in the form of the nervous liquor), in comparison, is able to stimulate the muscular fibres to contract by entering into them. This is Haller’s influx model of muscular contraction.

Cullen’s general approach is somewhat different. For Cullen, there are, essentially, two necessary circumstances for muscular contraction to take place: (i)

¹⁸ For an introduction to theories of muscular motion, see Hubert Steinke, “Theories of Animal Motion Before 1750,” in *Irritating Experiments: Haller’s Concept and the European Controversy on Irritability and Sensibility, 1750-90*, Clio Medica/The Wellcome Series in the History of Medicine (Amsterdam: Rodopi, 2005).

¹⁹ NLM, 2:196.

²⁰ *Ibid.*, 2:200.

²¹ This may be one reason why it has not, as far as I know, been discussed in the secondary literature on Cullen.

²² WUSL, 1:301.

²³ *Ibid.*, 1:303.

the assistance of the Nervous Power, usually derived from the Animal Power of the brain and (ii) the particular organisation of the muscular fibre itself (the Inherent Power).

In most cases, the Nervous Power, often as a consequence of the Animal Power of the brain, excites or stimulates the muscles to contract. But what role do each of these components—the Nervous, Animal and Inherent Powers, respectively—play in contraction? To be clear, Cullen’s model took into account all three powers, at least by the time we get to his 1772 textbook and lectures. There, he tells his audience that “There is a necessity for considering the Contractility of muscles as in part depending upon the Inherent as in part depending upon the nerves, and as in part depending upon the Brain hence the Inherent, Nervous, or Animal power.”²⁴

We must first tease apart how dependent the Nervous Power was upon the Animal Power of the Brain. Cullen wants to conclude that it is almost always, perhaps constantly, dependent, that “these Functions are of universal Influence and support with regard to one another, and that there is a power in the Brain always diffusing it’s [*sic*] influence over other parts of the Nervous System.”²⁵ And he certainly thinks that the Animal power is quite influential in the body: “Most Muscles are moved by the power of the Will. Whether you will call it volition, there is not a Muscle but what is to be operated upon by passions of the Mind, and hence we conclude that the inherent power is constantly operated upon by a Function that we have supposed to be exercised in the Brain.”²⁶ He seems to conclude, then, that there is thus “a constant dependance of the Inherent power on the Animal, because the destroying the Nerves of the part immediately produce a Palsy.”²⁷

At the same time, he concedes to Haller that the inherent power of the muscles can exist, at least for a time, totally disconnected from the brain in many animals: “The proof on the other hand of the independant [*sic*] power of the Inherent power, are these I have so oft mentioned, as the cutting out of Muscles & their remaining even then subject to the power of Stimuli. We must grant it, but the question is how long it may subsist? [A]nd in what vigor it does subsist? I find it difficult to answer this....”²⁸

Thus there is some doubt here, which Cullen acknowledges.²⁹ In any case, setting aside the (possibly) universal necessity of the Animal Power of the brain, we

²⁴ NLM, 2:184.

²⁵ YML, Inst., 1:300-1.

²⁶ Ibid., 1:298.

²⁷ Ibid., 1:298.

²⁸ Ibid., 1:299.

²⁹ See the fuller discussion at, e.g. YML, Inst., 1:296-301. Cullen puts it carefully in §88 of his textbook by using ‘commonly’ instead of ‘universally’: “§88. The nervous power (§87) is commonly determined to motion by the will. This we suppose to act in the brain only (§33), and to depend upon sensation, and other modifications of thought; and this power, which is to be chiefly referred to the mind and acts in the brain only, we name the ANIMAL POWER.” Cullen, *Institutions of Medicine*, 67-8, §88. At the same time, the universal influence of the energy of the brain throughout the nervous system is a leading assumption of much of his pathology, so he clearly attaches a lot of importance to other parts of the nervous system being dependent upon it in most cases.

will focus on the role of the Nervous Power.³⁰ Recall that the nervous fluid is peculiar and inherent to the nerves (their medullary substance) and has “a free oscillation to any part of them under modifications.”³¹ One of these modifications is what happens when the nervous fluid interacts with muscle fibre. This interaction “excites muscles into contraction” (leaving aside whether it be ultimately derived from the Animal Power of the brain, or not).³² We will explore this in a moment, but first note that when the nervous fluid does *not* interact with muscle fibre—that is, when it simply courses through the medullary substance of the nerves (strictly speaking) which are enveloped by membranes—no contraction will occur. Why not? “[B]ecause,” Cullen tells us, “there would not be that room for a circulation that would bring the muscular parts nearer together; And as we maintain the equable continuity of medullary fibre, there is no occasion for accumulation, & the propagation should be from one end to the other.”³³ Cullen is suggesting that contraction depends in part on the accumulation of the nervous fluid in muscle fibres.

Contrast this to when muscular fibre is present. It “acts like electrics per se, and confines the propagation of the [nervous] fluid; We can go so far and find that the nervous power may be stopt [*sic*] at the two extremities of the muscular fibre, and is accumulated about it, if the circumstances are such as admit of it.”³⁴ This accumulation of the nervous fluid stimulates the muscle fibres to contract, if the circumstances are right. And what are these circumstances? They have to do with the state of organisation of the muscular fibre itself.

The Particular Organisation of the Muscle Fibre

We have just seen how the nervous fluid interacts differently with muscle fibres than it does with the structurally-distinct medullary substance (e.g. in the nerves, strictly so called). The “Muscular fibres are distinguished from Nerves by the Contractility which must infer a difference of Organization”—but in what does this difference consist?³⁵

The key insight here, Cullen thinks, is one that Haller emphasised. He noticed, and supported the view, that the force of cohesion of living muscle fibres was greater than in dead ones. This fact was not as air-tight as Cullen would have liked but had

³⁰ Indeed, Cullen’s model really takes into account all three powers, at least by the time we get to his 1772 textbook and lectures. Note that in my discussion, the organisation of the muscle fibre is essentially the Inherent power. So I do touch upon all three powers.

³¹ WUSL, 1:313.

³² *Ibid.*, 1:313.

³³ *Ibid.*, 1:313-14.

³⁴ *Ibid.*, 1:314.

³⁵ YML, Inst., 1:272.

critical implications, if true. As Cullen remarked in his commentary on proposition §81 in his 1768-9 syllabus:³⁶

Here is a fact which if well supported will have considerable influence, but it has not been hitherto taken notice of. I offer this as a fact, but as a fact of which I am not conscious from my own Experiments or those I have had access to...With regard to other Elastics we know they will at one time sustain a greater Weight than at another time, from being in different circumstances, as in the case of Silk threads being twisted or not. From a gross Observation of the Stahlians & others of Borelli, upon which Dr. Haller depends, & the evident weakness of dead muscular fibres we shall perceive how much they are plainly weaker than when alive...Hence the Conjecture of Dr. Haller is highly probable that the coherent force of the living fibre of Muscles is greater than in dead ones. [H]ence the Nervous power must increase the Vis cohaerens of simple solido or Muscular fibres taken as such.³⁷

If this assumption is true, then we can explain “why the Action of the fibre is greater in the Muscular than in the other parts of the Nervous System.”³⁸ This is because, according to Cullen’s most explicit proposition on the matter, “the cause of muscular contraction is an increase only of that same power which gives the contractility of the simple solids, and of other inanimate elastics...”³⁹ And we know what causes the contractility of simple solids: the force of cohesion. He alludes to this, as well as the underlying theory for it, right after noting the remarks above, in his 1770-71 lectures. He is nowhere else quite so explicit as this:

I would give you a Theory here, taken from S^r Isaac Newton, Euler & other reputable Philosophers, were you prepared to receive it. They maintain that the Cohesion of Bodies is owing to an universal elastic Fluid or Aether, (the mixture of which I leave it to them to prove) which in the Pores of Bodies is denser on one side of the Particles, & rarer on the other, owing to the distance of the particles of such Bodies; that there is at least a Maximum, which is the greatest distance that the Particles can be removed from one another, without Solution of Contiguity. This Theory of theirs is the only one I know which explains the remarkable Phoenomena [*sic*] of Elastics resisting Tension more & more till the moment they break. I am easy whether you receive this Theory or not, but perhaps when you see the Result of it on our System in general, you will think better of it. We know Electric bodies are capable of more or less quantities of Electric Matter accumulated on their surfaces, i.e. their excited & non-excited state. Now, taking this Analogy & applying it to the Vis Nervea & Vis Insita, we may explain most of the Phoenomena of Muscular Action on it: we cannot perhaps explain all, nor can we hope to do so, till we know more particularly the nature of it. The difference of the Vis Nervea & Vis Insita I

³⁶ The proposition in question is §81 in his 1768-69 syllabus and §100 in his 1770-71 and 1772 texts. It is virtually unchanged from one edition to the next. It marks the closest he comes to spelling out his own theory of muscular contraction. As he puts it in reference to §81, “I have endeavoured to come as near as possible...” (YML, Inst., 1:303).

³⁷ YML, Inst., 1:303-4.

³⁸ Ibid., 1:307.

³⁹ Ibid., 73, §100.

take to be that the one is more capable of excitement than the other; & with this I dismiss our Theory.⁴⁰

Thus, at its most fundamental level, Cullen's theory of muscular contraction is predicated on his understanding of the force of cohesion. And the force of cohesion is one of the forces that is explained by the behaviour of the Aether. Indeed, just to make this point clear, Cullen included his hypothesis for the attraction of cohesion in his discussion of the simple solids, at the beginning of his 1768-9 course. He does not include this in subsequent courses, and it is a major discussion of his understanding of the workings of matter.⁴¹

My point is simply that Cullen's theory of muscular contraction is actually rooted in his underlying theory of the nervous system (which in turn links up with his understanding of cohesion), insofar as it presumes the existence of a subtle, elastic fluid that shares affinity to the Aether and can be excited in various degrees. Put another way, his theory of muscular contraction is a direct consequence of his theory of the nervous system; it is inextricable from it. He puts it somewhat more clearly in his 1772-3 lectures:

[A]ll that our Theory requires is to suppose that this subtile Elastic fluid is by various means excited to a greater degree...it is only supposing that this Elastic fluid can be thus excited upon the Nerves and muscular fibres of living animals and that in consequence of a certain degree of Excitement the Nerves are rendered Sentient, and that by some peculiarity of the muscular fibre it can be there accumulated and occasion muscular action.⁴²

Cullen's theory of muscular contraction is a product of his understanding of the nervous fluid, as well as his understanding of cohesion at a micro-level. And both of these are deeply rooted in his aether theorising. His theory of the nervous system allows him to posit a potential solution to the problem of muscular contraction. Indeed, a theory of the nervous system ought to be one such that it can explain both the phenomena of Sense and Motion — for those are the functions of the nervous system.

The scrupulous reader will have observed that, at least in my reconstruction, Cullen's theory offers few anatomical details about the particular organisation of the muscle fibre itself. Cullen really just suggests that if it were organised in a particular way, it would explain how the Nervous Power could increase the force of cohesion in muscle fibres, thereby producing contraction. Cullen was usually candid about this

⁴⁰ NLS, MS 3535, 136-7. Emphasis in original.

⁴¹ I do not have space to consider Cullen's ontology of matter here (an analysis of his discussion at YML, Inst., 1:36-42 would be a great place to begin). Nonetheless, I can point out, in the most general terms, that Cullen held what might be called a *Circumambient Model* of the Aether. First, he believed (at least in 1769) all the matter in the universe to be of two general kinds: either Atoms or Aether (YML, Inst., 1:37). Second, these two kinds of matter are connected to each other such that "every single Atom has a portion of AEther connected with it, & surrounding it as an Atmosphere, which is always of the figure of y^c Body surrounded, & of a certain limited extent, & so connected as to remain always on the surface of the Atom, & by its Elastic nature pressing equally on every part of the Atom towards its Center" (1:37-8).

⁴² NLM, 2:201-2.

lack of anatomical knowledge; he thought the question had not yet been settled by experiment or universally agreed upon by physiologists or anatomists. But he does at one point in his 1770-71 lectures conjecture about their shape: “I would not choose to add to these Hypotheses, but if I was to add any I would say that a Spiral Structure of the Fibres appears most probable, & applies best to the Phenomena of Contraction & Extension.”⁴³

Regardless of their actual structure, Cullen believed that a difference of organisation between muscle fibres on the one hand and the medullary substance of the nerves, strictly speaking, on the other, ought not to be underestimated. Great differences in behaviour could be the result of simple structural differences of the same kind of matter. In his 1770-71 lectures, he draws attention to this very point: “A great difference may arise from Organization. A wire drawn out will have but a short Contraction in comparison to what the same Wire will have, if it is wound into a Spire, & then drawn out, the Spire will contract to 1/3 of its Length.”⁴⁴

In his lectures about muscular contraction, Cullen was often keen to contrast his own theory with that of Haller’s. And certainly there were significant differences. We need not here determine the exact nature of those differences, beyond pointing out that Cullen certainly rejected Haller’s *vis Insita*, if we take that to mean that the muscles were substantively (rather than structurally) different from the nerves, insofar as they contained an Inherent Power within them (something residing in the gluten) that allowed them to contract independently of the Nervous Power. But, though Cullen does not agree with Haller’s notion of the *vis Insita*, he does adopt the notion of some kind of inherent power in the muscle fibres, albeit one that is due to a structural, organisational difference rather than a different kind of matter. Thus, in a way, their views are not so dissimilar as they first appear: both emphasise an inherent power in the nervous system that is responsible (in different ways) for the phenomena of muscular motion.

Perhaps it is this similarity in emphasis on an inherent power in the system that prompts Cullen to wonder why Haller did not see the virtues of Cullen’s own theory, for its implications are seemingly built into it—or so Cullen argues:

But to me it is very extraordinary that Haller did not find another explanation from his own Theory. He says that the *Vis Nervea* does not give an additional quantity of matter, but only stimulates or puts in action the *Vis insita*. This doctrine of the Inherent power leads to the supposition of a power constantly present, and every Phaenomenon whatever proves that it is a communication of motions from the Velocity with which the motions are produced, & any how a motion excited serves to induce contraction analogous to his doctrine of Stimulus[.] [T]here needs no additional matter to account for contraction merely the motions excited are sufficient, no one can conceive that the point of a needle adds any thing.”⁴⁵

⁴³ NLS, MS 3535, 135.

⁴⁴ *Ibid.*, 130-1.

⁴⁵ YML, Inst., 2:270-1.

That is to say, with respect to muscular contraction, relaxation “depends on the inherent power & contraction on the communication of motion, the former being only a cessation of the Action of the inherent power, & the latter the motion of it.”⁴⁶ There is no need for a Hallerian *vis Insita* here.

Conclusion

My goal in this Appendix has been to show how certain distinctive features of Cullen’s approach to the nervous system are actually consequences of Cullen’s underlying theory of the nervous system. This supports my contention that Cullen’s understanding of the nervous fluid—his theory of the nervous system—is the fundamental and unifying doctrine of his approach to the nervous system.

⁴⁶ *Ibid.*, 2:271.

Appendix 4C: The Aether Controversy

In late 1768 a small pamphlet was published in Edinburgh, later to become part of the first edition of the *Encyclopaedia Britannica*. It contained an article on the topic of Aether.¹ The anonymous author of this article (and general compiler of the *Encyclopaedia*) was William Smellie (1740-95), Edinburgh printer and writer, who had attended some medical classes at the University.² Nonetheless, he used the article to launch a fierce attack on some of the medical opinions of William Cullen, the most popular teacher at the Edinburgh Medical School. But he did so indirectly; Cullen's name was never mentioned. Instead Smellie forcefully criticised an inaugural medical dissertation entitled, *De ortu animalium caloris*, written by a recently-graduated Edinburgh medical student, Gustave Richard Brown. In this dissertation, Brown enthusiastically endorsed Cullen's ideas about aether and the nervous fluid. Smellie used his 'Aether' article to dismiss Brown's claims. This attack, which I describe below, precipitated a rare public outburst from Cullen in early 1769, in which he responded directly to the article at the tail-end of his lectures on the nervous system.³

For the remainder of Cullen's life, Smellie's article became a rallying point of sorts for those who opposed Cullen and his views. For instance, in the 1780s John Brown—who had become friendly with Smellie—published his thinly-veiled but

¹ For the early publishing history of the *Encyclopaedia Britannica*, from which the following details about the *EB* are drawn, see *The Early Britannica (1768-1803): The Growth of An Outstanding Encyclopedia*, ed. Frank A. Kafker and Jeff Loveland (Oxford: Voltaire Foundation, 2009). The *EB* was published serially in 100 installments, roughly once a week, beginning in December 1768. These pamphlets were later combined into a three volume, handsome quarto edition (the 'first edition') published in 1771. See William Smellie, *Encyclopaedia Britannica; Or, a Dictionary of Arts and Sciences, Compiled Upon a New Plan. Illustrated with One Hundred and Sixty Copperplates. By a Society of Gentlemen in Scotland* (Edinburgh: A. Bell and C. Macfarquhar, 1771). The 'Aether' article was part of the second installment. The first installment was printed around December 22, 1768 according to *The Weekly magazine, or Edinburgh amusement* of 22 December 1768. It commented that "as we intend to give a specimen occasionally of every new work of merit, especially of such as are originally of Scots production, we have selected an explanation of the following very singular article from No 1 of the ENCYCLOPAEDIA BRITANNICA, just published." (Quoted in *The Early Britannica*, 16). The second installment, No. 2, which contained the 'Aether' article, was printed shortly thereafter. *The Edinburgh advertiser* for 20-23 December 1768, announced "the appearance of number 2 for the following day." See *The Early Britannica*, 17, fn. 22. Thus, Cullen could have obtained a copy of the article as early as Christmas 1768, though we do not know when he in fact did so. His defence of his views occurred in March 1769.

² For the classic biography of Smellie (to be used with caution), consult Robert Kerr, *Memoirs of the Life, Writings, & Correspondence of William Smellie, Late Printer in Edinburgh, Secretary and Superintendent of Natural History to the Society of Scottish Antiquaries. In Two Volumes* (Edinburgh: John Anderson, 1811). For Smellie's activities as a printer, see especially the work of Stephen W. Brown, including "William Smellie and the Culture of the Edinburgh Book Trade, 1752-1795," in *The Culture of the Book in the Scottish Enlightenment*, ed. Paul Wood (Toronto: University of Toronto Press, 2000), and Stephen W. Brown, "William Smellie and Natural History: Dissent and Dissemination," in *Science and Medicine in the Scottish Enlightenment*, ed. Paul Wood and Charles W. J. Withers (East Linton: Tuckwell Press, 2002).

³ I am unaware of any previous reference, even in Thomson's biography, to Cullen's angry and detailed response to Smellie's anonymous attack on his views. For some insight into this controversy, absent Cullen's response, see Christopher Lawrence, "Medicine as Culture: Edinburgh and the Scottish Enlightenment" (PhD Thesis, University of London, London, 1984), 417-28.

anonymous *Observations on the Principles of the Old System of Physic* (1787), where he cites Smellie's article for its rhetorical brilliance and effective refutation of Cullen's system. He suggests that the Aether article "refuted in a masterly and philosophical manner" the whole idea of explaining medical principles on the supposition of an aetherial elastic fluid.⁴ Brown was so taken by the effectiveness of Smellie's article that he subsequently included a nearly complete copy of it in his introduction to his *Observations*.⁵

Smellie's 'Aether' Article: An Attack on Cullen's Fundamental Doctrines

As Brown recognised, Smellie's article was indeed a rhetorical tour de force, scathing and dismissive from beginning to end. He assumed, from the start, that Aether was an imaginary fluid—a fanciful hypothesis that philosophers only entertained before they knew better; that is, before Francis Bacon showed them the proper method of philosophizing, by focusing on facts and experiments, instead of wild conjectures. It is human nature to be tempted to account for phenomena by these kind of hypotheses, Smellie wrote, but some things, "from their very nature, must, and ever will, elude our researches."⁶

Even the great Newton gave into this temptation, Smellie claims, and this led to his unfortunate speculation about the cause of gravity itself. In this conjecture, Newton "had recourse to a subtile elastic aether, not much different from that of the ancients, and by it accounted for every thing he did not know, such as the cause of gravitation, muscular motion, sensation, &c."⁷

This was a regrettable mistake, and in fact "philosophers have generally looked upon this attempt as the foible of a great man, or, at least, as the most useless part of his works; and accordingly peruse it rather as a dream or a romance, than as having

⁴ See John Brown, *Observations on the Principles of the Old System of Physic, Exhibiting a Compend of the New Doctrine* (Edinburgh: Apollo Press, by Martin and McDowall, 1787), xxxii, note.

