Systems of Value:

Knowledge, Imperialism, and Scientific Authority in the Context of 18th Century Sweden

by

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Abstract

The focus of this work is 18th century Sweden, circling around the lives and works of people – some more and some lesser known, some even forgotten – who dedicated their careers to the acquisition, dissemination, and application of diverse forms of knowledge. The sources and case studies are thus presented through the lens of History of Knowledge, a methodology that lends itself very well to a time marked by constant fights for academic predominance and intellectual fluidity. Taking into account that History of Knowledge is still a relatively young field, the introductory part of this dissertation is concerned with establishing a working methodology and laying out the innovative research potential of the field. In general, the contribution of this project should be seen less as the presentation of new evidence, and more as a re-assessment and re-interpretation of already established evidence, with a focus on the coexistence of diverse knowledge systems beside the one predominant in Western academia, i.e. empiricism. The approaches used here include, among others, historical, political, economic, scientific, gender-theoretical, religious studies, anthropological, and northern studies methodologies.

In the second part, the dissertation features a comprehensive account of Sweden's political and academic landscape at the beginning of the 18th century. It analyzes the role of knowledge in early modern Sweden and parts of Europe, as well as its steadily increasing significance for economic and social processes. The dissertation further explores the role of information and knowledge as contributing factors in the formation of Sweden into the nation state it is today. The focus lies on early modern Sweden's international trade and political relations as well as its internal economic and political developments. Specifically, this dissertation analyzes how in the wake of the losses of the Great Northern War, Sweden successfully established itself as a hub for research and industrial expertise, leaving behind its former military prowess. As a result, the

country succeeded in creating an economic and political niche in the shadow of Europe's big political players such as e.g. Britain, the Netherlands, or Spain. The example of Sweden deserves special attention because political, economic, and social processes were highly pronounced and revealing due to the specific geographical and political circumstances under which its strategies and policies developed. When put in a bigger European and global context, the case offers many parallels and points of comparison as well.

In the third part, two case studies – the first one on Emanuel Swedenborg and the second one on Carl Linnaeus – exemplify the processes and policies that Sweden implemented to enforce its strategic push towards knowledge and information becoming the driving factors to ensure its long-term international competitiveness. In comparison, the cases unveil the underlying mechanisms at work in the creation of a coherent empirical knowledge system that would soon dominate Western academia.

The fourth and final part discusses the findings of the thesis and their ramifications for modern academia and the empirical knowledge system.

Für Elfriede.

While I feel the need to express my heartfelt gratitude to the many people who have supported and trusted me over the duration of this project, I promised my mother in what was to be one of her last clear moments that I would write “Für Elfriede.” at the beginning of this work. This is for her, for my brother Peter, and for my husband Jackson – the most important people in my life.

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Prologue

The majority of the following doctoral thesis has been written and researched on Treaty 6 Territory. The University of Alberta's *Revised Statements of Traditional Territorial Acknowledgement* describes it as "a traditional gathering place for diverse Indigenous peoples including the Cree, Blackfoot, Metis, Nakota Sioux, Iroquois, Dene, Ojibway/Saulteaux/Anishinaabe, Inuit, and many others whose histories, languages, and cultures continue to influence our vibrant community."[1]

Transferring to the UofA – a university not only in another country, but on a different continent – as well as the switch from classical philology to history was, in many ways, a clash of academic cultures as much as a forced, self-critical reassessment of my intellectual roots and convictions. It made me analyze and rethink the axioma of what is – at its core – a deeply Euro-

[1] From the University of Alberta's *Revised Statements of Traditional Territorial Acknowledgement*, https://www.ualberta.ca/toolkit/communications/acknowledgment-of-traditional-territory (last accessed 2019/1/2). While I am convinced that such acknowledgements are important, I also believe that it perpetuates the divisive barrier between institution and indigenous community ("*our* community" [italics added]). Nonetheless, I choose it as the starting point to my thesis for several reasons: firstly, as a sign of respect towards the people on whose land I work and live as an uninvited guest – a fact unknown to me for the first years of living in Canada. Secondly, as you shall see, it follows from the conclusions of this thesis. Thirdly, it shall serve me as a reminder of the necessity to reflect critically on the practices and policies of the very institution that I have entrusted with my education and intellectual growth, and that has, in return, entrusted me with the right and duty to carry on that same academic ideal – whether successfully shall be assessed, partially, in and through this work. Consequently, this dissertation– besides its obvious function to attest to my ability to get through a Ph. D. program while remaining sufficiently sane – could be seen as my humble contribution to the Truth and Reconciliation efforts taking place in this country and in many other places worldwide – a contribution made through writing, because I believe the pen – in some lucky instances – to be mightier than the sword.

Quaecumque vera.

centric, patriarchal, and Christiano-form approach to academic work and the world in general that constituted the foundation of my Master's degree.

As a recent immigrant to Canada, I have actively and passively encountered a wide array of problems caused and perpetuated by settler colonialism, racism, and – just as often– a reluctance to look outside one's own box. It was a hard but valuable lesson and it has helped me to get out of my own box. Among other things, my time in Edmonton has taught me a lot about history, but also about the human condition. The few truths I've found are the following:

1. There is more than one truth.
2. If someone tells you they know *the* truth, run.
3. Nobody is the villain in their own story.
4. Gravity always wins.

1 General Introduction

In recent years, the concept of a separate field of History of Knowledge has entered the academic landscape as both a sub-field of History and an intersectional field that combines aspects from a range of disciplines in the humanities, sciences, and other academic fields. It constitutes an alternative to the – academically and demographically – rather elitist concept of History of Science. This development could first be observed in the environment of German-speaking universities with a focus on *Geistesgeschichte*, and it has since spread out from there quickly, speaking to the large popularity and potential of the field.

"In the 2010s," writes Johan Östling, one of the forerunners of History of Knowledge in Scandinavia, "the field has started to attract considerable attention in other countries and contexts, for example, as 'the history of knowledge' in the Anglophone world, as 'kunskapshistoria' or 'kunskapshistorie' in the Nordic region, and in the ambitious French work *Lieux de savoir*."[2] Featuring a compilation of the defining texts and authors up to 2018, his is, to the best of my knowledge, the most comprehensive and timely account of this young but rapidly growing field. Among the early works exploring history of knowledge "*avant la lettre*," Östling emphasizes the important contributions of sociology, history, and philosophy of science, "including works by Ludwik Fleck, Robert K. Merton, Edmund Husserl, Alexandre Koyré, Thomas S. Kuhn, Michel Foucault, and Donna Haraway."[3] Many scholars of anthropology and

[2] Johan Östling et al., "The history of knowledge and the circulation of knowledge. An introduction," in *Circulation of Knowledge: Explorations in the History of Knowledge*, ed. Johan Östling et al., (Lund: Nordic Academic Press, 2018), 9.

[3] Cf. ibid., esp. 9-15.

cultural history in the 20th century, including "Michel de Certeau, Roger Chartier, Robert Darnton, Carlo Ginzburg, and Natalie Zemon Davis," have made pioneering contributions to knowledge and knowledge systems by analyzing "rituals, systems of belief, and representations of power."[4] As a separate field, History of Knowledge has only emerged in the recent past – namely the last two decades – and predominantly in the Germanophone world as *Wissensgeschichte*. Zürich's *Zentrum Geschichte des Wissens* (History of Knowledge Centre) and the Berlin *Max-Planck-Institut für Wissenschaftsgeschichte*[5] (Max Planck Institute for the History of Science) emerged as its hubs.[6] Philipp Sarasin, one of the most eminent scholars of History of Knowledge and member of the Zürich-based centre, has shaped the field by emphasizing the "societal production and circulation of knowledge:" the question is "not whether some forms of knowledge are good or bad, useful or useless, but how, when, and why a certain type of knowledge appears and possibly disappears, what effects it has, and who its carrier is."[7] The beauty of this approach is that it allows the researcher to focus on the phenomena without having to sacrifice the value and independence of individual knowledge systems.

Over the last couple of years, the field has attracted considerable interest in North American universities and academic associations. Peter Burke's two volumes of *A Social History of*

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[4] Östling et al., "The history of knowledge and the circulation of knowledge," 10-11.

[5] It is telling how the names of those institutes allow to permeate and expand their research foci – *Wissenschaft* being roughly the equivalent of Eng. 'science,' and *Wissen* the word for 'knowledge.'

[6] Östling et al., "The history of knowledge and the circulation of knowledge," 11, 12-13.

[7] Ibid., 12.

Knowledge (2000 and 2012) pioneered the field.[8] In his ensuing book, emblematically titled *What is the History of Knowledge?*, he contributed further to the founding of an academic identity within the field, especially in the English-speaking world. His works have in common that they emphasize the diversity of knowledge forms, expanding the potential application areas of the field significantly.[9]

Since one of the defining criteria for a successful discipline is not only its broad applicability, but also a cohesive self-understanding and methodology, contributions by scholars such as Simone Lässig have helped History of Knowledge to establish itself as a serious discipline and a widely acknowledged area of expertise pursued by various academic institutions and individuals.[10]

With its increasing popularity arises the question of the field's appeal for History and other disciplines. Firstly, shifting the historian's focus away from events, persons, or 'connections' and onto knowledge (phenomena) as the object of desire offers a fresh viewpoint as well as a "way to develop new and integrative forms of humanistic research."[11] It facilitates the merging of different narratives of, for instance, class and gender, material cultures, politics, religion,

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[8] Cf. Peter Burke, *A Social History of Knowledge: From Gutenberg to Diderot* (Cambridge, UK: Polity Press, 2000); Peter Burke, *A Social History of Knowledge: From the Encyclopaedia to Wikipedia*. II (Cambridge: Polity Press, 2012).

[9] Peter Burke, *What is the History of Knowledge?* (Oxford: Polity Press, 2015); cf. also Östling et al., "The history of knowledge and the circulation of knowledge," 13.

[10] Östling et al., "The history of knowledge and the circulation of knowledge," 13.

[11] Ibid., 10.

nationalism and colonialism, and socio-economic aspects under a common denominator.[12] By making knowledge the focus – a category far less politicized and gendered than *science* – it has the potential to "provide narratives that are not based on the rise of the Western scientific standard."[13] Furthermore, it avoids hierarchical categorization of knowledge systems into superstitions, beliefs, empirical data, etc.

As a system of knowledge based on empirical methods and its self-perpetuating success, science in the Western academic sense is inherently elitist and thus concentrated in and around a few regions world-wide – mostly European and North American universities and a number of big research companies. Similar to its geographical concentration, the measures of success for scientific research are narrowly defined (and measurable) parameters such as publication volume, citations, and – ultimately derived from those factors – market value.

Science in the narrow definition we hold today is a historically young concept, pertaining to approximately the last two centuries as most researchers are reluctant to call anything before the 19th century 'proper' science. Starting in the early modern period (some argue in the Renaissance), science (and naturalism or natural philosophy as its predecessors) developed into a clearly defined system of knowledge – driven by political, social, cultural, nationalist, and not least economic dynamics.

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[12] Phillip Sarasin, "Was ist Wissensgeschichte?" *Internationales Archiv für Sozialgeschichte der deutschen Literatur (IASL)* 36, Issue 1 (2011): 159, https://doi.org/10.1515/iasl.2011.010.

[13] Östling et al., "The history of knowledge," 15.

Therefore, science as a system of knowledge has been struggling with its position in regard to other systems of knowledge that lie outside of an academic setting – and, in the case of the humanities, even within academia. Considering that the predominant standards that pertain to science are not easily (or rationally) applicable to other systems of knowledge, the subjugation of other disciplines to the same standards is both counterproductive and misleading. This limitation is especially pertinent to those disciplines that are not centered around empiricism. The concept of History of Knowledge removes the self-imposed burden of having to explain non-empirical elements that comes with any science-centered methodology: it simply regards such elements as different *kinds* of knowledge, with a different set of qualifications and goals, and standards other than empirical ones.

However, viewing History of Knowledge as an entity detached from other fields – for instance the History of Science, History of Medicine, or History of Ideas – poses many questions: What is the definition of knowledge? Where does knowledge come from? Where does knowledge end and belief start? Is there a difference between knowledge and information? How do variables such as gender, education, class, etc. impact knowledge? Who *has* knowledge? How is knowledge measured? Can (new) knowledge be created? Is knowledge a prerequisite for *scientia* or the result of science, or vice versa? The answers to these questions are complex and change according to time and place and many other variables. Additionally, the field is at this point not clearly defined – at the same time an advantage and potential pitfall.

The present work will offer responses to some of those questions, and just like a hydra, it will come up with a hundred new ones for every attempted answer. In the age of the internet, social media, news feeds, alternative facts, and fake news, it is harder than ever before to distinguish valid information from intellectual by-products or intentionally misleading

information. In contemporary education, a lot of class time is, necessarily, spent on showing students how to handle the overflow of information efficiently, correctly, and responsibly. Tellingly, in 2017, the University of Washington offered a course with the enticing title "Calling Bullshit in the Age of Big Data" as part of its Program on Climate Change.[14] Like never before in the history of humankind, information and expert authority are contested – as if the much-revered virtue of skepticism had backfired to create a society in which everyone trusts nothing and nobody believes anything.

Meanwhile, science, skepticism, and paranoia over who to believe and who to distrust have created an environment of confusion, dependence, hypocrisy, and constant insecurity. Bunker spots for the nearing zombie apocalypse are for sale online; the flat earthers (surprisingly appropriately) hold a conference at the West Edmonton Mall's Fantasy Land Hotel; lobbyists deny climate change and white supremacists the Holocaust; and as if the present did not hold enough challenges, so-called 'anti-vaxxers' help the measles to an unwanted revival.

The unprecedented amounts of and exposure to knowledge are in my opinion the big challenges of the digital age. It is not the first paradigmatic 'turn' of that kind – just think printing press, telegraphs, radio, and so on. Much like those prior turns, this one shall pass and become an essential part of our cosmos (once the initial shock is over). In "The Circulation of Knowledge," Östling and his co-editors see the challenges of the current situation as critical, and emphasize the role of History of Knowledge as a key methodology:

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[14] Cf. https://pcc.uw.edu/education/quarterly-climate-courses/calling-bullshit-in-the-age-of-big-data/.

> Political and economic aspirations are closely bound up with knowledge institutions, yet at the same time leading politicians question scientific truths, and the new media landscape is awash with so-called alternative facts. For this reason, it behooves scholars to scrutinize knowledge and its place in other chronological contexts. As an intellectual enterprise, the raison d'être of the history of knowledge is ultimately to strengthen our ability to reflect on a fundamental issue: the role of knowledge in society and in human life.[15]

Approaches towards knowledge and its potential applications were and are diverse, although a consensus has seemingly been reached that the empirical method as championed by Western science leads to the most consistently reliable results – and, with the desired standards and outcomes in mind, probably for good reasons. Nonetheless, in the past as much as today, there is and has been a broad variety of ways to preserve or gain knowledge within different systems, or to transfer it from one system to the other. History of Knowledge provides the common denominator to compare them as systems on level ground.

The history of knowledge (lower case) is at times surprising, often convoluted, and bewildering, but certainly it is fascinating and revealing. So is the field of History of Knowledge (upper case) which I consider myself a practitioner of. It dawned upon me relatively late: after years of answering questions regarding my professional field with a spontaneous tirade of half-embarrassed, half-exhausted mumbling about 'the overlap between History of Ideas, Science, Religion, and cultural history including gender aspects – and some colonialism and post-colonial studies – in 18th century Scandinavia,' I realized that what I was doing for my academic career is

[15] Östling et al., "The history of knowledge," 10.

easiest summarized under the umbrella of History of Knowledge. In the following, I will demonstrate why stepping into the cold waters of such a relatively young field is worthwhile.

1.1 Thesis Goals

The goal of this thesis – I wish to state that very clearly – is not to do away with the theoretical approach to History of Science à la Latour, Shapin, Dear, Daston, Burke, and many other eminent figures in the historical disciplines and humanities. They have all made valuable contributions to their respective fields, but the problem remains that History of Science necessarily revolves around the concept of Western science and is thus insufficiently prepared to analyze and compare any given system of knowledge that is not, does not originate in, or does not use Western academia as its normative default. Neither is it the goal of my work to do away with empiricism and science, but to show and re-interpret them in relation to other systems of belief and systems of knowledge.

In *The Power of Knowledge*, Jeremy Black tellingly uses the concepts of information and knowledge interchangeably to describe phenomena of global reach, but in the conclusions he stumbles over the inherent self-centered nature of his vantage point: "Information technologies were open to all Westerners but were only slowly or poorly adopted by non--Westerners."[16] Other authors like Adrian Johns have emphasized instead the transformative potential of Western knowledge transmission – in this example specifically that of the book – for "[k]nowledge, politics, social life, and cultural practices," functioning "as a tool for the making of context and content alike."[17] In his account of early modern printed books, he regards critically their potential

[16] Jeremy Black, *The Power of Knowledge: How Information and Technology Made the Modern World* (New Haven: Yale University Press, 2014), 409.

[17] Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago, Ill.: University of Chicago Press, 1998), 623.

usefulness as well as the pitfalls posed by inaccessibility, the elitist nature of their distribution, and cultural barriers for authors, making it a valuable account of knowledge policy of the time.[18]

Using the Western context as a normative standard immediately and considerably limits the applicability range of any given academic research methodology or concept. For that reason, I chose the normative standard provided by the methodology of History of Knowledge for the present case: considering that both the subject matter of 18th-century Sweden calls for a decentralized vantage point, and that the *causa* Swedenborg feeds off the tension between different belief systems – namely those of empiricism and spiritualism – this approach was to me the most promising option.

The biggest strength of History of Knowledge is that its broad applicability as an interdisciplinary and intersectional field offers a powerful alternative to common methodologies, and that it enables the researcher to analyze systems of knowledge free from the hierarchies of empiricism and thus Western science. This broad applicability is necessary, as most works on knowledge and knowledge systems that potentially pertain to the region or time setting are likely tailored to a British (or at best a continental European) context. As a consequence, the paradigms first need to be adapted to 'peripheral' countries like Sweden which do not often enjoy the spotlight in North American or British academia. This is true for the works by Black and Johns discussed above, as well as for many others. In summary, academic literature on the British and continental European context offers valuable insights that can serve as parallels for a discussion

[18] Cf. Johns, *The Nature of the Book*, e.g. c. 7, esp. 445-446. Like many other authors, Johns concentrates his observations in and around the British context.

of Sweden or other 'peripheral' countries, but not necessarily as models. As discussed in the chapters "3.2.2 Science – A Very Short Deconstruction" and "3.2.3 Swedish Scientificality," the linguistic and geographical differences between the English-speaking world and Sweden alone warrant a careful approach – not even to mention the anachronistic usage of the modern term science in an 18th-century context.

1.1.1 Learning from the Past

At the centre of this dissertation is Sweden in the 18th century. The country constitutes for several reasons a very compelling example: it demonstrates how empirical research – fuelled by the explicitly mercantilist agenda of the state (which will be discussed in-depth over the course of part 2) – and the status and practice of knowledge in both private and public institutions changed fundamentally within a few decades. It helps understand the role of knowledge and information in the formation and establishment of new boundaries that were central in defining the emerging nation state. This dissertation will thus explore how the acquisition, application, and value of knowledge developed as it shifted from an early modern, rationalist system towards an economically oriented, empirical one.

Understanding the past helps to prepare for the future as much as it helps to understand the present. The idea that changes in economic thinking based on mercantilist motifs influenced the formation of nation-states in the early modern era is well established. So is the fact that the status of knowledge changed considerably during that period, and that it was vital for many transformative processes in political, cultural, and economic life.

In the case of Sweden, the 18th century was the backdrop for some radical changes in political and economic re-calibration induced by the losses in the Great Northern War (1700-

1721), and the country's ensuing need for a wide-ranging reassessment of its policy. Under the new system of cameralism, a form of mercantilism originally developed in Germany, Sweden set out to become a big power once again.[19]

1.1.2 Terminology and Working Definitions

Before going *in medias res*, it is necessary to define the limitations and applications of several important terms and key concepts, most of which have as many definitions as people writing about them. I send ahead my own working definitions for the purpose of this thesis in order to limit the specific context in which they are valid, appearing in alphabetical order.

Academic

Since its birth in ancient Greece several millennia ago, the word 'academic' has wandered far from its origins. While the term is no longer synonymous with and limited to Plato's school of philosophy, the derived academy has successfully maintained and at points expanded the classist, elitist, and sexist undertone that has been a distinctive feature throughout Western knowledge culture. I will use the words academia and academic in regard to their spatial and cultural confinement to the context of institutions in the spirit of the Western university, and comparable institutions of private or governmental nature. In the present case, such institutions are, e.g., the Scientific Academies and Societies founded in the late 17th and early 18th century all over Europe, universities, and in some cases governmentally subsidized or semi-private entities

[19] See e.g. Lisbet Koerner, "Purposes of Linnaean travel: a preliminary research report," in *Visions of Empire: Voyages, Botany, and Representations of Nature*, eds. David Philip Miller, and Peter Hanns Reill (Cambridge [England]: Cambridge University Press, 1996), 119.

like the Swedish Bureau of Mines as well as private individuals dedicated to the cultivation and dissemination of (empirical) knowledge.

Enlightenment

The term enlightenment and the concept Enlightenment, as well as their equivalents in other languages[20] will not be used in this dissertation unless quoted as such in primary and secondary sources. Both word and concept are overused and, arguably, overrated. As a result, the many attempts at defining them have caused more confusion than good. I opt to pre-empt further disarray by replacing it with specific years or century markers.[21]

Knowledge

The value of knowledge and what knowledge even is depends on many factors, for instance class, cultural or geographical context, religious affiliation, or political circumstance. Since knowledge necessarily exists within social contexts and depends on living beings as its carriers, it is always relative to the values held by its 'hosts.' For the present purpose, I follow Simone Lässig's interdisciplinary definition as the combination of 'abstract,' intangible knowledge with "practical, social or tacit knowledge, that draws not only on texts but also images and objects as source material, and that considers not only knowledge as a 'product' but also the actors, practices, and processes involved in creating, disseminating, and transforming knowledge."[22]

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[20] The Swedish term is *upplysning*, for reference.

[21] Thank you to Joseph Patrouch who suggested to cut the term. It made my research, writing, and life in general significantly easier.

[22] Simone Lässig, "The History of Knowledge and the Expansion of the Historical Research Agenda," *Bulletin of the German Historical Institute* 59 (2016): 32.

Naturalism + Naturalists

To call practitioners of empirical research in the 18th century 'scientists' would be an anachronism (cf. chapter "3.2.3.1 Scientia, *vetenskap*, science"); similarly, to call them 'proto-scientists' would define them through a negative, and thus simply make them an intermediary step on the way to becoming 'scientists' – another anachronistic term. 'Natural philosopher' might be the terminology of choice for many publications on the topic, but it holds – in the Swedish case – too much association with philosophy to be accurate or justifiable. Furthermore, it is too close to the rather esoteric German *Naturphilosophie*, a concept from which most Swedish researchers in the 18th century desperately and actively tried to distance themselves. Rather than trying to determine the least damning of those options, I will settle for the term 'naturalist' or the Swedish vernacular option, *vetenskapare*.

Science + scientific

The words 'science' and 'scientific' – unless indicated otherwise – will be used not in the modern English sense of learned knowledge based on and derived from empirical experimentation, but – for lack of a better alternative – specifically as the translation of the Swedish noun *vetenskap* and the corresponding adjective *vetenskaplig*. This is especially relevant in the section on Swedish "scientificality." The reader might want to think of the terms as the equivalent of lat. *scientia*, which entails both the possession of knowledge and its application.[23]

[23] For a more in-depth discussion, see chapter "3.2.3.1 Scientia, *vetenskap*, science."