⁵ See *Ibid.*, xxxiv-liv. Brown's excerpt excludes one or two paragraphs from Smellie's original article but is essentially complete. Brown also occasionally adds his own commentary in a few footnotes to the excerpt, including the claim that "the professorial influence of the original Author [i.e. Cullen] of this stuff has excluded all mention of it, as well as this criticism upon it, from the new edition of the work [the *EB*] we have mentioned" (xxxii, note). Whatever truth may be in the claim that Cullen influenced the content of the article on Aether in the second edition of the *EB* (1778), it was no longer under the auspices of William Smellie but of James Tytler (1745-1804). And Tytler's version seems to have been written, more or less, from scratch. Tytler's entry is initially conflicted about the existence of aether, though in the end it appears to identify aether with the electric fluid. See *Encyclopaedia Britannica; Or, a Dictionary of Arts and Sciences, &c. On a Plan Entirely New. The Second Edition; Greatly Improved and Enlarged* (Edinburgh: J. Balfour and Co., W. Gordon, J. Bell, J. Dickson, C. Elliot, W. Creech, J. McCliesh, A. Bell, J. Hutton, and C. Macfarquhar, 1778), 2840-41.

⁶ William Smellie, "Aether," in *Encyclopaedia Britannica* (1771), 31. I am quoting from the three volume first edition (1771) of the *EB*. There is no reason to think the content of the No. 2 pamphlet changed between its printing in late 1768 and its publication as part of the three volume first edition; indeed, at its bottom, the article still contains a reference to its origins as the No. 2 pamphlet. With respect to the printing and editorial practices of the first edition, see *The Early Britannica*, 11-67.

⁷ Smellie, "Aether", 32.

any connection with science. But we are sorry to find, that some late attempts have been made to revive this doctrine of aether...”⁸

This is where one expects Smellie to refer to Cullen and his doctrines. But instead he attacks the views of Gustave Richard Brown, a recent graduate of the Edinburgh Medical School,⁹ as outlined in Brown’s 1768 inaugural dissertation *De ortu animalium caloris* [‘On the Origin of Animal Heat’].¹⁰ But there was no question, as Cullen notes in his response, whose views the author was really attacking. Thus Smellie was, in effect, accusing Cullen of reviving the imaginary notion of Aether and violating the principles of proper philosophy. This, Smellie worries, could have dangerous effects upon the minds of Cullen’s students, who would not know better.¹¹

Smellie’s critique of Brown’s views pulls no punches: “It is, perhaps, wrong to say that he [Brown] has *reasoned*; for the whole hypothetical part of his essay is a mere farrago of vague assertions, non-entities, illogical conclusions, and extravagant fancies. His aether seems to be an exceedingly tractable sort of substance: Whenever the qualities of one body differ from those of another, a *different modification of aether* at once solves the phaenomenon.”¹² As James Gregory wrote later, when reviewing the controversy, the whole topic was “very roughly handled” by Smellie.¹³

Brown’s theorising, Smellie insists, can explain anything and everything by means of Aether and thus “obscurity is for ever banished from the works of nature. It is impossible to gravel an aetherial philosopher. Ask him what questions you please, his answer is ready:—‘As we cannot find the cause *any where* else: ergo, by dilemma, it must be owing to aether!’”¹⁴

To turn the dagger, Smellie then quotes an excerpt from Swift’s “A Tale of a Tub”. Cullen appears to have taken special umbrage at the implication of the

⁸ Ibid., 32.

⁹ Gustave Richard Brown was from Maryland (1768, MD; 1766 RMS). There is no question that he attended Cullen’s course on the Institutions of Medicine. Not only is he listed as an attendee in the student lists for years 1766-67 and 1767-68, but his notes, or more precisely, notes in his possession, appear to have survived for the 1766-67 course (see WUSL, xxWZ 260 C967L 1767, Vols. 1 & 2). Nonetheless, it is still an open question the extent to which Brown interacted with, or was particularly close to, Cullen. He does not appear to have been one of Cullen’s favoured students, but this is complicated by the fact that Brown died not long after his return to Maryland, so we have little evidence of a correspondence. It is thus unclear whether Brown was a ‘disciple’ of Cullen’s, as Smellie implies, or just a student who imbibed Cullen’s views. For more on Brown, see Cordell, Eugene F. “The Doctors Gustavus Brown of Lower Maryland.” *The Johns Hopkins Hospital Bulletin* 13, no. 137-138 (1902): 188-192.

¹⁰ Gustavus Richard’s Brown, *Disputation Physica Inauguralis, De Ortu Animalium Caloris* (Edinburgi: Balfour, Auld, et Smellie, 1768). Given Smellie’s critique, it is not surprising that Smellie did not include it in his published editions of notable Edinburgh medical theses. It is also not printed and translated in Douglas’ “Eminent Dissertations” though Brown was a member of the Royal Medical Society in 1766. See David Douglas, *Dissertations by Eminent Members of the Royal Medical Society* (Edinburgh: Royal Medical Society, 1892).

¹¹ Smellie, “Aether”, 34.

¹² Ibid., 33.

¹³ James Gregory, *Additional Memorial to the Managers of the Royal Infirmary* (Edinburgh: Murray & Cochrane, 1803), 187.

¹⁴ Smellie, “Aether”, 34.

following lines from Swift that Smellie includes: “Let us therefore now conjecture how it comes to pass that none of these great projectors do ever fail providing themselves and their notions with a number of *implicit disciples*.”¹⁵

Smellie’s critique, then, is not so much about Aether per se, or even really about Brown’s dissertation but rather a vehicle for him to ridicule Cullen and his ‘fundamental doctrines’ (as Cullen calls them) on the nervous fluid and Aether. Smellie suggests that Cullen, by endorsing Aether as an explanation, is leading students astray by not following the proper rules of philosophy. He, Cullen, is in fact not even engaged in philosophy but wild, fanciful, dangerous hypothesising, and doing so in front of young, impressionable minds. Thus Smellie ends his article with the hope that it will ‘guard’ the minds of those “unacquainted with the genuine principles of philosophy, from being led into a wrong track of investigation.”¹⁶

James Gregory’s Recollection

There is a revealing recollection of the Aether controversy by Dr. James Gregory (1753-1821), who succeeded Cullen as Professor of the Practice of Physic and was a former pupil of his, as well as being the son of Cullen’s colleague, Dr. John Gregory.¹⁷ At the turn of the century, Gregory was engaged in a written, and no doubt, verbal dispute with the Managers of the Royal Infirmary. It seems an unlikely context to learn more about Cullen and the Aether controversy, but the memory of Cullen was still fresh in Edinburgh at that time. In any case, in the course of his dispute, Gregory provides a somewhat different interpretation of Cullen’s theorising about the nervous system than Smellie did, as well as offering some details surrounding the controversy not to be found elsewhere.

Gregory relates an anecdote about Cullen that he heard from his father, Dr. John Gregory: “‘*There must be a Tub to amuse the Whale,*’ said DR CULLEN to my father, who had expressed his concern at seeing so many of our students mis-spend their time and labour in that manner, and had even taken the liberty of a friend and a colleague to remonstrate a little with him on some of his own most favourite speculations, neither the truth nor the usefulness of which my father could perceive.”¹⁸

¹⁵ Ibid., 34. The quotation comes from Swift’s *A Tale of a Tub*. See, e.g. Jonathan Swift, *A Tale of a Tub. Written for the Universal Improvement of Mankind. To Which Is Added, An Account of a Battel [sic] Between the Antient and Modern Books in St. James’s Library* (London: John Nutt, 1704), 166. The reason why the suggestion was so unwelcome to Cullen was that he made a particular point in many of his lectures, and indeed in his approach to medicine in general, to lambast medical sectaries, the unquestioned authority of their leaders, and their encouragement of disciples.

¹⁶ Smellie, “Aether”, 34.

¹⁷ For more on James Gregory, see Michael Barfoot, “James Gregory (1753-1821) and Scottish Scientific Metaphysics, 1750-1800” (PhD Thesis, University of Edinburgh, Edinburgh, 1983).

¹⁸ James Gregory, *Memorial to the Managers of the Royal Infirmary* (Edinburgh: Murray & Cochrane, 1800), 209. Cullen’s phrase seems to come from Swift’s *A Tale of a Tub*. In the Preface, Swift wrote: “To this End, at a Grand Committee, some Days ago, this important Discovery was made by a certain curious and refined Observer; That Sea-men have a Custom when they meet a *Whale*, to fling him out an empty *Tub*, by way of Amusement, to divert him from laying violent Hands upon the Ship.” See Swift, *Tale of a Tub*, 14.

James Gregory interprets the explanation Cullen gave to his father as an ingenious insight into human nature and motivation—that of a master teacher. Cullen believed that medical students needed to have sufficient motivation to study, at great length and pains, all the tiresome details of physic. And they would be more likely to maintain interest if they could be amused, at the same time, by ingenious and interesting hypotheses. Cullen, with his metaphor about needing a tub to amuse the whale, was simply trying to induce the ‘ardour’ that was “the first and most essential requisite in a student of physic.”¹⁹ Yes, it might sometimes be spent on useless speculations, “yet, on the whole, that every man with ardour and perseverance, and no man without them, would make progress at last.”²⁰ That was the point and meaning of Cullen’s explanation to Dr. John Gregory, about why he engaged in “some of his own most favourite speculations.”²¹

Gregory clarified his interpretation of Cullen’s metaphor in his *Additional Memorial* in this way:

His meaning plainly was, that while he endeavoured to instruct his pupils in the well established and useful facts and principles of physic, which are often dry and tedious, sometimes even disgusting, it was necessary to beguile and animate them on their weary way, by amusing them with more pleasing prospects, and engaging them in pursuits, which, by rousing them to active exertions, might quicken their progress in their toilsome journey; even while they seemed to withdraw them farthest from the beaten track.²²

Gregory says that Cullen was obviously successful in this endeavour, if one considers his own success and that of his students later in their lives (Gregory himself being a student of Cullen’s).

In John Bell’s answer to Gregory’s 1800 *Memorial*, he objects to Gregory’s seeming portrayal of Cullen as a cynical teacher, whose fundamental doctrines were simply ‘a cheat’ to amuse his students:

How will the enemies and rivals of this school rejoice, and serious men lament, and thousands, who practice according to the doctrines of Cullen, grieve to hear of this wanton aggression?...What will the world think, when they hear this gentleman [James Gregory] commend the greatest Professor of this school for that dereliction of his own doctrine, which degrades him from the rank of science, and for that hypocrisy, which crowns his name and memory with dishonour...In what light must this enforced obedience [to Cullen’s doctrines] appear, now, when the doctrine is declared to be a tale! a very cheat?²³

¹⁹ Gregory, *Memorial*, 209.

²⁰ *Ibid.*, 210.

²¹ *Ibid.*, 209.

²² Gregory, *Additional Memorial*, 189.

²³ John Bell, *Answer for the Junior Members of the Royal College of Surgeons, of Edinburgh, to the Memorial of Dr. James Gregory* (Edinburgh: Peter Hill, 1800), 53-4.

There is much more going on here, in the exchange between Bell and Gregory, than a dispute about the memory of Cullen.²⁴ We cannot address that here; but the exchange did not end with Bell's reply. Gregory, in turn, replied to Bell in 1803, and he defends and elaborates upon his anecdote.

There is much of interest in Gregory's description of his intimacy with Cullen and his own interpretation of Cullen's doctrines, which it must be remembered Gregory lectured on for many years, using Cullen's textbooks on the Institutions and his *First Lines*. But for our purposes, it is his elaboration of the anecdote he hinted at in his 1800 *Memorial* that demands attention. Gregory writes that "The subject of my father's friendly hint to Dr Cullen, which produced his ludicrous avowal of the expediency of throwing out a tub to amuse the whale, was the *Nervous System*; on which Dr Cullen used to descant, at great length, and with much vivacity and ingenuity, when he taught the Theory of Physic... illustrating very fully, and in a most entertaining manner, many hypothetical theories, about the nature and properties of a supposed nervous fluid or aether; the existence of which still remains to be proved."²⁵

Gregory goes on to say, in a kind of defence of Cullen, that he later gave up many of these entertaining but hypothetical theories. Gregory claims that, to the best of his memory, from 1776 until his death in 1790, Cullen never again mentioned (to him, at least) anything further about the nervous aether.²⁶

Gregory suggests that it was his father's remonstrance about Cullen's speculations that led Cullen to be more careful in his teaching. "I believe Dr Cullen took in good part that friendly hint, which my father gave him."²⁷

But then he tells us, in more detail, about the Aether controversy, stirred up by Smellie's article a year or two after Gregory's intervention with Cullen. This event, "relating to the same subject... made Dr Cullen very angry, and gave my father some uneasiness."²⁸

This was, of course, Smellie's publication of the article on Aether. "In that article," Gregory writes:

²⁴ One facet that stands out is Gregory's attack on Erasmus Darwin's work, and Bell's defence of it. The anecdote about Cullen becomes a part of that debate.

²⁵ Gregory, *Additional Memorial*, 185. My focus in chapter 4 is on Cullen's theory of the aetherial nervous fluid. But it is significant that Gregory highlights, as well, another related set of conjectures about the nervous system by Cullen as being, like his nervous fluid conjectures, highly speculative and implausible. This other topic was Cullen's theory of nutrition, which Cullen claimed was conducted by a secretion from the brain, through the nerves, to various parts of the body. An exploration of Cullen's theory of nutrition, which is more germane to Cullen's theorising than it sounds at first, has not been done, but might reap surprising dividends.

²⁶ *Ibid.*, 186. It is usually pointed out, e.g. by Barfoot, in discussions of this episode, that Cullen did in fact continue to discuss aether, even in his final publication, *A Treatise of Materia Medica*. But the passage generally referred to in that work, while it does mention a subtle, elastic fluid, does not use the term 'Aether' (see William Cullen, *A Treatise of the Materia Medica. In Two Volumes* (Edinburgh: Charles Elliot, 1789), 91). I believe this to be significant. It is perhaps also noteworthy that Cullen expresses his views in that passage "with some confidence." In short, it does not sound like someone who has changed their mind but rather someone who is cautious about the words he is using.

²⁷ Gregory, *Additional Memorial*, 187.

²⁸ *Ibid.*, 187.

the doctrine of the Nervous Aether, and the whole of Dr Cullen's doctrine of the Nervous System, were very roughly handled. This, without ever mentioning Dr Cullen's name, or alluding to him as the author or assertor of such doctrines, was done under pretence of discussing a certain Thesis, published in this University in 1768, on the cause of Animal Heat. . . It was well known to every Student of Physic at the University at that time, and indeed it is avowed by Dr Brown in the whole of his Thesis, from the motto on his title-page to the concluding sentence of his dissertation, (which sentence is quoted in my former Memorial, page 210.), that it was the Theory on those subjects taught by Dr Cullen. It was one of his tubs to amuse the whale.²⁹

But Cullen did not know who the author of the anonymous article was for some time. And, because John Gregory's remonstrance had been on the same subject just a few years previous, Cullen assumed that Gregory was the author of the article. James Gregory says that Cullen mentioned this assumption to some of his pupils, and even other people, including William Creech, the bookseller. In fact, he even mentioned it to William Smellie, who was the author of the article. Cullen "told him [Smellie] that he was *sure* that my father had written that article, and that he knew his style."³⁰

Smellie must have taken great pleasure in this initially. But not too long after, John Gregory learned that Smellie was the author, "for he was so much piqued at Dr Cullen's unjust and ungenerous suspicion, that he spared no pains to discover the real author of that well written but severe article, which had given such offence, and been so rashly imputed to him."³¹

Cullen, a few years later, also learned that Smellie was behind it and was livid with him, Gregory says. And another effect of this, Gregory suggests, was that future editions of the article in the *Encyclopaedia* were changed so as not to offend Cullen.³²

Gregory concludes, in a sort of back-handed compliment to Cullen, that, in any case, Cullen's "chief merit was not as a Theorist in Physic."³³ He may have been good at detecting faults in other medical theories, but he could not establish his own successfully. The reasons for this, to Gregory, were obvious and echo Smellie's own

²⁹ *Ibid.*, 187-8. The impression Gregory gives in his former *Memorial* is somewhat misleading (see Gregory, *Memorial*, 210). Gregory implies that Brown was some slavish disciple of Cullen and his doctrines. But a cursory examination of Brown's thesis checks this a bit. First, Gregory conveniently omits the fact that Brown dedicated his thesis, not to Cullen, but to his own father, Dr. John Gregory. And while it is true that Brown, in his epitaph, inserts Cullen's name in a passage by Lucretius, Cullen and his views only appear near the end of the thesis. Finally even the last passage quoted by Gregory ("Si erravero, tamen, cum Neutono et Culleno, magna commented errare, quam, cum vulg. hominum ignave sapere, potties juvabit") is not simply a reference to Cullen. Instead, Brown is aligning himself with Cullen *and* Newton, which is substantively different, I think. The thesis merits a more thorough examination than I can provide here, but Brown does not come across as the slavish unthinking disciple, on intimate terms with Cullen and his doctrines, than he is made to appear by both Smellie and Gregory.

³⁰ Gregory, *Additional Memorial*, 188. Gregory claims to have heard this from Alexander Smellie, William's Smellie's son.

³¹ *Ibid.*, 188.

³² *Ibid.*, 188. It is hard to assess the veracity of this claim. I have not come across evidence of it, but it would not be surprising either.

³³ *Ibid.*, 190.

critique: Cullen “was not sufficiently cautious as to the general facts or principles that he assumed, and too readily admitted, as his great predecessors had done, many vague and general hypotheses or conjectures, which neither are nor ever can be proved.”³⁴

Gregory blunts this a bit by admitting, in contrast to Bell’s accusations, that “Dr Cullen stated *all* his hypothetical theories with great modesty, and many expressions of doubt and diffidence, and many strong acknowledgements of their imperfections... That candour and modesty with which Dr Cullen displayed in his systematical writings... was an excellent lesson to his pupils, and certainly contributed much to recommend both himself and his doctrines to them...”³⁵

Nonetheless, Cullen’s theories about the nervous system were not as popular with his colleagues as they may have been with his students. Here, again, as we shall see, Gregory’s observation echoes Smellie’s critique. He writes that during the entire time Cullen taught at Edinburgh:

To the best of my knowledge and belief, there never was a time when even *one* of his Colleagues admitted those theories; nor do I believe they ever were admitted by the other Physicians, Fellows of the Royal College in this City, who had not been his pupils, or by any great number of Physicians, if by any, in the three kingdoms, who were his seniors or cotemporaries, and not his pupils. And I had good occasion to observe, between fourteen [1789] and nine and twenty years ago [1774], that in London his doctrine, which Mr John Bell says had enslaved the Medical world, was treated with great contempt.³⁶

Gregory’s observation that none of Cullen’s Edinburgh medical colleagues agreed with his theories lends credence, I think, to my argument that Cullen’s views of the aetherial nervous fluid were quite particular to him, in the context in which he lived and worked. And if this is the case, it also suggests that, if we had to pinpoint what was distinctive about Cullen’s approach to the nervous system, his understanding of the nature of the nervous fluid makes a very good candidate indeed.

A final thought on Smellie’s critique: a less obvious reason why it has been worth highlighting is that it sheds some light on the opposition Cullen faced in Edinburgh, long before John Brown turned against his old master.

This is still a shadowy area, beyond our knowledge of Brown and the rise of Brunonianism, but it now seems to me that Brown’s turn against Cullen was simply the final and most influential critique of Cullen’s popularity and approach to medicine. Opposition began much earlier, probably dating to around his arrival in Edinburgh in 1755, and was certainly alive and well by the time Rutherford needed a

³⁴ Ibid., 190.

³⁵ Ibid., 197-8.

³⁶ Ibid., 193-4. I show, in Chapter 4, that Gregory’s observation that none of Cullen’s medical colleagues shared his views about the nervous fluid is accurate.

successor for his Chair in the Practice of Physic (c.1764).³⁷ And what is interesting about the opposition to Cullen is that many of his critics were, in a way, all connected to each other. Dr. John Rutherford, the outgoing Professor of the Practice of Physic in Edinburgh in the 1760s, appears to have had quite a hostile view of Cullen and thus ensured that Cullen would not replace him. He chose, instead, Dr. John Gregory from Aberdeen. This was quite a devastating blow to Cullen, and it more or less assured that Cullen and Gregory would not be on intimate terms, while they both taught at Edinburgh. Indeed, much more work needs to be done to clarify the relationship between Gregory and Cullen, but it appears that though they were on polite terms, their relationship became increasingly strained.

It is unclear if Gregory had anything to do with Smellie's 'Aether' article, but it is significant that Cullen immediately assumed Gregory was behind it. Yet even if Gregory had no pre-knowledge of it, his influence and example inspired Smellie and may have fuelled his dislike of Cullen.

Another figure important here is William Buchan (1729-1805), who was friends with Smellie and greatly admired John Gregory. Buchan, too, can be considered one of Cullen's opponents. The point here is only that there was a fairly coherent oppositional bloc to Cullen's views and perhaps to Cullen himself, beginning with Rutherford, then reinvigorated by his chosen successor, John Gregory, who in turn inspired both William Buchan and William Smellie. And John Brown, once he shed his allegiance to Cullen, became close friends with Smellie. So we have an oppositional bloc of Rutherford, Gregory, Smellie, Buchan and John Brown, all of whom, for various reasons and in different ways, opposed Cullen and his views in Edinburgh.

Cullen's Response to Smellie's Attack: A Disagreeable Preamble

In his 1768-69 lectures on the Institutions of Medicine, Cullen ends his discussion of the nervous system in a striking way. In a series of three lectures, he responds publicly to what he took to be an attack on his 'fundamental doctrines' in the 'Aether' article printed in the second installment of the serially-printed *Encyclopaedia Britannica*.³⁸ This attack spurred Cullen to publicly defend his views.

Cullen does so in two parts. First, he criticises the 'Aether' article in a 'disagreeable Preamble'. He refers to this as a preamble because it is preliminary to

³⁷ An early example of opposition was an anonymous satire of Cullen's speech on the death of John Clerk, delivered in June 1757. The satire probably came out not long after. See Anon, *A Funeral Oration in Honour of Miss Jenny Muir, A Celebrated Lady of Pleasure by Miss Betty Montgomery, Her Dear Friend and Successor* (Amsterdam, c.1757). For an excellent, anonymous example of the opposition to Cullen's securing the Practice of Physic chair, see Anon, *A Letter From A Citizen of Edinburgh, to Doctor Puff* (Edinburgh, 1764). This piece was, in part, a response to a pamphlet written by some of Cullen's supporters. See Anon, *Address to the Citizens of Edinburgh* (Edinburgh, 1764).

³⁸ I am making an educated guess about how many lectures Cullen used to respond to the attack and to outline his theory of the nervous system. This is because the YML MS I have used, which is very detailed in general, does not ordinarily divide the content by lecture or date. Therefore I have had to rely on internal evidence.

the second and more substantive part of his discussion, in which he explicates and defends his ‘Theory of the Nervous System.’³⁹

Cullen will now “beg leave to make some Criticisms on what has lately appeared in a performance termed the Encyclopedia Britannica under the Article AETHER, as some of my fundamental doctrines are there attempted to be ridiculed [*sic*].”⁴⁰

Cullen is suspicious of the article and its author. “I should decline taking notice of such a catchpenny performance, or of an Author who is ignorant of the principles of the subject he attempts to ridicule [*sic*],” but he thinks that it is “not the joint efforts of the Authors of that work, it is rather the Suggestion of some malicious Enemy, whom if he holds a rank in the literary world above that of a common dictionary-writer I challenge to appear in public.”⁴¹ These indeed are very strong and angry words for the usually mild-mannered and cheerful Cullen. At this early stage, it is unclear if he had a particular enemy in mind.⁴² But he clearly did not believe that the apparent authors of the article—who would have seemed to him to be either ‘a Society of Gentlemen in Scotland’ or simply the publishers Andrew Bell and Colin Macfarquhar—were solely responsible for its content.⁴³

The article is so troublesome to him, Cullen says, because he thinks some of its readers, even those he respects, may be inclined to ridicule him “from want of knowledge of the principles on w^{ch} [which] my Hypothesis [*sic*] are founded” and, even worse, that the attack might discourage students from studying the nervous system, despite its great importance.⁴⁴ Therefore “I thought proper to convict the Authors of the Encyclopedia of Ignorance and malice, but I believe their Malice reaches farther than their Ignorance.”⁴⁵

After airing these general concerns, Cullen identifies three assertions to which he objects. The first is the authors’ less than flattering portrayal of Newton’s conjecture of the Aether: “How injurious are they to a person of the first rank in Philosophy, the immortal Sir Isaac Newton! They have asserted that the opinion of

³⁹ I discuss this second part in chapter 4.

⁴⁰ YML, Inst., 2:238. Note that Volume 2 is 289 pages in length, so another way of finding the ‘disagreeable Preamble’ is to flip to the last 1/5th of the volume.

⁴¹ Ibid., 2:238.

⁴² As I mentioned above, James Gregory claimed that Cullen quickly assumed—incorrectly—that the author must have been John Gregory. Cullen only learned a few years later that it was Smellie who wrote it.

⁴³ The title page for the 1771 three-volume edition of the *EB* says that it was “By a Society of Gentlemen in Scotland” but I do not know if pamphlet No. 2, which Cullen would have read, also contained this attribution. It would almost certainly have listed, as the 1771 title page does, the two printers, Bell and Macfarquhar. In any case, Cullen wavers in his discussion between attributing the ‘Aether’ article to one or more authors, and he is still unsure of the extent to which the ‘Authors of the Encyclopedia’ might be responsible for that particular article or not. He clearly suspects third-party involvement. In my summary of his discussion, I follow this wavering, sometimes referring to a single author, sometimes to ‘authors’.

⁴⁴ YML, Inst., 2:238.

⁴⁵ Ibid., 2:239.

that great man is at present an exploded one, that Philosophers consider it as the foible of his Age; nay farther that it is a mere reverie, a romantic Chimera.”⁴⁶

But, Cullen responds, Newton’s opinion about an Aether was not original to him and was held by many of his illustrious predecessors or contemporaries, including Leibniz, Wolff, and all the Cartesians (and is still held by many French followers of Descartes). In fact, “it is by this doctrine of an universal pervading AETHER that they [the Cartesians] account for their Plenum in opposition to the notions of a vacuum adopted by other Philosophers.”⁴⁷

Moreover, many authorities in physic and natural philosophy maintain Newton’s opinion today.⁴⁸ For instance, “Mr Euler takes the existence of an Aether as an indisputable point, & says AETHER is diffused thro’ every particle of matter, in the universe.”⁴⁹ And Dr. Franklin, “another author famous in the literary world,” wonders in a letter to Cadwallader Colden of York, whether, in his words, “may not all the phaenomena of Light be solved by supposing all space filled with an AETHEREAL Elastic fluid whose vibrations give the Sensations of Light”?⁵⁰

Cullen’s point is that, given these authorities, it is absurd to claim that Newton’s opinion on this topic is treated contemptuously by philosophers, full-stop. “At least our Critic sh^d [should] have produced his Authorities, but these are Anonymous to us, to him, & to the world—& I find no Author that ever doubted or attempted to contradict it.”⁵¹

Cullen thus condemns the author for his ignorance, in terms as strong as those Smellie used to attack him:

There is no crime in not understanding an Author, but it is a great one to attack him without understanding him. Accordingly our Author is not only ignorant of my principles, but even of the manner in w^{ch} [which] Sir Isaac treated this opinion, and nothing is left but to conclude that he is grossly ignorant or has uttered a notorious falsehood. I am happy that I am not in the situation of poor Galileo, thanks to this enlightened age[;] than I am not otherwise I should have my mouth stopt for uttering Heresies in Philosophy.⁵²

The second assertion Cullen combats is the author’s claim “That this subtile Elastic fluid is mere conjecture & that Sir Isaac himself was not convinced of the reality of the existence, either from Observation or Experiment.”⁵³ This is just a willful misreading of Newton’s conjecture, Cullen thinks, for “any person who reads

⁴⁶ Ibid., 2:239.

⁴⁷ Ibid., 2:239.

⁴⁸ In what follows, I am not providing a complete summary of the authorities Cullen cites here; I am just giving a flavour of his ‘disagreeable Preamble’.

⁴⁹ YML, Inst., 2:239.

⁵⁰ Ibid., 2:240.

⁵¹ Ibid., 2:241.

⁵² Ibid., 2:241. The notes here may have slightly garbled Cullen’s last sentence. I have added one mark of punctuation (in brackets) to highlight what I think is the correct reading.

⁵³ Ibid., 2:242.

the passage will immediately perceive that Sir Isaac was convinced of the opinion, & that from facts.”⁵⁴

Cullen also disagrees with the claim that Newton applied his Aether conjecture “to solve all the Phaenomena he did not understand.”⁵⁵ Cullen insists that Newton “never applied it, on the contrary he only proposes it in a few modest queries—he said that the laws of this Aether collected were too few & insufficient to apply the doctrine concerning it to the explication of the several Phaenomena.”⁵⁶ Here Cullen makes an interesting distinction, one he takes for granted, between maintaining, even proposing an opinion, on the one hand, and applying that opinion to phenomena. Cullen thinks Newton was convinced, from facts, about the existence of the Aether, but yet he was very cautious in *applying* this doctrine to explain various natural phenomena. And he is to be commended precisely for that caution in application—however speculative the opinions themselves happen to be.

Cullen thinks that the author of the Aether article did not grasp this distinction between holding views and applying them: “What then shall we think of the Impudence of a grovelling Author who had the opportunity of reading this [passage from Newton], & yet could call in question a philosopher who was no less ingenious in finding out causes than cautious in applying his doctrines?”⁵⁷

The real target of the article was not, Cullen says, Newton’s conjecture about Aether. No, contrary to their claim to be protecting their readers from Newton’s opinion, the authors’ intent was “to throw out general abuse upon me. They have abused my doctrines in general, without candour, without being acquainted with my opinions or the principles they were founded upon—I am the hair brained Professor who has got a fanatical set of Disciples.”⁵⁸

Despite this, Cullen is adamant that he is under no obligation to defend Dr. Brown’s thesis. For “I, as a professor of physiology, thought myself obliged to give you the Conjectures concerning the Nervous System. Haller has a paragraph de conjecturis.”⁵⁹ It is true, Cullen concedes, that “What I have expressed as loose & undetermined concerning the Ortus Animalium Caloris, Dr Brown has delivered with an Air of confidence, w^{ch} [which] I could not approve of, & if it had been possible I sh^d [should] have stopped...”⁶⁰ In any case, the greater part of the thesis, Cullen says,

⁵⁴ Ibid., 2:242.

⁵⁵ Ibid., 2:242.

⁵⁶ Ibid., 2:242.

⁵⁷ Ibid., 2:242.

⁵⁸ Ibid., 2:243. Cullen’s last claim here seems to be a reference to the passage from the Swift quote that Smellie included in his article, which I referenced above: “Let us therefore now conjecture how it comes to pass that none of these great projectors do ever fail providing themselves and their notions with a number of *implicit disciples*.” See Smellie, “Aether”, 34.

⁵⁹ Ibid., 2:243.

⁶⁰ Ibid., 2:243. This perhaps suggests that Cullen had no personal involvement in, or oversight over, Brown’s thesis itself, at least until it was already accepted. It would be interesting to know more about the details surrounding Brown’s dissertation and its subsequent publication. Smellie would have read it, if he did not know about it before, in the course of this publication, for he, along with Balfour and Auld, were the University’s official printers.

“will not appear so ridiculous [*sic*] as the Authors of the Encyclopedia have imagined,” once Cullen has laid out the principles of his theory.⁶¹

Still, his listeners are encouraged, as they have always been, to “cautiously receive & be wary in applying” Cullen’s theory of the nervous system, which he will deliver shortly.⁶²

Before he concludes his Preamble, Cullen wants to convince his listeners that the ‘Doctrine of Sir Isaac Newton’, which Cullen refers to as ‘the fundamental position’, has been very generally accepted by authoritative figures from both medicine and natural philosophy, since Newton’s time.⁶³ Now he will list some of these authorities, before giving his own defence “independant [*sic*] of any Authority.”⁶⁴

It is not necessary here to discuss Cullen’s authorities (though I list them in the following footnote), but it is clear that Cullen’s rhetorical purpose is to deflate the claim, made in the Aether article, that the supposition of the existence of Aether is, by itself, a ridiculous, fanciful and absurd notion, not taken seriously by those who know how to philosophise.⁶⁵

Cullen is thus able to conclude his ‘disagreeable preamble’ by emphasising:

the illegality of my Critics [*sic*] assertion that either my pupil or I wanted to revive exploded doctrines. But my Comentators [*sic*], Gentlemen, are neither philosophically nor morally scrupulous, since they have attacked me both ignorantly and unjustly, and nothing can be more truely [*sic*] ridiculous, for Men to attempt an explanation of the whole circle of Sciences without a competent knowledge of the principles on which they are founded. The specimen on the Article Aether warrants this assertion.⁶⁶

The Aftermath

It is clear that Cullen took the controversy surrounding his physiological doctrines—especially about the Aether and the nervous fluid—seriously and

⁶¹ Ibid., 2:244.

⁶² Ibid., 2:244.

⁶³ Ibid., 2:244.

⁶⁴ Ibid., 2:246.

⁶⁵ The authorities Cullen lists (though he sometimes includes a summary sentence or two) might be useful in tracing some of the thinkers and works who shaped Cullen’s own views over the years. Or perhaps they just seemed to him to be particularly illustrative. They are as follows (see YML, Inst., 2:244-5): Dr. Richard Mead, who Cullen says believed, in his later years, that “the Nervous fluid as highly subtle & elastic [was] lodged in the brain & diffused over the Nerves, being a quantity of the universal Aether that pervades all bodies...Neither Dr. Mead nor the Authors of his life knew that this was a rejected & exploded opinion, nor was Dr. Mead censured as absurd for adopting it” (2:244-5). Dr. Browne Langrish assumes it in his Chroonian lectures of 1747; Dr. David Hartley adopts it as the foundation of his physiology, and “perhaps he may have failed [*sic*] in his general Application but no one has treated his fundamental proposition as absurd” (2:245). Dr. Bryan Robinson “in his treatise on Sir Isaac’s Aether” (2:245), Dr. Hayes, Gaubius, and various French physiologists, including Le Cat and Camel “in his treatise of the Animal Oeconomy” (2:245)—all believed in the existence of the Aether.

⁶⁶ YML, Inst. 2:245-6. Cullen’s reference to “the whole circle of Sciences” is a reference to the literal meaning of the word ‘Encyclopedia’, or circle of knowledge.

responded to it forcefully in a set of lectures delivered in March 1769. Given James Gregory's later recollections about its impact, and Cullen's remaining career at Edinburgh, can we identify some of the effects that this controversy had on his thinking, or at least, on how he presented his particular doctrines in subsequent years?

Recall James Gregory's verdict: that ever since Cullen was taken to task by William Smellie (and remonstrated by John Gregory before that) he hardly ever talked about the aether and his theory of the nervous system in any detail again. Gregory wrote that: "Many of these opinions were tacitly, and others more than tacitly, given up by Dr Cullen himself, both in his lectures and in his printed text-book, his *First Lines*, when he taught the *Practice of Physic*."⁶⁷

Since I am not focusing on Cullen's later teaching of the *Practice of Physic*, I cannot assess here whether Gregory's verdict is correct, with respect to Cullen's teaching from 1776-1790. Of course, in one sense this would not be surprising at all—even expected—for in teaching the practice of physic rather than its institutions, Cullen would assume that his students were already familiar with his basic physiological doctrines. What need was there, pedagogically speaking, to bring up his theory of the nervous system in any detail once he began teaching the practice? To the extent his physiological doctrines arose in talking about practice, they did so in his novel theory of fever and spasm but always in the background.

Setting this logistical point aside, I would not be the first to point out, as is usually done when discussing Gregory's memories of Cullen's turn to silence, that Cullen did in fact continue to discuss a subtle, elastic fluid in the nervous system, e.g. in his final publication, *A Treatise of the Materia Medica*, which at least shows that Cullen had not abandoned his doctrine, contrary to Gregory's claim.⁶⁸ Nonetheless, it is perhaps significant that Cullen does not use the loaded term 'Aether' in that passage.

Furthermore, while I cannot speak to the more distant aftermath (post 1773, when Cullen became the sole occupant of the Chair of the Practice of Medicine), it is revealing to look at the more *immediate* aftermath of the controversy. How did he approach the topic in his remaining lectures on the institutes of medicine in 1770-71 and 1772-3? Did he draw back or continue to teach his fundamental doctrines to his students?

There is only space for some general observations. What I think a comparison of the lectures show is that Cullen did indeed draw back, hoping to avoid further controversy. But contrary to Gregory's interpretation, he did not do so out of any sense that his conjectures were misguided or that it was wise to give up his opinions, tacitly or otherwise. No, Cullen was, if anything, more dedicated to his fundamental doctrines; he was just less willing to air his views in public, in an attempt to avoid

⁶⁷ Gregory, *Additional Memorial*, 186.

⁶⁸ I have already referred to the relevant passage in Cullen's final publication, which can be found in Cullen, *Materia Medica*, 91.

further dispute.⁶⁹ He had, after all, not yet achieved his grand aim of securing the most prestigious and well-paid chair in the medical school, that of the Practice of Physic. If he had any hope of doing so, he could not upset his colleagues, various patrons, or the Town Council too much. Cullen was not a martyr to his views, like his friend Hume. Indeed, Cullen was painfully aware of how controversial views could quickly and decisively prevent someone as talented as Hume from obtaining a professorial chair, or advancing his career. Cullen was too politically astute—and relentlessly ambitious—to take that road, even if he sympathised with it.

In this light, what Cullen says about the controversy during his 1770-71 course is particularly revealing. He explicitly mentions the repercussions of the Aether controversy on him personally: “The Investigation of Causes is often impossible, but it is even agreeable [*sic*] to conjecture concerning them, it is agreeable [*sic*] to you; it is agreeable [*sic*] to myself. I shall however always if I can warn you of these, & warn you against extending them. This is very necessary for even my Conjectures have often in Conversation & Dissertations been extended to such a Length as to make me & the Person who advanced them appear ridiculous.”⁷⁰

He returns to this point in more vivid language a little later:

Any curious Speculations which may occur I absolutely intend to avoid, but when I say we may admit the investigation of Causes, yet I admit that Men, especially in Youth, are prone to investigate Causes. And this is the best way to keep up the Attention of young Students. Whether it is right to indulge this I doubt: I have formerly done it, but I was deceived in the Effect. What I advanced with Diffidence as Conjecture, they who heard me pushed farther in Conversations, Disputations, & even in printed Dissertations, which have brought disgrace & Ridicule on me and my Pupils; me, as a crackbrain'd Projector, & them as fanatical Changelings. I must however sometimes mention that Conjectures have been made, that I may explain the Language of Physicians. I shall however mention them only as such & give you warning after this Caveat I proceed not answerable for your Errors.⁷¹

This shows that Cullen was indeed stung by the Aether controversy and avoided indulging in some of his ‘Conjectures’ especially about the aetherial nervous fluid.⁷² But he did not avoid the topic entirely. In fact, in the same set of lectures in 1770-71, Cullen claims to want to publish his theory of the nervous system in writing as soon as he had the time: “I have a Theory of the Nervous Fluid, but will not deliver it here by word of mouth, but am resolved to take the first leisure I have, &

⁶⁹ In his 1772-3 lectures, in an aside, he says, about his fundamental doctrine concerning the nervous fluid, “that every time I take a view of the Nervous System [it] approaches to me nearer to probability...” (NLM, 3:20-21).

⁷⁰ NLS, MS 3535, 30.

⁷¹ NLS, MS 3535, 66. Cullen’s reference to keeping the attention of young students is in the same spirit as Gregory’s story about Cullen using a Tub to amuse the Whale.

⁷² It is also worth noting another omission from Cullen’s later lectures, that supports this. In his 1768-9 lectures, in the context of discussing the simple solids, Cullen describes his hypothesis for the attraction of cohesion (see YML, Inst., 1:36-42). In doing so, he talks extensively about the interaction between atoms and the Aether. In his 1770-71 and 1772-3 discussions of the simple solids, he drops this discussion of the Aether.

deliver it in writing.”⁷³ And he admits, in that very same place, that he is willing to “indulge a little those of a speculative Turn”, whereupon he provides the ‘Heads’ of his theory in a few sentences.⁷⁴

But in general he is extremely reticent to discuss his theory. Indeed, he comes close at times to disavowing its import entirely. He says at one point in his 1770-71 lectures, in the context of discussing his terms of Excitement and Collapse, that:

I am now at liberty to give you a Theory; & I shall give you a Theory of my own, which I do not value two-pence, nor care whether you do. I only throw it out as Amusement...Here there is a scheme of a Theory on the Nervous System, which I shall not prosecute farther here, but I say we may have abstract Speculations on a Subject without applying them to Life & Business. If you apply it rashly to the System of Physick & allow it to influence your Practice, I say you are to blame, and it is your own fault...I have given you a Sketch of a Theory on it, which is no more than an illustration; & so far as I can see has no application to use, at least I can discover none.⁷⁵

Cullen does say a bit more about his theory of the nervous system in his 1772-3 lectures than he does in those of 1770-71. Yet he generally downplays its significance. Prior to discussing some of the basics of his theory, he explicitly refers to his subsequent discussion as a “Lusus Ingenii”—an ingenious game—suggesting to his audience that it was not of special importance.⁷⁶

Later in these same lectures, Cullen sometimes goes so far as to retract his earlier way of describing his fundamental doctrine as his ‘theory of the nervous system’. In reference to §145, the last proposition in his *Institutions* textbook devoted to the nervous system, he tells his audience that:

I have expressed myself in a manner here, that I cou’d wish to be observed I do not say that this is the Theory of the Nervous System, I say that these are the facts and Laws, and however in some instances you may think I have approached to Theory, I wou’d wish you to receive every particular I have delivered with diffidence, till you are perswaded [*sic*] that the Conclusion is established as a matter of fact, if you do so there will be no danger of a misapplication, and if you do so, you will be constantly enlarging the number of facts, and be much fitter for the application. I have

⁷³ NLS, MS 3535, 200. I have not come across anything in Cullen’s *Nachlass*, even in draft form, that might fit this description. I suspect he simply never had time to do it. Thus, his oral defence of 1769 is probably the most complete description of his theory that remains extant.