Scandinavia + Scandinavian

Scandinavia serves as a geographical umbrella term for the countries of Norway, Sweden, and Denmark who share a close geographical, cultural, and linguistic proximity. At times, Scandinavia is also used as a shorthand for the countries of the European North, and in that sense includes Iceland, the Faroe Islands, and Finland in addition to the three core countries.[24] In this work, I adhere to the meaning in the narrower sense – Sweden, Norway, and Denmark. However, in the 18th century, Sweden exerted significant and extensive political and cultural influence over Finland and the Baltic regions which were at the time considered part of the realm; one could thus justifiably argue that Scandinavia *de facto* refers to those areas as well. Because the power dynamics between Sweden and Russia at the time were constantly in flux, the specific circumstances and developments will be pointed out as they become relevant for the discussion.[25]

'Western'

The adjective 'Western' (capital letter) is used here in regard to the Euro-centric way of thinking pervasive in modern academia that is founded on an inherently Christian world view, and only secondarily as a general geographical direction through its association with the cultural dimensions originating there. Many authors, especially in the field of Western Esotericism, seem

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[24] Henrik Bogdan, and Olav Hammer, "Introduction," in *Western Esotericism in Scandinavia*, eds. Henrik Bogdan, and Olav Hammer (Leiden: Brill, 2016), 3.

[25] Andres Kasekamp, *A History of the Baltic States* (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2010), offers a concise and readable summary from the prehistoric era to the 21st century.

to assume a natural understanding within the reader and thus refrain from giving a definition. They implicitly refer to a "form of spirituality that stresses the importance of the individual effort to gain spiritual knowledge"[26] that is not concerned with rational or empirical proof – with Western referring to the geographical context in which the amalgamation of "Judeo-Christian" substrate with external sources took place.

1.1.3 On Knowledge

> There's no point in believing in things that exist.
> - Terry Pratchett, *Small Gods*

If one were to ask a hundred people, family feud style, to define the meaning of knowledge, the different answers would probably look something like this: science, belief, school, education, intelligence, trivia. Since I did not actually ask a hundred people, and therefore do not have secure data that gives me knowledge about my hypothetical sample population's answers, my assumptions are not empirical (and with a sample size of only a hundred people, my data would not even be representative of the overall population of, say, all people in Canada over the age of 16). My assumptions are simply educated guesses. Therefore, I am not able to say with any certainty that my answers are correct. What I can say is that I *believe* them to be around 80 percent congruent with the assumed answers of those hundred people.

To tell the truth, I am not really interested in the results of this hypothetical experiment (and in any case too much of an introvert to talk to a hundred people), but it served the purpose of

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[26] Henrik Bogdan, *Western Esotericism and Rituals of Initiation* (Albany: State University of New York Press, 2007), 5.

making a point. According to the principles of the empirical model that is currently prevalent in Western academia, it demonstrates – in a very much over-simplified manner – the difference between knowledge and belief. The answers would be completely different if the experiment were conducted in a different time and location: say we, hypothetically, turned a DeLorean into a time machine, and traveled back a few centuries to ask the inhabitants of Salem what they believed knowledge was, the answers would probably lean towards what nowadays would account for belief or even superstition.[27]

Similarly, results would vary given a different cultural context: for instance, an interview among an equal number of people living in the rain forests of South America would produce different results from one conducted with people in central India or southeastern Australia. Or maybe not – I am only making educated guesses here.

For the present purpose, it is vital to keep in mind the different status knowledge holds – regardless of its context. The important take-away is that the status of accuracy and reliability as the defining criteria for knowledge (in opposition to belief) changes, and that those categories themselves are constructs of a very recent past.

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[27] And then burn the DeLorean with its passengers on a stake, because they most *certainly* would have recognized witchcraft when they saw it.

2 Sweden

2.1 A Special Case?

Like many other non-English-speaking countries in the 'periphery' of Europe (think the Baltic states or the Balkans, for instance), Sweden often goes unnoticed by the rest of the world – in current news as much as in the past. It has often been unjustly perceived as a minor political player and as such remains un- or underrepresented in historical works, school curricula, or generally in public discourse. Many works on 18th century Europe do not even bother to mention Sweden – presumably because its political zenith had been reached long ago in the second half of the 17th century under King Karl XI (1655-1697; king of Sweden 1660-1697) and to a degree his son, King Karl XII (1682-1718; king of Sweden 1697-1718).

For example, in *Scientia in Early Modern Philosophy* (2010), the authors and editors explore in primarily philosophical terms the distinctive meanings and conceptualizations of *scientia* in Europe from Aristotelian and non-Aristotelian antiquity to the 17th century.[28] As comprehensive and relevant as the individual cases are, the work is afflicted with the ailment of many a book on European philosophy: it somehow completely fails to take into account what is happening beyond the so-called centres of European learned culture – usually including France, Germany, the Netherlands, Italy, and the British Isles, and not necessarily in this order. Scandinavia in general and Sweden specifically are not usually mentioned, although many international experts,

[28] Tom Sorell, G. A. J. Rogers, and Jill Kraye, *Scientia in Early Modern Philosophy: Seventeenth-Century Thinkers on Demonstrative Knowledge from First Principles* (Dordrecht, Netherlands: Springer, 2010).

architects, and artists came to Stockholm during that time on royal invitation or through other connections. The French philosopher René Descartes (1596-1650) even died there – unfortunately of pneumonia rather than of old age.[29] To say it with social media lingo, it was not the lack of 'content,' but the lack of followers that lets Sweden go unnoticed so often.

Perpetuating the same old assumptions about European centres of learning while disregarding the rest of the world as unimportant is deceptive and will necessarily lead to selective perception and representation. Revisiting the same topics and areas over and over does not add much novelty to the discussion, nor does it add value to the historical discussion of a country that has in more than one instance proven to be a strong competitor in areas commonly assumed to be dominated by major European countries – namely England and France.[30]

Just like the big imperial powers (England, France, Germany, the Netherlands, Spain, Portugal, etc.), Sweden engaged in long-distance trade through its own East India and Africa Companies, participated in oppressive colonialism both overseas and in the Scandinavian North, and was involved in the Atlantic Triangle trade as a slave owning and trading colonial power in Africa and the East Indies.

What the country lacked in population and political influence, it made up for by means of scientific innovation and aggressive mercantilist policies – both with the intention to further the nationalistic goals of political independence and economic autarky. As a former military super-

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[29] Herman Lindqvist. *A History of Sweden: From Ice Age to Our Age* (Stockholm: Norstedts Förlag, 2006), 208-209.

[30] Ibid., 360-361.

power and well-connected global actor, 18th century Sweden should therefore be recognized as a small yet serious competitor in trade, research, and politics with nationalist ambitions and international influence – not just as a side dish on the big *smörgåsbord* of history.

2.1.1.1 Swedish Exceptionalism?

Naturally, there is more than meets the eye. For over 200 years, Sweden has not participated in wars (UN peace missions and occupations notwithstanding).[31] The country constantly appears on top of all the desirable rankings worldwide – for instance, lowest corruption, highest living standards, or narrowest gender pay gap.[32] Life expectancy in 2016 was on average at 82 years – four more than in the USA. Those and other factors contribute to Sweden's positive reputation world-wide, and many of them are rooted in the last three centuries of its history that had significant impact on the country's current make-up: the welfare state, its diplomatic acumen, and a certain affinity for innovative thinking are just a few of the qualities Sweden gets lauded and ridiculed for, as the case may be.

During the 18th century in particular, the focus area of the present work, Sweden was the backdrop for – often radical[33] – political, scientific, economic, and cultural changes that influenced the national and international perception of the country lastingly. Much has been said

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[31] Lindkvist, Thomas, Maria Sjöberg, Susanna Hedenborg, Lars Kvarnström, and Donald Sims MacQueen, *A Concise History of Sweden from the Viking Age to the Present.* First edition (Lund: Studentlitteratur, 2018), 8.

[32] Jon Pierre, *The Oxford Handbook of Swedish Politics* (Oxford University Press, 2016), 6.

[33] Cf. Jonas Nordin, "Frihetstidens radikalism," in *Riksdag, Kaffehus och Predikstol: Frihetstidens Politiska Kultur, 1766-1772*, eds. Marie-Christine Skuncke, and Henrika Tandefelt, 55-72. Stockholm: Atlantis, 2003.

about Swedish Exceptionalism, the country's outstanding position in international comparison, based largely on its socialist welfare system that – despite being decried as unsustainable – continues to thrive. Some authors such as Pierre see it in decline, but it is criticism on a very high level.[34]

From a comparative historical perspective, increased attention needs to be paid to factors such as population density, urbanization, geographic expansion, diplomatic relations, religion, and ethnic composition. They were and still are key factors in the development of the country's political system.

In general, developments that were already well on the way or long established in Britain and continental Europe often took several years or decades to reach Sweden, and they underwent a meticulous selection and adaptation process to meet the needs and interests of local politics and economy. Implementing new policies or market trends in the vast country was often a slow process affected and defined by the course of the seasons, remoteness of places, or the necessity to overcome local resistance towards change. The filters for technological, social, or economic innovation were possibly more than in other parts of Europe the country's topography and natural environment.

2.1.2 New Politics for a New Time

First, let us set the scene for the economic environment and political events that fundamentally shaped 18th century Sweden. At the beginning of the century, Sweden had been

[34] Pierre, *Oxford Handbook of Swedish Politics*, 6-7.

focussing all its attention on the Great Northern War that would last for more than 20 years. By the end of the war, in 1721, the general mood was on the lower end of the optimism spectrum as the military missions had been very costly to the country both in economic and demographic terms: thousands of soldiers and one king had died on the battlefield; the treasury was drained, and so was the motivation of the people; territorial losses impacted the country's self-esteem and economic foundation. On the other hand, the war had an unexpected positive side effect: it helped to consolidate the nation as it forced the state to refocus on its internal strengths and creative potential apart from active warfare: exploitable natural resource, human labour and brainpower.[35]

Many characteristics of the Swedish government, for instance pertaining to its legislation, jurisdiction, land ownership rules, or regional administration, go back to the time often referred to as the Viking Age – roughly the last quarter of the first millennium CE – and to the Middle Ages, and they warrant a closer look for the present context. Due to its topography and climate, Sweden had always been sparsely populated, with the most people concentrating in the warmer southern and coastal regions of the peninsula. Sweden's terrain and topography were natural barriers to fast communications and transportation, and many areas were notoriously difficult to access. The peculiarities in Sweden's geography were partially responsible for regional isolation and conducive to the preservation of local traditions. Natural waterways – navigated with ships in summer and sleighs in winter – were the aortas of trade, travel, and communication for many centuries. Only in the Middle Ages did a network of large and regularly maintained roads

[35] Lindqvist, *History of Sweden*, 337.

develop, allowing the monarchy and Church to extend their reach, and enabling higher trade volumes.[36] The metal industry and its expansion was a driving factor of trade and thus behind the development of infrastructure. The hubs of ore production were in Uppland (the region north of Stockholm and around Uppsala), and in the central region of Dalarna with the centre Falun where "deposits began to be exploited on a large scale in the mid 1200s."[37]

Communities were arranged in *hundare*, a community of approximately a hundred people that became synonymous with the concept of a village; chieftains were at the top of the hierarchy, with thralls and independent farmers at the lower end.[38] In the Viking Age, a person's status depended less on their wealth since "[p]ower was based more on personal relations than on ownership of land."[39]

The status of landownership began to shift significantly under the influence of the Church in the Middle Ages. Archeological and archival evidence indicates that most significant changes took place between 1000 and 1300 CE with "the gradual emergence of parishes, as well as bishoprics, the construction of churches, the introduction of ecclesiastical fees, and the rise of a comprehensive hierarchical structure."[40] In the Middle Ages, formal parliamentary meetings were not yet established; large regional or supra-regional gatherings, so-called *tings* (cf. 'things'), took place instead if required.[41] While Sweden had an established monarchy, the king

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[36] Lindkvist et al., *A Concise History of Sweden*, 38-39.
[37] Ibid., 37.
[38] Lindquist, *History of Sweden*, 54; Lindkvist et al., *A Concise History of Sweden*, 17.
[39] Lindkvist et al., *A Concise History of Sweden*, 17.
[40] Ibid., 47.
[41] Ibid., 24.

was until the late medieval period elected from one of two families, resulting in regular political turmoil.[42]

Stabilized state organization goes back to the 17th century when, following the death of Karl IX, his chancellor of the realm, a man named Axel Oxenstierna (1583-1654), established a royal pledge that set a limit to absolutism and reined in the power of the monarchy through legal means.[43] The ensuing period was called *stormaktstiden*, the time of the country's political and military zenith in the 17th and early 18th century.

Since the 17th century, Sweden had been governed by a political system consisting of a hereditary monarchy, the *Riksdag*[44] (the parliamentary council wherein the Estates were represented), and the *Riksråd* (a council to represent the interests of the higher classes against those of the king), as well as other legislative bodies like the chancellery who was in charge of foreign policy decisions (Sw. *Kanslikollegiet*).[45] The headquarters of those institutions were located in the capital Stockholm.[46]

Taken together, the different branches of government were supposed to establish a power balance between the interests of the various groups. However, the power distribution among them changed significantly during the late 17th and 18th century. Villstrand describes this era as one of opposites: on the one hand, beliefs in magic and superstition thrived, bishops thundered

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[42] Lindkvist et al., *A Concise History of Sweden*, 24.
[43] Ibid., 86-87.
[44] For a more detailed discussion of the parliamentary system, see chapter "3.1.2.4 The *Riksdag*."
[45] Nils Erik Villstrand, *Norstedts Sveriges Historia*, bd. 4, (Stockholm: Norstedts, 2009), 267.
[46] Ibid.

down from their pulpits, and witches burned on the stakes.[47] All the while, the country saw innovation in education, the establishment of new cities, and a highly sophisticated government and legal system. Sweden was per constitution from 1634 divided into 23 counties (Sw. *län*) which functioned as the next smaller legislative and administrative entities. The counties were divided further into so-called *fögderier* with the *fogde* (bailiff) as their head, who was also a direct subordinate to the crown. As their central duties, the people holding this office had to protect their land, perform military service, and act as prosecutors in *tings*.[48] Cities were legally separate entities, headed by a mayor and magistrates.[49]

Starting in the 17th century, the goals of the Swedish state became more utilitarian, and in the 18th century they developed into a strictly mercantilist agenda led by the prospect of national profit and economic gain.[50] The losses of the Great Northern War had contributed to a switch in policy mentality away from military dominance towards strategic economic growth. At the same time, in 1720, a new constitution drew power away from the king and gave it instead to the Council of the Realm (Sw. *Riksråd*). The council consisted of 16 members from the clergy, nobility, and burgher Estates; three candidates for each position were suggested for the king to choose from.[51]

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[47] Villstrand, *Norstedts Sveriges Historia* 4, 14.

[48] Ibid., 268.

[49] Ibid., 269.

[50] See e.g. Karin Johannisson, *Det mätbara samhället. Statistik och samhällsdröm i 1700-talets Europa*, Stockholm: Norstedts Förlag, 1988.

[51] Lindkvist et al., *A Concise History of Sweden*, 128-129.

The *Riksdag* under the control of the 'liberal' Hats party and the nation's leading economists followed the French example of a strongly mercantilist polity. Due to the considerable losses in the Thirty Years War, Germany had developed a "continental sister doctrine to mercantilism,"[52] named cameralism, which the Swedish eagerly adapted further to their own needs. Swedish cameralism, in turn, was modeled closely after and adapted from the German system.

In research literature, many authors do not even distinguish a specific Swedish system – or its German ancestry – and instead apply the more general concept of mercantilism to the Swedish context.[53] Terminology remains somewhat inconsistent, with many authors using mercantilism and cameralism in the Swedish context interchangeably.[54] For example, Eli Heckscher's classical work *An Economic History of Sweden* (first published in 1941 under the original title *Svensk arbete och liv*) does not grant the country much of an innovative or even independent agency: instead, Heckscher refers to the system as mercantilism throughout the period of 1720-1815 which he considers the 'Foundation of Modern Sweden.'[55] Recent works on the Swedish economy adhere to the concept of a more specialized form of mercantilism, following the German role model of cameralism. The cameralist-mercantilist system

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[52] Lisbet Koerner, *Linnaeus: Nature and Nation* (Cambridge, MA: Harvard University Press, 1999), 3.

[53] I will use the hyphenated term cameralist-mercantilist here to clearly indicate the 'mixed heritage' of the concept.

[54] Some authors evidently do not see sufficient need to distinguish between mercantilism and cameralism. That might be a pragmatic choice that simply acknowledges cameralism as a super-category of mercantilism, or it could speak to an author's preference to reserve cameralism as a terminus technicus for the German context. The term mercantilism is prevalent in literature.

[55] Eli F. Heckscher, *An Economic History of Sweden* (Cambridge: Harvard University Press, 1954), esp. c. 5.

encompassed "numerous policing measures to encourage a prosperous, populous and unified national economy, as well as a series of trade regulations."[56]

Its proponents were "at their origin, seventeenth-century German fiscal theoreticians employed as princely financial advisers […] [who] aimed to improve manufacturing and agriculture by means of protectionist legal measures and technological innovations."[57]

Adherents of cameralist-mercantilism advocated for producing whatever possible within the country, exporting as much as possible, and taxing imports while keeping them to a minimum. In practice, this strategy translated to "producer monopolies and state manufactures; import barriers; navigation acts; pronatalist legislation; export bans on gold; funding of science and technology; and improvements to infrastructure"[58] – everything from Sweden for Sweden.

To further the state's goals, the demographic make-up of the workforce was analyzed and optimized, people were measured by their labour potential, scientific academies were founded to foster innovation and educate local talent, and knowledge was turned into a commodity under the command of economic success. Meanwhile, the local universities of Lund and Uppsala provided a steady supply of loyal, trained professionals for state service whose one and only mission was to utilize all available resources to the fullest in the best interest of the state.[59]

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[56] Koerner, "Purposes of Linnaean travel," 119.

[57] Koerner, *Linnaeus: Nature and Nation*, 1.

[58] Ibid., 3.

[59] Chris Evans, "Where in the World was Sweden? A Brief Guide for Foreigners," in *Sweden In the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén (Farnham, Surrey, England: Ashgate, 2013), 35.

The successful implementation and adaptation of cameralist-mercantilism were primarily steered by a handful of influential writers, politicians, and theorists such as Anders Berch (1711-1774), Pehr Niklas Christiernin (1725-1799), Carl Fredrik Scheffer (1715-1786), Carl Leuhusen (1724-1795), or Anders Nordencrantz (a.k.a. Bachmanson; 1697-1772). But the most prominent economist was probably the Finn Anders Chydenius (1729-1803) who also served as a representative in the *Riksdag*.[60] Together, all of these economists turned the concept of cameralist-mercantilism into a powerful tool in the service of Sweden's economic independence and a centralized government.

2.1.2.1 Political Arithmetic: Revenge of the Nerds

For their ideal of a centralized government to work properly, the state needed information – ideally, lots of it, and the more accurate, the better. To succeed with this concept, Swedish economists followed a bigger European trend: political arithmetic – the systematic collection and analysis of data. At the beginning of this development was not the word but a generalized, large quantity of numbers – data – and it started when economists and mathematicians first set out in true empirical fashion to measure and collect reliable information about everything and anything possible. Their weapon of mass abstraction came from the British Isles and had sprung from the head of William Petty (1623–1687).[61] In the eponymous book *Political Arithmetick*,

[60] Heckscher, *An Economic History of Sweden*, 204; cf. Henrik Knif, "Den farliga staden. Anders Chydenius och Stockholm," in *Riksdag, Kaffehus och Predikstol: Frihetstidens Politiska Kultur, 1766-1772*, eds. Marie-Christine Skuncke, and Henrika Tandefelt, 155-170. Stockholm: Atlantis, 2003.

[61] Ted McCormick, *William Petty and the Ambitions of Political Arithmetic* (Oxford: Oxford University Press, 2009), 2.

posthumously published in 1690,[62] Petty offered a method to describe a whole population or part of a population and its respective qualities mathematically by gathering relevant information such as the number of births, deaths, population age, and so on.[63]

Petty, a trained physician with a liking for math, suggested using numbers and data for the specific purpose of quantifying and analyzing large numbers of actual people, something never considered before. It was a powerful tool that would allow the state to "shape and reshape populations, using natural processes and artificial aids."[64] The practical highlight of his career was probably the assessment of the religious and geographical factions of Cromwellian Ireland, where his (politically very ambiguous) work was "lauded then and since as the first scientific mapping" of the country – at that point a battlefield of denominations and, depending on one's point of view, deviations.[65]

Petty's ideas provided the theoretical foundation for a myriad of experimental projects with very tangible, lasting, real-life consequences – as seen here in the case of Ireland. Allowing him to systematically gather data and analyze the country's religious composition, it was used to rearrange the "different national and confessional subpopulations" in England and Ireland.[66] The outcome of this so-called Down Survey was "the redistribution of approximately 8,400,000 acres

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[62] A few articles regarding applied cases notwithstanding, Petty was unwilling to publish *Political Arithmetick* during his lifetime – probably due to the mixed reactions his earlier works had garnered. Cf. McCormick, *William Petty*, 260-261.

[63] McCormick, *William Petty*, 5, 303.

[64] Ibid., 305.

[65] Ibid., 3.

[66] Ibid., 10.

of land from Catholic to Protestant owners," and had a lasting social and political effect on Ireland's population as well as English domination over the country.[67]

A student of Thomas Hobbes (1588-1679) – a man who loved geometry, but famously detested numbers[68] – Petty believed the foundation of politics to be expressible through mathematical terms. The brilliance of his invention lay in introducing the Galilean idea of measurable entities to Hobbes' number-free geometry in order to apply them to measure social entities. The study of society and everyone within it now possessed a never before seen concreteness through the mathematical representation of abstract variables – a mathematical model of people.[69] Petty created what we would nowadays refer to as statistics – although his concept is not directly comparable to the complexity and scope of modern statistical sciences.[70]

Even more importantly than their mathematical potential, his method combined the realms of the worldly and the divine: society was man-made, nature was God-given.[71] Through his methods, humanity would not only get closer to a perfectly functioning state, but also to God.[72] Petty found heavenly support for his undertaking in a passage from Scripture itself: "But thou

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[67] McCormick, *William Petty*, 117.

[68] For a comprehensive account of Hobbes' understanding of geometry (and everything wrong with it), see e.g. Douglas Michael Jesseph, *Squaring the Circle: The War Between Hobbes and Wallis* (Chicago, IL: University of Chicago Press, 1999).

[69] Johannisson, *Det mätbara samhället*, 11-12.

[70] On the concept of Petty's political arithmetic and the different definitions among different disciplines, see e.g. McCormick, *William Petty*, 5. See further Johannisson, *Det mätbara samhället*, 25-26.

[71] Lars Magnusson, "Den ekonomiska diskussionen under frihetstiden," in *Riksdag, Kaffehus och Predikstol: Frihetstidens Politiska Kultur, 1766-1772*, eds. Marie-Christine Skuncke, and Henrika Tandefelt (Stockholm: Atlantis, 2003), 37.

[72] Johannisson, *Det mätbara samhället*, 11-12.

hast ordered all things in measure and number and weight."[73] Said bible verse was a welcome argument to defend the rising popularity of statistical data collection among empiricists: it made a great justification for the execution of empirical work in the name of God and naturalism. For once, numbers and scripture spoke the same language.

And Petty was not alone with the assumption that there was a mathematical blue-print hidden in God's great plan: he followed in the footsteps of big names such as Kepler and Galilei who assumed a divine structure behind everything natural.[74] Swedenborg and Linnaeus (of whom we will hear more in a bit) as well as many of their contemporaries were equally convinced that a divine structure was hidden in nature – an approach often referred to as physico-theology.