⁷⁴ Specifically, Cullen tells his auditors: “I reckon then the Nervous Fluid is an elastic Fluid, & is inherent in the Solid of the Nervous System, analogous to the Power of Magnetism. This is confined to the medullary substance alone: & I imagine the different states of the Nervous System depend on the different degrees of the Excitement of this Fluid on the surface of the solid & its Pores, analogous to Electricity. These are the Heads of my Theory. I think no one has come so near to the same Idea, as Dr Gaubius (Vid: §136, 137 here he has something of the same head.) He concludes with “Care ne de contractile fluido cogitaris.” Dr Gaubius is very cautious in applying his opinions; tho’ it is probable his Idea is much the same as I have given you. With this I conclude the whole of the Nervous System” (NLS, MS 3535, 201).

⁷⁵ NLS, MS 3535, 185-6.

⁷⁶ “However I was willing to bestow a few Minutes on a Lusus Ingenii, if you carry it further it is at your peril...” (NLM, 3:18).

added [this?], to obviate a mistake that the public may be in, With regard to the power by which Motions are communicated from one part to the other I have glanced at it in several parts, but I have told you that it is a conjecture only, and I find that when I indulge in giving such, it is liable to engage you in discussions that I cannot relieve [*sic*] you in, and in which you will not be able to extricate yourselves, so that I wou'd leave it abstracted from Theoretical views, to be treated entirely as a matter of fact.⁷⁷

This shows that the Aether controversy of 1768-69 changed the way that Cullen formulated, or delivered his views, at least in public, even if the controversy had no effect on the substance of his fundamental doctrines. In fact, as I have now shown, Cullen's understanding of the nervous fluid—"the power by which Motions are communicated from one part to the other"—was pivotal to his entire medical System. Thus, his minimisation of it here as mere conjecture rings hollow. Rather, Cullen was adjusting the packaging of his views, without changing the product itself. Since Cullen scholarship has thus far focused on his later lectures, it has perhaps mistaken Cullen's politically cautious expression of his views for the views themselves.

⁷⁷ NLM, 3:70-71.

Appendix 5A: Source Material

HSP/LCP, Rush Papers, Correspondence Vol. 24, pp. 56a-d

Letter from William Cullen to Benjamin Rush, October 16, 1784.

-The handwriting appears to be that of Cullen's last amanuensis, Mr. Paul, but it is signed by Cullen himself.

[a]

My Dear Sir

you know I believe that I am a bad Correspondent and I hope you will believe that I am no worse to you than to other people. I grow old and at the same time busier than ever but at the same time I cannot allow the bearer to Set out for Philadelphia without giving you a few lines were it only to tell you that I hold you and shall always hold you in the same esteem and affection as ever. I think you expressed your esteem of me and did me a great deal of honour in publishing the two first volumes of my First lines. I have now desired M^r Elliot to Send you that work as I hope considerably improved and enlarged by two Volumes more and comprehending every Subject that will ever enter into my Course but while I live and am capable of study I shall go on

[b]

in endeavouring to improve and add to this work.

I have just now put to the press a new Edition of the Synopsis Nosologiae with some corrections and additions but I believe I have put my last hand to that laborious work.

If I have a little leisure next Summer I will endeavour to give a new Edition of my Materia Medica, the existence of the last still gives me a great deal of pain and even for the sake of my future reputation I think it necessary to give one more correct but I hope at the same time to give one in consequence of more experience Reading and reflection very greatly improved.

The only other work that I would be anxious to finish before I die is a Treatise on the Preservation of health but it must be a large one and whether I shall ever be able

[c]

to finish it to my mind is very uncertain. I have thus given you my own Literary History. What other pieces of Literature this place here produced Mr. Elliot will certainly communicate to you. I suppose you may know that the Philosophical Society of this place is now established by a Charter from his Majesty under the title of the Royal Society of Edin.^r and upon a plan that may unite the whole of the

Literature of Scotland. The Members are therefore divided into two Classes one the Physical comprehending every branch of Natural knowledge and whatever relates to it the other intitled [*sic*] the Literary comprehending Antiquities, Belles Lettres &.^c The Members have hitherto in their several departments shown a great deal of Ardour and I expect that against next Spring a Volume of Transactions will be published.

I have now given you as long a letter

[d]

as my time can possibly allow but I cannot conclude it without telling you that Mr. Dobson who delivers it is a very worthy young Man and if you can assist him with your Countenance and advice you will highly oblige me who am with great regard and affection

Dear D^r.

Your most Obedient humble Servant
William Cullen

Edin^r. 16.th Oct^r
1784 D^r Cullen

P.S. I must still add what I would by no means willingly have omitted, that is, my respectful and affectionate compliments to all my Old pupils at Philadelphia I shall always hold it as my highest honour that the founders of the Medical College of Philadelphia were all of them my Pupils and if it can be known I think it will be the most certain means of transmitting my name to a distant posterity for I believe that this School will one day or other be the greatest in the world. I shall be glad to hear that your Philosophical Society is revived with some spirit.

MS Cullen 125/1113, (Running Folio/MS Cullen 125 folio/MS Cullen 1113 folio)
“Remarks on the Art of preserving Health”, undated.
-31 pages in Cullen’s handwriting. Undated.

Cullen’s essay “Remarks on the Art of preserving Health” has been preserved for us in full, but it is distributed between two separate archival documents, MS Cullen 125 and MS Cullen 1113. I discovered this purely by chance. Pages from one are interspersed in the other, and vice versa, though there are additional pages included, as well. I believe these additional pages are from an earlier but incomplete draft of the same essay.

Since the documents are not collected together in GUL, Special Collections, I have referred to the separate foliations in the following form: Running Folio/125 folio/1113 folio. For example, the foliation 17v/-/9v refers to the 17v folio (of the

combined virtual document). This folio is not found in MS Cullen 125 (hence the blank ‘-’) but is folio 9v at MS Cullen 1113.

MS Cullen 288

“Discourse in honour of Dr. Clerk. 1757”

-18 pages in Cullen’s handwriting

John Thomson printed an *edited* version of this speech as Appendix B in volume I of his *Life* (TLC, 1:525-536). Thomson’s version differs, sometimes significantly, from MS Cullen 288, which appears to be the final draft. He excised major portions of the speech that bear directly on Cullen’s views on hygiene, perhaps because he did not discuss Cullen’s views on this topic in the body of his text.

I suppose it is also possible that Thomson was working from another draft of Cullen’s speech that has not survived—but I doubt it.

MS Cullen 302

Incomplete draft of the “Discourse in honour of Dr. Clerk”

-4 pages in Cullen’s handwriting

MS Cullen 335 & 336

A Treatise on the Preservation of Health (c. 1783-5)

MS Cullen 335 (Part I) and 336 (Part II)

-136 pages in Cullen’s handwriting

-William Thomson’s [?] transcription of this *Treatise* (in a bound volume with index) can be found at MS Cullen 406.

Cullen’s *Treatise* is approximately 136 folio pages, written in Cullen’s hand (c. 37,000 words). It was left unfinished and unpublished at his death in 1790. It is likely the longest, most substantial unpublished work in Cullen’s handwriting still extant.

The *Treatise* itself is divided into two parts. The first part, entitled “Of the Animal Oeconomy”, discusses “the Several functions which are necessary to understand the effects of the several powers which may be applied to change it from its Sound and healthy to a diseased State” (14). This appears to be fairly complete, at least in content. The second part, entitled, “Of the preservation of Health”, discusses “those Several powers which are capable of changing the State of the human body itself in a measure tending to disorder it” (14). This is definitely incomplete. Cullen provides a road map to what he wishes to discuss, but his draft does not cover all his projected topics.

To give a sense of its content, here is an outline of the major sections of the work (as named and divided by Cullen). Note its incompleteness, especially part II:

A Treatise on the Preservation of Health (c. 1783-85)

Introduction

1. Whether an art of health is to be Studied
2. By whom is the Art of health to be studied and practiced

Part I. Of the Animal Oeconomy

1. Of the Nervous System
2. Of the Circulation of the Blood
3. Of Breathing or Respiration
4. Of Digestion or the Conversion of the Aliments taken in, into the nature of the human Juices
5. Of the discharges or those matters which are either passing constantly out of the body or from time to time must be thrown out of it
6. Of the different States of the Animal Oeconomy with respect to

Temperament Age and Sex

- A. Of Temperament
7. Of peculiarities of temperament or Idiosyncrasies

Part II. Of the preservation of Health

1. Of the Several powers acting on the body
 - A. Of Air
 - i. Of the gravity and elasticity of the Air
 - ii. Of the effects of the sensible qualities of the air that is of its heat, or cold, humidity or dryness
 - iii. Of the degree of Cold affecting the body
 - iv. Of the general effects of Cold
 - v. Of the particular effects of Cold with respect to the Several functions of the body
 - a. Of the Salutary effects of Cold
 - b. Of the morbid effects of Cold
 - vi. Of the Several circumstances favorable or unfavorable to the morbid action of Cold

MS Cullen 405

“An Essay on the Hypochondriac Disease in a Letter”

-William Thomson’s [?] 115 page transcription (in a bound volume) of the original letter.

-Drafts of the original letter, with some pages in Cullen’s handwriting (and others in the handwriting of his amanuenses, presumably) are held at MS Cullen 337. But note that MS Cullen 405 cannot be completely reconstructed from MS Cullen 337; there are likely some pages missing, and the final order is hard to determine. Thus, I have used MS Cullen 405 instead of MS Cullen 337.

The Essay is undated but my guess is that it was written in the late 1740s to early 1750s, before Cullen went to Edinburgh. He refers to 'Animal Spirits' instead of

the Nervous Power, for instance, and he never mentions irritability in his discussion, which leads me to think it was written before Haller's essay on that topic (1752/3). Cullen is clearly soliciting patronage with the essay, so it may have been part of his push to obtain the Medical Chair at Glasgow, which he eventually obtained in 1751, largely through the help of the Duke of Argyll.

Mike Barfoot has suggested that the Essay was written in the form of a consultation letter to Baron John Maule of Inverkeilor (1706-1781), who would have been a suitable patron for Cullen.¹ On balance, the anecdotal evidence appears to support Barfoot's claim (though it is not definitive). Here is why: first, we know Baron Maule was in contact with Cullen's friend and patron, Dr. John Clerk (see, e.g. MS Cullen 68).

Second, Lord Kames wrote a letter to Cullen (dated Nov. 17, 1749), possibly referring to Cullen's attempt to gain support for the Medical Chair at Glasgow (which he finally did in 1751). And in this context he mentions Baron Maule. Kames writes: "How I can be of use to you in the Subject matter of your last Letter, I don't readily apprehend. However to acquit myself of my Duty to you and to remove the Suspicion of indolence I called at Baron Maule to try what expedients he could Propose to dispatch."²

Third and finally, within the papers collected as MS Cullen 337, there are a few pages that appear to be part of a clinical consultation letter written to Baron Maule. In his own handwriting, at one point Cullen has written, "I have now delivered as fully as I well could what may be necessary for the management of that weakness of Stomach which Baron Maule labours under and Shall now proceed to say what is necessary with regard to that weakness as I think it is of the whole System which renders him liable to be affected with cold."³

There is some question as to whether these pages have just been collected with the draft pages of the Essay on the Hypochondriac disease or are rightfully part of those drafts. Internal evidence alone does not appear to answer the question. But I presume this is why Barfoot believes the Essay on the Hypochondriac Disease was also meant for the Baron. And while the case is not air-tight, there is enough circumstantial evidence to operate under this assumption, in the absence of other plausible suggestions. I have not had time to examine Baron Maule's extant papers, but it is possible that Cullen's original letter still survives.⁴

The context of the Essay is Baron Maule's hypochondriac disease and Cullen's advice on the best treatment. But it is not strictly a clinical letter—Cullen does not appear to have been Baron Maule's primary physician at the time. Instead,

¹ Michael Barfoot, "Philosophy and Method in Cullen's Medical Teaching," in *William Cullen and the Eighteenth Century Medical World*, ed. A. Doig, J. P. S. Ferguson, I. A. Milne and R. Passmore (Edinburgh: Edinburgh University Press, 1993), 129, note 38. Barfoot describes the Essay as "a long consultation letter to his friend and patron, Baron John Maule of Inverkeilor."

² MS Cullen 1138, 1r.

³ MS Cullen 337, p. 44. There is also a reference to the Baron on p. 42.

⁴ Had I the time, I would look for the original version of Cullen's Essay in the following collections: NLS, MS 10781; NLS, Adv. MS.5.1.9; NRS, GD18/3229, 3270 (NRA 29182); and NRS, GD45/14 (NRA 17164 Ramsay).

Cullen writes: “I have endeavoured to entertain you in the following Sheets with a Dissertation upon your Disease.”⁵ Cullen is here soliciting Baron Maule’s patronage, in the form of a Consilium—a traditional vehicle for doing so—likely in the context of his quest to obtain the Medical Chair at Glasgow (which he finally did in 1751). The Essay is particularly full and detailed on Cullen’s approach to the non-naturals.

MS Cullen 445

“Hygieine”

-MS Cullen 445 seems to contain a number of documents, on different subjects. The first 4 pages, which are in Cullen’s handwriting, discuss hygiene. It is possible that other pages in MS Cullen 445 continue this discussion.

In Chapter 5, I refer to this as a lecture from Cullen’s Glasgow days. While it is undated, the fact that Cullen refers to hygiene as the “fourth part of the Institutions” shows that he has not yet adopted his three-fold division of the Institutions into Physiology, Pathology and Therapeutics, but all his Edinburgh lectures on the Institutions adopt that tripartite model. So this must be from before he taught at Edinburgh.

⁵ MS Cullen 405, 1.

BIBLIOGRAPHY

BIBLIOGRAPHY

Cullen's Published Works

What follows is a list of the major editions of Cullen's works, published during his lifetime. What do I mean by 'major editions'? I include here (excepting the works under the final two headings, for reasons that will be obvious) only editions of Cullen's works where it seems Cullen had a *substantive role* in its composition. So, for instance, I exclude the 1777 and 1785 editions of Cullen's *Institutions of Medicine* textbook because these do not appear to be works that Cullen altered himself. Rather, he agreed to their publication and they were 'corrected' by his bookseller. This is also true of the 1784 edition of *A Letter to Lord Cathcart* and the 1786 and 1788 editions of Cullen's *First Lines*, so I exclude them as well.

This is not to be taken as a final, comprehensive list of everything Cullen published, or had printed, during his lifetime. Indeed, it is likely not. But I am confident that it does include all of Cullen's major published works, at least the ones in which he was significantly involved in their composition and put his name down as author. Finally, I generally include only the Edinburgh editions of his works, although sometimes the joint Edinburgh-London editions are preferred.

This list might usefully be compared with the one that Thomson includes at the end of volume II of his Cullen biography. See 'Published Writings of Dr Cullen' at TLC, 2:687-690. Thomson's list is neither complete nor free from error, but it does list later editions (i.e. post-1790) that I do not.

Institutions of Medicine

Cullen, William. *Institutions of Medicine. Part I Physiology. For the Use of the Students in the University of Edinburgh*. Edinburgh, 1770.

—>This is very rare, but a copy can be found at UNMC, WZ 260 C967i 1770.

———. *Institutions of Medicine. Part I, Physiology. For the Use of the Students in the University of Edinburgh*. Edinburgh, 1772.

Synopsis Nosologiae Methodicae

Cullen, William. *Synopsis Nosologiae Methodicae*. Edinburgi, 1769.

———. *Synopsis Nosologiae Methodicae. In Usum Studiosorum. Editio Altera. In Quarta Parte Emendata; Et Adjectis Morborum Speciebus Aucta. A Gulielmo Cullen, M.D. Et in Acad. Edinb. P.* Edinburgi: apud A. Kincaid & W. Creech: Londini, apud W. Johnston, T. Cadell, J. Murray, et E. & C. Dilly, 1772.

———. *Synopsis Nosologiae Methodicae, Exhibens Clariss. Virorum Sauvagesii, Linnæi, Vogelii, Et Sagari, Systemata Nosologica. Edidit Suumque Proprium*

Systema Nosologicum Adjecit Gulielmus Cullen, Med. D. Et in Acad. Edinb. Med. Pract. Prof. Medicus Regius Apud Scotos Primarius, Et Coll. Reg. Med. Edinb. Socius; Nec Non Societatum Reg. Lond. Philos. Edinb. Philos. Philadelph. Med. Reg. Paris. Med. Hauniens. Et Med. Edinb. Sodalit. Editio Tertia, Emendata Et Plurimum Aucta, Duobus Tomis. Edinburgi: prostant venales, apud Gulielmum Creech; et Londini, apud Thomam Cadell, et Joannem Murray, Bibliopolas, 1780.

———. *Synopsis Nosologiæ Methodicæ, Exhibens Clariss. Virorum Sauvagesii, Linnæi, Vogelii, Sagari, Et Macbridii, Systemata Nosologica.* Edidit Suumque Proprium Systema Nosologicum Adjecit Gulielmus Cullen, Med. D. ET in Acad. Edinb. Med. Pract. Prot. Medicus Regius Apud Scotos Primarius, ET Coll. Reg. Med. Edinb. Socius; Nec Non Societatum Reg. Lond. Reg. Edinb. Philos. Philadelph. Med. Reg. Paris. Med. Hauniens. Et Reg. Med. Edinb. Sodalit. Editio Quarta, Emandata Et Plurimum Aucta, Duobus Tomis. Edinburgi: prostant venales apud Gulielmum Creech, 1785.

Materia Medica

Cullen, William. *A Treatise of the Materia Medica. In Two Volumes.* Edinburgh: Charles Elliot, 1789.

First Lines of the Practice of Physic

Cullen, William. *First Lines of the Practice of Physic, for the Use of Students in the University of Edinburgh. By William Cullen, M.D. Vol. I.* Printed for J. Murray, London; and William Creech, Edinburgh, 1777.

———. *First Lines of the Practice of Physic, for the Use of Students in the University of Edinburgh. By William Cullen, M.D. & P. Second Edition, Corrected. Vol. I.* Edinburgh: printed for William Creech. And sold in London by T. Cadell in the Strand, and J. Murray No. 32. Fleet-Street, 1778.

———. *First Lines of the Practice of Physic, for the Use of Students in the University of Edinburgh. By William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh; First Physician to His Majesty for Scotland; Fellow of the Royal College of Physicians of Edinburgh, of the Royal Society of London, &c. &c. Third Edition, Corrected.* Edinburgh: William Creech, 1781.

———. *First Lines of the Practice of Physic. By William Cullen, M.D. A New Edition. Corrected, Enlarged, and Completed in Four Volumes.* Charles Elliot, Edinburgh; And T. Cadell, London, 1784.

A Letter to Lord Cathcart

Cullen, William. *A Letter to Lord Cathcart, President of the Board of Police in Scotland; Concerning the Recovery of Persons Drowned, and Seemingly Dead. By William Cullen, M.D. First Physician to His Majesty, and Professor of the Practice of Physic in the University of Edinburgh. To Which Is Added, An Extract From the Journals of the Board of Police, Containing a Paper Presented by Lord Cathcart, to That Honourable Board, on the Same Subject.* Edinburgh: Charles Elliot, 1776.

Chemistry

Cullen, William. "Of the Cold Produced by Evaporating Fluids, and of Some Other Means of Producing Cold; By Dr. William Cullen, Professor of Medicine in the University of Glasgow." *Essays and Observations, Physical and Literary. Read before a Society in Edinburgh, and published by them. Volume II.* (1756): 145-156.

Miscellaneous Publications & Printings

Haller, Albrecht von. *Primae Lineae Physiologiae, in Usum Praelectionum Academicarum, Ad Editionem Tertio Auctam & Emendatam Expressae. Accedit Rerum Index.* Edinburgi: Kincaid & Bell, 1767.

—>Cullen had this printed and produced a detailed index for it. Thomson's description is accurate: "When Dr Cullen was inducted on the 1st November 1766 to the duties of the office of Professorship of the Institutions of Medicine, he had no text-book for that department of the science. With the view of supplying this defect, he published, in 1767, an Edition of the *Primae Lineae* of Albert von Haller, from the Third Edition by the author... What is here called an Index is rather a minute, detailed, analytical Table of Contents, presenting an enumeration of all the subjects treated in the volume, and the divisions of each" (TLC, 2:687-8).

Cullen, William. *Catalogus Materiae Medicae* [1761].

—>Thomson describes this publication as follows: "This Catalogue, which Dr Cullen prepared for the use of the pupils attending the course of Lectures on Materia Medica, which he delivered in 1761, is, in an improved and amended form, republished in the *Treatise on Materia Medica* of 1789" (TLC, 2:687). It is not easy to find, but a copy is held at EUL, Special Collections, H.18.69/4. WorldCat describes it as consisting "of 52 pp. with signatures [A]-G."

Unauthorised Publications

Cullen, William. *Clinical Lectures, Delivered in the Years 1765 and 1766, by William Cullen, M.D. Late Professor of the Practice of Physic in the University of Edinburgh...Taken in Short-hand by a Gentleman Who Attended*. London: Mr. Lee and Mr. Hurst, Paternoster-Row, 1797.

—>Thomson claims that this work “is one of questionable authenticity; and though it professes to give Clinical Lectures by Dr Cullen, it cannot justly be regarded as a production of his. It was merely a speculation of the bookseller; and, indeed, any book bearing the name of Cullen, for some years before his death, and after that event, would have been readily bought.” (TLC, 2:690). This is an odd claim, however, for Thomson quotes from it in both his biography of Cullen, as well as his edition of Cullen’s works. Compare, for instance, the manuscript quotation from TLC, 1:342-3 to the bottom half of p. 9 from this publication (they are virtually identical). Thomson also quotes directly and explicitly from these *Clinical Lectures* at TLC, 1:268, without condemning them. And finally, the section on Headache found in Thomson’s *Works*, Vol 2, pp. 537-559, comes directly from this publication. Thus, it does not appear that even John Thomson thought this was a fabrication. Perhaps that was the later opinion of David Craigie or Allen Thomson, who published the list.

Also, I think I have identified the ‘Gentleman Who Attended’ the lectures. He was a Glasgow physician by the name of Robert Marshall, and he may be the same Robert Marshall that exchanged letters with Cullen (Oct 15, 1779; June 27, 1782; Dec 4, 1787; Aug 11, 1788). His handwritten notes from these lectures are currently held in the Collier Rare Book Room at the New York Academy of Medicine Library (NYAM). My record for this volume reads: “Lectures on physiology, for the year 1766/7. [Edinburgh, 1766-67], v.p. 23.5cm. Notes taken by a student, Robert Marshall. Contains his clinical lectures.” And, indeed, the contents verify this information, and the clinical lectures referred to match the content of those subsequently published in 1797. If the Preface to the 1797 publication is accurate, it suggests that Marshall was already a well-known physician at the time of the lectures and that he took down his notes in short-hand. Of course, Marshall himself may not have been responsible for the publication in 1797.

———. *Lectures on the Materia Medica, As Delivered by William Cullen, M.D. Professor of Medicine in the University of Edinburgh: And Now Printed From a Correct Copy, Which Has Been Compared with Others by the Editors*. Dublin: Thomas Ewing, 1773.

———. *Lectures on the Materia Medica, As Delivered by William Cullen, M.D. Professor of Medicine in the University of Edinburgh. Now Published by Permission of the Author, and with Many Corrections From the Collation of Different Manuscripts by the Editors*. London: T. Lowndes, 1773.

—>The above two works are essential to understanding the controversy generated by their unauthorised publication. The first work (the Dublin edition)

was likely a copy of the original unauthorised publication (of which I have not yet been able to find a copy), before Cullen had a chance to intervene. The second, the 1773 London edition, was a re-print of the original, with Cullen's emendations and input, after he contacted the editors of the work. Although I have no space to explain more here, we know that the original text was based on Alexander Monro Drummond's notes from those lectures. And that his fellow pupils, William Falconer and James Blair, took those notes and, in comparison with some others, edited them together and published, without Cullen's permission, the controversial *Lectures on the Materia Medica*. A detailed discussion of this controversy would further illuminate Cullen's role as medical author, as well as the world of medical publishing in eighteenth-century Britain.

Manuscript Sources**Aberdeen University Library (AUL)**

MS 2206/7/8

Edinburgh University Library (EUL)Mic. M.28
Gen.2106D
H.18.69/4**The Hunterian Museum and Art Gallery (GLHM)**

C.43, 'Death Mask of William Cullen (1710-1790)'

Glasgow University Library (GUL)*Papers of William Cullen (1710-1790)*MS Cullen 009
MS Cullen 012
MS Cullen 014-016
MS Cullen 046
MS Cullen 047
MS Cullen 063
MS Cullen 068
MS Cullen 074
MS Cullen 108
MS Cullen 109
MS Cullen 125
MS Cullen 155
MS Cullen 156
MS Cullen 185
MS Cullen 260/01
MS Cullen 277-280
MS Cullen 288
MS Cullen 299
MS Cullen 300
MS Cullen 302
MS Cullen 320
MS Cullen 325
MS Cullen 326
MS Cullen 335

MS Cullen 336
MS Cullen 337
MS Cullen 405
MS Cullen 406
MS Cullen 445
MS Cullen 447
MS Cullen 451
MS Cullen 612/14
MS Cullen 614-628
MS Cullen 651-708
MS Cullen 714/06
MS Cullen 714/16
MS Cullen 780
MS Cullen 1069
MS Cullen 1081
MS Cullen 1113
MS Cullen 1136
MS Cullen 1137
MS Cullen 1138
MS Cullen 1145
MS Cullen 1147
MS Cullen 1149
MS Cullen 1168
MS Cullen 1200

**Historical Society of Pennsylvania/Library Company of Philadelphia (HSP/
LCP)**

Rush Family Papers. Rush Correspondence, Volume 24.

The National Archives (NAS)

C 12/1033/2, 'Cullen v. Lowndes'

The Newberry Library, Chicago (NLC)

Special Collections. Vault Case MS 5037.

National Library of Medicine (NLM)

HMD Collection, MS B 4, NLM Unique ID: 2931004R. 7 Volumes.

National Library of Scotland (NLS)

MSS 2078-80
 MS 3535
 MS 9236

National Records of Scotland (NRS)

Hamilton Family Papers. NRAS2177/TD2011/21/Bundle 1057

New York Academy of Medicine (NYAM)

-*Bard Collection, 1760-1820*. Samuel Bard to his father John Bard, February 4, 1764.

-Coller Rare Book Reading Room, MS. "Lectures on physiology, for the year 1766/7. [Edinburgh, 1766-67], v.p. 23.5cm. Notes taken by a student, Robert Marshall. Contains his clinical lectures."

Royal College of Physicians of Edinburgh (RCPE)

CUL/2/1/1, 'Lectures on Chemistry by Dr Cullen - History of Chemistry - History of Pharmaceutical Chemistry - History of Paracelsus and his Innovations'

—>For a more fine-grained look at the individual components of this collection of documents, see my Appendix 3A: Source Material.

CUL/2/1/5, 'Cullen's Lectures on Physiology Vol I'

CUL/2/1/6, 'Cullen's Lectures on Physiology Vol II'

CUL/2/1/8, 'Cullen's Lectures on Pathology Vol II'

CUL/2/1/9, 'Lectures by William Cullen on the History of the Practice of Physic'

—>For a more fine-grained look at the individual components of this collection of documents, see my Appendix 3A: Source Material.

CUL/2/1/10, 'Cullen's Lectures on Practice of Physic Vol I'

CUL/2/1/15, 'Cullen's Institutions &c.'

CUL/2/2/1, 'Cullen's Chemistry Vol I'

CUL/2/2/8-12, 'Cullen's Institutions of Medicine' in 5 Vols. [1772-3]

CUL/4/1, "Account Book Containing the Record of Medecines [*sic*] & Medicinal Preparations Furnished by Dr William Cullen During his Residence at Hamilton From September 1737 to October 1741 Notes of Bloodlettings Performed."

Royal College of Surgeons of England (RCSE)

MS 0054

Royal Society of London (RSL)*Charles Blagden Papers*

-CB/1/2/175 (alt: BLA.B.322a), John Bostock to Charles Blagden, [April] 1769

-CB/1/2/178 (alt: BLA.B.322d), John Bostock to Charles Blagden, 1769

-CB/1/3/101 (alt: BLA.C.66), Robert Cullen to Charles Blagden, May 11, 1769

Smithsonian Dibner Library (SDL)

Special Collections. MS 000210 B

University of Nebraska Medical Center's McGoogan Library of Medicine (UNMC)

WZ 260 C967i 1770

Wellcome Historical Library (WHL)

MS 3782

MSS 1928-41

MSS 1942-47

Washington University in St. Louis, Bernard Becker Medical Library (WUSL)

Bernard Becker Medical Library, Archives and Rare Books, call number: xxWZ 260 C967L 1767, Vols. 1 & 2.

Yale Medical Library (YML)

-Lectures upon the institutions of medicine: in five volumes / by William Cullen. Edinburgh, 1768-69.

—>A note about this manuscript: there does not appear to be a call number associated with these volumes so I have referred to them by a shortened version of their title, and volume and page number. And the volume itself is *not* paginated, so I have included my own pagination, which I believe to be correct (excluding the initial title page).

-Lectures upon the practice of physick / by Wm. Cullen. Edinburgh 1769/70. In four volumes.

Primary Sources

- Anderson, James. "Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh." *The Bee, or Literary Weekly Intelligencer* 1, Dec. 22 (1790): 1-10.
- . "Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh, Continued From Page 10." *The Bee, or Literary Weekly Intelligencer* 1, Jan. 12 (1791): 45-56.
- . "Cursory Hints and Anecdotes of the Late Doctor William Cullen of Edinburgh, Continued From Page 56." *The Bee, or Literary Weekly Intelligencer* 1, Jan. 26 (1791): 121-125.
- Anon. *A Letter to George Cheyne ... Shewing the Danger of Laying Down General Rules to Those Who Are Not Acquainted with the Animal Oeconomy*. London, 1724.
- . *An Address to the Proprietors of the South-Sea Capital. Containing, A Discovery of the Illicit Trade, Carry'd on in the West-Indies; And Shewing the Great Detriment Thereof to the Publick; And the Necessity of Discouraging It with Rigour, Notwithstanding the Pains Taken to Gloss It Over; And to Recommend Your Cautious and Tender Resentments. By a Proprietor of the Said Company*. London: Stephen Austen, 1732.
- . *A Funeral Oration in Honour of Miss Jenny Muir, A Celebrated Lady of Pleasure by Miss Betty Montgomery, Her Dear Friend and Successor*. Amsterdam. c. 1757.
- . *Address to the Citizens of Edinburgh*. Edinburgh, 1764. A copy can be found at NLS, Shelfmark 5.1113(36).
- . *A Letter From A Citizen of Edinburgh, to Doctor Puff*. Edinburgh, 1764.
- . *A Catalogue of Medical Books*. Edinburgh: Royal College of Physicians of Edinburgh, 1792. Held at RCPE, Strong Room, SN 6.3.
- Arbuthnot, John. *An Essay Concerning the Nature of Aliments, and the Choice of Them, According to the Different Constitutions of Human Bodies: In Which the Different Effects, Advantages, and Disadvantages of Animal and Vegetable Diet, Are Explain'd*. London: J. Tonson, 1735.
- Armstrong, John. *The Art of Preserving Health: A Poem. In Four Books. The Second Edition*. London: A. Millar, 1745.
- Bell, John. *Answer for the Junior Members of the Royal College of Surgeons, of Edinburgh, to the Memorial of Dr. James Gregory*. Edinburgh: Peter Hill, 1800.
- Black, Joseph. *The Correspondence of Joseph Black*. Edited by R. G. W. Anderson and Jean Jones. Farnham: Ashgate, 2012.

- Blair, James, Alexander Monro Drummond, James Maddocks, and Thomas Smith. *Address of the Students of Medicine, to the Right Hon. The Lord Provost, Magistrates, and Town-Council of the City of Edinburgh*. 1766. A copy can be found at NLS, Shelfmark 5.1815(3).
- Boerhaave, Herman. *Dr. Boerhaave's Academical Lectures on the Theory of Physic. Vol. II. Containing the Structure and Action of the Vital or Sanguificative Organs; Viz. The Heart, Lungs, Blood and Its Vessels, Glands, Brain and Nerves, &c.* 6 vols. London: W. Innys, 1743.
- . *Dr. Boerhaave's Academical Lectures on the Theory of Physic. Vol. III. Containing the Structure and Action of the Spleen, Omentum, Liver, Kidneys, Bladder, Muscles and Skin; With the Nature of Sweat, Perspiration and Nutrition.* 6 vols. London: W. Innys, 1744.
- . *Dr. Boerhaave's Academical Lectures on the Theory of Physic. Vol. IV. Containing the Oeconomy of the External and Internal Senses, Sleep, and Respiration.* 6 vols. London: W. Innys, 1745.
- . *Boerhaave's Orations*. Edited by Antonie M. Luyendijk-Elshout and E. Kegel-Brinkgreve. Leiden: Leiden University Press, 1983.
- Bostock, John. *A Sketch of the History of Medicine, From Its Origin to the Commencement of the Nineteenth Century*. London: Sherwood, Gilbert, and Piper, 1835.
- Bower, Alexander. *The History of the University of Edinburgh. Vol. II*. Edinburgh: Alexander Smellie, 1817.
- Brown, Gustavus Ricardus. *Disputatio Physica Inauguralis, De Ortu Animalium Caloris*. Edinburgi: Balfour, Auld, et Smellie, 1768.
- Brown, John. *Elementa Medicinæ*. Edinburgi: C. Elliot, 1780.
- . *Observations on the Principles of the Old System of Physic, Exhibiting a Compend of the New Doctrine*. Edinburgh: Apollo Press, by Martin and McDowall, 1787.
- . *The Elements of Medicine of John Brown, M.D. Translated From the Latin, with Comments and Illustrations, by the Author. A New Edition, Revised and Corrected. With a Biographical Preface by Thomas Beddoes. In Two Volumes*. London: J. Johnson, 1795.
- . *The Works of Dr. John Brown: To Which Is Prefixed a Biographical Account of the Author, by William Cullen Brown. In Three Volumes*. Edited by William Cullen Brown and Samuel Lynch. 3 vols. London: J. Johnson, 1804.
- Brucker, Jacob. *Institutiones Historiæ Philosophicæ. Editio Secunda Auctior Et Emendatior*. Lipsiæ, 1756.

- Buchan, William. *Domestic Medicine: Or, A Treatise on the Prevention and Cure of Diseases by Regimen and Simple Medicines. With An Appendix, Containing a Dispensatory for the Use of Private Practitioners. The Third Edition, with Considerable Additions*. London: W. Strahan, T. Cadell; J. Balfour, W. Creech, at Edinburgh, 1774.
- . *Observations Concerning the Prevention and Cure of the Venereal Disease*. London: T. Chapman, 1796.
- Burton, William. *An Account of the Life and Writings of Herman Boerhaave. 2nd Edition*. London: Henry Linton, 1746.
- Carlyle, Alexander. *Autobiography of the Rev. Dr Alexander Carlyle, Minister of Inveresk, Containing Memorials of the Men and Events of His Time*. 2nd ed. Edited by John H. Burton. Edinburgh: William Blackwood and Sons, 1860.
- Celsus. *On Medicine. Books I-IV*. Translated by W. G. Spencer. The Loeb Classical Library 292. Cambridge: Harvard University Press, 1935.
- Cheyne, George. *An Essay of Health and Long Life*. London: G. Strahan, 1724.
- Cornaro, Luigi. *Discourses on a Sober and Temperate Life*. London: Benjamin White, 1768.
- Craigie, David. "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson." *The Edinburgh Medical and Surgical Journal* 38, no. 113 (1832): 384-420.
- . *Elements of the Practice of Physic: Presenting a View of the Present State of Special Pathology and Therapeutics*. Edinburgh: Adam and Charles Black, 1837.
- . *Elements of General and Pathological Anatomy: Presenting a View of the Present State of Knowledge in These Branches. Second Edition, Enlarged, Revised, and Improved*. Philadelphia: Lindsay and Blakiston, 1851.
- "Cullen, William (O. P. R. Births 647/00 0020 0063 Hamilton)." Hamilton Parish (Lanarkshire, Scotland), *Old Parish Registers*, OPR 647/00 0020 0063, 02/05/1710, Digital Image, *ScotlandsPeople*: <http://www.scotlandspeople.gov.uk> [Accessed 02 June, 2011. Crown copyright].
- Curll, Edmund. *Memoirs of the Life and Writings of Matthew Tindall, L.L.D.: With a History of the Controversies Wherein He Was Engaged*. London: E. Curll, 1733.
- D'Alembert, Jean Le Rond, and Denis Diderot, eds. *Encyclopédie, Ou Dictionnaire Raisoné Des Sciences, Des Arts Et Des Métiers. Vol. 5*. Paris, 1755.

Douglas, David. *Dissertations by Eminent Members of the Royal Medical Society*. Edinburgh: Royal Medical Society, 1892.

Enfield, William. *The History of Philosophy, From the Earliest Times to the Beginning of the Present Century: Drawn Up From Brucker's Historia Critica Philosophiae. In Two Volumes. Vol. I*. London: J. F. Dove, 1819.

———. *The History of Philosophy, From the Earliest Times to the Beginning of the Present Century: Drawn Up From Brucker's Historia Critica Philosophiae. In Two Volumes. Vol. II*. London: J. F. Dove, 1819.

Fuller, Francis. *Medicina Gymnastica: Or, a Treatise Concerning the Power of Exercise, with Respect to the Animal Oeconomy; And the Great Necessity of It in the Cure of Several Distempers. By Francis Fuller. The Second Edition, with Additions*. London: Robert Knaplock, 1705.

Galen. "On the Sects for Beginners." In *Three Treatises on the Nature of Science*. Translated by R. Walzer and M. Frede. Indianapolis: Hackett Publishing Co., 1985.

———. *Galen: Selected Works*. Edited by Peter N. Singer. Oxford: Oxford University Press, 1997.

Gregory, James. *Memorial to the Managers of the Royal Infirmary*. Edinburgh: Murray & Cochrane, 1800.

———. *Additional Memorial to the Managers of the Royal Infirmary*. Edinburgh: Murray & Cochrane, 1803.

Gregory, John. *Lectures on the Duties and Qualifications of a Physician*. New Edition, corrected and enlarged ed. London: W. Strahan, T. Cadell, 1772.

Hales, Stephen. *Statical Essays: Containing Haemastatics; Or, An Account of Some Hydraulic and Hydrostatical Experiments Made on the Blood and Blood-Vessels of Animals*. London: W. Innys and R. Manby, 1733.

Haller, Albrecht von. *Opera Minora Emendata, Aucta, Et Renovata. Tomus Primus. Anatomica; Ad Partes Corporis Humani, Vitales, Animales, Naturales*. Lausannae: Francisci Grasset, 1763.

———. *Primae Lineae Physiologiae, in Usus Praelectionum Academicarum, Ad Editionem Tertio Auctam & Emendatam Expressae. Accedit Rerum Index*. Edinburgi: Kincaid & Bell, 1767.

———. *First Lines of Physiology, by the Celebrated Baron Albertus Haller, M.D. &c. Translated From the Correct Latin Edition Printed Under the Inspection of William Cullen, M.D. And Compared with the Edition Published by H.A. Wrisberg, M.D. Professor at Gottingen. To Which Are Added, the Valuable Index Originally Composed for Dr Cullen's Edition; And All the Notes and*

- Illustrations of Prof. Wrisberg, Now First Translated Into English. In Two Volumes. Vol. I.* Edinburgh: Charles Elliot, 1786.
- . *First Lines of Physiology, by the Celebrated Baron Albertus Haller, M.D. &c. Translated From the Correct Latin Edition Printed Under the Inspection of William Cullen, M.D. And Compared with the Edition Published by H.A. Wrisberg, M.D. Professor at Gottingen. To Which Are Added, the Valuable Index Originally Composed for Dr Cullen's Edition; And All the Notes and Illustrations of Prof. Wrisberg, Now First Translated Into English. In Two Volumes. Vol. II.* Edinburgh: Charles Elliot, 1786.
- Hamilton, Sir William. "Review of *An Account of the Life, Lectures, and Writings of William Cullen, M.D. Professor of the Practice of Physic in the University of Edinburgh*. By John Thomson, M.D." *The Edinburgh Review* 55, no. 110 (1832): 461-479.
- Hartley, David. *Observations on Man, His Frame, His Duty, and His Expectations. In Two Parts.* London: S. Richardson, 1749.
- Hippocrates. *Hippocratic Writings*. Edited by G. E. R. Lloyd. Translated by E. T. Withington, I. M. Lonie, W. N. Mann and J. Chadwick. London: Penguin Books, 1978.
- Hutcheson, Francis. *A System of Moral Philosophy in Three Books; Written by the Late Francis Hutcheson, L.L.D.* London, 1755.
- Innes, Cosmo, and Joseph Robertson, eds. *Munimenta Alme Universitatis Glasguensis: Records of the University of Glasgow From Its Foundation Till 1727. Vol. III—Lists of Members—Internal Economy.* University of Glasgow, 1854.
- Kerr, Robert. *Memoirs of the Life, Writings, & Correspondence of William Smellie, Late Printer in Edinburgh, Secretary and Superintendent of Natural History to the Society of Scottish Antiquaries. In Two Volumes.* Edinburgh: John Anderson, 1811.
- Langrish, Browne. *The Croonean Lectures on Muscular Motion.* London: C. Davis, 1747.
- Mackenzie, James. *The History of Health and the Art of Preserving It.* Edinburgh: William Gordon, 1758.
- Monro *primus*, Alexander. *The Anatomy of the Human Bones, Nerves, and Lacteal Sac and Duct. Corrected and Enlarged in the Seventh Edition.* Edinburgh: G. Hamilton and J. Balfour, 1763.