Soon, Petty's tool would become a prime example for the practical application of empirical methods – observing, measuring, analyzing – known otherwise exclusively to natural philosophy.[75] This development was not a given as it took a lot of convincing the right people for his projects to take off – only the most influential ones had even a possibility of being turned into reality. Accordingly, he presented his ideas and concepts to only a few hand-picked individuals. The prestige of his method grew slowly but steadily, via a "carefully cultivated network of friends, contacts, and potential patrons" – people who through their own positions and

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[73] Johannisson, *Det mätbara samhället*, 11. The quoted bible verse is Wisdom 11:20 (New Revised Standard Version).

[74] Johannisson, *Det mätbara samhället*, 12.

[75] Ibid., 12-13.

connections had access to senior state officials or even the crown, and who could pass on Petty's often radical ideas with the necessary diplomatic tact.[76]

In the long run, political arithmetic was going to take over the world. Petty, being the strong supporter of knowledge in the service of the state that he was, but also in favour of knowledge in the right hands, backed by the interests of state and church, started a silent revolution of numbers. He applied his quantifying spirit and measuring equipment to land, labour, livelihood – and when that was not possible, he made educated guesses.[77]

2.1.2.2 Information State

> I only believe in statistics that I doctored myself.
> - Winston Churchill

Modern states rely on information like a sundial on light: it is essential to all administrative and bureaucratic processes from birth certificates to school transcripts to speeding tickets to tax records to testaments. Without information, there is nothing but chaos. Considering information as "the content and the means of decisionmaking [sic]," both "administrative effectiveness and centralisation" depend on a well-functioning data gathering and processing system.[78] Some researchers even go as far as to see modern information systems as a precondition for modern states exactly *because* they allow for centralized decision making.[79] Even if one does not wish to

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[76] McCormick, *William Petty*, 259.

[77] Ibid., 97-98; Karin Johannisson, "Society in Numbers: The Debate over Quantification in 18th-Century Political Economy," in *The Quantifying Spirit in the Eighteenth Century*, eds. Tore Frängsmyr, J. L. Heilbron, and Robin E. Rider (Berkeley: University of California Press, 1990), 349.

[78] Black, *Power of Knowledge*, 120.

[79] Ibid., 120, 407.

lean that far out of the window, there is at least a significant historical correlation between the growing influence of nation states and the coinciding development of mathematical tools that made it possible to strategically process and use demographic information.

In the case of early modern Sweden, economists and political stakeholders (especially the Hats faction in the *Riksdag*, but more on that in a bit) agreed that information was the magical key to the country's economic well-being as it opened the flood-gates to never-ending demand and abundant labour: "*[E]t rikes välfärd förnämligast beror på invånarens myckenhet*"[80] – this or similar notions along the same lines can be found in almost every economic treatise of the 18th century. By the middle of the century, the process of deep political reorganization – fed by mercantilist ideas – was placing Sweden's citizens in the focus of economic interest as the state's most important source of wealth. Every self-respecting statesman had adapted the credo of the citizens' crucial role for the nation's well-being, and together they spread the word eagerly.

The simple (and numerous) Jans and Johannas living in this mercantilist utopia were the ones who created demand through their willingly offered labour; thus, they constituted the basis for the agricultural and industrial pillars that were supposed to be the answer to the country's loss of military influence.[81] The governing classes considered the peasant masses intellectually limited in their abilities to understand the intricacies of economic politics or to make decisions of national importance. Thus, they needed guidance in the form of carefully mitigated state control.

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[80] "A kingdom's well-being depends primarily on its abundance of people [my translation]." Johan Browalius, *Tankar om Svenska Folkbristen*, (Åbo, Tryckt hos Direct. och Kongl. Bolttr. I Storförstend. Finland, Jacob Merckell, 1756), 1. http://runeberg.org/folkbrist/0005.html.

[81] Johannisson, *Det mätbara samhället*, 96-97.

And who was in a better position to watch over the labourers than those who understood the numbers?

2.1.2.3 The Tabellverk

After several long decades and most of the treasury's contents had been spent on warfare against Russia, Denmark, and Poland that resulted in much human and economic loss, the new methods of political arithmetic – adapted to the national interests and preferences of Sweden – promised thus-far unheard-of possibilities, and led the way to a supposedly much improved, eventually perfect society.[82] It had taken several decades and a detour via Germany where Petty's ideas were moulded and adapted into the system of cameralism, but the seed eventually fell on fertile ground and gained foothold in Sweden. The country was ready and eager for the new era: "Political arithmetic offered a key to calculating Sweden's potential and devising a new strategy for growth and prosperity."[83]

In the 1730s, the *Riksdag*, Sweden's representative parliamentary structure about which we will hear more in the next chapter, had raised the question of how best to obtain and analyze detailed information about the country's infrastructure. Of special interest was data on population, land use, mines, woods, qualified tradesmen, and the manufacturing industry.[84] For the time being, the *Vetenskapsakademi* had taken over responsibility for statistical tasks, but the consensus was that a separate, specialized entity should be assigned this highly important

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[82] Johannisson, *Det mätbara samhället*, 96.
[83] Johannisson, "Society in Numbers," 353.
[84] Johannisson, *Det mätbara samhället*, 157.

responsibility: the publications of Petty and others had inspired the idea, and it was presented to the Secret Committee of the *Riksdag* in 1746.[85]

The concept for the so-called *Tabellverk* was born, an institution solely dedicated to data gathering and processing in the service of the state. It was the first institution of its kind in the world. From then on, data was gathered and analyzed by one source, and the *Riksdag* would decide how best to implement the resulting information in the national interest.[86]

In another instance, the astronomer and member of the *Vetenskapsakademi* Pehr Wilhelm Wargentin, "used similar statistical methods for predicting the movements of the Jovian satellites and for interpreting the vital statistics amassed at the Office of Tables (Sw. *Tabellverket*)."[87] Unlike in other European states, Sweden – especially in the late 18th and 19th century[88] – employed its astronomers not so much to observe the skies, but the land. Performing duties of land surveyors and map makers, Sweden benefited immensely from their mathematical talents. This extended to their function as analysts for the *Tabellverk* as the state relied on accurate information in order to make informed decisions. The cooperation between astronomers and the state speaks to the evident overlap between public and empirical institutions and their interests,

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[85] Johannisson, *Det mätbara samhället*, 158.

[86] Lindqvist, *History of Sweden*, 357.

[87] Sven Widmalm, "Astronomy as Military Science: The Case of Sweden, ca. 1800-1850," in *The Heavens on Earth: Observatories and Astronomy In Nineteenth-Century Science and Culture*, ed. David Aubin, Charlotte Bigg, and Heinz Otto Sibum (Durham [NC]: Duke University Press, 2010), 175.

[88] The conclusions from this example are relatable to earlier developments in the 18th century, although the focus of Widmalm's paper is later.

as well as the usefulness and synergetic effects of applying mathematical methods to social or military projects for the Swedish state.[89]

2.1.2.4 The Riksdag

As noted above, long before the Swedish nation state began to emerge, the peoples living in the Scandinavian region had organized their communal political and judicial interests in a sort of democratically organized meeting – the *ting* (also spelled *thing*). Archeological findings and literary sources point to the existence of gathering places that were used as regular meeting sites for *tings* since at least the 1200s.[90] Representation in those meetings was based on hundreds (Sw. *hundare*), i.e. one representative was sent out per hundred people, which roughly corresponded with the number of people in a village community. Officials who were sent out to a *thing* were in charge of representing issues of their individual hundred. This system was indicative of the sparsely populated land in which regular regional and supra-regional meetings could (for logistical and economic reasons) not be attended by a larger number of people.

Although royal families and hereditary monarchies emerged later, the representative structure and organization based on hundreds was maintained and continued to include the peasant population, leading to political representation reminiscent of democratic systems.[91] The story of the *Riksdag* as a political institution began in this assembly system, and it would be of vital importance in the future of the country.

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[89] Widmalm, "Astronomy as Military Science," 175-176, 188-189.
[90] Lindkvist et al., *A Concise History of Sweden*, 24.
[91] Ibid., 23-24.

As a result of the peace treaty of Nystad, formalized in 1721 after the end of the Great Northern War, Sweden had found its status reduced from that of a large military and political power to a comparatively small country at the margins of the European continent. It had to find and establish its place within the European fabric anew.

Sweden was separated from mainland Europe and the British Isles by sea, and from its direct neighbours to the east and west by mountains and the northern tundra of Sápmi. But worse than that, Russia had separated it from its former possessions on the continent and in the Baltic region (cf. Figure 1). Sweden's strong (and slightly too self-confident) leader, King Karl XII, had died a spectacular and very final death on the battlefield in 1719, leaving the country in shambles.[92]

The official end of the war had followed with a slight delay two years later in 1721. A new era in the history of Sweden was about to begin. It was called – somewhat ironically – *frihetstiden*, the Age of Liberty. *Frihet* referred to the freedom from Karl XII, who had made a name for himself as an authoritarian king drunk on adrenaline, power, and warfare.[93] Upon his death, he was succeeded by his youngest and only surviving sister, Ulrika Eleonora, who abdicated in favour of her German-born husband, Frederik I, within the year.

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[92] Bo Lindberg, "Inledning: Politisk kultur och idéer," in *Riksdag, Kaffehus och Predikstol: Frihetstidens Politiska Kultur, 1766-1772*, eds. Marie-Christine Skuncke, and Henrika Tandefelt (Stockholm: Atlantis, 2003), 13.

[93] It stands to reason that the one or another glass of liquor was involved, too.

Figure 1: Swedish Empire in Early Modern Europe (1560-1815).[94]

[94] Wikimedia Commons, s. v. "Swedish Empire in Early Modern Europe (1560-1815)," https://commons.wikimedia.org/w/index.php?curid=8676778.

When Fredrik I finally saw his long-held ambitions to the Swedish throne coming true, he was almost immediately reined in by the *Riksdag*, the parliamentary assembly that had been put in control over legislation and state funds. Spooked by the autocratic frenzies of Karl XII, the *Riksdag* had made it its single-most important mandate to never let an autocrat rule over Sweden again, and so it did everything in its power to limit the new king's political influence as much as possible.

Arvid Horn emerged as the diligent political leader. He was a protagonist in the establishment of the new constitution and reigned in the country's ambitious foreign politics to a manageable level.[95] At the height of his political career, Horn had accumulated many high-ranking official positions: among others, he was *Kanslipresident* (President of the Chancellery), and speaker of the *Rådskammar* as well as speaker of the Secret Committee, making him one of the most influential actors in Swedish politics.[96]

As a consequence of the post-war political shifts, 18th century Sweden possessed one of the most progressive governments in all of Europe as far as representation of the population and freedom of speech[97] were concerned.[98] Free speech became part of the constitution and "the principle of public access to official records was introduced, which meant that the

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[95] Lindberg, "Inledning: Politisk kultur och idéer," 13.

[96] Mansén, *Norstedts Sveriges Historia* 5, 32.

[97] While legally protected on paper, many authors of political pamphlets continued to write anonymously or under pseudonym even after 1769 – out of fear of retributions. Cf. Erik Bodensten, "Political knowledge in public circulation. The case of subsidies in eighteenth-century Sweden," in *Circulation of Knowledge: Explorations in the History of Knowledge*, ed. Johan Östling et al. (Lund: Nordic Academic Press, 2018), 88; Nordin, "Frihetstidens radikalism," 61.

[98] Lindqvist, *History of Sweden*, 331.

administration's documents must be open to the public."[99] Critique of the Constitution and religious writings were, however, exempt from the Freedom of the Press Act.[100]

Both the legal protection of free speech and representation of all estates secured praise from many of Europe's most liberal thinkers: Voltaire and Jean Jacques Rousseau lauded the new system that was rivalled at the time in its generous liberties of public discourse only by Britain.[101] It is worth emphasizing that this system was not a result of the influence of enlightened political thinkers, but grew primarily on the already existent structures of representation – such as the local and supra-regional *thing* assemblies – that simply favoured the development of a (for early-modern European standards) unusually broad representation. It was only secondarily influenced by liberal political ideas of the 17th and 18th century European state theorists.[102]

The *Riksdag* in the Age of Liberty possessed factual parliamentary control, leaving very little power to the monarchy.[103] Over the course of the 18th century, the influence of the *Riksdag* grew considerably (until Gustav III's coup d'état in 1772 put an end to it).[104] Unsurprisingly, not everyone was happy about this development: Frederik I at the beginning of *frihetstiden* found himself at the losing end of the bargain, and soon lost ambition when he realized that the role of

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[99] Lindkvist et al., *A Concise History of Sweden*, 134.
[100] Ibid., 134.
[101] Lindqvist, *History of Sweden*, 332; Mansén, *Norstedts Sveriges Historia* 5, 21.
[102] Nordin, "Frihetstidens radikalism," 70.
[103] Mansén, *Norstedts Sveriges Historia* 5, 21.
[104] Lindqvist, *History of Sweden*, 410-411.

king did not live up to his great expectations. He was, factually, a puppet of the *Riksdag* for the rest of his days as king.[105]

As the institution in charge of legislature, taxes, and economic issues, the *Riksdag* was of major strategic importance for all political decisions. It was controlled by Sweden's small, but over-proportionally represented and thus immensely powerful nobility.[106] The three other estates were represented through 'The Most Honourable Estate of the Clergy,' totalling 0.9 percent of the overall population; 'The Lawful Estate of the Burghers' (ca. 20 percent of the population);[107] and finally 'The Honourable Estate of the Peasants,' representing the biggest population group with ca. 80 percent.[108] One Vice Secretary of The Honourable Estate of Peasants was usually a Finnish native speaker, representing and giving a voice to one of the country's largest and most important minorities.[109] Some groups – lawyers or physicians, for instance – were not represented because their professions did not entitle them to membership in any of the Estates.[110]

Representation in the *Riksdag* was neither equal nor proportional: while peasants were given one vote per 100 people, the nobility constituted less than one percent of the overall population

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[105] Lindqvist, *History of Sweden*, 340.

[106] Ibid., 343; Michael F. Metcalf, "Hattar och mössor 1766-72. Den sena frihetstidens partisystem i komparativ belysning," in *Riksdag, Kaffehus och Predikstol: Frihetstidens Politiska Kultur, 1766-1772*, eds. Marie-Christine Skuncke, and Henrika Tandefelt (Stockholm: Atlantis, 2003), 43.

[107] The Burghers' Estate also allowed women to elect and be elected, although they had to fulfill very narrowly defined conditions. Cf. Nordin, "Frihetstidens radikalism," 71.

[108] Lindqvist, *History of Sweden*, 343-345.

[109] Ibid., 345-346.

[110] Mansén, *Norstedts Sveriges Historia* 5, 22.

while possessing a hugely disproportionate number of votes – one for each noble family; the overall number of votes oscillated accordingly.

To add further to the uneven power distribution, the nobility controlled the so-called *Sekreta Utskott* or Secret Committee, with 50 votes out of an overall hundred; the Estates of the Clergy and Burghers held 25 votes each. True to its name, the Secret Committee was an exclusive gathering where the most important decisions were made in advance of official *Riksdag* meetings. Importantly, it was in charge of foreign policy decisions.[111] The Secret Committee excluded members of the Peasants' Estate from participating because its representatives were assumed to be too ignorant to understand the matters at stake.[112]

The unequal representation given to the lower estates was, nonetheless, far ahead of most European countries at the time. While the Swedish approach guaranteed that all corners of the country and most of its population were – in theory sometimes more so than in practice – represented, it brought with it the very real burden of financing the long and expensive business trips of the representatives. Coming from the remotest corners of Sweden, the respective members sometimes had to undertake week-long travels to Stockholm and set up their living quarters there while the *Riksdag* was in session.

The sessions happened at least once every three years and could last for a very long time – over a whole year,[113] and in the case of the 1760-1762 session a full 20 months.[114] Sending out

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[111] Mansén, *Norstedts Sveriges Historia* 5, 22.
[112] Lindqvist, *History of Sweden*, 346.
[113] Ibid., 343; Bodensten, "Political knowledge in public circulation," 88.
[114] Mansén, *Norstedts Sveriges Historia* 5, 22.

representatives and supporting their often lavish lifestyle was therefore a costly undertaking due to travel and living expenses, none of which were covered by a salary. Instead, voters from the respective communities had to pay for all their representatives' expenses. Especially for the delegates of the nobility, sessions were a sumptuous undertaking as they had to keep up a certain living standard – ranging from their own extravagant clothing to offering refreshments and meals to supporters and party members which was not a small feat in the overpopulated capital.[115]

With all the expenses for *Riksdag* meetings resulting in a need for an additional source of income, the representatives were vulnerable to foreign intervention in the form of bribes: the governments of other European countries – among them England, France, Denmark, and Russia – on a regular basis 'sponsored' Estate members in exchange for political support of their respective, competing agendas.[116] Swedish politicians working together with representatives of other countries was per se neither unusual, nor was it generally frowned upon. During the better part of the 18th century, the Swedish treasury depended to a large degree on subsidies from foreign countries.[117]

While providing a welcome source of income, this system brought very noticeable consequences for Swedish politics because this form of negotiable affiliation could shift the balance in the *Riksdag* as the following example demonstrates.

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[115] Metcalf, "Hattar och mössor," 43.

[116] Lindqvist, *History of Sweden*, 346-347; Metcalf, "Hattar och mössor," 43.

[117] See article by Bodensten, "Political knowledge in public circulation," esp. 85-87. See further article Skuncke, "Medier, mutor och nätverk."

The parliamentary system in 18th century Sweden was comprised of two factions, the Hats and the Caps.[118] The Hats (sw. *Hattor*, named after its partisans' affinity for the latest French fashion),[119] were decidedly friendly with the French and stood for more innovative politics, while the Caps (sw. *Mötar*, after the sleeping caps worn by older people who made up the majority of its members)[120] stood for traditional, conservative values and policies, and leaned towards a balanced relation between the European powers, although with a bias towards Russia.[121] During a session in the 1730s, the French government, represented by its ambassador, "used the promise of French subsidies to mobilize political support and overthrow the Cap-dominated government."[122] The move by the Hats was a success: the new Riksdag emerged much more Francophile, and for most of the 18th century, French style in architecture, art, fashion, and even language would exert a strong influence on Sweden.[123] While it is impossible to say what would have happened without the French intervention – the Hats might have overthrown the Caps at some point anyways – the foreign support presumably helped their cause a great deal or at least accelerated it.

With only a minor intermezzo when in 1742-1743 the Hats fell back into their old habits of waging war against Russia, the political predominance of the *Riksdag* lasted without major geo-political incidents until the session of 1771-1772, when Gustav III and the Estates clashed. It is a

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[118] Metcalf, "Hattar och mössor," 39-40.
[119] Lindqvist, *History of Sweden*, 349.
[120] Ibid., 349.
[121] Bodensten, "Political knowledge in public circulation," 84-85.
[122] Ibid., 85.
[123] Lindqvist, *History of Sweden*, 406.

long and complex story, and not very relevant here. The simplified summary goes something like this: exacerbated by a famine and an economic crisis, intrigue was added to insult, Hats fought Caps, Caps fought Hats, and the *Riksdag* session turned into a never-ending farce, culminating in the king gathering troops and preparing to march on the capital.

After gaining the support of the assembled military in Stockholm, Gustav III, who had assumed the throne one year earlier after his father's death, had the members of the council arrested straight out of a meeting that was taking place. He was not willing to accept the restrictions his predecessor had to face for his own reign. The same day, he "proclaimed to the public that a new order was to be introduced."[124] Gustav III's policies were unpopular and he was later shot at a masquerade ball.[125] Sweden's *frihetstid* had ended the way it had started: with major political changes and another ill-fated king. The knowledge policy it had introduced and consolidated over the decades, however, would last.

2.1.3 Summary

Overall, Sweden's political agenda after the Great Northern War was directed towards a reformation of its internal structures. The mission of the new government was based on a cameralist-mercantilist recalibration of the entire Swedish state, including the exploitation of the country's natural resources, and a policy program focusing on education and innovation from

[124] Lindkvist et al., *A Concise History of Sweden*, 135.
[125] Ibid., 136.

within.[126] A detailed discussion of those aspects will follow in the ensuing chapters and in the case studies.

As discussed in the previous chapters, from 1719 on, all important political and financial decisions had to go through the *Riksdag*. Whoever had power over it factually controlled the country. With the rise of the Hats party in the 1730s, a generation of fresh political minds took the steering wheel from the geriatric Caps party. The Hats were oriented towards France and in general pursued a more liberal political style than the Caps.

Over the course of the 18th century, their aggressive foreign political agenda of economic expansion shifted the power balance in Sweden noticeably, manifesting in policies and an avalanche of political writing on the topic.[127] Funded by subsidies from foreign allies and instigated by the *tryckfrihetsförordning* (the Freedom of Press act) from 1766, a veritable flood of political pamphlets covered Sweden.[128] At the end of the 1765-1766 session, the Caps formally took over from the Hats. They were keen on opening a new political chapter of prosperity. Having adapted a more liberal outlook, they intended to cultivate Swedish independence from other states, politically and economically.[129]

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[126] Johannisson, *Det mätbara samhället*, 96-97; Hjalmar Fors, *The Limits of Matter: Chemistry, Mining, and Enlightenment* (The University of Chicago Press, 2015), 118; Evans, "Where in the World was Sweden?," 35.

[127] Magnusson, "Den ekonomiska diskussionen under frihetstiden," 25.

[128] Skuncke, "Medier, mutor och nätverk," 266.

[129] Lindkvist et al., *A Concise History of Sweden*, 133-134.

2.2 Knowledge as Strategy

Most researchers in the humanities as well as the sciences agree that the concept of science as we know it was conceived in Europe in the 18th century. Empirical standards consolidated, new subcategories developed from existing fields of research, disciplinary definitions were agreed upon, and universities adapted their programs to the state's and economy's rapidly growing demand for naturalists and *vetenskapare*.[130] All of these developments followed the rationale of "a new kind of 'natural philosophy' that was directed towards control of the world."[131] Jeremy Black describes this change as fundamental to both science and the whole century, stating that the "increased use of new information was not only part of the general trend of eighteenth-century Western society, but also a significant aspect of the Enlightenment."[132] Proper understanding of the natural world was the starting point to a new age.

The following chapters explore how knowledge in Sweden in the 18th century was forged into a tool in the service of national and individual interests, the solidification of knowledge systems, and the mechanisms at work to keep them in place. They will also show how and why Sweden's information policies and strategies differed from that of other European countries, especially in the aftermath of the Great Northern War.

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[130] In some cases, a university education also served the entertainment of young nobles and 'gentlemen.'

[131] Peter Dear, *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Princeton, N.J.: Princeton University Press, 2009), 164. Cf. further Fors, *Limits of Matter*, 40-41.

[132] Black, *The Power of Knowledge*, 175.

2.2.1 Organization of Knowledge

Sweden's losses after the Great Northern war had led to intense self-reflection by government officials and intellectuals, and the resulting conclusion was that a different, less martial way was to be the future of the country: economic strength – and with it the knowledge at its root – won over physical strength. As a result, the 'sciences' were actively encouraged "for the good of the fatherland [so] it would be possible to examine and develop the latest results within trade, technology and industry."[133]

People like Carl Linnaeus and his disciples, along with many experts from other research fields, were the pioneers of this movement.[134] Towards the end of the 17th and during the 18th century, Sweden saw a veritable explosion of researchers who "established magnificent systems" and "scholarly compilers." One possible explanation for this boom is the relative scarcity of qualified individuals in the small country: it led a few outstanding minds to take upon themselves works of vast scope in a broad range of fields and specialties, but at the same time it denied them the possibility to concentrate and specialize.[135]

Theoretical justification for systematic exploration of nature came from all sides: the foundation year's second volume of the *Kungliga Svenska Vetenskapsakademiens Handlingar* contains an article by a land surveyor named Jacob Faggot (1699-1777) called "Tankar om Landsbruk."[136] Faggot was the "head of the government's surveying bureau, and also a member

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[133] Lindqvist, *History of Sweden*, 359-360.