- Monro secundus, Alexander. *Observations on the Structure and Functions of the Nervous System. Illustrated with Tables*. Edinburgh: William Creech, 1783.
- Murray, John. *An Author's Conduct to the Public, Stated in the Behaviour of Dr. William Cullen, His Majesty's Physician at Edinburgh*. London: J. Murray, 1784.
- Newton, Isaac. *Opticks: Or, A Treatise of the Reflections, Refractions, Inflections and Colours of Light. The Second Edition, with Additions*. London: W. and J. Innys, 1718.
- . *The Mathematical Principles of Natural Philosophy. Translated Into English. Vol. II*. London: Benjamin Motte, 1729.
- Pinel, Philippe. *Institutions De Médecine-pratique*. Paris: Duplain, 1785.
- . "Clinique." In *Dictionnaire Des Sciences Medicales. Tome Cinquième*. Edited by C. L. F. Panckoucke. Paris, 1813.
- Plato. *Plato: Complete Works*. Edited by D. S. Hutchinson and John M. Cooper. Indianapolis: Hackett Publishing, 1997.
- Robinson, Bryan. *A Dissertation on the Aether of Sir Isaac Newton*. Dublin: Geo. Ewing and Wil. Smith, 1743.
- de la Roche, Daniel. *Analyse Des Fonctions Du Système Nerveux*. Geneva: Du Villard Fils & Nouffer, 1778.
- Rush, Benjamin. *The Letters of Benjamin Rush. In Two Volumes*. Edited by L. H. Butterfield. Princeton: Princeton University Press, 1951.
- Smellie, William. *Encyclopaedia Britannica; Or, a Dictionary of Arts and Sciences, Compiled Upon a New Plan. Illustrated with One Hundred and Sixty Copperplates. By a Society of Gentlemen in Scotland*. First ed. 3 vols. Edinburgh: A. Bell and C. Macfarquhar, 1771.
- . "Aether." *Encyclopaedia Britannica; Or, a Dictionary of Arts and Sciences, Compiled Upon a New Plan. Illustrated with One Hundred and Sixty Copperplates. By a Society of Gentlemen in Scotland* 1 (1771): 31-4.
- Swift, Jonathan. *A Tale of a Tub. Written for the Universal Improvement of Mankind. To Which Is Added, An Account of a Battel [sic] Between the Antient and Modern Books in St. James's Library*. London: John Nutt, 1704.
- Sydenham, Thomas. *Methodus Curandi Febres: Propriis Observationibus Superstructa*. London, 1666.

- . *The Whole Works of That Excellent Practical Physician, Dr. Thomas Sydenham. The Tenth Edition.* Translated by John Pechey. London: W. Feales, R. Wellington, J. Wellington, A. Bettsworth, F. Clay, 1734.
- . *The Works of Thomas Sydenham, M.D. Translated From the Latin Edition of Dr. Greenhill with a Life of the Author by R. G. Latham, M.D. In Two Volumes. Vol. II.* London: Sydenham Society, 1850.
- Thomson, John. *An Account of the Life, Lectures and Writings, of William Cullen, M.D. In Two Volumes. Vol. I.* William Blackwood, Edinburgh; T. Cadell, Strand, London, 1832.
- . *An Account of the Life, Lectures and Writings of William Cullen, M.D. In Two Volumes. Vol. II. Commenced by Dr John Thomson and Dr William Thomson, and Concluded by David Craigie, M.D.* Edinburgh and London: William Blackwood and Sons, 1859.
- , ed. *The Works of William Cullen: Containing His Physiology, Nosology, and First Lines of the Practice of Physic; With Numerous Extracts From His Manuscript Papers, and From His Treatise of the Materia Medica. Volume 1.* Edinburgh: William Blackwood, 1827.
- Tindal, Matthew. *Christianity As Old As the Creation: Or, the Gospel, a Republication of the Religion of Nature. Volume 1.* London, 1730.
- Tissot, S. A. *Advice to People in General, with Respect to Their Health.* 2 vols. Edinburgh: A. Donaldson, 1766.
- Tytler, James, ed. *Encyclopaedia Britannica; Or, a Dictionary of Arts and Sciences, &c. On a Plan Entirely New. The Second Edition; Greatly Improved and Enlarged.* Edinburgh: J. Balfour and Co., W. Gordon, J. Bell, J. Dickson, C. Elliot, W. Creech, J. McCliesh, A. Bell, J. Hutton, and C. Macfarquhar, 1778.
- Whytt, Robert. *An Essay on the Vital and Other Involuntary Motions of Animals. The Second Edition, with Corrections and Additions.* Edinburgh: John Balfour, 1763.

Secondary Sources

- Ackerknecht, E. H. *Medicine at the Paris Hospital, 1794-1848*. Baltimore: Johns Hopkins Press, 1967.
- Aitken, George A. *The Life and Works of John Arbuthnot, M.D.* Oxford: Clarendon Press, 1892.
- Albrecht, Michael. *Eklektik: Eine Begriffsgechichte Mit Hinweisen Auf Die Philosophie-und Wissenschaftsgeschichte*. Stuttgart-Bad Cannstatt: Frommann-Holzboog, 1994.
- Allen, Richard C. *David Hartley on Human Nature*. Albany: State University of New York Press, 1999.
- Anderson, R. G. W., and A. D. C. Simpson, eds. *The Early Years of the Edinburgh Medical School*. Edinburgh: Royal Scottish Museum, 1976.
- Anstey, Peter. "The Creation of the English Hippocrates." *Medical History* 55, no. 4 (2011): 457-478.
- Armstrong, John. *John Armstrong's the Art of Preserving Health: Eighteenth-century Sensibility in Practice*. Edited by Adam Budd. Farnham: Ashgate, 2011.
- Asner, Glen. "Absorption, Refrigeration." In *Encyclopedia of 20th-Century Technology*. Edited by Colin Hempstead and William Worthington. London: Routledge, 2004. 670-672.
- Barfoot, Michael. "James Gregory (1753-1821) and Scottish Scientific Metaphysics, 1750-1800." PhD Thesis, Edinburgh: University of Edinburgh, 1983.
- . "Dr. William Cullen and Mr. Adam Smith: A Case of Hypochondriasis?" *Proceedings of the Royal College of Physicians of Edinburgh* 21, no. 2 (1991): 204-14.
- . "Philosophy and Method in Cullen's Medical Teaching." In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- . "Introduction." In *An Account of the Life, Lectures, and Writings of William Cullen, Vol. I. John Thomson. With a New Introduction by Mike Barfoot*. Lives of the Literati. Bristol: Thoemmes Press, 1997.
- Bassiri, Nima. "The Brain and the Unconscious Soul in Eighteenth-Century Nervous Physiology: Robert Whytt's *Sensorium Commune*." *Journal of the History of Ideas* 74, no. 3 (2013): 425-448.

- Bates, Donald G. "Thomas Sydenham: The Development of His Thought, 1666-1676." PhD Thesis, Baltimore: The Johns Hopkins University, 1975.
- . "Sydenham and the Medical Meaning of Method." *Bulletin of the History of Medicine* 51, no. 3 (1977): 324-338.
- Beatty, Heather R. *Nervous Disease in Late Eighteenth-century Britain: The Reality of a Fashionable Disorder*. Studies for the Society for the Social History of Medicine. London: Pickering & Chatto, 2012.
- De Beer, G. "Sir Charles Blagden's First Visit to Switzerland." *Gesnerus* 11, no. 1-2 (1954): 17-35.
- Bell, Jr., Whitfield J. "Some American Students of 'That Shining Oracle of Physic,' Dr. William Cullen of Edinburgh, 1755-1766." *Proceedings of the American Philosophical Society* 94, no. 3 (1950): 275-281.
- Berryman, Jack W., and Roberta J. Park, eds. *Sport and Exercise Science: Essays in the History of Sports Medicine*. Urbana: University of Illinois Press, 1992.
- Booth, Emily. *'A Subtle and Mysterious Machine': The Medical World of Walter Charleton (1619-1707)*. Dordrecht: Springer, 2005.
- Bowman, Inci A. "William Cullen (1710-90) and the Primacy of the Nervous System." PhD thesis, Bloomington: Indiana University, 1975.
- Boyes, J. "Sir Robert Sibbald: A Neglected Scholar." In *The Early Years of the Edinburgh Medical School*. Edited by R. G. W. Anderson and A. D. C. Simpson. Edinburgh: Royal Scottish Museum, 1976.
- Brazier, Mary A. B. *A History of Neurophysiology in the 17th and 18th Centuries: From Concept to Experiment*. New York: Raven Press, 1984.
- Broadie, Alexander. *The Scottish Enlightenment: An Anthology*. Edinburgh: Canongate Books, 1997.
- , ed. *The Cambridge Companion to the Scottish Enlightenment*. Cambridge: Cambridge University Press, 2003.
- . *The Scottish Enlightenment*. Edinburgh: Birlinn, 2007.
- Brodsky, Alyn. *Benjamin Rush: Patriot and Physician*. New York: St. Martin's Press, 2013.
- Broman, Thomas. "Rethinking Professionalization: Theory, Practice, and Professional Ideology in Eighteenth-Century German Medicine." *The Journal of Modern History* 67, no. 4 (1995): 835-872.

- Brown, Stephen W. "William Smellie and the Culture of the Edinburgh Book Trade, 1752-1795." In *The Culture of the Book in the Scottish Enlightenment*. Edited by Paul Wood. Toronto: University of Toronto Press, 2000.
- . "William Smellie and Natural History: Dissent and Dissemination." In *Science and Medicine in the Scottish Enlightenment*. Edited by Paul Wood and Charles W. J. Withers. East Linton: Tuckwell Press, 2002.
- Bryson, Gladys. *Man and Society: The Scottish Inquiry of the Eighteenth Century*. Princeton, NJ: Princeton University Press, 1945.
- Buchet, Christian, ed. *L'Homme, La Santé Et La Mer: Actes Du Colloque International Tenu À L'Institut Catholique De Paris Les 5 Et 6 Décembre 1995*. Paris: H. Champion, 1997.
- Bylebyl, J. J. "Galen on the Non-natural Causes of Variation in the Pulse." *Bulletin of the History of Medicine* 45, no. 5 (1971): 482-485.
- Bynum, W. F. "Cullen and the Study of Fevers in Britain, 1760-1820." *Medical History. Supplement*, no. 1 (1981): 135-47
- , and Roy Porter, eds. *Brunonianism in Britain and Europe. Medical History, Supplement 8*. London: The Wellcome Trust Centre for the History of Medicine, 1988.
- . "Cullen and the Nervous System." In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- . "Nosology." In *Companion Encyclopedia of the History of Medicine: Volume 1*. Edited by W. F. Bynum and Roy Porter. London: Routledge, 1993.
- . "William Cullen (1710-1790)." In *Oxford Dictionary of National Biography*. Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/6874> [Accessed 17 June, 2011].
- Cantor, David, ed. *Reinventing Hippocrates: The History of Medicine in Context*. Aldershot: Ashgate, 2002.
- Cantor, G. N. *Optics After Newton: Theories of Light in Britain and Ireland, 1704—1840*. Manchester: Manchester University Press, 1983.
- , and M. J. S. Hodge, eds. *Conceptions of Ether: Studies in the History of Ether Theories, 1740-1900*. Cambridge: Cambridge University Press, 1981.
- de Ceglia, Francesco Paolo. "The Blood, the Worm, the Moon, the Witch: Epilepsy in Georg Ernst Stahl's Pathological Architecture." *Perspectives on Science* 12, no. 1 (2004): 1-28.

- . “Hoffmann and Stahl. Documents and Reflections on the Dispute.” *History of Universities* XXII/1 (2004): 98-140.
- Champion, J. A. I. *The Pillars of Priestcraft Shaken: The Church of England and Its Enemies, 1660-1730*. Cambridge: Cambridge University Press, 1992.
- Chang, Ku-Ming. “Motus Tonicus: Georg Ernst Stahl's Formulation of Tonic Motion and Early Modern Medical Thought.” *Bulletin of the History of Medicine* 78, no. 4 (2004): 767-803.
- Christie, J. R. R. “Ether and the Science of Chemistry: 1740-1790.” In *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*. Edited by G. N. Cantor and M. J. S. Hodge. Cambridge: Cambridge University Press, 1981.
- . “William Cullen and the Practice of Chemistry.” In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- . “Historiography of Chemistry in the Eighteenth Century: Hermann Boerhaave and William Cullen.” *Ambix* 41, no. 1 (1994): 4-19.
- Clarke, Edwin. “The Doctrine of the Hollow Nerve in the Seventeenth and Eighteenth Centuries.” In *Medicine, Science and Culture: Historical Essays in Honor of Owsei Temkin*. Edited by Lloyd G. Stevenson and Robert P. Multhauf. Baltimore: Johns Hopkins University Press, 1968.
- , and L. S. Jacyna. *Nineteenth-Century Origins of Neuroscientific Concepts*. Berkeley: University of California Press, 1992.
- , and Charles Donald O'Malley, eds. *The Human Brain and Spinal Cord: A Historical Study Illustrated by Writings From Antiquity to the Twentieth Century. Second Edition, Revised and Enlarged*. San Francisco: Norman Publishing, 1996.
- Coleman, William. “Health and Hygiene in the *Encyclopédie*: A Medical Doctrine for the Bourgeoisie.” *Journal of the History of Medicine and Allied Sciences* 29, no. 4 (1974): 399-421.
- Conrad, Lawrence I., Michael Neve, Vivian Nutton, Roy Porter, and Andrew Wear. *The Western Medical Tradition: 800 BC to AD 1800*. Cambridge: Cambridge University Press, 1995.
- Cook, Harold J. *The Decline of the Old Medical Regime in Stuart London*. Ithaca: Cornell University Press, 1986.
- . “Good Advice and Little Medicine: The Professional Authority of Early Modern English Physicians.” *Journal of British Studies* 33, no. 1 (1994): 1-31.
- . “Boerhaave and the Flight From Reason in Medicine.” *Bulletin of the History of Medicine* 74, no. 2 (2000): 221-240.

- Cordell, Eugene F. "The Doctors Gustavus Brown of Lower Maryland." *The Johns Hopkins Hospital Bulletin* 13, no. 137-138 (1902): 188-192.
- Coutts, James. *History of the University of Glasgow, 1451-1909*. Glasgow: James Maclehose and Sons, 1909.
- Crellin, J. K. "William Cullen: His Calibre As a Teacher, and An Unpublished Introduction to His *A Treatise of the Materia Medica*, London, 1773." *Medical History* 15, no. 1 (1971): 79-87.
- . "William Cullen and Practical Chemistry." *Actes du XIIe Congrès International d'Histoire des Sciences, Paris, 1968* 6 (1971): 17-21.
- Crosland, M. P. "The Use of Diagrams As Chemical 'Equations' in the Lecture Notes of William Cullen and Joseph Black." *Annals of Science* 15, no. 2 (1959): 75-90.
- Cunningham, Andrew. "Sydenham Versus Newton: The Edinburgh Fever Dispute of the 1690s Between Andrew Brown and Archibald Pitcairne." *Medical History Supplement No. 1* (1981): 71-98.
- . "Thomas Sydenham: Epidemics, Experiment and the 'Good Old Cause'." In *The Medical Revolution of the Seventeenth Century*. Edited by Andrew Wear and Roger K. French. Cambridge: Cambridge University Press, 1989.
- . "Medicine to Calm the Mind: Boerhaave's Medical System, and Why It Was Adopted in Edinburgh." In *The Medical Enlightenment of the Eighteenth Century*. Edited by Andrew Cunningham and Roger K. French. Cambridge: Cambridge University Press, 1990.
- . "The Transformation of Hippocrates in Seventeenth-Century Britain." In *Reinventing Hippocrates: The History of Medicine in Context*. Edited by David Cantor. Aldershot: Ashgate, 2002.
- , and Ole Peter Grell, eds. *Medicine and Religion in Enlightenment Europe. The History of Medicine in Context*. Aldershot: Ashgate, 2006.
- Dalzel, Andrew. *History of the University of Edinburgh From Its Foundation. Vol. II —History*. Edinburgh: Edmonston and Douglas, 1862.
- D'Elia, Donald J. "The Republican Theology of Benjamin Rush." *Pennsylvania History* 33, no. 2 (1966): pp. 187-203.
- Devine, T. M., and Gordon Jackson, eds. *Glasgow: Beginnings to 1830*. Manchester: Manchester University Press, 1995.
- Dewhurst, Kenneth. *Dr. Thomas Sydenham (1624-1689): His Life and Original Writings*. London: Wellcome Historical Medical Library, 1966.

- Dixon, Thomas M. *From Passions to Emotions: The Creation of a Secular Psychological Category*. Cambridge: Cambridge University Press, 2003.
- Dobbin, Leonard. "A Cullen Chemical Manuscript of 1753." *Annals of Science* 1, no. 2 (1936): 138-156.
- Doig, A., J. P. S. Ferguson, I. A. Milne, and R. Passmore, eds. *William Cullen and the Eighteenth Century Medical World*. Edinburgh: Edinburgh University Press, 1993.
- Donini, Pierluigi. "The History of the Concept of Eclecticism." In *The Question of "Eclecticism": Studies in Later Greek Philosophy*. Edited by John M. Dillon and A. A. Long. Berkeley: University of California Press, 1996.
- Donovan, Arthur L. *Philosophical Chemistry in the Scottish Enlightenment: The Doctrines and Discoveries of William Cullen and Joseph Black*. Edinburgh: Edinburgh University Press, 1975.
- Duchesneau, François. *La Physiologie Des Lumières: Empirisme, Modèles Et Théories*. International Archives of the History of Ideas. The Hague: Martinus Nijhoff, 1981.
- Duncan, Alexander. *Memorials of the Faculty of Physicians and Surgeons of Glasgow, 1599-1850*. Glasgow: James Maclehose and Sons, 1896.
- Elster, Jon. *Alchemies of the Mind: Rationality and the Emotions*. Cambridge: Cambridge University Press, 1999.
- Emerson, Roger L. "Natural Philosophy and the Problem of the Scottish Enlightenment." *Studies on Voltaire and the Eighteenth Century*, no. 242 (1986): 243-291.
- . "Sir Robert Sibbald, Kt, the Royal Society of Scotland and the Origins of the Scottish Enlightenment." *Annals of Science* 45 (1988): 41-72.
- . "Science and the Origins and Concerns of the Scottish Enlightenment." *History of Science* 26 (1988): 333-66.
- . "Science and Moral Philosophy in the Scottish Enlightenment." In *Studies in the Philosophy of the Scottish Enlightenment*. Edited by M.A. Stewart. Oxford, UK: Clarendon Press, 1990.
- . "Medical Men, Politicians and the Medical Schools at Glasgow and Edinburgh 1685-1803." In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- . "The Founding of the Edinburgh Medical School." *Journal of the History of Medicine and Allied Sciences* 59 (2004): 183-218.

- . *Academic Patronage in the Scottish Enlightenment: Glasgow, Edinburgh and St Andrews Universities*. Edinburgh: Edinburgh University Press, 2008.
- Estes, J. Worth. "The Medical Properties of Food in the Eighteenth Century." *Journal of the History of Medicine and Allied Sciences* 51, no. 2 (1996): 127-154.
- Faber, Knud. *Nosography: The Evolution of Clinical Medicine in Modern Times. Second Edition, Revised*. New York: Paul B. Hoeber, 1930.
- Fara, Patricia. *An Entertainment for Angels: Electricity in the Enlightenment*. New York: Columbia University Press, 2003.
- Fauque, Danielle M. E. "An Englishman Abroad: Charles Blagden's Visit to Paris in 1783." *Notes and Records of the Royal Society* 62, no. 4 (2008): 373-390.
- Fischer-Homberger, Esther. "Eighteenth-century Nosology and Its Survivors." *Medical History* 14, no. 4 (1970): 397-403.
- Fleßenkämper, Iris. "From Aristocratic Support to Academic Office: Patronage and University in the Scottish Enlightenment." In *Scholars in Action: The Practice of Knowledge and the Figure of the Savant in the 18th Century. Volume I*. Edited by Andre Holenstein, Hubert Steinke, Martin Stuber, and Phillipe Rogger. 2 vols. Leiden: Koninklijke Brill NV, 2013.
- French, Roger K. *Robert Whytt, the Soul, and Medicine*. London: Wellcome Institute, 1969.
- . "Ether and Physiology." In *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*. Edited by G. N. Cantor and M. J. S. Hodge. Cambridge: Cambridge University Press, 1981.
- . "Sickness and the Soul: Stahl, Hoffmann and Sauvages on Pathology." In *The Medical Enlightenment of the Eighteenth Century*. Edited by Andrew Cunningham and Roger K. French. Cambridge: Cambridge University Press, 1990.
- Frixione, Eugenio. "Irritable Glue: The Haller-Whytt Controversy on the Mechanism of Muscle Contraction." In *Brain, Mind and Medicine: Essays in Eighteenth-Century Neuroscience*. Edited by Harry Whitaker, C. U. M. Smith and Stanley Finger. New York: Springer, 2007.
- Frixione, Eugenio, Stanley Finger, William Clower, and C. U. M. Smith. *The Animal Spirit Doctrine and the Origins of Neurophysiology*. Oxford: Oxford University Press, 2012.

- Garcia-Ballester, Luis. "On the Origin of the Six Non-natural Things in Galen." *Sudhoffs Archiv. Beihefte*, no. 32 (1993): 105-115.
- Gaukroger, Stephen. *The Emergence of a Scientific Culture: Science and the Shaping of Modernity 1210-1685*. Oxford: Oxford University Press, 2006.
- , ed. *The Soft Underbelly of Reason: The Passions in the Seventeenth Century*. London: Routledge, 1998.
- Getman, Frederick H. "Sir Charles Blagden, F.R.S." *Osiris* 3 (1937): 69-87.
- Geyer-Kordesch, Johanna. "Fevers and Other Fundamentals: Dutch and German Medical Explanations c. 1680 to 1730." *Medical History. Supplement*, no. 1 (1981): 99-120.
- . "Georg Ernst Stahl's Radical Pietist Medicine and Its Influence on the German Enlightenment." In *The Medical Enlightenment of the Eighteenth Century*. Edited by Andrew Cunningham and Roger K. French. Cambridge: Cambridge University Press, 1990.
- , Fiona A. Macdonald, and Andrew Hull. *Physicians and Surgeons in Glasgow: The History of the Royal College of Physicians and Surgeons of Glasgow, 1599-1858*. London: The Hambledon Press, 1999.
- . *Pietismus, Medizin Und Aufklärung in Preussen Im 18. Jahrhundert: Das Leben Und Werk Georg Ernst Stahls*. Tübingen: Max Niemeyer Verlag, 2000.
- Gigliani, Guido. "What Ever Happened to Francis Glisson? Albrecht Haller and the Fate of Eighteenth-Century Irritability." *Science in Context* 21, no. 04 (2008): 465-493.
- Golinski, J. V. "Utility and Audience in Eighteenth-century Chemistry: Case Studies of William Cullen and Joseph Priestley." *The British Journal for the History of Science* (1988): 1-31.
- . *Science As Public Culture: Chemistry and Enlightenment in Britain, 1760-1820*. Cambridge: Cambridge University Press, 1992.
- Gray, James. *History of the Royal Medical Society, 1737-1937*. Edinburgh: Edinburgh University Press, 1952.
- Gruman, Gerald J. "A History of Ideas About the Prolongation of Life: The Evolution of Prolongevity Hypotheses to 1800." *Transactions of the American Philosophical Society* (1966): 1-102.
- Guerrini, Anita. "James Keill, George Cheyne, and Newtonian Physiology, 1690-1740." *Journal of the History of Biology* 18, no. 2 (1985): 247-66.
- . "The Tory Newtonians: Gregory, Pitcairne, and Their Circle." *Journal of British Studies* XXV (1986): 288-311.

- . “Isaac Newton, George Cheyne and the ‘Principia Medicinae’.” In *The Medical Revolution of the Seventeenth Century*. Edited by Andrew Wear and Roger K. French. Cambridge: Cambridge University Press, 1989.
- . “A Diet for a Sensitive Soul: Vegetarianism in Eighteenth-Century Britain.” *Eighteenth-Century Life* 23, no. 2 (1999): 34-42.
- . *Obesity and Depression in the Enlightenment: The Life and Times of George Cheyne*. Norman: University of Oklahoma Press, 2000.
- . “Alexander Monro Primus and the Moral Theatre of Anatomy.” *The Eighteenth Century* 47, no. 1 (2006): 1-18.
- Haakonssen, Lisbeth. *Medicine and Morals in the Enlightenment: John Gregory, Thomas Percival and Benjamin Rush*. *Clio Medica* 44: Wellcome Institute Series in the History of Medicine. Amsterdam: Rodopi, 1997.
- Hakfoort, Casper. *Optics in the Age of Euler: Conceptions of the Nature of Light, 1700-1795*. Cambridge: Cambridge University Press, 2006.
- Hall, Thomas S. *Ideas of Life and Matter: Studies in the History of General Physiology, 600 B.C.— 1900 A.D. In Two Volumes*. Chicago: Chicago University Press, 1968.
- Hannaway, Caroline, and Ann La Berge, eds. *Constructing Paris Medicine*. *Clio Medica* 50. Amsterdam: Rodopi, 1998.
- Hawke, David Freeman. *Benjamin Rush: Revolutionary Gadfly*. Indianapolis: Bobbs-Merrill Co., 1971.
- Heberden, Ernest. “Correspondence of William Heberden, FRS with the Reverend Stephen Hales and Sir Charles Blagden.” *Notes and Records of the Royal Society of London* (1985): 179-189.
- Heilbron, J. L. *Electricity in the 17th and 18th Century: A Study of Early Modern Physics*. Berkeley: University of California Press, 1979.
- Heimann, P. M. “Nature Is a Perpetual Worker: Newton's Aether and Eighteenth-Century Natural Philosophy.” *Ambix* 20, no. 1 (1973): 1-25.
- . “Ether and Imponderables.” In *Conceptions of Ether: Studies in the History of Ether Theories 1740-1900*. Edited by G. N. Cantor and M. J. S. Hodge. Cambridge: Cambridge University Press, 1981.
- Henry, John. “Doctors and Healers: Popular Culture and the Medical Profession.” In *Science, Culture and Popular Belief in Renaissance Europe*. Edited by Stephen Pumfrey, Paolo L. Rossi, and Maurice Slawinski. Manchester: Manchester University Press, 1991.

- Home, R. W. "Electricity and the Nervous Fluid." *Journal of the History of Biology* 3, no. 2 (1970): 235-251.
- , ed. *Aepinus's Essay on the Theory of Electricity and Magnetism. Introductory Monograph and Notes by R. W. Home*. Translated by Peter James Connor. Princeton: Princeton University Press, 1979.
- . "Newton on Electricity and the Aether." *Contemporary Newtonian Research* (1982): 191-213.
- . "Leonhard Euler's 'Anti-Newtonian' Theory of Light." *Annals of Science* 45, no. 5 (1988): 521-533.
- . *Electricity and Experimental Physics in Eighteenth-Century Europe*. Hampshire: Variorum, 1992.
- Hook, Andrew, and Richard B. Sher, eds. *The Glasgow Enlightenment*. East Linton: Tuckwell Press, 1995.
- Houston, Robert Allan. *Literacy in Early Modern Europe: Culture and Education 1500-1800*. London: Longman, 2002.
- Hudson, Geoffrey L., ed. *British Military and Naval Medicine, 1600-1830*. Wellcome Series in the History of Medicine, Clio Medica 81. Amsterdam: Rodopi, 2007.
- Jackson, Stanley W. "The Use of the Passions in Psychological Healing." *Journal of the History of Medicine and Allied Sciences* 45, no. 2 (1990): 150-75.
- Jacyna, L. S. *A Tale of Three Cities: The Correspondence of William Sharpey and Allen Thomson*. *Medical History*, Supplement 9. London: Wellcome Institute for the History of Medicine, 1989.
- . "Robert Carswell and William Thomson at the Hôtel-Dieu of Lyons: Scottish Views of French Medicine." In *British Medicine in An Age of Reform*. Edited by Roger K. French and Andrew Wear. London: Routledge, 1991.
- . *Philosophic Whigs: Medicine, Science, and Citizenship in Edinburgh, 1789-1848*. London: Routledge, 1994.
- James, Susan. *Passion and Action: The Emotions in Seventeenth-century Philosophy*. Oxford: Oxford University Press, 1999.
- Jarcho, Saul. "Galen's Six Non-naturals: A Bibliographic Note and Translation." *Bulletin of the History of Medicine* 44, no. 4 (1970): 372-77.
- Jolley, L. "Two Inquiries About the Bibliography of William Cullen." *The Bibliothek: A Journal of Bibliographical Notes and Queries Mainly of Scottish Interest* (1956): 28-29.

- Jones, Catherine. "Benjamin Rush, Edinburgh Medicine and the Rise of Physician Autobiography." In *Scottish Medicine and Literary Culture, 1726-1832*. Edited by David E. Shuttleton and Megan J. Coyer. Amsterdam: Rodopi, 2014.
- Jordanova, Ludmilla. "The Popularization of Medicine: Tissot on Onanism." *Textual Practice* 1, no. 1 (1987): 68-79.
- Jungnickel, Christa, and Russell McCormach. *Cavendish*. Philadelphia: American Philosophical Society, 1996.
- Kafker, Frank, and Jeff Loveland, eds. *The Early Britannica (1768-1803): The Growth of An Outstanding Encyclopedia*. Oxford: Voltaire Foundation, 2009.
- Kaiser, David, ed. *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*. Cambridge: MIT Press, 2005.
- Kelley, Donald R. "Eclecticism and the History of Ideas." *Journal of the History of Ideas* 62, no. 4 (2001): 577-592.
- Kent, Andrew, ed. *An Eighteenth Century Lectureship in Chemistry: Essays and Bicentenary Addresses Relating to the Chemistry Department (1747) of Glasgow University (1451)*. Glasgow: Jackson, Son & Company, Publishers to the University, 1950.
- King, Lester S. "Nosology." In *The Medical World of the Eighteenth Century*. Chicago: Chicago University Press, 1958.
- . "Rationalism in Early Eighteenth Century Medicine." *Journal of the History of Medicine and Allied Sciences* 18 (1963): 257-71.
- . "Stahl and Hoffmann: A Study in Eighteenth-century Animism." *Journal of the History of Medicine and Allied Sciences* 19 (1964): 118-130.
- . "Boissier De Sauvages and 18th Century Nosology." *Bulletin of the History of Medicine* 40, no. 1 (1966): 43-51.
- . "Introduction." In *First Lines of Physiology by the Celebrated Baron Albertus Haller M.D. &c. Two Volumes in One. A Reprint of the 1786 Edition with a New Introduction by Lester S. King, M.D.* The Sources of Science 32. New York: Johnson Reprint Corporation, 1966.
- . "Empiricism and Rationalism in the Works of Thomas Sydenham." *Bulletin of the History of Medicine* 44, no. 1 (1970): 1-11.
- . "Medical Theory and Practice at the Beginning of the Eighteenth Century." *Bulletin of the History of Medicine* 46, no. 1 (1972): 1-15.
- , and M. C. Meehan. "A History of the Autopsy. A Review." *The American Journal of Pathology* 73, no. 2 (1973): 514-44.
- . "George Cheyne, Mirror of Eighteenth Century Medicine." *Bulletin of the History of Medicine* 48, no. 4 (1974): 517-39.

- . *The Philosophy of Medicine: The Early Eighteenth Century*. Cambridge: Harvard University Press, 1978.
- Klemme, Heiner F. *Reception of the Scottish Enlightenment in Germany: Six Significant Translations, 1755-1782*. Bristol: Thoemmes Press, 2000.
- Knoeff, Rina. *Herman Boerhaave (1668-1738): Calvinist Chemist and Physician*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2002.
- Knoff, William F. "A History of the Concept of Neurosis, with a Memoir of William Cullen." *American Journal of Psychiatry* 127, no. 1 (1970): 80-84.
- Lalor, Stephen. *Matthew Tindal, Freethinker: An Eighteenth-century Assault on Religion*. London: Continuum, 2006.
- Laudan, Larry. *Science and Hypothesis: Historical Essays on Scientific Methodology*. Dordrecht: D. Reidel, 1981.
- Lawrence, Christopher. "William Buchan: Medicine Laid Open." *Medical History* 19, no. 1 (1975): 20-35.
- . "The Nervous System and Society in the Scottish Enlightenment." In *Natural Order: Historical Studies of Scientific Culture*. Edited by Barry Barnes and Steven Shapin. London: Sage, 1979.
- . "Medicine As Culture: Edinburgh and the Scottish Enlightenment." PhD Thesis, London: University of London, 1984.
- . "Ornate Physicians and Learned Artisans: Edinburgh Medical Men, 1726-1776." In *William Hunter and the Eighteenth-Century World*. Edited by William F. Bynum and Roy Porter. Cambridge: Cambridge University Press, 1985.
- . "Alexander Monro Primus and the Edinburgh Manner of Anatomy." *Bulletin of the History of Medicine* 62 (1988): 193-214.
- . "The Edinburgh Medical School and the End of the 'Old Thing' 1790-1830." *History of Universities* 7 (1988): 259-86.
- Lawrence, Paul David. "The Gregory Family: A Biographical and Bibliographical Study, to Which Is Annexed a Bibliography of the Scientific and Medical Books in the Gregory Library, Aberdeen University Library." PhD Thesis, Aberdeen: University of Aberdeen, 1971.
- Leach, R. D. "Sir Gilbert Blane, Bart, MD FRS (1749-1832)." *Annals of the Royal College of Surgeons of England* 62, no. 3 (1980): 232-239.
- Levitin, Dmitri. "Matthew Tindal's Rights of the Christian Church (1706) and the Church-State Relationship." *The Historical Journal* 54, no. 03 (2011): 717-740.

- Lindeboom, G. A. *Herman Boerhaave, the Man and His Work*. London: Methuen & Co Ltd, 1968.
- . “Boerhaave's Concept of the Basic Structure of the Body.” *Clio Medica* 5 (1970): 203-208.
- . *Boerhaave and Great Britain: Three Lectures on Boerhaave with Particular Reference to His Relations with Great Britain*. Leiden: E. J. Brill, 1974.
- Lloyd, G. E. R. “Galen and His Contemporaries.” In *The Cambridge Companion to Galen*. Edited by R. J. Hankinson. Cambridge: Cambridge University Press, 2008.
- López Piñero, José M. *Historical Origins of the Concept of Neurosis*. Translated by D. Berrios. Cambridge: Cambridge University Press, 1983.
- Macdonald, Fiona A. “The Infirmary of the Glasgow Town's Hospital, 1733-1800: A Case for Voluntarism?” *Bulletin of the History of Medicine* 73, no. 1 (1999): 64-105.
- Mackie, J. D. “Glasgow University in the Eighteenth Century.” In *An Eighteenth Century Lectureship in Chemistry: Essays and Bicentenary Addresses Relating to the Chemistry Department (1747) of Glasgow University (1451)*. Edited by Andrew Kent. Glasgow: Jackson, Son & Company, Publishers to the University, 1950.
- Martin, Julian. “Sauvages's Nosology: Medical Enlightenment in Montpellier.” In *The Medical Enlightenment of the Eighteenth Century*. Edited by Andrew Cunningham and Roger K. French. Cambridge: Cambridge University Press, 1990.
- Mathew, W. M. “The Origins and Occupations of Glasgow Students, 1740-1839.” *Past & Present*, no. 33 (1966): 74-94.
- Maulitz, Russell C. “The Pathological Tradition.” In *Companion Encyclopedia of the History of Medicine, Vol. 1*. Edited by W. F. Bynum and Roy Porter. London: Routledge, 1993.
- McCullough, Laurence B. *John Gregory and the Invention of Professional Medical Ethics and the Profession of Medicine*. Dordrecht: Kluwer Academic Publishers, 1998.
- McDougall, Warren. “Charles Elliot's Medical Publications and the International Book Trade.” In *Science and Medicine in the Scottish Enlightenment*. Edited by Charles W. J. Withers and Paul Wood. East Linton: Tuckwell Press, 2002.

- Mellyn, Elizabeth W. "Consilia." In *Medieval Science, Technology, and Medicine: An Encyclopedia*. Edited by Thomas Glick, Steven J. Livesey, and Faith Wallis. New York: Routledge, 2005.
- Melton, James Van Horn. *The Rise of the Public in Enlightenment Europe*. Cambridge: Cambridge University Press, 2001.
- Mikkeli, Heikki. "Legitimizing a Discipline: James Mackenzie's *History of Health* (1758)." In *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*. Edited by Donald R. Kelley. Rochester: University of Rochester Press, 1997.
- . *Hygiene in the Early Modern Medical Tradition*. Helsinki: Academia Scientiarum Fennica, 1999.
- Miller, David Philip. "Blagden, Sir Charles (bap. 1748, D. 1820)." In *Oxford Dictionary of National Biography*. Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/2553>, [Accessed 7 April, 2013].
- Moore, Norman. "Bostock, John (1744?–1774)." In *Oxford Dictionary of National Biography*. Oxford University Press, 2004. Rev. Kaye Bagshaw, <http://www.oxforddnb.com/view/article/2940> [Accessed 30 July, 2014].
- . "Craigie, David (1793–1866)", Rev. Michael Bevan, *Oxford Dictionary of National Biography*, Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/6584>, [Accessed 9 May, 2014].
- Morrell, J. B. "The University of Edinburgh in the Late Eighteenth Century: Its Scientific Eminence and Academic Structure." *Isis* 62, no. 2 (1971): 158-171.
- . "The Edinburgh Town Council and Its University, 1717-1766." In *The Early Years of the Edinburgh Medical School*. Edited by R. G. W. Anderson and A. D. C. Simpson. Edinburgh: Royal Scottish Museum, 1976.
- Mullett, C. F. "A Village Aristotle and the Harmony of Interests: James Anderson (1739-1808) of Monks Hill." *The Journal of British Studies* 8, no. 1 (1968): 94-118.
- Mulsow, Martin. "Eclecticism or Skepticism? A Problem of the Early Enlightenment." *Journal of the History of Ideas* 58, no. 3 (1997): 465-477.
- Murray, David. *Memories of the Old College of Glasgow: Some Chapters in the History of the University*. Glasgow: Jackson, Wylie and Co., 1927.

- Neuburger, Max. *The Historical Development of Experimental Brain and Spinal Cord Physiology Before Flourens*. Translated and edited, with additional material, by Edwin Clarke. Baltimore: Johns Hopkins University Press, 1981.
- Nicolson, Malcolm. "The Metastatic Theory of Pathogenesis and the Professional Interests of the Eighteenth-century Physician." *Medical History* 32, no. 3 (1988): 277-300.
- Niebyl, Peter H. "The Non-Naturals." *Bulletin of the History of Medicine* 45, no. 5 (1971): 486-492.
- Noltie, H. J. *John Hope (1725-1786): Alan G. Morton's Memoir of a Scottish Botanist*. Edinburgh: Royal Botanic Garden, 2011.
- Nutton, Vivian. *Ancient Medicine*. London: Routledge, 2004.
- Ochs, Sidney. *A History of Nerve Functions: From Animal Spirits to Molecular Mechanisms*. Cambridge: Cambridge University Press, 2004.
- Oz-Salzberger, Fania. *Translating the Enlightenment: Scottish Civic Discourse in Eighteenth-Century Germany*. Oxford: Clarendon Press, 1995.
- Passmore, R. "William Cullen and Dietetics." In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- Pelling, Margaret. "Food, Status and Knowledge: Attitudes to Diet in Early Modern England." In *The Common Lot: Sickness, Medical Occupations, and the Urban Poor in Early Modern England: Essays*. London: Longman, 1998.
- Phillipson, Nicholas T. "Culture and Society in the 18th Century Province: The Case of Edinburgh and the Scottish Enlightenment." In *The University in Society, Volume II*. Edited by Lawrence Stone. Princeton, NJ: Princeton University Press, 1974.
- . "The Scottish Enlightenment." In *The Enlightenment in National Context*. Edited by Roy Porter and Mikuláš Teich. Cambridge: Cambridge University Press, 1981.
- Porter, Roy. "Lay Medical Knowledge in the Eighteenth Century: The Evidence of the *Gentleman's Magazine*." *Medical History* 29, no. 2 (1985): 138-68.
- , ed. *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society*. Cambridge: Cambridge University Press, 1985.
- . "'A Little Learning': Knowledge and Health in the 18th Century." *Gut Festschrift* 30 (1989): 75-80.