[134] Fur, "Colonialism and Swedish History," 21.

[135] Martin Lamm, *Emanuel Swedenborg: The Development of His Thought* (West Chester, Pennsylvania: Swedenborg Foundation, 2000), 19.

[136] "Considerations on the Usage of Land."

and one time secretary of the Academy of Sciences" who exerted considerable influence on Sweden's 18th century economy through his position and writings.[137]

In his first contribution to the *Handlingar*, Faggot made a clear argument for humankind's God-given right to use the resources of the land for food and shelter, but in a considerate manner, and "*icke så, at menniskan, likt Göde=diur, skal utan sköl och snille röra i jorden*."[138] Human actions in nature, wrote Faggot, had to have intention and purpose, and needed to be based on knowledge and skill; naturalism was the perfect tool to realize those ideals.

As a consequence of the Great Northern War, Sweden was in a vulnerable position regarding technical expertise. Without sufficient numbers of well-educated local specialists to educate the next generation of engineers and researchers, the country was highly dependent on foreign workers and their knowledge to meet the growing demand. The need to attract foreign specialists was especially pronounced in the areas of mining engineering, metallurgy, and chemical processing because they were at the core of the country's vital mining industry.[139]

If Sweden's unfavourable situation in regard to its economic and academic future was to change, infrastructure for education and innovation from the inside had to be established, and already existing structures had to be adapted in order to guarantee a supply of national

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[137] Heckscher, *Economic History of Sweden*, 155.

[138] "Not such that humans, like cattle being fattened for slaughter, should without reason or wit poke about in the earth [translation by Kenneth Nyberg]." Jacob Faggot, "Tankar om Landsbruk," *Kungliga Svenska Vetenskapsakademiens handlingar* 1, v. 1 (Oct.-Dec. 1739): 85.

[139] It shall be emphasized that other European countries such as Britain or the German-speaking areas had a strong economic emphasis on mining, too. However, their dependence on a single economic sector was less pronounced than in Sweden's case.

specialists. It was not a coincidence that so many young Swedish students travelled far and wide through Europe and the world for their education: they simply could not get it at home.

Innovative thinking and the development of technologies suitable for economic application were mostly encouraged outside of the Church-controlled universities. The two big ones were located in Lund and Uppsala. The latter, as the see of the Lutheran bishop, was traditionally under special scrutiny by the Church, and under pressure to cater to the needs of the administrative government sector.

The 'sciences' and technological innovation were of low curricular priority: on the one hand, the Swedish Church had limited interest in nature or the market value of humans, save for their souls and the purpose of missionizing.[140] On the other hand, the set-up of universities was still in the tradition of medieval universities and explicitly geared towards study subjects such as law, theology, or the humanities. During the 18th century, "the main task of the universities was the training of clergymen and public officials, […] scientific research should be left to the Royal Swedish Academy of Sciences."[141]

Most graduates would continue their careers as employees in the service of the government, not as researchers. Consequentially, new subjects had to make their way into existence via a detour in the 'real world.'[142] Unconventional and divergent thought patterns were more likely to

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[140] Dear, *Revolutionizing the Sciences*, 164-165; cf. chapter "3.2.5.4. The North."

[141] Tore Frängsmyr, "The Enlightenment in Sweden," in *The Enlightenment in National Context*, eds. Roy S. Porter and Mikuláš Teich (Cambridge: Cambridge University Press, 1981), 165, doi:10.1017/CBO9780511561283.012.

[142] Teleman, "The Swedish Academy of Sciences," 63.

develop in the field – where the utilitarian principle was strong. Ironically, empirical and technical field research was often justified through the argument that investigating nature was to investigate God's greatest creation.[143]

The most eminent non-academic research institutions could be found in wealthy and influential individuals or institutions of a certain standing and prestige – for instance, people like Carl Linnaeus, or organizations such as the Royal Academies or the Bureau of Mines (Sw. *Bergscollegium*).[144] In combination with international research networks of naturalists and the national communities, they were incentivized through profit returns, patriotic motifs, or the promise of influence to conduct what was considered useful and marketable research endeavours resulting in technological innovations and applications. It was those institutions that paved the way for an empirical approach to knowledge – the forerunner of modern science.[145]

2.2.1.1 Places of Knowledge

Over the course of the 17th and 18th century, all over Europe scientific academies and societies opened their doors. Their common objective was "the improvement of their native country."[146] While nationalist goals ranked high on their agendas, they acknowledged the mutual benefit of research exchange and contributed to the establishment of an international network

[143] Teleman, "The Swedish Academy of Sciences," 69.

[144] Following Fors' translation, Bureau of Mines is used here for *Bergscollegium*. Many older texts refer to the institution as the Board of Mines, but Bureau "emphasizes the organization's collegial structure at the top level." Cf. Fors, *Limits of Matter*, 14-15.

[145] Teleman, "The Swedish Academy of Sciences," 63.

[146] Jonsson, "Commentary," 126.

built on "a real cooperation in European science in the form of a regular distribution of research reports and international projects."[147]

Apart from the institutional organization, the spatial location as well as the modes of knowledge acquisition and research changed significantly over the course of the 17th and 18th centuries. In the wake of the reforms Axel Oxenstierna had brought on the way, the state "was now reorganized around about a dozen bureaus (*kollegier*) [italics original]," and among them was the Bureau of Mines.[148] It oversaw 12 regional offices – so-called *Bergmästardöme* – who "presided over a local 'mining court' that enforced the *Bergscollegium's* decrees [italics original]."[149] The Bureau was led by a governing board manned by "a panel of senior officials bearing the titles of assessors and councillors."[150] Like other Bureaus, it combined state authority with the influence and decision-making power of its often high-ranking members.

The Bureau of Mines was the first institution in Sweden equipped with a laboratory. It was prominently located within the perimeter of the Royal Castle in Stockholm. Two years after its founding in 1637, the chamber of assaying (a branch of the Bureau) opened the doors of its laboratory in "which the minerals of the various mining sites of the Realm would be investigated."[151] A German specialist – nota bene – was hired to oversee procedures, and he

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[147] Jonsson, "Commentary," 126-127.

[148] Fors, *Limits of Matter*, 47.

[149] Chris Evans, and Göran Rydén. *Baltic Iron in the Atlantic World in the Eighteenth Century* (Leiden: Brill, 2007), 315.

[150] Fors, *Limits of Matter*, 47.

[151] Ibid., 48.

carried the official title *Laborant*.[152] For a long time during which the laboratory functioned mainly as a pharmacy and medical supplier of the Bureau's surgeons – as overseeing the care for injured miners was part of its mandate – it battled with sub-par leadership, lack of interest, and insufficient financial support from the government; in 1674, it was torn down to make way for horse stables.[153]

It was only under Urban Hiärne (1641-1724) – a renowned geologist and physician, and one of the few Swedes whose name was known outside of Scandinavia – that the situation changed dramatically for the better. Together with his influential patrons – namely Sten Nilsson Bielke (1624-1684) and Bengt Horn (1623-1678), both of whom held high positions in the government (i.e., seats in the Council of the Realm) and at court through their noble heritage – Hiärne could convince the king of the laboratory's importance for the Swedish economy (and not least the King's international reputation). Their efforts resulted in a large sum of money dedicated to setting up a chymical laboratory.[154] The restored laboratory's official mandate was to research and produce medicines for surgeons and conduct analyses of minerals collected all over the country; Paracelsian and alchemical experiments were also conducted on the side.[155]

The efforts of Hiärne and his colleagues proved to be impactful and lasting in their effect on Swedish economy and research culture. Long after the establishment of the Bureau of Mines' laboratory, in 1750, Johan Gottschalk Wallerius (1709-1785) became the first holder of a chair

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[152] Fors, *Limits of Matter*, 48.
[153] Ibid., 49.
[154] Ibid., 48-49.
[155] Ibid., 48, 50.

for chemistry/chymistry at Uppsala Universitetet, and he set up the institution's first chemical laboratory.[156] After Linnaeus, Wallerius was the most acclaimed naturalist of Swedish origin in Europe, publishing extensively on metallurgy and mineralogy.[157]

The changes in research facilities severely impacted the way research was conducted and new questions arose about how knowledge should be derived and treated. From the late Middle Ages on, a split had gone through Europe's learned communities regarding the (natural) habitat of the (theoretical) philosopher and his practically-minded naturalist colleagues: were they to be kept inside the walls of a university, or should they be allowed to run free in courts and fields and forests? Were the events in a laboratory to be separated from the political interests of the state, or was there – in the Hobbesian sense – no place the philosopher should not go, no field of research he should not tread on? What was the place of the independent researchers who could afford to finance themselves?

The answers to those questions were as numerous as the mouths who uttered them. Continental universities had already paved the way for the professional court astronomer, mathematician, philosopher, artist– or on the more creative side for the alchemist, soothsayer, or astrologer (sometimes they were one and the same person). They were often provided spaces to work in – e.g. laboratories, observatories, studios – as well as adequate equipment.[158] By the 17th century, such court laboratories were so popular that Hiärne could use them as leverage to

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[156] Jonsson, "Commentary," 124-125.
[157] Ibid., 125.
[158] Cf. Fors, *Limits of Matter*, 48-49.

convince the Swedish King of the necessity to renovate and expand the one in Stockholm lest he and his entire court be ridiculed by the rest of Europe.[159]

In Sweden, among the numerous patrons of the arts and *vetenskap*, two stand out: Queen Kristina (1626-1689), daughter of King Gustav Adolf, and Queen Hedwig Eleonora (1636-1715), née Hedwig Eleonora of Holstein-Gottorf, the wife of King Karl X Gustav and mother of King Karl XI. Through their influential positions, they had the possibility of establishing Stockholm as a court of European standing. Their method of choice was not war and arms, but knowledge.

In 17th-century Sweden, Queen Kristina had followed an agenda to develop Stockholm into a centre of learning. It was also she who established "a 'favorable' balance of trade" to cut down on imports and expand exports.[160] Kristina herself was well-read, infamously fond of Classical antiquity, even nicknamed the 'Minerva of the North,' and a keen intellectual who defied gender norms and expectations alike.[161]

Her undertaking of creating a Northern centre of learning was successful, although to what exact degree remains disputed.[162] In any case, she set the foundation for Sweden as an attractive location for research and art, and soon Sweden was a welcoming place to experts from all over

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[159] Fors, *Limits of Matter*, 49-50.

[160] Heckscher, *Economic History of Sweden*, 162-163.

[161] According to an anecdote, she once forgot her 'bible' in church which turned out to be an Ovid edition. Her affinity also manifested in the large marble statues she used to adorn the palace and her exile in Rome. Cf. Kristoffer Neville, and Lisa Skogh, "Queen Hedwig Eleonora and the arts," in *Queen Hedwig Eleonora and the Arts: Court Culture in Seventeenth-Century Northern Europe*, eds. Kristoffer Neville, and Lisa Skogh (London: Routledge, Taylor & Francis Group, 2017), 9.

[162] Lindqvist, *History of Sweden*, 209.

Europe. René Descartes, one of her guests, and his philosophical program left a particularly lasting mark on Swedish thinking through Cartesianism – "the mechanical description of reality."[163] Descartes school of thought would become one of the defining principles that informed Sweden's naturalist researchers in the 18th century – even if it was often used as a negative that they distanced themselves from.[164]

Following in Kristina's footsteps – but as the consort of the King and after his death as dowager queen and temporary regent in her underaged son's stead rather than as the ruling monarch[165] – Queen Hedwig Eleonora successfully expanded the standing and appeal of Stockholm as a centre for research, architecture, and art, but in a more political way than Kristina, who had rejected marriage and queen-like behaviour, and eventually abdicated.[166]

Hedwig Eleonora was more subtle in her approach, cultivating and realizing her influence through culture and the strategic distribution of information through art. "[D]ictat[ing] much of her income to patronage and collecting," Hedwig Eleonora financed buildings, travels, and art commissions, mostly in the form of paintings. Her goal was to increase the prestige of Sweden's capital and the whole country as much as the popularity and legitimacy of her own family.[167]

Architecture was one of her prestige projects and she was responsible for the building or restoration of several royal palaces. In many cases, the art to fill the new buildings derived from

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[163] Fors, *Limits of Matter*, 24.
[164] Ibid., 53, 122.
[165] Neville and Skogh, "Queen Hedwig Eleonora and the arts," 9.
[166] Ibid.
[167] Ibid., 6, 9.

collections in Germany or Poland that had been plundered during the War.[168] Among the most eminent of her projects are the renovation of the Drottningholm[169] palace. Numerous works by prominent European artists, and the *pretiosa* cabinet at Ulriksdal Palace – a veritable treasury of exotica exhibiting minerals, parts of animal, porcelain, furniture, and jewellery – are also on her list of achievements.[170]

Considering the political and cultural implications of those examples, art was one of the few areas that allowed women to be involved in politics without too openly conducting politics. This was especially important for Hedwig Eleonora who as a foreign-born Queen had to develop special diplomatic tact lest she compromise any of her many alliances.

In some instances, art even allowed women to act in ways that were not open to men: art patronage was a very powerful visual tool that was often left to female members of the royal family. At least in the case of Hedwig Eleonora's husband, it seems that he was too busy waging war to engage in art patronage.[171] Hedwig Eleonora understood very well how to use this situation to her, the country's, and her family's advantage, commissioning numerous paintings that celebrated the nationalistic value of Sweden's nature to create a sense of patriotic belonging, and to emphasize the political importance of its monarchical dynasty.[172]

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[168] Neville and Skogh, "Queen Hedwig Eleonora and the arts," 6.

[169] *Drottning* is Swedish for Queen.

[170] Neville and Skogh, "Queen Hedwig Eleonora and the arts," 6-7.

[171] Ibid., 10.

[172] Ibid.; cf. further Kjell Wangensteen, "'Paint Their Majesties; immortal praises' – Hedwig Eleonora as patron of David Klöcker Ehrenstrahl," in *Queen Hedwig Eleonora and the Arts: Court Culture in Seventeenth-Century Northern Europe*, eds. Kristoffer Neville, and Lisa Skogh (London: Routledge, Taylor & Francis Group, 2017); Mikael Ahlund, "Northern nature at the court of Hedwig

Both cases demonstrate how the role of the royal court as an employer and supporter of arts and knowledge changed under the influence of the two Queens. Not least, they stand out because two women were the prime actors in establishing a thriving court culture of international reputation in Sweden which in turn benefitted the academic and economic status of the whole country. Through their ceaseless engagement to establish Stockholm – and the rest of Sweden with it – as an internationally renowned centre for research and the arts, Queen Kristina and Queen Hedwig Eleonora made lasting contributions to the country's status as a location of technological, empirical, and artistic excellence that would become a valuable asset for the country's economic strategies throughout the 18th century.

Especially after the Great War, a valuable pillar of the new political agenda was research innovation, and the country profited immensely from the already established centres of research and the people involved in it – among others, the *Bergscollegium's* laboratory, private individuals, or those participating in intellectual court culture. In the second half of the 18th century, spurred by the cameralist-mercantilist ideal, Sweden had further established itself as a nation of excellence in technological innovation and proved keen on defending its position as a pioneer in many empirical areas.[173]

Eleonora," in *Queen Hedwig Eleonora and the Arts: Court Culture in Seventeenth-Century Northern Europe*, eds. Kristoffer Neville, and Lisa Skogh (London: Routledge, Taylor & Francis Group, 2017), 96-97.

[173] Bodensten, "Political knowledge in public circulation," 86; Ulf Teleman, "The Swedish Academy of Sciences: Language policy and language practice," in *Language of Science in the Eighteenth Century*, ed. Britt-Louise Gunnarsson (Berlin: De Gruyter Mouton, 2011), 63, 83.

This focus shift was partially a consequence of flagging support from the French who (just like Sweden and the rest of Europe) had been badly hit by the consequences of the Seven Years War (1753-1760). Up to that point, French subsidies had been an important source of revenue in exchange for political alliance and the latest fashion trends; the war interrupted the consistent flow of payments to Sweden and exacerbated the economic crisis in the country.[174]

But even before foreign subsidies dried up, the emphasis on demographic and economic growth had been strong: in the first half of the century, a number of new academies and research institutions had been founded, or they expanded their pre-existent activities. The most important ones were:

Kungliga Vetenskapssocieteten i Uppsala.

Established in 1710, it was the first of its kind in Scandinavia.[175] Among its members were – unlike in the case of the *Vetenskapsakademi* – representatives from both the humanities and naturalism (especially from the field of medicine). The topics of publications were as varied as its members; the *Vetenskapssocietet* published in Latin to allow international colleagues easy access to the articles.[176]

Kungliga Vetenskapsakademien.

The idea for the *Vetenskapsakademi* came up in 1739 when six prominent people – among them

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[174] Teleman, "The Swedish Academy of Sciences," 86-87.

[175] Charles Bazerman. "Church, State, and the Printing Press: conditions for autonomy of scientific publication in early modern Europe," in *Langnguage of Science in the Eighteenth Century*, ed. Britt-Louise Gunnarsson (Berlin: De Gruyter Mouton, 2011), 30.

[176] Teleman, "The Swedish Academy of Sciences," 63-64.

politicians, public figures, and naturalists – decided to create an institution that was to be modelled after the British Royal Society and adapted to the needs of Sweden. The founding members were:

- Carl Linnaus (1707-1778), a botanist;
- Mårten Triewald (1691-1747), an engineer;
- Jonas Alström (1685-1761), a factory owner;
- Anders Johan von Höpken (1712-1789), politician and member of the Hats party;
- Carl Wilhelm Cederhjelm (1705-1769), also politician and member of the Hats party;
- and finally, Sten Carl Bielke (1709-1753), a politician and amateur botanist.[177]

Since its establishment, the *Akademi* was based on a "unique and ambitious programme which aimed to promote 'useful' sciences," and it was closely affiliated with the ideas of the Hats party.[178] The most prominent founding member was Carl Linnaeus, "but the real initiator was Mårten Triewald (1691-1747), a fortification officer with wide interest [sic], especially in mine engineering and gardening."[179] Some of the other members were also appointed members of the French Academy as well as the Royal Society, proving their eminent status as naturalists and their excellent networking positions.

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[177] Tore Frängsmyr, "Introduction: 250 Years of Science," in *Science in Sweden: The Royal Swedish Academy of Sciences, 1739-1989,* ed. Tore Frängsmyr (Canton, MA: Science History Publications, U.S.A., 1989), 3.

[178] Skott, "Expanding Flora's Empire," 240-241.

[179] Teleman, "The Swedish Academy of Sciences," 63.

The first president of the *Vetenskapsakademi*, the nobleman Anders Johan von Höpken (1712-1789), was a "prominent politician [and] member of the mercantilist party."[180] Besides its naturalist purpose and patriotic aspirations, the list of important founders and members alone would have guaranteed the *Vetenskapsakademi* prestige among Europe's naturalist, as well as political influence in Sweden.

In the *Akademi's* constitution, the founding members stated that the publications of the *Kungliga Vetenskapsakademi* would be exclusively held in the local vernacular Swedish – not the European *lingua franca* for matters of international intellectual importance at the time, Latin (or, increasingly, French).[181] Linnaeus was the most outspoken advocate for the vernacular.[182] His choice and advocacy would prove to be very significant as they held wide-ranging implications for the political, social, economic, and academic development of a relatively lightly populated country in Europe's Northern periphery.

For one, the *Vetenskapsakademi's* decision speaks of a certain confidence in the nation's intellectual capabilities and expertise. It was informed by the assumption that academic, technological, and economic autarky as defined and called for by the cameralist-mercantilist principle was both necessary and possible. Furthermore, it established its position as a supporter of local talent and interests. As part of its mandate, the *Akademi* funded research endeavours with bursaries – for example the expeditions of Linnaeus and many of his students.[183] Sweden's

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[180] Teleman, "The Swedish Academy of Sciences," 63.
[181] Ibid., 64.
[182] Seeing the style of his Latin, one gets closer to understanding why.
[183] Skott, "Expanding Flora's Empire," 240-241.

technological advantage soon manifested in growing expertise in fields such as mining, medicine (including, at that point, botany and biology), or chemistry that could compete with the big research nations of Europe.[184]

While the *Akademi* was elitist, it was not entirely cut off from reason – at least when it came to recognizing and honouring outstanding research contributions. The first woman to become a member of the *Akademi* and the only female to be admitted before the 20th century was Countess Eva Ekeblad (1724-1786). This honour was bestowed upon her for finding a way to produce wig powder (starch) and spirits from potatoes – a crop whose potential even the great Linnaeus had not recognized (and instead decried as a useless, poisonous nightshade).[185] Ekeblad's example shows that as a sign of gratitude for a discovery as valuable as her method of distilling liquor and instilling fashion style from an allegedly useless rhizome, the *Akademi* was willing to grant her access to their exclusive circles.

Svenska Akademien.

Founded in 1786 by King Gustav III, this institution was and still is dedicated to the "sole purpose [of] the cultivation of the Swedish language and its literature."[186] Its most important publication is the *Svenska Akademiens Ordbok* (SAO), the standard reference work for Swedish Language and as such comparable to the OED.

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[184] Lindqvist, *History of Sweden*, 360.

[185] Ibid., 356; Fara, *Sex, Botany & Empire*, 37.
The categorization is technically true (he invented it), but the potato turned out less deadly if handled correctly. Linnaeus was evidently blind to shades of grey.

[186] Teleman, "The Swedish Academy of Sciences," 84.

This list of institutions is not intended to be exhaustive, but instead aims at providing a rough overview of the organization of knowledge and the landscape of institutionalized research in 18th century Sweden outside of the established universities. Further candidates that would fit in this list are e.g. the Bureau of Mines (Sw. *Bergscollegium*, established in 1637), which was in charge of the iron works and their respective production quotas,[187] and of which we will hear extensively below in the case study on Emanuel Swedenborg, as well as a number of private research facilities that were certainly important in their respective ways, but are of low priority for the present purpose – for instance the countless private research facilities and laboratories that university professors and private researchers fancied to install in their homes.

In summary, by the 18th century the way in which empirical naturalism was conducted had changed not only regarding brick and mortar buildings, but also concerning the acquisition, dissemination, and utilization of knowledge. The public could access the collections held in so-called cabinets of curiosity – the predecessors of museums, containing more or less exotic specimens – while researchers gathered their material in nature as "the paradigm of collecting and accumulating things largely took place en route, while travelling, walking and botanising."[188] Besides the obvious function of gathering information about one's direct environment, observing nature in "'the field' also became linked to the idea of measurement and

[187] Evans, "Where in the World was Sweden?," 36.

[188] Hanna Hodacs, Kenneth Nyberg, and Stéphane van Damme, "Introduction: de-centring and re-centring Linnaeus," in *Linnaeus, Natural History and the Circulation of Knowledge*, eds. Hanna Hodacs, Kenneth Nyberg, and Stéphane van Damme (Oxford: Voltaire Foundation, 2018), 4.

quantification; fields in the abstract sense became areas of investigation, in the exploration of the systematic relationship between the life and geography of plants."[189]

2.2.2 Science – A Very Short Deconstruction

From a 21st century North American perspective, the 18th century Swedish context is very different – not only in terms of geography and time, but also in its fundamental outlook on categorization and instrumentalization of knowledge. Revisiting some of the 20th century's milestones of education and knowledge will help to bring into perspective the 18th-century Swedish point of view.