- . “Spreading Medical Enlightenment: The Popularization of Medicine in Georgian England, and Its Paradoxes.” In *The Popularization of Medicine, 1650-1850*. Edited by Roy Porter. London: Routledge, 1992.
- , ed. *The Popularization of Medicine, 1650-1850*. London: Routledge, 1992.
- . *The Greatest Benefit to Mankind: A Medical History of Humanity*. New York: W. W. Norton & Co., 1999.
- Power, D’A. “Rutherford, John (1695–1779).” In *Oxford Dictionary of National Biography*. Oxford University Press, 2004. Rev. Jean Loudon, <http://www.oxforddnb.com/view/article/24363> [Accessed 30 July, 2014].
- Powers, John C. *Inventing Chemistry: Herman Boerhaave and the Reform of the Chemical Arts*. illustrated ed. Chicago: University of Chicago Press, 2012.
- Poynter, F. N. L. “Sydenham's Influence Abroad.” *Medical History* 17, no. 3 (1973): 223-234.
- Ramsay, Sir William. *The Life and Letters of Joseph Black, M.D.* London: Constable & Co., 1918.
- Rather, L. J. “G.E. Stahl's Psychological Physiology.” *Bulletin of the History of Medicine* 35 (1961): 37-49.
- . *Mind and Body in Eighteenth-Century Medicine: A Study Based on Jerome Gaub's De Regimine Mentis*. London: Wellcome Historical Medical Library, 1965.
- . “The ‘Six Things Non-Natural’: A Note on the Origins and Fate of a Doctrine and a Phrase.” *Clio Medica* 3 (1968): 337-347.
- Ravitch, Mark M. “Invective in Surgery: William Hunter Versus Monro Primus, Monro Secundus, and Percival Pott.” *Bulletin of the New York Academy of Medicine* 50, no. 7 (1974): 797-816.
- Redwood, John. *Reason, Ridicule and Religion: The Age of Enlightenment in England, 1660-1750*. London: Thames and Hudson, 1976.
- Reid, Thomas. *Thomas Reid on the Animate Creation: Papers Relating to the Life Sciences*. Edited by Paul Wood. Edinburgh: Edinburgh University Press, 1995.
- Rendall, Jane. “‘Friends of Liberty and Virtue’: Women Radicals and Transatlantic Correspondence, 1789-1848.” In *Gender and Politics in the Age of Letter Writing, 1750-2000*. Edited by Caroline Bland and Máire Cross. Aldershot: Ashgate, 2004.
- . “‘Women That Would Plague Me with Rational Conversation’: Aspiring Women and Scottish Whigs, c. 1790-1830.” In *Women, Gender and*

- Enlightenment*. Edited by Barbara Taylor and Sarah Knott. Basingstoke: Palgrave Macmillan, 2005.
- . “Prospects of the American Republic, 1795-1821: The Radical and Utopian Politics of Robina Millar and Frances Wright.” In *Enlightenment and Emancipation*. Edited by Susan Manning and Peter France. Lewisburg: Bucknell University Press, 2006.
- . “Medicine, Politics, Gender, and the Reputation of William Cullen (1710-1790).” Unpublished paper, November 26, 2012.
- . “Family, Politics and Reform in Margaret Cullen’s *Home: A Novel* (1802).” In *Women in Eighteenth-Century Scotland: Intimate, Intellectual and Public Lives*. Edited by Katie Barclay and Deborah Simonton. Farnham: Ashgate, 2013.
- Risse, G. B. “The Brownian System of Medicine: Its Theoretical and Practical Implications.” *Clio Medica* 5 (1970): 45-51.
- . “The History of John Brown’s Medical System in Germany During the Years 1790-1806.” PhD Dissertation, Chicago: University of Chicago, 1971.
- . “The Quest for Certainty in Medicine: John Brown’s System of Medicine in France.” *Bulletin of the History of Medicine* 45, no. 1 (1971): 1-12.
- . “William Cullen and Child Care. A 1788 Letter.” *Clio Medica* 8, no. 1 (1973): 65-67.
- . “‘Doctor William Cullen, Physician, Edinburgh’: A Consultation Practice in the Eighteenth Century.” *Bulletin of the History of Medicine* 48 (1974): 338-351.
- . *Hospital Life in Enlightenment Scotland: Care and Teaching at the Royal Infirmary of Edinburgh*. Cambridge: Cambridge University Press, 1986.
- . “Brunonian Therapeutics: New Wine in Old Bottles?” *Medical History Supplement*, no. 8 (1988): 46-62.
- . “Cullen As Clinician: Organisation and Strategies of An Eighteenth Century Medical Practice.” In *William Cullen and the Eighteenth Century Medical World*. Edited by A. Doig, J. P. S. Ferguson, I. A. Milne, and R. Passmore. Edinburgh: Edinburgh University Press, 1993.
- . “In the Name of Hygieia and Hippocrates: A Quest for the Preservation of Health and Virtue.” In *New Medical Challenges During the Scottish Enlightenment*. *Clio Medica/The Wellcome Series in the History of Medicine* 78. Amsterdam: Rodopi, 2005.
- . “The Royal Medical Society Versus Campbell Denovan: Brunonianism, the Press, and the Medical Establishment.” In *New Medical Challenges During the Scottish Enlightenment*. *Clio Medica/The Wellcome Series in the History of Medicine* 78. Amsterdam: Rodopi, 2005.
- . *New Medical Challenges During the Scottish Enlightenment*. *Clio Medica/The Wellcome Series in the History of Medicine* 78. Amsterdam: Rodopi, 2005.
- Robertson, John. “The Scottish Contribution to the Enlightenment.” In *The Scottish Enlightenment: Essays in Reinterpretation*. Edited by Paul Wood. Rochester: Rochester University Press, 2000.

- . *The Case for the Enlightenment: Scotland and Naples, 1680-1760*. Cambridge: Cambridge University Press, 2005.
- Rocca, Julius. "William Cullen (1710-1790) and Robert Whytt (1714-1766) on the Nervous System." In *Brain, Mind and Medicine: Essays in Eighteenth-Century Neuroscience*. Edited by Stanley Finger, C. U. M. Smith and Harry Whitaker. New York: Springer, 2007.
- Rodger, N. A. M. "Medicine and Science in the British Navy of the Eighteenth Century." In *L'Homme, La Santé Et La Mer: Actes Du Colloque International Tenu À L'Institut Catholique De Paris Les 5 Et 6 Décembre 1995*. Edited by Christian Buchet. Paris: H. Champion, 1997.
- Roe, Shirley A. "Anatomia Animata: The Newtonian Physiology of Albrecht Von Haller." In *Transformation and Tradition in the Sciences: Essays in Honor of I. Bernard Cohen*. Edited by Everett Mendelsohn. Cambridge: Cambridge University Press, 1984.
- Rosenberg, Charles E. "Medical Text and Social Context: Explaining William Buchan's *Domestic Medicine*." *Bulletin of the History of Medicine* 57, no. 1 (1983): 22-42.
- Rosner, Lisa. "Eighteenth-Century Medical Education and the Didactic Model of Experiment." In *The Literary Structure of Scientific Argument: Historical Studies*. Edited by Peter Dear. Philadelphia: University of Pennsylvania Press, 1991.
- . *Medical Education in the Age of Improvement: Edinburgh Students and Apprentices 1760-1826*. Edinburgh: Edinburgh University Press, 1991.
- . "Ants in the Academy: Formic Acid and the University Dissemination of Enlightenment Science." *Eighteenth-Century Thought* 2 (2004): 207-231.
- Rousseau, George S. *Nervous Acts: Essays on Literature, Culture and Sensibility*. Basingstoke: Palgrave Macmillan, 2004.
- Rowbottom, Margaret, and Charles Susskind. *Electricity and Medicine: History of Their Interaction*. San Francisco: San Francisco Press, 1984.
- Schmidt-Biggemann, Wilhelm, and Theo Stammen, eds. *Jacob Brucker (1696-1770): Philosoph Und Historiker Der Europäischen Aufklärung*. Berlin: Akademie Verlag, 1998.
- Schneider, Ulrich Johannes. "Eclecticism and the History of Philosophy." In *History and the Disciplines: The Reclassification of Knowledge in Early Modern Europe*. Edited by Donald R. Kelley. Rochester: University of Rochester Press, 1997.

———. “Eclecticism Rediscovered.” *Journal of the History of Ideas* 59, no. 1 (1998): 173-182.

Schofield, Robert E. *Mechanism and Materialism: British Natural Philosophy in the Age of Reason*. Princeton: Princeton University Press, 1970.

Scott, William Robert. *Francis Hutcheson: His Life, Teaching and Position in the History of Philosophy*. Cambridge: Cambridge University Press, 1900.

Shapin, Steven. “Property, Patronage, and the Politics of Science: The Founding of the Royal Society of Edinburgh.” *British Journal for the History of Science* 7, no. 1 (1974): 1-41.

———. “How to Eat Like a Gentleman: Dietetics and Ethics in Early Modern England.” In *Right Living: An Anglo-American Tradition of Self-help Medicine and Hygiene*. Edited by Charles E. Rosenberg. Baltimore: Johns Hopkins University Press, 2003.

———. “Descartes the Doctor: Rationalism and Its Therapies.” In *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*. Baltimore: Johns Hopkins University Press, 2010.

———. “How to Eat Like a Gentleman: Dietetics and Ethics in Early Modern England.” In *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*. Baltimore: Johns Hopkins University Press, 2010.

———. “Trusting George Cheyne: Scientific Expertise, Common Sense, and Moral Authority in Early Eighteenth-Century Dietetic Medicine.” In *Never Pure: Historical Studies of Science As If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority*. Baltimore: Johns Hopkins University Press, 2010.

Sher, Richard B. *Church and University in the Scottish Enlightenment*. Edinburgh: Edinburgh University Press, 1985.

———. “Science and Medicine in the Scottish Enlightenment: The Lessons of Book History.” In *The Scottish Enlightenment: Essays in Reinterpretation*. Edited by Paul Wood. Rochester: Rochester University Press, 2000.

———. *The Enlightenment and the Book: Scottish Authors and Their Publishers in Eighteenth-Century Britain, Ireland and America*. Chicago: University of Chicago Press, 2006.

Shryock, Richard H. “Empiricism Versus Rationalism in American Medicine.” *Proceedings of the American Antiquarian Society* 79 (1969): 99-150.

- Shuttleton, David E. "'A Modest Examination': John Arbuthnot and the Scottish Newtonians." *Journal for Eighteenth-Century Studies* 18, no. 1 (1995): 46-62.
- , and Megan J. Coyer, eds. *Scottish Medicine and Literary Culture, 1726-1832*. Amsterdam: Rodopi, 2014.
- . "An Account Of...William Cullen: John Thomson and the Making of a Medical Biography." In *Scottish Medicine and Literary Culture, 1726-1832*. Edited by David E. Shuttleton and Megan J. Coyer. Amsterdam: Rodopi, 2014.
- Sigerist, Henry E. *Landmarks in the History of Hygiene*. London: Oxford University Press, 1956.
- Singy, Patrick. "The Popularization of Medicine in the Eighteenth Century: Writing, Reading, and Rewriting Samuel Auguste Tissot's *Avis Au Peuple Sur Sa Santé*." *The Journal of Modern History* 82, no. 4 (2010): 769-800.
- Skoczylas, Anne. *Mr. Simson's Knotty Case: Divinity, Politics, and Due Process in Early Eighteenth-century Scotland*. Montreal: McGill-Queen's University Press, 2001.
- . "Simson, John (1667-1740)." In *Oxford Dictionary of National Biography*, Online Edition, Oct 2009. Oxford: Oxford University Press, 2004. [<http://www.oxforddnb.com/view/article/25604>, accessed 29 June 2014].
- Slack, Paul. "Mirrors of Health and Treasures of Poor Men: The Use of the Vernacular Medical Literature of Tudor England." In *Health, Medicine, and Mortality in the Sixteenth Century*. Edited by Charles Webster. Cambridge: Cambridge University Press, 1979.
- Smith, C. U. M. "David Hartley's Newtonian Neuropsychology." *Journal of the History of the Behavioral Sciences* 23, no. 2 (1987): 123-136.
- Smith, Ginnie. "Prescribing the Rules of Health: Self-help and Advice in the Late Eighteenth Century." In *Patients and Practitioners: Lay Perceptions of Medicine in Pre-Industrial Society*. Edited by Roy Porter. Cambridge: Cambridge University Press, 1985.
- Smith, Wesley D. *The Hippocratic Tradition*. Ithaca: Cornell University Press, 1979.
- Spary, Emma C. *Eating the Enlightenment: Food and the Sciences in Paris*. Chicago: University of Chicago Press, 2012.
- Spillane, J. D. *The Doctrine of the Nerves*. Oxford: Oxford University Press, 1981.

- Steinke, Hubert. *Irritating Experiments: Haller's Concept and the European Controversy on Irritability and Sensibility, 1750-90*. Clio Medica/The Wellcome Series in the History of Medicine 76. Amsterdam: Rodopi, 2005.
- . "Theories of Animal Motion Before 1750." In *Irritating Experiments: Haller's Concept and the European Controversy on Irritability and Sensibility, 1750-90*. Clio Medica/The Wellcome Series in the History of Medicine 76. Amsterdam: Rodopi, 2005.
- Stockhorst, Stefanie. *Cultural Transfer Through Translation: The Circulation of Enlightened Thought in Europe by Means of Translation*. Amsterdam: Rodopi, 2010.
- Stott, Rosalie. "William Cullen and Edinburgh Medicine: A Reappraisal." *The Society for the Social History of Medicine Bulletin* 38 (1986): 7-9.
- . "Health and Virtue: Or, How to Keep Out of Harm's Way. Lectures on Pathology and Therapeutics by William Cullen c. 1770." *Medical History* 31, no. 2 (1987): 123-142.
- Strube, Irene. *Georg Ernst Stahl*. Leipzig: B.G. Teubner, 1984.
- Taylor, D. W. "The Manuscript Lecture-notes of Alexander Monro, Secundus (1733-1817)." *Medical History* 22, no. 2 (1978): 174-86.
- . "'Discourses on the Human Physiology' by Alexander Monro Primus (1697-1767)." *Medical History* 32, no. 1 (1988): 65-81.
- Taylor, Georgette. "Variations on a Theme: Patters of Congruence and Divergence Among 18th Century Chemical Affinity Theories." PhD Thesis, University College London, 2006.
- . "Unification Achieved: William Cullen's Theory of Heat and Phlogiston As An Example of His Philosophical Chemistry." *The British Journal for the History of Science* 39, no. 4 (2006): 477-501.
- . "Marking Out a Disciplinary Common Ground: The Role of Chemical Pedagogy in Establishing the Doctrine of Affinity at the Heart of British Chemistry." *Annals of Science* 65, no. 4 (2008): 465-486.
- . "Pedagogical Progeniture or Tactical Translation? George Fordyce's Additions and Modifications to William Cullen's Philosophical Chemistry Part I." *Ambix* 61, no. 1 (2014): 48-66.
- Temkin, Owsei. "Albrecht Von Haller, 'A Dissertation on the Sensible and Irritable Parts of Animals'." *Bulletin of the History of Medicine* 4 (1936): 651-99.
- Thackray, Arnold. *Atoms and Powers: An Essay on Newtonian Matter-theory and the Development of Chemistry*. Cambridge: Harvard University Press, 1970.

- Thévenot, Roger. *A History of Refrigeration Throughout the World*. Translated by J. C. Fidler. Paris: International Institute of Refrigeration, 1979.
- Thomas, Keith. "Health and Morality in Early Modern England." In *Morality and Health*. Edited by Allan M. Brandt and Paul Rozin. New York: Psychology Press, 1997.
- Thomson, Ann. *Bodies of Thought: Science, Religion, and the Soul in the Early Enlightenment*. Oxford: Oxford University Press, 2008.
- Thomson, Thomas. *The History of Chemistry. In Two Volumes. Vol. I*. London: Henry Colburn and Richard Bentley, 1830.
- Tipton, Charles M., ed. *Exercise Physiology: People and Ideas*. Oxford: Oxford University Press, 2003.
- Trail, R. R. "Sydenham's Impact on English Medicine." *Medical History* 9, no. 4 (1965): 356-364.
- Trevelyan, Humphry. *Goethe & the Greeks*. Cambridge: Cambridge University Press, 1981.
- Trevor-Roper, Hugh. "The Scottish Enlightenment." *Studies on Voltaire and the Eighteenth Century* 58 (1967): 1635-58.
- . "The Scottish Enlightenment." *Blackwood's Magazine* 322 (1977): 371-388.
- Underwood, E. A. *Boerhaave's Men: At Leyden and After*. Edinburgh: Edinburgh University Press, 1977.
- Vila, Anne C. "Beyond Sympathy: Vapors, Melancholia, and the Pathologies of Sensibility in Tissot and Rousseau." *Yale French Studies*, no. 92 (1997): 88-101.
- Walker, W. B. "Luigi Cornaro, a Renaissance Writer on Personal Hygiene." *Bulletin of the History of Medicine* 28, no. 6 (1954): 525-34.
- Walker, W. Cameron. "Animal Electricity Before Galvani." *Annals of Science* 2, no. 1 (1937): 84-113.
- Wallace, J. "Blane, Sir Gilbert, First Baronet (1749–1834)." In *Oxford Dictionary of National Biography*. Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/2621> [Accessed 30 July, 2014].

- Wear, Andrew. "The Popularisation of Medicine in Early Modern England." In *The Popularization of Medicine, 1650-1850*. Edited by Roy Porter. London: Routledge, 1992.
- . "The History of Personal Hygiene." In *Companion Encyclopedia of the History of Medicine. Volume 2*. Edited by W. F. Bynum and Roy Porter. London: Routledge, 1993.
- Wellman, Kathleen. *La Mettrie: Medicine, Philosophy, and Enlightenment*. Durham: Duke University Press, 1992.
- Whittaker, E. T. *A History of the Theories of Aether and Electricity: From the Age of Descartes to the Close of the Nineteenth Century*. London: Longmans, Green, and Co., 1910.
- Wightman, William P. D. "William Cullen and the Teaching of Chemistry." *Annals of Science* 11, no. 2 (1955): 154-165.
- . "William Cullen and the Teaching of Chemistry—II." *Annals of Science* 12, no. 3 (1956): 192-205.
- Wild, Wayne. "The Correspondence of Dr William Cullen: Scottish Enlightenment and New Directions in Medicine-by-Post." In *Medicine-by-Post: The Changing Voice of Illness in Eighteenth-Century British Consultation Letters and Literature*. Clio Medica/The Wellcome Series in the History of Medicine 79. Amsterdam: Rodopi, 2006.
- . "George Cheyne: A Very Public Private Doctor." In *Medicine-by-Post: The Changing Voice of Illness in Eighteenth-Century British Consultation Letters and Literature*. Clio Medica/The Wellcome Series in the History of Medicine 79. Amsterdam: Rodopi, 2006.
- Wilson, David B. *Seeking Nature's Logic: Natural Philosophy in the Scottish Enlightenment*. University Park: Pennsylvania State University Press, 2009.
- Wilson, Leonard G. "Fevers." In *Companion Encyclopedia of the History of Medicine. Volume I*. Edited by W. F. Bynum and Roy Porter. London: Routledge, 1993.
- Withers, Charles W. J. "William Cullen's Agricultural Lectures and Writings and the Development of Agricultural Science in Eighteenth-Century Scotland." *Agricultural Historical Review* 37, no. 2 (1989): 144-156.
- . "Natural Knowledge As Cultural Property: Disputes Over the 'Ownership' of Natural History in Late Eighteenth-Century Edinburgh." *Archives of Natural History* 19 (1992): 289-303.

- . “Geography, Science and National Identity in Early Modern Britain: The Case of Scotland and the Work of Sir Robert Sibbald (1641-1722).” *Annals of Science* 53, no. 1 (1996): 29-73.
- . “Toward a Historical Geography of Enlightenment in Scotland.” In *The Scottish Enlightenment: Essays in Reinterpretation*. Edited by Paul Wood. Rochester: Rochester University Press, 2000.
- . *Geography, Science, and National Identity: Scotland Since 1520*. Cambridge: Cambridge University Press, 2001.
- . *Placing the Enlightenment: Thinking Geographically About the Age of Reason*. Chicago: Chicago University Press, 2007.
- Wood, Paul. “The Natural History of Man in the Scottish Enlightenment.” *History of Science* 28 (1990): 89-123.
- . “Science, the Universities, and the Public Sphere in Eighteenth-Century Scotland.” *History of Universities* 13 (1994): 99-135.
- , ed. *The Culture of the Book in the Scottish Enlightenment*. Toronto: University of Toronto, 2000.
- . *The Scottish Enlightenment: Essays in Reinterpretation*. Rochester: Rochester University Press, 2000.
- . “Science in the Scottish Enlightenment.” In *The Cambridge Companion to the Scottish Enlightenment*. Edited by Alexander Broadie. Cambridge: Cambridge University Press, 2003.
- Wright, John P. “Boerhaave on Minds, Human Beings and Mental Disease.” *Studies in Eighteenth-Century Culture* 20 (1990): 289-302.
- . “Metaphysics and Physiology: Mind, Body and the Animal Economy in Eighteenth-Century Scotland.” In *Studies in the Philosophy of the Scottish Enlightenment*. Edited by M. A. Stewart. Oxford: Clarendon Press, 1990.
- . “Materialism and the Life Soul in Eighteenth-Century Scottish Physiology.” In *The Scottish Enlightenment: Essays in Reinterpretation*. Edited by Paul Wood. Rochester Studies in Philosophy. Rochester: University of Rochester Press, 2000.
- , and Paul Potter, eds. *Psyche and Soma: Physicians and Metaphysicians on the Mind-Body Problem From Antiquity to Enlightenment*. Oxford: Oxford University Press, 2000.
- . “Whytt, Robert (1714-66).” *Continuum Encyclopedia of British Philosophy* 4 (2006): 3423-3425.
- Wright-St Clair, Rex E. *Doctors Monro: A Medical Saga*. London: Wellcome Historical Medical Library, 1964.
- Yolton, John W. *Thinking Matter: Materialism in Eighteenth-Century Britain*. Oxford: Blackwell, 1983.

Young, B. W. "Tindal, Matthew (bap. 1657, D.1733)." In *Oxford Dictionary of National Biography*, Online Edition, May 2005. Oxford: Oxford University Press, 2004, <http://www.oxforddnb.com/view/article/27462> [Accessed 29 June, 2014].

Zachs, William. *The First John Murray and the Late Eighteenth-Century London Book Trade: With a Checklist of His Publications*. Oxford: Published for the British Academy by Oxford University Press, 1998.