Two centuries and an ocean separate the two systems, but more than the geographical and temporal distance, the disparity between them is to a large degree founded on the recent development and re-framing of the concept of science within the North American – read: Western – context.

As a concept, empirical science as well as most large scientific disciplines in the modern understanding were formed in the 19th century. However, the purpose of science – the 'What for?' – much more than the 'How?' underwent a major shift not too long ago, triggered to a large degree by the global socio-political and military events of the 20th century – most prominently the two World Wars and the Cold War – and impact of Western capitalism and politics on education and economy. All those events shifted the purpose and value of information

[189] Hodacs, Nyberg, and van Damme, "Introduction: de-centring and re-centring Linnaeus," 5.

significantly in their own way, contributing once again to an increasingly utilitarian understanding of knowledge.

In the wake of the great wars, political and intellectual insecurity during the first half of the 20th century experienced by many of Europe's leading thinkers caused a major brain drain during which they were forced to emigrate to America in vast numbers and seek employment at US universities, leading to an "influx of mature, brilliant, and underappreciated Jewish and 'dissident' refugee intellectuals who were suddenly competing with Americans for the few academic jobs that did open up."[190] With them, they brought a European way of thinking and a (very much justified) suspicious attitude towards fascist systems and totalitarianism.

The wave of immigrants was felt in all areas of academic life, although the ensuing developments followed divergent trajectories in the fields of the sciences and humanities. First of all, the influx to the US during and after the Second World War had a noticeable impact on the academic system regarding faculty and student bodies alike. Besides the composition of the university population, the theoretical perception of states and state ideologies changed, shifting towards a highly critical view of fascist systems in general, as well as the tight-knit state intelligence systems build on information and total observation that had made possible their terrible efficiency.

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[190] Alan Sica, "Merton, Mannheim, and the Sociology of Knowledge," in *Robert K. Merton: Sociology of Science and Sociology as Science*, ed. Craig J. Calhoun (New York: Columbia University Press, 2010), 167.

The 20th century was unique in many of the worst possible ways as it encountered a number of never before seen possibilities of mass destruction and wantonness that can be summed up as an abundance of *could* and a lack of *must not*: technology had developed faster than the necessary maturity to use it. While practical science was at the centre of attention, the moderating voices from the humanities had been exiled into academia's figurative dungeons where their cautionary tales could not be heard.

In practice, education in North America was closely tied to the economy and thus to politics, with an increasing focus on useful knowledge that abided by the state's interest.[191] In addition to its primary purpose of putting knowledge into people's brains (which they could then use to fight the good fight), education served an assimilative function that made it "politically more important in the United States than in other, more homogenous nations."[192] During a large portion of the 20th century, science also served as a politicized instrument in the West's tool box of anti-communist state strategies – in the US more so than in other countries.[193]

Many of the problematic aspects of the 20th century education system have carried over to the 21st century and are still present today – a strong economic emphasis on the sciences, commercialization of academia, inward focus, and ideological function of schooling, to name just a few.

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[191] Andrew Hartman. *Education and the Cold War: The Battle for the American School* (New York: Palgrave Macmillan, 2008), 199.

[192] Ibid., 197.

[193] Black, *The Power of Knowledge*, 408; Angermüller, "Institutionelle Kontexte geisteswissenschaftlicher Theorieproduktion," 77-78.

Especially in times of alternative facts and fake news, this heritage is worrisome as it perpetuates a divisive perception of empiricism and scientific reliability – both theoretically and practically. Since the 1980s and 1990s, researchers like Bruno Latour or Steven Shapin solidified the sociology of science as a post-modern and post-structuralist approach. While their contributions are in many ways nothing less than ground-breaking, they are – as discussed in the introduction – afflicted with certain ailments that come with their focus. This is not to criticize any author for working within a topic of expertise, which is necessary and inevitable. I am, however, critiquing certain choices that strike me as wantonly myopic. In the introduction to *A Social History of Truth*, an overall recommendable piece, Shapin writes:

> What happened in England was, by any standards, 'important' for scientific change. I am well aware that, in significant ways, matters were arranged differently in other European settings, and that these too were 'important' for the development of science. Indeed, this book does not contain a great deal about knowledge-making practices obtaining in early modern France or Italy or Norway. […] My relative ignorance of these cultural settings and periods is culpable, but not, I hope, fatal to the inquiry I have framed here.[194]

Over the next pages, Shapin goes on to explicate the reasons for his elision as a result of "the interests and conventions of various academic disciplines."[195] He argues with the necessity for the historical discipline to concern itself with the *particular* in order to not get lost in generalities, as it so often happens in the philosophical context.

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[194] Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago: University of Chicago Press, 1994), xvii.

[195] Ibid.

I believe that the execution of his own claims – in this specific case – does not go very far beyond the universalisation he wants to avoid as the study is restricted to a sample size of exactly one: the British context. As a result, the conclusions might be interesting and relevant to that specific scholarly context, but any deduction made on its basis is naturally going to be a *universalisation* because the analysis does not take into account *particular* cases from which to make a justifiable deduction. Shapin explicitly invites "reaction, critical and otherwise, from scholars knowledgeable about other cultural and temporal settings,"[196] thus relying on others to 'activate' his theoretical foundation. In any case, it would be more credible a claim if his critique and appeal were followed by the author setting a good example.

The practicality of Shapin's approach to focus on one area is both understandable and, to a large degree, necessitated by the mere scope and extent of his research. Nonetheless, a scholar of such influence disregarding the non-English-speaking 'rest' while calling for a broader scope in analyzing particular cases sets a dangerous precedent for his own discipline as much as for others, perpetuating the notion that "France or Italy or Norway"[197] can be disregarded without much consequence and easily brushed aside as a case of gentlemanly ignorance – not to speak of 'exotic' places that are not even on the map of 'the truth.' Shapin's contribution is a starting point, but certainly not the end of the trajectory.

The developments in the 20th century and particularly those incited by the politics of the Cold War have led to an education system that was and still is oriented towards economic utility

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[196] Shapin, *A Social History of Truth*, xviii.
[197] Ibid., xvii.

and marketability. In this way, it might be compared to the shift towards utilitarianism that occurred in 18th century Sweden under the dogma of cameralist-mercantilism, but for very different reasons.

The understanding of knowledge and information in the North American context has changed drastically as a result, and due to the United States' eminent role in world politics, aspects of it have spread across the globe. I believe it is important to be aware of those changes in order to understand and compare different knowledge systems properly – especially when one side of the equation lies far in the past.

2.2.3 Swedish Scientificality – A New Standard

Before we get into a discussion about knowledge and knowledge systems – empirical or not – we need to know more about the specific context of knowledge in 18th century Sweden, and how empirical knowledge then differed from our modern day understanding of science, specifically in the North American context.

Then and now, careful consideration has to be given to what constitutes knowledge, who has access to what kind of knowledge, what knowledge systems there are, and how access to them is regulated. First, let us go back to the roots of the problem: what was considered or termed knowledge, and what was its history? For this purpose, the following two sections focus on theoretical and practical considerations: in a first step on the word *vetenskap*, and in a second step an analysis of the concept *vetenskap* and its role in the creation of scientificality in Sweden. The scholarship of Teleman and Gunnarsson will serve as the foundation for the two chapters, respectively.

2.2.3.1 Scientia, vetenskap, science

Most works on the History of Science show a certain reluctance to apply the term science to a historical context before the 19th century.[198] They speak instead of naturalism, natural philosophy, or proto-science. Personally, I prefer in more general terms not only to use a different word, but to consider it from the vantage point of the History of Knowledge.

Using the lens of History of Science has the distinct disadvantage that it helps to solve problems which it created in the first place – classification, periodization, distinction, anachronisms, and not least a highly elitist, Western focus – to name just a few. Contrarily, looking at the knowledge system of science as one of many within the bigger picture of History of Knowledge relieves some of the pressures immediately: with its broader scope comes comparability without hierarchy, and the possibility to generalize. However, the issue of definition remains one of context: what one person considers knowledge, another person calls belief or superstition.

Peter Burke, in the defining 2016 work *What is the History of Knowledge?*, illustrates the peculiarities of Anglophone science and History of Science through the example of a conference on the 'History of Information' held in 2012 by the American Historical Association: "The choice of the term 'information' rather than 'knowledge' illustrates the empiricist culture of the USA, contrasting in particular with the German concern for theory and *Wissenschaft* [italics

[198] While others use it too freely, in my opinion. Cf. also chapter "2.1.2 Terminology and Working Definitions," s. v. "Naturalism."

original], a term often translated into English as ‘science’ but referring more widely to different forms of systematically organized knowledge.”[199]

Similar things can be said for the term *vetenskap* in Swedish, although German and Swedish History of Knowledge are not congruent.[200] Etymologically, the word ‘science’ is an indirect descendant of lat. *Scientia*.[201] It entered the hybrid language that is English (riddled with grammatical, syntactic, and lexical elements from Gaelic, French, German, and other local substrates)[202] – via the Romance French. Such ancestry is very common for English terminology of (arguably) learned status: the textbook example are the technical terms for animals before and after meat. The word cow stems from the Germanic language of its peasant keepers, while its menu-festation in the afterlife – beef – is French like the people who ate it. Similar things can be said for pig/pork, or calf/veal.[203]

The eastern and northern Germanic languages such as German, Dutch, or the tongues of Scandinavia with their respective vernacular terms have a very different etymology (e. g., Ger. *Wissenschaft*; Sw. *vetenskap*), which they derive from the past tense of an old form of ‘to see’ (compare Lat. *videre*, Gr. *εἰδον*). In this process, a preterite verb form with the meaning ‘I have

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[199] Peter Burke, *What is the History of Knowledge?* (Oxford: Polity Press, 2015), 10.

[200] They could be called parallel at best.

[201] On a side note: the opposite of lat. *scius* (‘to have knowledge’) is *nescius* (‘to be ignorant’) – the root of the English word nice. Cf. OED, “nice, *adj.* and *adv*.”

[202] Anne McCabe, *An Introduction to Linguistics and Language Studies* (London: Equinox Pub, 2011), 238.

[203] Poultry might be added to this list as the terminal reincarnation of the Phasinaidae family’s culinarily preferred members, but there is no equivalent for horse meat which is not a common food source in British culture.

seen' assumes the status of a separate verb with the meaning 'I know' (Ger. *wissen*; Sw. *veta*).[204] Linguistically speaking, this is a case of generalization. It follows the rationale that once one has seen – i.e., observed – something, one has knowledge of it (cf. Lat. *meminisse*, to know: having remembered something in the past is equal to knowing something in the present). The etymology of Eng. 'to know' is, according to the OED, not completely clear, but in any case, it is not derived from Latin or Greek roots.[205]

Seeing the different terms and their respective development should already put us in a state of alertness in the face of the translation 'science' for *scientia* in English, and even more so for translations into other languages that do not share a common root. It further warrants an inquiry into the regional Swedish usage and translation, and a concise definition of the words Lat. *scientia* for treatises in Latin, and Sw. *vetenskap*, respectively.

Ever since Sapir and Whorf's famous works,[206] the importance of language as more than a vehicle for thoughts has pervaded all fields of research: language shapes thinking and is thus a crucial aspect of comparative historical analysis. The present case – *scientia* and its Germanic counterparts – is no exception: the terms do not align etymologically, and neither did their meanings in the way native speakers conceptualized *scientia* or *vetenskap*. For example, in the

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[204] SAOB, "veta[1]."

[205] OED, "to know."

[206] Edward Sapir and later his student Benjamin Whorf were the drivers behind (although not the inventors of) what is broadly known as the hypothesis of linguistic relativity – sometimes referred to as the Sapir-Whorf-hypothesis. Very simply put, it states that the language an individual speaks influences their thinking. Cf. Martin Pütz, and Marjolyn Verspoor, *Explorations in Linguistic Relativity* (Amsterdam: John Benjamins, 2000), 1-2.

middle ages, theology was often referred to as the "queen of the *sciences* [italics added for emphasis]." However, a modern English-speaker would never, *never* consider theology a *science*. The discrepancy is simply rooted in the translation[207] of *scientiae* Peter Dear employs here, rendering the medieval usage as 'sciences' in the modern form.[208]

To get a better grasp of the usage of *vetenskap* in the Swedish context, a good starting point is to consult the authority on all things semantics and etymology: *Svenska Akademiens Ordbok* (SAOB), the Swedish equivalent to the OED. The entry for *vetenskap* is – unsurprisingly – a long one and features a multitude of semantic levels, etymological information, paraphrases, and finally an extensive list of compendia derived from the root word *vetenskap*.[209] Among them are, for instance, *vetenskapssamhälle* (-community), *vetenskapsgren* (-field), *vetenskapsord* (-word), or *vetenskapssocietet* (-society).

All the semantic levels that relate to the concept of 'science' or 'scientific' in the modern Anglophone sense originate either in or after the 18th century. Apparently, the need for a word to translate the concept of *scientia* was felt, and it was answered with a vernacular term – not a loan word. Before the 1700s, the word of choice in the Swedish vernacular was *lärdom* or *kunskap*.

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[207] Dear's translation is uncharacteristically negligent for a scholar of his standing, and I can only make educated guesses about his reasoning. Considering it very unlikely that he was not aware of the anachronism, I must assume that he used the term 'sciences' intentionally, either to draw attention to the status of the subject, or because Dear wanted the translation to be as close to the root word as possible in order to emphasize on its relation to the modern concept. Be it as it may, the choice of wording is far from ideal and perpetuates an unrealistic alignment of two very different concepts by virtue of their remote linguistic relation, and at the same time underrepresents the importance of semantic change in historical concepts.

[208] Dear, *Revolutionizing the Sciences*, 3.

[209] SAOB, "Vetenskap."

Lärdom is semantically very different from *vetenskap*: as a derivative of *lära* (to teach), it roughly meant 'having received teachings in a subject' or 'being educated/skilled in something;' it was often used in a professional context such as the skilled trades. *Kunskap* shares with *vetenskap* the semantic level 'status of knowing something,' and with *lärdom* the 'status of having learned a skill;' out of the three, it translates most closely to knowledge.[210] While *lärdom* describes the passive acquisition and resulting possession of (theoretical or practical) knowledge or a person's learned status or skill, *kunskap* is also the possession of (theoretical or practical) knowledge, but describes something closer to 'knowledge derived from experience,' or 'common knowledge;' *vetenskap* is used to describe the active search for and accumulation of new knowledge (that can built upon old knowledge).

As can be deduced from the increased and changing usage of *vetenskap* especially since the 17th century, it referred to the processes of knowledge creation through empirical experimentation and observation. The changing meaning of the term *vetenskap* is a semantic indicator for a larger change in the way literate people conceptualized knowledge and science. Starting in the 18th century, the new dimension of meaning as well as the abundance of new compounds formed in conjunction with *vetenskap* indicate a lasting paradigm shift. Its many derivatives indicate an expansion of the social, spatial, academic, and political context in which research was conducted. The derivatives point at a professionalization and institutionalization of the empirical process in a university and laboratory context: spatial changes took place that transported the process of knowledge creation and experimentation into a specialized setting (cf.

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[210] Cf. SAOB, "Lärdom;" SAOB, "Kunskap."

Vetenskapsakademi [1739]). Very soon, practitioners of science constituted a distinct professional circle: *vetenskapsidkare* (1792) and its female counterpart *vetenskapskvinna* (1836) were part of a *vetenskapssamhälle*;[211] their diverse research practices were summarized under the verb *vetenskapa* (1838).

Numerous compounds and derivatives were still formed over the course of the 19th century to describe actions, processes, and objects belonging to *vetenskap*. They attest to the continuous growth of Sweden and the Swedish language as a location and means of research: *vetenskapa* (verb; to execute/perform *v.*; 1838); *vetenskapare* (noun; person performing/executing *v.*; 1895); *vetenskaplig* (adjective; expressing relation to *v.*; 1796).[212] The Swedish words for specific research fields show clearly that *vetenskap* to this day considers subjects from the humanities and sciences equally *vetenskap*: *biblioteksvetenskap*, *konstvetenskap* (art), *religionsvetenskap*, *läkarvetenskap* (medicine), *skogsvetenskap* (forestry), or *ingenjörsvetenskap* (engineering). There is, however, a distinction between different types of *vetenskaperna*: e.g. *sköna vetenskaperna* (fine arts), *rättsvetenskap* (law), *socialvetenskap*, and *naturvetenskap* that follows a part medieval, part early modern distinction between Faculties.

In summary, the etymological and semantic development of the word *vetenskap* reflects 18th-century utilitarian governmental efforts in Sweden to increase the national potential and predominance in generating knowledge for the economic and political benefit of the state. Moreover, it is also in line with the developments in Europe and beyond: during the 18th and 19th

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[211] SAOB, "Vetenskap."
[212] Ibid.
Years in parentheses indicate a word's first occurrence.

century, nationalist tendencies were increasing strongly, and led to the formation of neatly defined national identities. Swedish as a language of research contributed to this goal.[213] The mere existence of the word *vetenskap* and its many compounds confirms the need for neologisms in the local vernacular. The fact that new ones continued to be added and adapted speaks to the success of the concept: *vetenskap* became an important part of everyday life – learned as well as colloquial.

2.2.3.2 Language Politics

Until the early modern age, Sweden's linguistic landscape was comprised of a variety of local dialects and different local and foreign languages. *The* Swedish language (as regulated by a linguistic authority and defined through coherent orthography, grammar, semantics, etc.) did not exist before the 18th century, and purists might argue that it still does not exist today. Besides the regionally varying dialects of Swedish itself, large numbers of German, Sámi, and Finnish speakers enriched the number of spoken languages; Latin was the preferred medium for international communication.[214] Additionally, many foreign tongues were spoken within the ever-shifting borders of the country, including the native languages used by immigrants or mercenaries.[215] German must have been commonly used as well, especially in the Hanseatic cities surrounding the Baltic Sea, and in the landlocked centres of trade that often stood under the influence of foreign aristocrats and investors.[216]

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[213] Teleman, "The Swedish Academy of Sciences," 68.
[214] Lindkvist et al., *A Concise History of Sweden*, 39-40.
[215] Ibid., 76.
[216] Ibid., 40.

Besides political considerations, the practical part of language politics was equally important to the development of Swedish as a research language. Publishing in a language other than French or Latin was a risky undertaking for all sides and had to be well thought through and executed: relying on the 'wrong' language could limit the potential audience and reception of the author, or pose a financial risk to the publisher. Therefore, due importance must be given to the fact that Swedish first had to be moulded into a recognized, standardized, and admissible language of *vetenskap*.

The decision of researchers, state, and institutions to grow the vernacular into a standardized code (Sw. *vetenskapsspråk*) was a calculated step that came at the price of international accessibility and thus recognition of many a Swedish scholar: whoever wanted to publish a work with the *Akademi* as well as internationally had to go to the trouble of writing two versions.[217] From an international standpoint, the decision was perceived as mildly irritating as it formed an obstacle for unmitigated research communication among scholars, and the *Akademi* was as a result met with international critique for not publishing in a common language.[218]

Although the process of creating a Swedish research lingo required a lot of groundwork and patience from many sides, it almost necessarily guaranteed that the harvest of Swedish research remained in Sweden as the intended peer group was clearly defined by their membership in a language community. Furthermore, it contributed to the nationalistic ideals of the time. Resourceful individuals like the Swiss physician Albrecht von Haller (1708-1777) went to such

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[217] Teleman, "The Swedish Academy of Sciences," 68.
[218] Jonsson, "Commentary," 127.

lengths as to learn Swedish in order to get access to the *Handlingar*. He also published reviews in German in the *Göttingische Anzeigen*, making Sweden's research efforts accessible to a broader circle of European researchers.[219] The *Handlingar's* international recognition despite the language barrier speaks to the importance and quality of Sweden's contributions, as well as to the validity of the *Akademi's* decision to publish in the vernacular for nationalistic reasons.

A similar linguistic bottleneck effect is occurring in modern-day language politics, creating an exceptional position for today's prevalent *lingua franca* of research and international communication, English. I use it here to illustrate some processes that run parallel to those in 18th century Sweden – although partially in the reverse direction.

Over the last decades, English has been immensely successful as the prime language of international communication – due to international politics, academic publication standards, and (especially recently) streaming services, social media, and the internet in general. Besides the constantly growing generation of digital natives who acquire the language in the classroom and on the smartphone, its omnipresence as a research language necessitates adequate working knowledge among researchers worldwide who want to publish internationally. Since bi- or multilingualism is far more frequent among non-English native speakers, and oftentimes considered dispensable in Anglophone academia, the same phenomenon has unintentionally created an artificial bottleneck in the perception and accessibility of untranslated non-Anglophone research. As a result, it poses a considerable disadvantage for a large portion of monolingually Anglophone academics. At the same time, the predominance of English in

[219] Jonsson, "Commentary," 127.

academia intensifies the problem of visibility for non-Anglophone publications and increases the pressure to publish in English or provide a translation.[220]

The question of publication language is – then and now – an ideological one. In the case of Sweden, using the vernacular had many important implications besides pre-selecting the intended audience. The fact that the *Kungliga Vetenskapsakademi* made Swedish its official publishing language was certainly a bold move that spoke to the trust and expectations in the country's capabilities, but was also a manifestation of the change in mentality: "The new era needed a new prose for the purposes of information and discussion, a prose from which unnecessary verbosity was banished, and in which language was not allowed to obscure the naked truth."[221]

Establishing Swedish as a research language also promised a certain democratization of *vetenskap*. Unlike learned Latin, publications in Swedish were accessible to a much larger group of people literate in the vernacular.[222] Through libraries, political pamphlets, and other cheap prints – the production of which was encouraged by the activities of the *Vetenskapsakademi* as much as by political interests – a large part of Sweden's population gained potential access to information on current politics and academic publications.[223] The gamble paid off: in terms of empiricist research and innovation in important fields such as medicine (which at the time included *biologi* and *botanik*, the specialties of Carl Linnaeus), or the equivalents of modern-day

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[220] Cf. e.g. Östling et al., "The history of knowledge," 18-19.
[221] Teleman, "The Swedish Academy of Sciences," 83.
[222] Ibid.
[223] Ibid., 83-84.

engineering and chemistry, Sweden was by the end of the 18th century on the same level with the dominant scientific nations of the day – England and France.[224]

In conclusion, while 'science' and *scientia* have a common etymological history, they describe two semantically very different concepts, and even world views. In the 17th and 18th century, *scientia* was the international term of choice to describe the ideal of 'learnedness.' With the institutionalization and professionalization of research, *scientia* slowly transmuted into the research-based, empirical branch of natural philosophy that is at the heart of the modern word and concept of science.

Scientia was translated into different vernacular terms that were similar, but often not equivalent. Especially in the non-Romance languages it assumed meanings that are quite different from what English-speakers nowadays understand as 'science,' and therefore need to be put in context. The biggest difference to science/*scientia* is that *vetenskap* is not reserved exclusively for the natural sciences: it refers to *all* knowledge strategically derived through thinking, experimenting, and observing, preferably in a professionalized research context. Its establishment was the product of strategic and considerate research and language politics by the Swedish government and research institutions such as the *Vetenskapsakademi*, always with national and economic goals in mind.

Teleman suggests that while the *Transactions* made many important contributions to the development of the Swedish language, they were nonetheless limited as the institution had

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[224] Lindqvist, *History of Sweden*, 360-361.

"neither the capacity nor the energy to formulate the norms of a uniform orthography."[225] Language politics was among the dominant areas of friction between its members and many discussions ensued – for instance regarding orthography, the goal of lexicographic unity of words, or the eschewal of loan words of origins other than Latin.

However, none of these issues could be resolved to a satisfying degree as none of the naturalists and politicians who made up the *Akademi* possessed the necessary linguistic expertise.[226] It must be assumed that at least until the establishment of the *Svenska Akademi* in 1786 much of the standardization of Swedish occurred naturally through the growing interest in systemic research and knowledge, as well as through literary production outside of empirical research.

In any case, the *Vetenskapsakademi* and its *handlingar* provided a crucial and much desired platform for local specialists to publish their findings and establish the foundations of scientificality that are essential for a research community to prosper. Most importantly, it set a precedent by establishing Swedish as a language adept for research – an act of high importance for the patriotic and economic awareness and self-understanding of its dispersed research community, and as a signal the European public. More than words, Swedish was a political statement and instrument with the power to create belonging.

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[225] Teleman, "The Swedish Academy of Sciences," 84.
[226] Ibid., 65-66.

2.2.3.3 Scientificality: More than Words

In addition to organized *vetenskap*, a common research lingo was necessary in order to allow the growing network of national specialists to speak and write about a given topic in a precise and empirically adequate way. At the same time, such a common standardized language allowed for professionalization and a sense of belonging to form within that group. It created *scientificality* of content, boundaries for the users, and not least a nationalistic sense of belonging.

In her article on linguistic scientificality in Sweden, Gunnarsson analyzes exactly that concept in the context of medical and surgical publications of the *Kungliga Vetenskapsakademi* in the 18th century. Surgery as a mechanical practice was, at this point, still considered separate from medicine – a learned trade that allegedly required handiwork more than thinking.[227]

Gunnarsson's sources are twelve articles published in the *Transactions of the Royal Swedish Academy of Sciences* (Sw. *Kungliga Svenska Vetenskapsakademiens Handlingar*) between 1750 to 1769, six on medical and surgical topics each (as they were considered separate fields at that point).[228] Through linguistic (not scientific) analysis, she concludes that the Swedish research community in the mid-18th century was – as was to be expected – rather disorganized and in the early stages of development, but she also reaches some surprising conclusions about the research community *per se*.

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[227] The Greek root of the word surgeon literally translates to "person who works with their hands."

[228] Gunnarsson, Britt-Louise, "The linguistic construction of scientificality in early Swedish medical texts," in *Language of Science in the Eighteenth Century*, ed. Britt-Louise Gunnarsson (Berlin: De Gruyter Mouton, 2011), 307-308.

Through her research on medical language, Gunnarsson convincingly demonstrates that the creation of scientificality in and through the Swedish language was an active process carried out by a very small number of experts. Although they were certainly the country's most eminent specialists in their respective fields, they were connected personally to individual colleagues, but not as a community. In order to establish Swedish as a research language, it had to be tailored for communicating about highly specialized knowledge. Equivalents to Latin terms were found where no Swedish word existed in order to keep up with the rapidly growing fields of medicine and surgery.

On an organizational level, the article demonstrates the importance of the *Handlingar* as a platform for researchers to connect as a national community. Further in-depth research comparing the first medical publications from this article with publications from the following decades or centuries may possibly show a standardization of vocabulary, and an increase and solidification of Swedish terminology. There is evidently rich potential for further linguistic study.

Overall, Gunnarsson concludes that conventions of modern scientificality such as formatting, technical terminology, source citation, or avoiding first person perspective of the researcher-author were starting to be standardized, but not yet agreed on. The overall elements of medical texts such as categorization, description of cases, and eventually diagnosis and treatment were present.[229] By analyzing the names and positions of individuals addressed in the texts, Gunnarsson shows that the research community in the middle of the 18th century Sweden was

[229] Gunnarsson, "The linguistic construction of scientificality," 328-329.

small and acted on an individual basis; it is likely that physicians knew each other in person (and even met occasionally) or at least knew of each other's work from secondary sources. Gunnarsson's results further indicate that a community identity had not yet formed.[230] As both researchers and patients are often referred to by name, connections on an interpersonal level were quite pronounced and important – the physicians were closer with their patients than their colleagues.[231]

Gunnarsson's findings are in line with those of Teleman on the *Handlingar* of the *Vetenskapsakademi*, although from a different angle. Both agree that a loosely organized community of national specialists established Swedish as a research language, an endeavour that was supported and mandated by the cameralist-mercantilist policy put forward by the government and enforced at first mostly by individual researchers who acted as privateers or were associated with universities.

After the establishment of the *Vetenskapsakademi*, its members and publications contributed to the process of creating scientificality in Swedish as well, but to a limited degree. While the publications of the *Vetenskapsakademi* did not intend to establish a standardized Swedish research language, they offered an important vehicle of exchange that addressed the publication needs of national specialists and allowed researchers to establish Swedish as a research language.

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[230] Gunnarsson, "The linguistic construction of scientificality," 318-320.
[231] Ibid., 329.

2.2.4 Knowledge as a Commodity

Sweden's widespread cameralist-mercantilist agenda was increasingly pushing knowledge as a means to an end: to boost national productivity and thereby ensure territorial and economic sovereignty. Opting out of this system was hardly an option, neither for individuals nor for academic disciplines. But to bring their economic potential to full fruition, any given discipline's worth first had to become measurable – a process tough to realize for such an abstract concept as knowledge.

An indirect indicator for a discipline's worth was found in the market value of its research contributions. Via the profitableness for economic production, systems of knowledge were ascribed different amounts of prestige. Subsequently, disciplines held value according to a hierarchy of usefulness and non-useful knowledge that originated in different fields of study. The most prestige was held by knowledge both useful and reliable – such as that derived through the empirical methods of naturalism; towards the bottom was knowledge which proved neither useful nor reliable – such as that held by marginalized groups like women, lower classes, religious minorities, and others.

As discussed earlier, Sweden actively supported naturalists in their research in return for marketable results. One of the most pervasive examples for this synergistic relationship is the *Bergscollegium* or Bureau of Mines. Through the efforts of one of Sweden's early trailblazers in the field of chemistry, Urban Hiärne (1641-1724), the government could be convinced that research in the field of chymistry – the term Fors coined to describe the transitional phase

between alchemy and chemistry[232] – was a smart and necessary investment (more on that in a bit). Hiärne argued that research into chemistry would be an asset for the country's mining industry and result in significant profits for the state's coffers.[233] The *Bergscollegium* formed the first such research facility in Sweden and was hugely successful at deriving new knowledge in all aspects of mining – from the extraction of the raw material to metallurgy and the refinement of the finished metal products. Chymistry, in particular, was essential to improving quality standards and production processes, finding new materials, and developing novel applications.[234]

With the concentration of innovative intellectual power outside of the traditional settings of universities came many changes in the way knowledge was utilized. The goal was no longer exclusively to educate dutiful, loyal servants for the state, or to study for the sake of studying, but to mass-produce innovation for the nation.

As a result, royal courts all over Europe employed empiricists and artists to enhance their prestige, political influence, and reputation.[235] However, Fors points out that knowledge and research were in no way limited to the courtly centers of learning, but increasingly discovered other spaces. Factually, a lot of research was happening outside of institutional spaces 'in the field.'[236] Travelling researchers played an important role in transferring knowledge from one place to another – from the field to laboratories (such as that of the *Bergscollegium*) and diverse other research entities (such as the academies or private researchers like Linnaeus), and vice

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[232] Fors, *Limits of Matter*, 11-12.
[233] Ibid., 46.
[234] Ibid., 46-47.
[235] Ibid., 49-50; Neville and Skogh, "Queen Hedwig Eleonora and the arts," 9-11.
[236] Fors, *Limits of Matter*, 8.

versa. Their mobility allowed the researchers to gather information and network with other specialists, and to bring back valuable information to the home country or report their findings to the institutions that financed them.[237]

In parallel to the establishment of institutional spaces for research, a certain democratization of the policy-making process took place, following the French and English examples of public discourse. To a growing degree, interested laypeople with diverse backgrounds were included in the practice of knowledge production and research. The popularity of prize contests in the second half of the 18th century attests to this development. It followed the example of the *Concours Académique*,[238] and over the course of a few decades Sweden saw a sharp increase in contests and participation rates.

Prize contests allowed whoever had the means to set up a contest to collect a large quantity of ideas from a diverse crowd, quality notwithstanding. The best solutions could be implemented at will and according to the needs of the respective problem. Prize contests show that increasingly knowledge was seen as a commodity that potentially got more powerful with the number of brains involved; creative problem solving was applied to any given issue and just about anybody could be an expert.

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[237] That is basically the bottom line of *Limits of Matter*. Cf. esp. Fors, *Limits of Matter*, 10-12, 85-86, 153-154.

[238] For prize contests in France and Britain, cf. Jeremy L. Caradonna, *The Enlightenment in Practice: Academic Prize Contests and Intellectual Culture in France, 1670-1794*. Ithaca: Cornell University Press, 2012.

For example, Chydenius and the *Vetenskapsakademi* were at one point looking for insight into the emigration problem Sweden had been facing for a while, asking the public "*Hvad kan vara orsaken, at sådan myckenhet svenskt folk årligen flyttar utur landet*?"[239] Another time, a group called the 'Royal Patriotic Society' in 1789 wanted suggestions as to how "the 'wandering Lapps' could best be incorporated into society."[240]

Learned Academia remained firmly in the hands of the same old elite groups – white, Christian men. However, the composition of those groups tended more and more towards 'homegrown' Swedes. Much like beer yeast, the formerly courted foreign experts had done away with their own *raison d'être*: the quality and quantity of education in Sweden which they had helped to establish had soon become sufficiently reliable to allow for the system to be continued by 'homegrown' professionals, thus turning the influx of foreign specialists into an unwelcome burden.

While Sweden's national education system had outgrown its dependence on the expertise of foreign workers and scholars, its education and research structures would remain a work in progress for the foreseeable future. Scientific standards did not just drop down from heaven: it took a few generations of naturalists to agree on a common language, let alone on common empirical standards, or to build publication and research infrastructure. For decades, knowledge from different systems – be it foreign, indigenous, folkloric, female, empirical – circulated in

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[239] "What could be the possible reasons why such a large number of Swedish people leave the country every year [my translation]?" Johannisson, *Det mätbara samhället*, 104.

[240] Lindqvist, *History of Sweden*, 364.

parallel at the highest tiers of learning, unscathed and thriving, as the examples in the following sections of this chapter will show.

2.2.4.1 Alchemy's Youngest Daughter

> "I'm looking for the magic
> I'm feeling for the right way out of mind
> Looking for the alchemy to release me from my maze.
> I am making myself."
> - Joan as Police Woman, *The Magic*

A telling example for the co-existence of knowledge systems is alchemy with its derivatives. The case of early 18th-century Swedish chemistry/chymistry attests to the fruitful co-existence of learned, esoteric, and folkloric knowledge. I like to think of it as the bastard child of alchemy and naturalism – or maybe their super-hero sidekick who finally got her own show because she is so good at making things explode.[241] The Bureau of Mines,[242] with its focus on chemical processes in mining and metallurgy, played a key role in establishing the modern science branch of chemistry: "Between 1730 and 1760, several minerals were defined as previously unknown species of metal at the Bureau of Mines, that is, they were discovered, in the sense that they were isolated, described, and presented as novelties to the international community of chemists."[243]

Two of the elements that were discovered and described at the Bureau of Mines have a particularly remarkable origin story to tell: cobalt and nickel. In Scandinavia, the belief in keeper entities that inhabit rocks and mines and mountains was very popular throughout the 18th and far

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[241] She is terrible at creating gold, though.
[242] Cf. chapter "3.2.1.1 Places of Knowledge."
[243] Fors, *Limits of Matter*, 10.

into the 19th century, and it partially still exists to this day.[244] In early modern Sweden, the spirit folk were omnipresent. They could have good or bad intentions towards humans. In the mining business – which was preoccupied with drawing ore from underground, thereby arguably 'stealing' from its keepers and disturbing them – they predominantly made the miners' work and life harder.

Folkloric beliefs such as this were very popular among people of unlearned backgrounds, but they were also known to otherwise hyper-rational thinkers who reportedly held on to folkloric beliefs under certain circumstances. The idea of underground-dwelling spirits,[245] for example, was so prevalent even among associates of the Bureau of Mines that it found its way into the naming convention of chemical elements: the metals cobalt (discovered in 1735) and nickel (discovered in 1751) were considered worthless because inferior to the precious iron, and were thus named after unfriendly spirits.[246]

The name for the metal cobalt (Sw. *kobolt*, first used in this meaning in 1730) comes from Ger. *Kobold*, a kind of underground spirit whose secret super-power it was to turn precious iron ores into not so precious ones – cobalt.[247] Similarly, the name for nickel was derived from the given name 'Nikolaus,' and described a keeper spirit whose alleged ability it was to jinx valuable

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[244] In modern-day Iceland, elf advocates protect the natural habitats of earth spirits, if needed through legal means and public demonstrations: https://www.theguardian.com/world/2013/dec/22/elf-lobby-iceland-road-project.

[245] Cf. on subtle matter theory in chapter "4.1.1.2 Swedenborg in His Time."

[246] Fors, *Limits of Matter*, 36.

[247] SAOB, "cobalt."

copper into useless nickel.[248] Cheap and sufficiently abundant, the metal was later used to mint and lend its name to the eponymous coin – the nickel.[249] Those naming conventions speak to the continuous popularity and existence of folkloric knowledge among learned people that were far more common than might be implied by the empirical halo they surrounded themselves with.

2.2.4.2 Conventional Knowledge

> "Every minute," continued M. Krempe with warmth, "every instant that you have wasted on those books is utterly and entirely lost. You have burdened your memory with exploded systems and useless names. Good God! In what desert land have you lived, where no one was kind enough to inform you that these fancies which you have so greedily imbibed are a thousand years old and as musty as they are ancient? I little expected, in this enlightened and scientific age, to find a disciple of Albertus Magnus and Paracelsus. My dear sir, you must begin your studies entirely anew."
> - Mary Wollstonecraft Shelley, *Frankenstein*

Despite its continuous popularity, many efforts were made to eradicate knowledge connoted as female, foreign, Jewish, or as lower-class superstitions from the manly world of science. The members of the learned societies had a reputation to maintain. Generally, gender conventions in

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[248] Fors, *Limits of Matter*, 36; SAOB, "nickel." Honouring its importance for Canada as the world's largest producer of nickel, the Royal Canadian Mint dedicated a 1951 commemorative nickel coin to Cronstedt and "The identification of nickel." https://www.mint.ca/store/mint/about-the-mint/5-cents-5300006#5_1.

[249] Coin size, motif, and metal components in Canada changed significantly over time, containing different ratios of copper, nickel, steel, silver, and zinc, but the name remained. In 2019, the main component is steel with added copper and a nickel coating. Cf. https://www.mint.ca/store/mint/about-the-mint/5-cents-5300006#5_1.

18th century Sweden (and most parts of Europe)[250] were very clearly established. At their core, they set the roles and activities admissible for men and women in social contexts. They also regulated who could have what knowledge, or who could commonly adhere to what knowledge system.

Besides gender, many other factors like a person's nationality, ethnicity, religion, social status, upbringing, political affiliation, connections, or age had an impact on their ability to access knowledge – some through systemic barriers such as access to schooling and literacy, and others through social conventions.

To a growing extent, science and empiricism were connoted as a domain for the wealthy, white, married, Christian, male Swedes – preferably all at once. Implicit and explicit limitations were in place to control who could penetrate the walls of these exquisite circles. For example, during the early 18th century, foreigners – predominantly German-speaking mining engineers and workers – were actively sought after by the Swedish state, encouraged to immigrate, and bring with them their specialist knowledge because they were desperately needed as instructors and specialists.[251]

Once the foreigners' expertise could be matched and emulated by that of the locals, they were no longer welcome. In fact, they now constituted competition for the local specialists they had helped to train. Consequently, the foreigners' status declined rapidly and so did the prestige

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[250] Cf. the case of midwives in early modern Britain as mentioned in chapter "3.2.4.3 Engendering Power."

[251] Fors, *Limits of Matter*, 103-104.

of the knowledge of these formerly valued members of the scientific community; they became associated with outdated 'esoteric charlatanries' such as alchemy and other superstitions, and vice versa. Whether in fact they adhered to those systems of knowledge was unimportant.

Within a few decades, the empirical standards forbade even an association with knowledge outside of the narrowly defined system of naturalism, although those same definitions were subject to a constant process of renegotiation. While there was no legal penalty for non-compliance, a refusal to meet the given standards could lead to serious consequences for the individual's career and livelihood[252] – such as ridicule, exhausting scholarly controversies that affected one's reputation and professional opportunities (e.g. through censorship), or exclusion from the community (as we shall see in the case studies below).

Certain amounts of hypocrisy were unavoidable in this context: in the last decades of the 17th century, Urban Hiärne, the famous naturalist and writer, had been significantly involved in the establishment of a chymical laboratory at the Bureau of Mines that he used – among other things – for "experiments in chrysopoeia and medicine."[253] Similarly, people such as the Swedish naturalist Axel Fredrik Cronstedt (1722-1756) went to great lengths to attack and discredit all and any knowledge of an occult or alchemical nature which he generally deemed inappropriate for learned men such as himself.[254] Cronstedt's hyper-sensitivity towards unlearned knowledge systems originated at least partially in personal experiences of his youth

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[252] Cf. chapter "3.2.4.4 Marginalizing Knowledge," as well as its subsections 3.2.4.4.1-3.2.4.4.3.
[253] Fors, *Limits of Matter*, 46; cf. also ibid., 48-50, 124-125.
[254] Ibid., 5, 131.

and proves how volatile empirical standards were.[255] In his later years, he was very outspoken about the fallacy of alchemy and went to great lengths to tag its adherents as irrational, often targeting the Finnish and Sámi populations of Sweden as well as Germans.[256] His change of mind in later years illustrates the rapid shifts in empiricism that took place within just a few decades, and sometimes forced an empiricist to renounce his earlier self.

2.2.4.3 Engendering Power

There are many highly indicative examples for the pervasive hierarchies within empirical systems of knowledge, and some of the most pervasive might be the social conventions about gender and sexuality found in the binomial nomenclature of Carl Linnaeus. A true child of his day, he prioritized male plant characteristics over female ones and imposed "the sexual discrimination that prevailed in the human world onto the plant kingdom."[257] Considering that he was at the same time completely aware *and* oblivious to the fact that the majority of plants possess both male and female sexual parts (and are therefore biologically considered hermaphrodites), is indicative of how strong the bias of the time was. For Linnaeus, plants not only had male and female sexual organs, but behaved like humans in their interactions, leading to numerous wedding, marriage, and love metaphors in his naming conventions – to the degree that marriage became equivalent with sexuality.[258]

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[255] Fors, *Limits of Matter*, 125.
[256] Ibid., 125-126.
[257] Fara, *Sex, Botany & Empire*, 21-22.
[258] Londa L. Schiebinger, *Nature's Body: Gender in the Making of Modern Science* (Boston: Beacon Press, 1993), 22, 25.

More on the topic will follow in the case study on Linnaeus proper. For now, shall it suffice to say that the social conventions of the 18th century pervaded the knowledge system of empiricism thoroughly as they were utilized to keep the non-empirical ones separate. So far, the examples have shown that behind the polemical attitude towards knowledge outside of the empirical system stood calculations of power – for the members of the learned communities, private individuals, academic institutions, and the state. There was often an undeniable overlap between their interests, and often enough they joined forces to protect and further their mutual goals and projects.[259]

Researchers and empiricists were at the centre of knowledge production, often supported through private financiers or the state as we have seen above. The value of knowledge was measured by how useful it was in economic terms. Through its inherently gendered and in other ways restricted nature, this system followed a natural tendency to propagate and reproduce itself through 'unnatural selection' and intellectual incest: privileged, powerful, rich, white, Swedish men educated, supported, and cooperated with other privileged, powerful, rich, Swedish men to make each other even more privileged, powerful, and rich.[260] The deeply patriarchal constitution of Church, state, universities, and of society in general – with man on top according to the 'natural, God-given order' – helped to perpetuate the status quo.[261]

Women, naturally, were supposed to know their place in society as they were assumed to be created to love, venerate, and respect the men in their lives – be he her husband, father, brother,

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[259] Cf. chapter "3.2.1 Organization of Knowledge."
[260] If not to the others, there is hypothetically a natural limit to whiteness.
[261] Villstrand, *Norstedts Sveriges Historia* 4, 468-469.

son, or priest. To question their own position was to question the natural order installed by God.[262] If a woman – or, similarly, a representative of any given minority – wanted to be recognized for their achievements, they had to work many times harder than members of the normative group.

This pressure meant that the targeted groups were not only required to excel, but more importantly they needed to "assimilate to European university culture" – in short, perform in as white and as male a way as possible.[263] The empirical system of knowledge relied heavily on male-connotated qualities such as reliability and mathematical methods while distinguishing itself explicitly from knowledge systems that did not adhere to those standards.

Being successful within the empirical system meant to conform and comply with expectations set by a male intellectual elite. While this was certainly possible to achieve for non-male or non-elite individuals, it proved markedly difficult. As the example of Eva Ekeblad[264] shows, a nonconformity in one area could be balanced out with an advantage in another: her being a woman was offset by her status as a noble woman; in combination with her empirical expertise and the usefulness of her research, it allowed her to succeed within the *Akademi*.[265] Similarly, women could (under very specific conditions) become representatives of the Burghers' Estate in the *Riksdag*,[266] foreigners earn recognition as experts in chemistry, or an

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[262] Villstrand, *Norstedts Sveriges Historia* 4, 468.
[263] Schiebinger, *Nature's Body: Gender in the Making of Modern Science*, 191.
[264] See chapter "3.2.1 Organization of Knowledge."
[265] Cf. Lindqvist, *History of Sweden*, 356; Fara, *Sex, Botany & Empire*, 37.
[266] See chapter "3.1.2.4 The Riksdag;" cf. Nordin, "Frihetstidens radikalism," 71.

enslaved black man achieve the (honorary) status of a "Professor in Herbology."[267] Cracking the system was complicated, but not impossible.

The overall tendency within *vetenskap* and other Western empirical systems was towards a widening gap between male and female gendered knowledge, as well as other targeted knowledge systems. Such a tendency was especially perceptible in the field of chemistry. For a long time, the forefather (foremother?) of the field, alchemy, had enjoyed a quite formidable reputation among European intellectual circles – natural philosophers and esoterically inclined ones alike, although the difference between them was much less pronounced before the 18th century.[268]

Alchemy promised an easy way to a long, healthy life and unimaginable riches, and thus attracted a crowd of influential nobles and intellectuals. Especially in Germany, the art of alchemy had many passionate followers and patrons, and it is only logical that German practitioners became the most influential source and role model for Swedish alchemists.

In a letter from 1758, the same Cronstedt divided alchemy into three branches: *alchymia rutomanica* (dowsing), *alchymia medica* (the search for a medical panacea), and *alchymia metallurgica* (transformative alchemy to produce gold). To Cronstedt, one was worse than the other, and he went to formidable lengths to ridicule them and bring them into association with

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[267] See the section on Kwasi, the slave and herbologist in chapter "3.2.4.4.3 Infringement and Appropriation." Cf. Susan Scott Parrish, "Diasporic African Sources of Enlightenment Knowledge," in *Science and Empire in the Atlantic World*, eds. James Delbourgo, and Nicholas Dew (New York: Routledge, 2008), 290-291.

[268] Cf. on Hiärne and Paracelsian knowledge, in Fors, *Limits of Matter*, 46.

women, foreigners, the lower classes, and Jews.[269] Especially two of the sub-categories, dowsing and gold making, had a long-standing tradition in Germany. It is not a coincidence that at the beginning of the 18th century Johann Friedrich Böttger, court alchemist in the service of Frederick I of Prussia, discovered – through trial and error and lots of luck – a process to produce the first European porcelain that was worth its name.[270] After Böttger had not delivered on his promise of turning silver into gold, the emperor had locked him up in a laboratory and made him experiment for years until he finally achieved acceptable results.[271]

Böttger, like so many of his contemporaries, had set out to transform dirt into gold, and – ironically – succeeded in a rather unexpected way. His works laid the foundation for 'cheap' European knock-offs to compete with Asian porcelain, China's "white gold."[272] This discovery catapulted Germany with Meissen as its centre to the top of European china ware production and ahead of its biggest competitor, the pottery from Delft with its iconic white and blue designs. Meissen Porzellan, the company Böttger's work founded, still exists today; some pieces are (almost) worth their weight in gold.

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[269] Fors, *Limits of Matter*, 124-126.

[270] Portuguese, Italian, and Dutch earthenware was readily available on the market as an alternative to Chinese imports, but their quality was much farther from original porcelain than the products coming out of Meissen.

[271] Robert Finlay, *The Pilgrim Art: The Culture of Porcelain in World History* (Berkeley: University of California Press, 2010), 62, 276.

Cf. Karl Berling, *Meissen China: an Illustrated History*. New York, Dover Publications, 1972; Maureen Cassidy-Geiger, *Fragile Diplomacy: Meissen Porcelain for European Courts Ca. 1710-63*. New Haven: Yale University Press, 2007.

[272] Finlay, *The Pilgrim Art: The Culture of Porcelain in World History*, 276.

As the 18th century progressed, alchemy fell more and more out of fashion until it was considered a guilty pleasure of the unlearned elite[273] – unlike astrology and magic, which were tagged by the learned elites as a pastime for the lower classes, or for unlearned rich (male or female) individuals.[274]

In summary, starting in the late 17th and continuing through the 18th century, the distinctions between empirical systems of knowledge and the non-empirical ones became increasingly more pronounced due to beginning specialization within academic fields, and the recontextualization and association of professionalized institutions with empirical knowledge. Finally, the process was accelerated due to a governmental push towards the production of useful knowledge by means of policies and legislation.

2.2.4.4 Marginalizing Knowledge

> "How do skinless sausages hold together, Mister Stibbons?" -
> "What? Eh? How should I know something like that?" -
> "Really? You don't know that but you think you're entirely qualified
> to know how the whole universe was put together, do you?"
> - Terry Pratchett, *The Last Continent*

A prominent and relatively simple way of targeting a knowledge system was to associate it with a marginalized group that ranged lower in the hierarchy of knowledge, resulting in the creation and solidification of group boundaries. From the perspective of empiricism, the selection of fields and systems to target was wide. Any such association can be understood as a

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[273] Despite the bad reputation, alchemy nonetheless concerned itself with turning dirt into gold. Meanwhile, the unlearned *poor* were too caught up with turning dirt into food.

[274] Fors, *Limits of Matter*, 5, 126.

label or *tag*, for instance gender, nationality, ethnicity, religion, social status, marital status, political affiliation, sexual orientation, physical ability, and so on.

Factually, such associations culminated in 'othering:' a dichotomy was created between two or more systems of knowledge with the implication that there was a right, useful side and a wrong, undesirable side to be on. Just by association, formerly broadly acceptable knowledge could be discredited as tagged with one of the labels – a powerful tool especially when combined with the cameralist-mercantilist agenda of utility.[275]

In the example from above, Cronstedt added another label to the pre-existent association of alchemy as 'foreign/German' by tagging it as female. The combination of the two became more convincing because the discrediting of female knowledge was supported through the gender conventions in Sweden's patriarchal society, and the discrediting of foreign specialists was in the national economic interest of the mining industry. The case of alchemy, chymistry, and chemistry is very telling. It demonstrates how a once renowned form of natural philosophy was replaced by increasingly more empirical practices, maintaining only the parts that were useful to naturalists and empiricists, and disposing of those that were no longer useful by relegating them to the realm of lower knowledge systems.

Knowledge could easily become marginalized in other ways, too. For instance, it was possible to move the space within which a certain knowledge system was admissible from public to private. Such was the case with the Bureau of Mines:

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[275] Fors, *Limits of Matter*, 132.

> [D]iscussion of curious phenomena did not simply vanish from the Bureau with the eighteenth century. Instead they moved to a private sphere. The public silence and professed disinterest that surrounded theories of metallic transmutation was extended also to several other areas. No longer fit to be part of the hegemonic, utilitarian discourse, premonitions and visions of angels, devils, and ghosts were now associated with religion, women, and family matters.[276]

During the 18th century, magical and folkloric beliefs remained prominent, but in changing contexts and explained through different rationale. Those beliefs became more and more associated with the female and the folkloric sphere, and pushed away from the learned, male, academic one where they were often replaced by empirical alternatives.

In some cases, empirical alternatives displaced folkloric, magical, or esoteric elements even in the spheres they had been banished to. A great example is medicine, and specifically the associated area of midwifery. In Sweden, until the end of the 18th century, healing was often considered a form of counter-magic, and it was therefore strongly associated with traditional knowledge that manifested in the "social practice of visiting spiritual places and healing wells to perform rituals."[277] Until the rise of specialized academic fields such as gynecology and obstetrics in medicine (and broad coverage and accessibility to it), midwifery was a crucial and class-defying practice that allowed women of different status to offer and receive individual,

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[276] Villstrand, *Norstedts Sveriges Historia* 4, 121-122.

[277] Jacqueline van Gent, *Magic, Body, and the Self in Eighteenth-Century Sweden* (Leiden: Brill, 2009), 127-128.

efficient, and time-honoured help during one of the most dangerous and challenging events of their lives.[278]

Midwifery was based on intimate knowledge of traditional healing – including herbs and anatomy – as well as on experience passed on from generation to generation. As an inherently female practice and concern, midwifery was also prone to accusations of dark magic or witchcraft, although not regularly from within the communities because they understood the vivid importance of and dangers associated with the practice.[279] Such associations were not necessarily based on gender connotations as male witches were found all over Europe, but based on the position of power midwives held over their patients and the high stakes that came with the profession – particularly when something went wrong.[280] Tellingly, in a 17th century trial in Germany regarding the death of an infant,[281] the midwife was accused of harmful magic and not, as might be assumed of malpractice.[282]

Just as in Germany, dark magic (Sw. *svart magi* or later also *trolldom*) was considered a punishable offense in Sweden.[283] There, the power of witches was based on the assumption that they – male or female – were capable of physically impacting and manipulating others, be they

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[278] Jonathan B. Durrant, *Witchcraft, Gender, and Society in Early Modern Germany* (Leiden: Brill, 2007) 196.

[279] Durrant, *Witchcraft, Gender, and Society in Early Modern Germany*, 196.

[280] Ibid., 196-197.

[281] In the same trial, other accusations included "harm[ing] livestock, the crippling of Hans Hermann, the unsuccessful poisoning of 'fishwater', and the murder of Georg Gutmann's wife" as well as the failure to cure headlice. Cf. Durrant, *Witchcraft, Gender, and Society in Early Modern Germany,* 193-194.

[282] Durrant, *Witchcraft, Gender, and Society in Early Modern Germany*, 194.

[283] Göran Malmstedt, *En Förtrollad Värld: Förmoderna Föreställningar Och Bohuslänska Trolldomsprocesser 1669-1672* (Lund: Nordic Academic Press, 2018), 14.

humans or animals, land or objects.[284] Under the influence of the Church's fight on heretics, pacts with the devil and other sins against God were added to the list of crimes that witches were commonly accused of.[285] In folkloric belief, dark magic could be countered with white magic (Sw. *vit magi*).[286]

Across Europe, the decline of midwife practice in the wake of a growing male-dominated gynecological and obstetrical practice is well documented. The symptoms of this process were a "competition between the traditional midwife and her male rivals, the increase in medical intervention and, as the role of women in the birth process diminished, the shift in emphasis in childbirth from the social to the medical sphere."[287] Severe regulations, costs, and restrictions were imposed on practicing midwives that forced them to comply with unattainable standards or fully pushed them out of the profession as David Harley has demonstrated on the case of rural 17th century England.[288] In Sweden, the field experienced a professionalization under male supervision when in 1708 Johan von Hoorn (1662-1724) established the first educational institution for midwives in the country. They were to replace the informal care system based on the assistance of the de facto midwives of the time – experienced local women.[289] Taken

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[284] Cf. Van Gent, *Magic, Body, and the Self in Eighteenth-Century Sweden*, chapter 3 "Magic and the Body;" Malmstedt, *En Förtrollad Värld*, 56.

[285] Ibid., 15, 54-55.

[286] Ibid., 14.

[287] Cf. Hilary Marland, "Introduction," in *The Art of Midwifery: Early Modern Midwives in Europe*, ed. Hilary Marland (London: Routledge, 1993), 1.

[288] Cf. David Harley, "Provincial midwives in England: Lancashire and Cheshire 1660-1760," in *The Art of Midwifery: Early Modern Midwives in Europe*, ed. Hilary Marland (London: Routledge, 1993), esp. 28-29.

[289] Villstrand, *Norstedts Sveriges Historia* 4, 453.

together, all those factors contributed in their own way to the shunning of an essential form of traditional knowledge and its highly-experienced and competent practitioners in favour of a male-dominated alternative that was not necessarily better, but certainly more empirical.

2.2.4.4.1 Polemic Arts

If rational discourse and argumentation were not enough to discredit a person or work, humour usually was.[290] Parody, satire, and caricature were an excellent means to denigrate enemies or whole knowledge systems as inferior and unreliable. For example, Cronstedt's satirical language – the allegory of alchemy as a dressed-up old woman, and chemistry as her deceiving daughter – in his letter multiplied the effectiveness of his words and made it easier to ridicule the targeted knowledge system (alchemy) and the tagged groups (Germans; women).

Much like today, humour was used all over Europe to discredit, critique, or ridicule individuals or entire groups – be they minorities or majorities – and successfully pervaded class boundaries.[291] Members of learned circles used humour constantly as a weapon to target their peers as well as outsiders. Evidently, they were especially fond of the multi-layered critique found in caricatures and literary allusions: there is, for instance in the field of naturalism, the popular example of a satirical attack on Joseph Banks through a 1795 caricature by James Gillray, titled "The great South Sea Caterpillar, transform'd into a Bath Butterfly."[292] It displays

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[290] Fors, *Limits of Matter*, 130.

[291] Cf. Elfriede Moser-Rath, „Lustige Gesellschaft": Schwank und Witz des 17. und 18. Jahrhunderts in Kultur und Sozialgeschichtlichem Kontext (Stuttgart: Metzler, 1984).

[292] Cf. David Philip Miller, and Peter Hanns Reill, eds. *Visions of Empire: Voyages, Botany, and Representations of Nature* (Cambridge [England]: Cambridge University Press, 1996), frontispiece; Fara, *Sex, Botany & Empire*, 60.

Banks metamorphosing from a caterpillar into a sash-wearing butterfly (the sash was an award from the Order of the Bath), its gaze directed upwards at a sun with a crown at its centre, symbolizing the British monarchy.

Banks, a wealthy land-owner and unofficial scientific advisor to the government, had been infamous for his close ties to politics and the highest tiers of society – a fact that did not escape the artist and his contemporaries.[293] However, the 'threat' posed by Gillray's drawn weapons had little real-life effect on Banks' career, but that did not keep the artist from trying: humour was a powerful tool, and if the ridicule yielded no political fruit, then it was at least entertaining and sought-after by the many fans of political satire.

Linnaeus, too, was the target of slander and mockery at the hand of his European colleagues: his French competitor Georges-Louis Leclerc, Comte de Buffon (1707-1788) ridiculed his classification of the genus *homo*, thereby "defend[ing] the elevated position of humanity against the less sophisticated Linnaeus."[294] Similarly, French naturalist Julien Offray de La Mettrie (1709-1751) mocked Linnaeus when he claimed that his categorization had turned two-legged men into four-legged animals.[295]

Outside of the exclusive circles of the learned, the less educated classes, too, rejoiced in reading humorous works that made fun of social conventions or the more learned classes. In

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[293] Fara, *Sex, Botany & Empire*, 60-63.

[294] Gunnar Broberg, "Homo sapiens. Linnaeus's Classification of Man," in *Linnaeus, the Man and His Work*, eds. Tore Frängsmyr, Sten Lindroth, Gunnar Eriksson, and Gunnar Broberg (Berkeley: University of California Press, 1983), 174.

[295] Ibid.,175.

Germany, vernacular collections of jokes and parodies such as "Schimpff und Ernst" were written for and geared towards those unconversant in Latin.[296]

2.2.4.4.2 Esotericism

Among the systems of knowledge most often targeted by empiricists, writers, and artists through their publications, satires, or slanders was that of esotericism and occultism. I use the singular because the two – although not equal – are often used interchangeably as the borders separating them are almost impossible to define. Then and now, esotericism and occultism – much like today the umbrella-term 'magic' – served as a basin for a variety of ideas and world-views that do not neatly fit into the romanticized Western ideal of academic reliability – or to use Fors' words to describe the early modern Swedish situation, "it was little more than a trash heap for epistemic objects that cannot be located anywhere else."[297]

Similarly, then and now, defining what constitutes esoteric or occult knowledge proved to be a difficult venture, and it often turned up in discourses pertaining to diverse disciplines. Wouter Hanegraaff, one of the most prominent and productive scholars in the field, shies away from a concise definition, naming the elusive nature of the concept as a reason, and pointing out the historical changes the concept underwent. He writes:

> Prior to the watershed of the eighteenth century, when the academic disciplines began to be established in their present form, the domain in question was still widely recognized as an important, although controversial, focus of intellectual and scholarly inquiry: theologians, philosophers and practitioners of the natural sciences were seriously

[296] Moser-Rath, *"Lustige Gesellschaft": Schwank und Witz des 17. und 18. Jahrhunderts*, 263.
[297] Cf. Fors, *Limits of Matter*, 150.

> debating its ideas and their implications. It is only in the wake of the Enlightenment that it vanished almost completely from accepted intellectual discourse and standard textbook narratives.[298]

Historically, esotericism was often successfully used as an umbrella category for knowledge that was too learned to be easily rejected simply as unlearned, but at the same time too 'out there' even for the strong of will. The term was first used to define this non-category in the 1790s in Germany and then slowly crept its way into the French in the 19th century.[299]

Since the re-emergence of esotericism as an admissible topic of scholarly scrutiny in the 20th century – much is owed to the works of Gershom Scholem, Antoine Faivre, and Wouter Hanegraaff – many sets of characteristics have been proposed to narrow down what esotericism actually *is* – or rather what it *is not*. Numerous attempts at providing workable definitions of the esoteric or occult have led to a surplus in terminology and opinion (much like with the concept of enlightenment) – and thus a lot of confusion.[300]

Most of the eminent authors – for instance Hanegraaff, Arthur Versluis, Kocku von Stuckrad, and Antoine Faivre – agree that esoteric knowledge has a pre-empirical, often metaphysical or supernatural dimension to it, be it regarding its methods or desired outcomes or both. Esotericism is the opposite to what Antoine Faivre calls the 'disenchanted world' of

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[298] Wouter J. Hanegraaff, *Western Esotericism: A Guide for the Perplexed* (New York: Continuum International Pub. Group, 2013), 2.

[299] Ibid., 3.

[300] Hanegraaff, *Western Esotericism: A Guide for the Perplexed*, 5.

empiricism. Especially in the late 18th and 19th century, it "attracted creative writers and artists, who began to perceive the occult as a territory of boundless imaginative liberty."[301]

Very recently, since the New Age movement of the 1960s and 1970s, esotericism has become even more strongly associated with different kinds of metaphysical and unscientific (!) knowledge – self-help books about the power of the body's magnetic fields, and whatever Gwyneth Paltrow sells as lifestyle.[302] To a degree, conspiracy theories could be added to the list, as they often draw inspiration from obscure or 'newly' 'rediscovered' writings, portraying them as some sort of long lost source – a tactic that allows them to justify "the origin and the history of the alleged plot."[303] Esoteric sources lend themselves to such purposes very easily, especially in the framework of conspiracies with religious undertones.[304]

Observing the ways in which the field and meaning of esotericism has changed over the course of its existence and in its more recent history is a powerful reminder of the discrepancy between academic and popular understanding, and the volatility of both. Knowing about what was considered esoteric or occult at what point gives us an idea about the changing criteria used to define different knowledge systems and their hierarchies. It also gives us an understanding of

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[301] Paul Kléber Monod, *Solomon's Secret Arts: The Occult in the Age of Enlightenment* (New Haven: Yale University Press, 2013), 227.

[302] Cf. e.g. Timothy A. Caulfield, *Is Gwyneth Paltrow Wrong about Everything?: When Celebrity Culture and Science Clash* (Toronto: Viking, 2015). While most of the claims are only absurd, some of them are straight-out dangerous as they promise unattainable results ranging from rosy skin to divine enlightenment to cancer cures in exchange for the obscenely earthen commodity of hard cash.

[303] Jovan Byford, *Conspiracy Theories: A Critical Introduction* (Basingstoke, Hampshire [England]: Palgrave Macmillan, 2011), 100.

[304] Ibid., 81.

the mechanisms that separated useful from less useful knowledge, and various knowledge systems from each other.

2.2.4.4.3 Infringement and Appropriation

As demonstrated earlier, Alchemy is a great example of a once highly popular form of *scientia* that was broadly embraced and admissible even among the highest social circles up to the late 17th century, and which later on steadily lost its appeal due to the rise of a more reliable knowledge system – empiricism. Its reputation suffered, and step by step its practitioners lost their prestige and credibility to the point where they were ridiculed and stereotyped. Consequently, the parts of alchemy that proved useful were adapted for the needs of empiricists and their employers, for example knowledge about chemical processes or instruments. The non-useful parts were labelled as esoteric and shunned. Generally speaking, "chymists became chemists when they were embedded in an institutional framework provided by states and academies. […] On the other hand, chymists became alchemists when they were preoccupied with knowledge areas […] that could not be fitted into the new institutional frameworks."[305] For better or worse, chemistry worked for the state and alchemy did not.

Since the later 17th and 18th century, continuous attempts were made to move and restrain esotericism to the world of the fine arts and literature, religious and spiritual circles, and generally to the fringes of society or vice-versa. Nonetheless, many elements of esoteric knowledge and practice had considerable impact on naturalism and empirical thinking. One example is the "categorisation and classification of objects and concepts [that] gained particular

[305] Fors, *Limits of Matter*, 150.

importance in the encyclopaedic tradition."[306] In this context, esoteric knowledge informed vital elements in the search for a universal language in the works of e.g. Christopher Polhem, Swedenborg's mentor.[307]

Athanasius Kircher, Francis Bacon, René Descartes, and many more shared the fascination with knowledge categorization and a universal language to remove all barriers in communicating about it. While their intentions proved to be unattainable within the limits of an empirical system, their methods were indispensable for empirical categorization and were thankfully and quietly accepted into the canon of empirical working methods.[308]

Appropriation of knowledge often occurred in the context of traditional medical and pharmaceutical knowledge. Especially when it came to the usage of plants for medicines or other industrial purposes, the naturalists did not shy away from appropriating traditional knowledge of foreign or unlearned people. Linnaeus, for instance, was for the most part very fond of Sámi medicines as he found them to be untainted by the influence of imported foreign food stuffs and luxury goods. His disgust towards those 'corrupt' commodities in juxtaposition to the healthy, unspoiled way of living he encountered among the Laps during his explorations constitutes both a reprocessing of the trope of the noble savage, and a commentary on his contemporaries' noxious habits that were certain to harm both the human body and the national economy: more than an ethnographic account of a people, his rendering of Sámi medicine and lifestyle was a

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[306] David Dunér, "The Language of Cosmos: The Cosmopolitan Endeavour of Universal Languages," in *Sweden In the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén (Farnham, Surrey, England: Ashgate, 2013), 46.

[307] Ibid., 45-46.

[308] Ibid., 46-47.

commentary on contemporary corruptness and "a call to moral rejuvenation."[309] As such, it necessarily has to be seen as a case of 'othering' rather than as an account of unreserved admiration.

A similar case of 'othering' and appropriation through literature is that of Christopher Polhem's (1661-1751) work *Nyia tiender uthur månan* ('New tidings from the Moon'). It tells the fictional story of a Sámi man capable of magic who was paid by Polhem to 'travel' to the moon in his mind and bring back information on the people living there. After approximately half a year of lying on the ground, face-down and without moving, the Sámi man, according to the account of Polhem, came back with detailed information about the culture and language of the moon people. In a following publication, Polhem used this fictional story to illustrate the advantages of a universal language. Similar to Linnaeus' critique of Swedish corruption in opposition to the moral values and superior health of the Sámi, it reflected his criticism about Swedish society through the contrasting lens of a foreign culture.[310]

Appropriation of knowledge and culture for the national Swedish context did not end in Europe. Through his correspondences, Linnaeus' reach extended to other continents as well. In Suriname – then a Dutch colony in the north of South America – an associate of Linnaeus' acquired knowledge about a local plant's medical properties from an African slave named Kwasi, later acknowledged by his masters with an inscription as "faithful to the whites," and 'honoured' through a 'promotion' to the position of Governor's slave.[311] The associate wrote

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[309] Koerner, *Linnaeus: Nature and Nation*, 71.
[310] Dunér, "The Language of Cosmos," 42-43.
[311] White kindness was just as bad as white rage.

home about it to Linnaeus who "named the tree in the African's honor *Quassia amara*."[312] Kwasi would go on to travel to Europe and become an expert and honorary "Professor of Herbology in Suriname." Later – by then a free man himself – he would become the master of three slaves of his own.[313]

All these examples – esotericism, the slave and herbologist Kwasi, and (with restrictions) Polhem's story about the Sámi man who met and lived with the moon people – exemplify how knowledge considered inappropriate or inadmissible by strict empirical standards was nonetheless appropriated for naturalist purposes and as a way to deliver social critique, often through 'othering' and fetishizing of 'the exotic.' The case of Eva Ekeblad and her admission to the *Akademi* in honour of her discovery of potato spirits could also be added to the list, although it was technically not her knowledge that was tagged, but her gender.

2.2.5 Sweden and Colonialism

The potential for internal growth in Sweden was defined and directed by its population size and the overall amount of workable land in the country. It turned out that the two were not only directly proportional, but also limited. For the large European colonial powers, especially Britain or the Netherlands,[314] which faced equally restrictive possibilities at home, the logical next step

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[312] Scott Parrish, "Diasporic African Sources of Enlightenment Knowledge," 290-291.

[313] Ibid., 291.

[314] The same is true for Denmark, Sweden's direct neighbour, which retained a highly influential position in the Atlantic throughout the 18th century, spearheaded by the *Vestindisk-Guineiske Kompagni*. Cf. Chris Evans, and Göran Rydén, *Baltic Iron in the Atlantic World in the Eighteenth Century* (Leiden: Brill, 2007), 292-293.

led outside of their own borders and into other regions of the world, where bountiful resources were there to be explored, conquered, harvested, and colonialized. Why, then, should the same thing not work for Scandinavia?

The Northern countries followed suit, "propelled by the same prospects of economic profit and political interests that pushed other European states to explore and exploit territories."[315] More than once, Sweden also tried to get a foothold in the Caribbean and Africa, but with mixed success. Once all attempts overseas had proven unsustainable, and following a simple process of elimination, it directed its colonial gaze further towards the North.

2.2.5.1 Past Entanglements

Before turning to Northern colonialism[316] *per se*, a closer look at the meta-discussion in modern Sweden is necessary: for one, it allows us to distinguish the different layers of historical discussions, and further helps us to understand where the discourse around Swedish colonialism originated – or, more accurately, why for many people Sweden's colonial past is such a polarizing topic between amends, ignorance, or denial.

Like few other countries, Sweden emerged from the age of empires almost entirely unscathed by moral scrutiny, and a look back at the last few centuries is necessary to understand how it got to this point. Few people in modern day Sweden are even aware that their country looks back on a history as a colonial power; internationally, this fact seems to be even less

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[315] Naum and Nordin, "Situating Scandinavian Colonialism," 5.

[316] The concept is sometimes referred to as northern expansion by a minority who is uncomfortable with the concept of internal colonialism.

known. The reasons for this ignorance – intentional or not – are manifold, and revolve around "unfamiliarity with that facet of national history, a denial that Scandinavian kingdoms had anything to do with atrocities caused by colonialism, and the recognition of the participation in the colonial act driven by economic ambitions and want of profit."[317] Colonialism in all its manifestations is, to put it bluntly, everything modern Sweden is not and does not want to be. To add to the issue, Sweden's active role as a colonizing power is often misrepresented and actively misinterpreted as benign interactions between benevolent invaders and locals, "based on collaboration rather than extortion and subjugation."[318]

Regarding global awareness, any given country's colonial history has often and wrongfully been regarded as national business. Such an approach can lead only to further obstacles in the process of decolonization, to the instrumentalization of history for the goals of nationalism, as well as to the censoring of constructive criticism within the research community on the grounds of citizenship – the ultimate hypocrisy. As a discipline dedicated to (unattainable, yet nonetheless worthwhile) standards of reliability and objectivity, History has to allow for an open discourse of reasonable voices, even if they hold a different passport or speak a different language.

Without acknowledging and recognizing the past for what it was, attempts at decolonization are blocked and slowed down both on a local Scandinavian and global level. This blockage results in a general misrepresentation of Sweden's history and prohibits all sides from entering a

[317] Naum and Nordin, "Situating Scandinavian Colonialism," 4.
[318] Ibid.

process of constructive, critical reflection and from learning from the past. Furthermore, it raises concerns over current political trends. The effects of treating the colonial past as a taboo are visible in the development and perception of Scandinavian 'exceptionalism' as well as, for example, in current political appropriation of a homogeneous ethnic identity as seen in 20th century Denmark.[319]

Evidently, keeping this narrative alive has current and very real consequences: only recently, a wave of nationalism, white supremacist activity, and conservative populism washed over the Scandinavian countries. In Denmark and Norway, a number of right-wing parties entered the national parliaments in the 1970s; over the last decade, nationalist tunes have been becoming stronger and more numerous in Sweden as well.[320] Newspaper headlines, social media posts, and political statements of the populist variety were increasingly based on the assumption that a country's 'pristine' population has to be guarded against an invasion of 'foreigners.'

As a result, the explicit necessity and academic obligation to address the issue openly "primarily grows out of a need to understand contemporary changes as societies become more heterogeneous, as immigration and a multicultural society meet xenophobic and populist reactions, framed in a global financial crisis reaching also into the Nordic countries."[321]

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[319] Naum and Nordin, "Situating Scandinavian Colonialism," 4.

[320] Pierre, *Oxford Handbook of Swedish Politics*, 7-8.

[321] Günlog Fur, "Colonialism and Swedish History: Unthinkable Connections," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin (New York: Springer, 2013), 18.

2.2.5.2 Overseas Colonialism

The important take-away for the present work is Sweden's factual colonial past and role as a globally operating colonial power and trade partner. The kingdom held overseas colonies in both Africa and America,[322] had trading posts in Asia, was – especially through its steel exports to England and Africa – an accomplice and actor in the Atlantic Triangle Trade, and colonized on a large scale its northern neighbours, the nomad peoples of Sápmi. Only recently, the country has intensified its efforts of decolonialization as researchers from Sweden itself and from all over the world have started to discover, acknowledge, investigate, and reassess its active role as a colonial power.

2.2.5.2.1 Trading Places

The idea to set out for foreign realms across the ocean to colonize and exploit went back to the 17th century when Gustavus II Adolf was asked by a group of Dutch investors for his royal sanction to attack Spanish-occupied territories in the Americas.[323] In 1638, the first 'permanent' settlement under Swedish jurisdiction was founded in the Delaware region – New Sweden or

[322] Naum and Nordin count the Baltic provinces of Estonia, Ingria, Karelia, and Livonia among the overseas colonies, too. Unlike Sápmi, they technically even pass the saltwater test (cf. chapter "3.2.5.4 The North: Uncommon Borders;" cf. Fur, "Colonialism and Swedish History," 25, esp. FN8).

[323] On the topic of Sweden's Atlantic colonies, especially on New Sweden and the Caribbean islands, see e.g. Erik Schnakenbourg, "Sweden and the Atlantic: The Dynamism of Sweden's Colonial Projects in the Eighteenth Century." In *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, edited by Magdalena Naum and Jonas M. Nordin, 229-242. New York: Springer, 2013; Holger Weiss, "A Divided Space: Subjects and Others in the Swedish West Indies during the late-Eighteenth Century," in *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén, 275-300. Farnham, Surrey, England: Ashgate, 2013.

Nya Sverige –, as well as an African trading post in Cabo Corso.[324] The Crown actively looked for volunteers to settle in New Sweden, but attracted only few.[325]

Cabo Corso was of interest as a trading post more than as a continuous settlement, providing slaves for the overseas colonies and a stop for ships headed to destinations in Asia. Towards the end of its active period under Swedish control in the 1660s, it resembled a fort more than a trading post.[326] Both colonial endeavours were given up soon: Swedish control over New Sweden ceded after 17 years in 1655, that over Cabo Corso after 24 years in 1663.[327]

Both colonial overseas areas were acquired by the Dutch within three decades of their establishment.[328] Meanwhile, the colonialist presence of Sweden in America had been a mitigated, but strategically important one: engaging in trade and establishing political connections, the country was just lurking for a shot at making another far-away destination its personal landing point and trade post – after all, Sweden was the last European country without a large colonial presence in the area.[329] Over a century after the failure of Cabo Corso, on the first

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[324] For a summary and detailed information on Sweden's involvement in the Delaware colony as well as the African slave trade as taught in school curricula over the 20th century, cf. Fur, "Colonialism and Swedish History," 19.

[325] Fredrik Ekengren, Magdalena Naum, and Ulla Isabel Zagal-Mach Wolfe, „Sweden in the Delaware Valley: Everyday Life and Material Culture in New Sweden," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin (New York: Springer, 2013), 172.

[326] Villstrand, *Norstedts Sveriges Historia* 4, 451-452; Lindqvist, *History of Sweden*, 138.

[327] Lindqvist, *History of Sweden*, 138.

[328] Magdalena Naum and Jonas M. Nordin, "Introduction: Situating Scandinavian Colonialism," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin (New York: Springer, 2013), 6;

[329] Schnakenbourg, "Sweden and the Atlantic," 229.

of July 1784, Sweden received the Caribbean island of St. Barthélemy from the French King, where its long-held overseas colonialist ambitions once again came true – even if only for a short time.[330]

2.2.5.2.2 Trading Vessels

For trade with Asia, Africa, and the West Indies to function cost-effectively, Sweden needed a fleet to transport goods, ideas, messages, and people back and forth. For many decades, it had mostly relied on the major European East India companies – namely the Danish, Dutch, and British. Paying foreign companies to ship tea, silk, and other amenities into the country was not in line with cameralist-mercantilist considerations on import trade. A new, more profitable alternative had to be found. Thus, Sweden acquired its very own trading fleet: *Svenska Ostindiska Companiet* (SOIC), the Swedish East India Company.[331] For many decades to come, its ships would be Sweden's nexus to Asia, as well as the doorway for Asian goods and ideas into the country.

While goods from China and India constituted the majority of overseas imports in the 17th and 18th century, other trade destinations were of interest as well. The SOIC had a sister company specializing on trade with Africa – the *Svenska Afrikakompani* or *Svenska Afrikanska Kompaniet*. Founded in the mid-17th century and operating out of Cabo Corso in modern-day

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[330] Weiss, "Divided Space," 275.

[331] On a side note: the SOIC had a recent revival when during marine excavations in the sea around Gothenburg (where the SOIC had been founded and stationed) an original ship was discovered – the *Ostindiefarare Götheborg*. A reconstruction was built in the 1980s and 1990s by a group of enthusiasts. Apart from the ship's blueprints, they also reused the SOIC name. The ship is fully functional and has sailed to destinations all over the world until its 'retirement' in 2015. Laying now in the Gothenburg harbour, it is a popular tourist attraction and landmark (www.soic.se).

Ghana, its mandate was the trade in slaves, ivory, sugar, and gold in exchange for mostly iron.[332] The half-life of this company was considerably shorter than that of the SOIC: the Afrikakompani was interested in selling slaves to 'local' buyers (i.e. Swedish colonialists), but was faced with a lack of potential customers as the country lacked the colonial possessions in which to deploy slave workers. Instead, they were sold to the Portuguese and Dutch for a while, fuelling their respective colonies' demands.[333] After a few years of more or less successful trading, the company's financial situation deteriorated, and it was terminated in 1663.[334]

The *Ostindiska Kompani* proved much more prosperous both in terms of active operation time and overall success. Through it, Sweden participated directly in colonial trade in the classical sense – and indirectly through its business connections with the big European East India Companies.[335] The company was founded in Göteborg in 1731, mainly on what was left of the former Ostend Company. Based in the Flemish city of the same name, the Ostend Company had sailed under the protection of the Austrian Netherlands, but since its business conflicted with the (Northern) Dutch and British trade monopolies given to their respective East India Companies, it eventually was forced to give in to political pressure.[336]

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[332] Villstrand, *Norstedts Sveriges Historia* 4, 451.

A modern, unrelated travel company uses the same name: http://afrikakompaniet.se. THAT is the reason why we need to talk about colonialism.

[333] Villstrand, *Norstedts Sveriges Historia* 4, 451-452.

[334] Ibid., 451.

[335] On colonialism in the 'classical' sense, see chapter "3.2.5.4 The North: Uncommon Borders," esp. the passage on the saltwater test. Cf. Fur, "Colonialism and Swedish History," 25, esp. FN8.

[336] Per Forsberg, Lars Melchior, and Ulf Andersson, *Ostindiefararen Götheborg 1738-45: Resorna För Ostindiska Kompaniet, Besättningarna, Haveriet* (Riksarkivet Landsarkivet i Göteborg, 2014), 3-4.

The Dutch and British EICs, by nature of their enterprises and monopolies, blocked potential rich European investors who wanted to enter the lucrative overseas trade market but could not do so under their 'own flag.' However, where money is liquid, it finds a crack to leak through. In this case, the SOIC offered a welcome loophole as it sailed under the protection of the Swedish crown and outside the jurisdiction of the Dutch and British empires.

Building on the Ostend company brought many advantages for this process: it simplified the legal, administrative, and financial situation and offered access to already existing trade posts along the route. By taking advantage of an already existent structure, the Swedish and their foreign investors could launch trade very quickly; within a few years, the business was sailing smoothly.[337]

The SOIC soon became an important asset to the mercantilist ambitions of 18th century Sweden as a driver of consumerism. Tea, textiles, and porcelain formed the core products of the enterprise, both for the (limited) local market and – especially in the case of tea[338] – as re-exports to other Western European countries. Scottish ports were among the most frequently (and clandestinely) visited: a flourishing smuggling business undermined the high duties which tea

[337] Hanna Hodacs, *Silk and Tea in the North: Scandinavian Trade and the Market for Asian Goods in Eighteenth-Century Europe. Europe's Asian Centuries* (London, England: Palgrave Macmillan, 2016), 183-184.

[338] Hanna Hodacs and Leos Müller, "Chests, Tubs and Lots of Tea. The European Market for Chinese Tea and the Swedish East India Company," in *Goods from the East, 1600-1800: Trading Eurasia*, ed. Maxine Berg (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2015), 277-278.

lovers had to pay in England, and it helped bring considerable revenue into the Swedish treasuries.[339]

On a larger European scale, smuggling was an immense problem for all sides (save those who got away with it): the prevalent economic theory of the day stated that illegal imports were highly detrimental to the state's tax revenue and cash reserves, and governments put in place the most severe of punishments: "In late seventeenth century and eighteenth-century France, for example, about sixteen thousand people were broken on the wheel, hung [sic], or quartered for selling printed cottons."[340] The deterring effects of harsh penalties such as torture and death had, however, little effect: the smuggling continued. But no matter how much governments despised it, smuggling was and remained vital in the process of bringing "commodities to the farthest corners and least auspicious consumers," on a global level.[341]

In the Swedish case, certain restrictions for import and export applied to the overseas trade, too, but the situation was met with a much more relaxed attitude and comparatively liberal legislation that got by without torture. For over eight decades, ships were exclusively sent out from and welcomed back into the Göteborg harbour – a legal restriction that made it easy for the Swedish state to control the import and export of goods with Asia.[342] Further limitations

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[339] Forsberg, Melchior, and Andersson, *Ostinidiefararen Götheborg*, 5.

[340] Koerner, *Linnaeus: Nature and Nation*, 4.

[341] Beverly Lemire, *Global Trade and the Transformation of Consumer Cultures: The Material World Remade, C.1500-1820* (Cambridge University Press, 2018), 138.

[342] Lindqvist, *History of Sweden*, 353.

concerned incoming ships from other countries: they could carry only "cargoes of products of the ships' own nationality" – a limitation with the primary intention to keep the Dutch at bay.[343]

Estimates suggest that only ten percent of all goods imported by the SOIC went into the domestic Swedish market; most of them were instead diverted to other European markets – to a large extent as smuggled goods destined for the British Isles.[344] By the middle of the 18th century, the Swedish and Danish East India Companies had solidified their status as the prime supplier of England's fine black market teas.[345] The SOIC simultaneously functioned as a means of cultural exchange and economic growth. Serving as a trade hub, the SOIC offered a way for Sweden to create revenue, and it acclimatized the local population to goods and ideas from Asia.[346]

In addition to its trade mandate, the SOIC was an important vehicle for research – literally.[347] Numerous students of Carl Linnaeus embarked on field travels with the SOIC to destination all over the globe, while he himself opted to conduct his studies in the comfort of the local universities or his home.[348] Linnaeus' students were numerous, ambitious, and – to a

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[343] Heckscher, *Economic History of Sweden*, 195.

[344] Michael F. Metcalf, *Goods, Ideas, and Values: The East Indies Trade as an Agent of Change in Eighteenth-Century Sweden* (Minneapolis: The Associates of the James Ford Bell Library, University of Minnesota, 1988), 9.

[345] Ibid., 10; Andrew Mackillop, "A North Europe World of Tea: Scotland and the Tea Trade, c.1690-c.1790," in *Goods from the East, 1600-1800: Trading Eurasia*, ed. Maxine Berg (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2015), 300.

[346] Mackillop, "A North Europe World of Tea: Scotland and the Tea Trade, c.1690-c.1790,"13.

[347] For more on the role of Linnaeus and his students in the overseas trade, see chapter "4.1.2 Carl Linnaeus," esp. sub-sections 4.1.2.2-4.1.2.4.

[348] Pratt, *Imperial Eyes*, 25.

certain degree – replaceable, considering that many of them never made it back home alive. During their journeys, they would often serve as chaplains or doctors for the ship's crew as they did not pay for their transportation thanks to special arrangements between the Swedish Academy of Science and the SOIC.[349]

Regular crew members as well were actively encouraged by the *Akademi* to collect and return plant and animal specimens on their trips, as well as to keep geographical records as amateur naturalists and botanists which led to an exponential growth of *naturalia* and *exotica* collections in Sweden, piling up in the local cabinets of curiosity.[350] In return, having on board a traveller skilled in "the tradition established by Linnaeus himself—during his travels in Scandinavia—of incorporating ethnographic observations in scientific reporting" proved advantageous for the SOIC because their knowledge about customs and local culture improved trade relations.[351]

The SOIC conducted 133 trips over the course of 82 years, importing and exporting thousands of tons of trade goods in the service of private investors, foreign financiers, and the Swedish state. Only eight ships were lost at sea.[352] The relatively new possibility of marine insurance through the Swedish Maritime Insurance company (established in 1739) additionally reduced the potentially disastrous effects of financial loss in the wake of shipwreck associated

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[349] Lindqvist, *History of Sweden*, 360; Pratt, *Imperial Eyes*, 25; Christina Skott, "Expanding Flora's Empire. Linnaean science and the Swedish East India Company," in *The Routledge History of Western Empires*, eds. Robert Aldrich, and Kirsten McKenzie (London; New York Routledge: 2014), 242, 244.

[350] Skott, "Expanding Flora's Empire," 244-245.

[351] Ibid., 247.

[352] Lindqvist, *History of Sweden*, 353.

with long-distance overseas trade, and thereby made investments in the company even more appealing.[353]

2.2.5.2.1 Trading Values

Materialism and the demand for consumer goods continued to thrive in the 18th century. Private investors and governmentally subsidised trade companies such as the British, Danish, or Dutch East India companies flooded the European market with trade goods from around the globe.[354] Sweden was no exception: tea, coffee, sugar, tobacco, spices, textiles, porcelain, dyes, and other luxury goods were especially popular – at least among the strata who had access to such commodities and could afford to buy them.[355]

The Swedish population had developed a taste for caffeinated beverages, sugar, foreign spices, and a good smoke, as well as the accessories needed to enjoy them. Slaves were also on the list of desired 'commodities.' From the point of view of the trading companies, luxury goods such as tea and spices were a great investment as they had a higher margin and volume to price ratio that allowed them to maximize their profits.[356]

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[353] Metcalf, *Goods, Ideas, and Values*, 13.

[354] For Swedish trade with Asia, see e.g. Hodacs, *Silk and Tea in the North*; cf. Chris Evans, and Göran Rydén. "From Gammelbo Bruk to Calabar: Swedish Iron in an Expanding Atlantic Economy." In *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, edited by Magdalena Naum and Jonas M. Nordin, 53-68. New York: Springer, 2013; Maxine Berg, ed. *Goods from the East, 1600-1800: Trading Eurasia*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2015, esp. ch. 12, ch. 18, and ch. 19.

[355] Mansén, *Norstedts Sveriges Historia* 5, 120.

[356] Naum and Nordin, "Introduction," 13; cf. article by Hanna Hodacs and Leos Müller, "Chests, Tubs and Lots of Tea."

In exchange for trade goods from Asia, Africa, and South America, Europe had not much to offer other than "a few mechanical trinkets, and of course guns."[357] Thus, most European nations had to rely on hard currency – usually in the form of silver from the Mexican colonies.[358] Sweden, however, lacked overseas silver mines and had to come up with more creative solutions to this problem. Its *potential* long-distance trade goods included locally sourced iron and steel, copper, other mining products, and furs. Iron designated for the trade with China was exchanged in the Spanish city of Cadiz for silver – the preferred commodity of the Chinese.[359] The ores originated in the mines of Dalarna in central Sweden, and in Sápmi.[360] The place of iron production was called a *gruva* or *bruk*, a "combination of an industrial community where the iron production took place in furnaces and forges, and a large landed estate, supplying charcoal and other resources."[361] The most productive mine was the one in Dannemora just north of Uppsala (cf. Figure 2).

Overall, at the beginning of the 18th century, iron accounted for 70 percent of Swedish exports.[362] While Swedish iron and steel were at the time the leading quality standard on the market and must have commanded high prices, the lack of detailed accounts makes it impossible to produce exact numbers for its exchange value – at least before 1772 when detailed records

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[357] Koerner, *Linnaeus: Nature and Nation*, 5.

[358] Koerner, "Purposes of Linnaean travel," 118-119.

[359] Skott, "Expanding Flora's Empire," 241.

[360] Naum and Nordin, "Situating Scandinavian Colonialism," 13.

[361] Göran Rydén, "Provincial Cosmopolitanism: An Introduction," in *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén (Farnham, Surrey, England: Ashgate, 2013), 1.

[362] Mansén, *Norstedts Sveriges Historia* 5, 116.

begin. What the sources do tell us is the exact nature of some of the SOIC's cargo: iron, wood,[363] cloth, and silver.[364]

Possible alternatives to locally sourced metals that could be used as barter or as hard currency were numbered, and so were other ways to make trade less costly. Sweden could export finished products instead of the raw materials, find ways to cut down on transport costs, rely on alternative exchange goods, develop new sources of income, or seek alternatives to the import goods to prevent all the wealth from being 'drained' from Sweden.[365]

At one point, the controversy over luxury goods escalated: certain imported commodities were so popular – and expensive – that the *Riksdag* mandated several very unwelcome restrictions, forbidding or limiting the consumption of coffee and other costly imports: they were considered so detrimental to the state that they had to be avoided at all cost (or, rather, at no cost at all).[366] Undeterred by laws and restrictions, luxury goods imports continued based on the argument of profit through re-export.[367] If people were unwilling to give up their bad habits, other options had to be considered more seriously.

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[363] The exported timber served as the building material for north-western European towns. Cf. Evans, "Where in the World was Sweden?," 35.

[364] Hodacs, *Silk and Tea in the North*, 58-59.

[365] Ibid., 183.

[366] Mansén, *Norstedts Sveriges Historia* 5, 113.

[367] Heckscher, *Economic History of Sweden*, 196.

Figure 2: Elias Martin (1739-1818), View of the Dannemora mine around 1780-1800.[368]

[368] Martin, Elias, *Dannemora gruva*, ca. 1780-1800, coloured pencil drawing. Swedish National Heritage Board/Riksantikvarieämbetet, http://kmb.raa.se/cocoon/bild/show-image.html?id=16001000021036.

With the exchange of trade goods and cash came the exchange of cultural practice – an important dimension of knowledge that is defined by Lässig to include "objects as source material" and location of cultural practice:[369] tea without the utensils to brew it is just dried plant parts, and, similarly, a teapot without the knowledge of how to use it is just a curiously shaped piece of porcelain.

Besides their presence as objects, material things "contain multiple histories."[370] They connect far away regions through their physical presence as much as the practices and knowledge attached to them, transgressing language and cultural boundaries. This makes them especially valuable as a means of knowledge circulation – a process (unlike that of knowledge dissemination) aimed in both directions – be it as objects carrying writing, as consumer goods, or as dedicated research objects such as the numerous plant samples and specimens Linnaeus received from his students and correspondents from across the globe.

Through material objects and production tools, knowledge practices circulated around the globe, for example as silk looms and silkworms, architectural styles, or harvesting techniques for imported plants.[371] The 18th century saw many ways in which global trade connections helped exchange goods and ideas. This development was essential in spreading technological advancements and cultural techniques that regularly resulted in the financial and economic benefit of a few, and ideally accomplished an increase of overall life quality for many – be it by

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[369] Lässig, "The History of Knowledge and the Expansion of the Historical Research Agenda," 32. Cf. also chapter "2.1.2 Terminology and Working Definitions," s. v. "Knowledge."

[370] Paula Findlen, "Early modern things: objects in motion, 1500-1800," in *Early Modern Things: Objects and Their Histories, 1500-1800*, ed. Paula Findlen, (London: Routledge, 2013), 11.

[371] Skott, "Expanding Flora's Empire," 244.

making daily life more bearable and interesting, or by simplifying work processes. In any case, cultural and material exchange was a process guided by the economic considerations of states, powerful companies, and their investors, and it depended on knowledge as an analytical tool and valuable resource.

Not least of all, the SOIC was a vital part of 18th century cultural life and economy in Sweden. Through its central role in international trade relations, material and cultural exchange, its research mandate, and the economic and social impact of its cargo, the Swedish East India Company helped its home country to gain notoriety as a trade partner (and sometimes as a competitor). It attracted investors from other countries and enabled efficient exchange of local resources for international goods, defining and expanding local taste for import and luxury goods for generations to come. By assisting in the creation of a market for those goods, the SOIC was also an important driver for social and economic change – be it through legislation, the race to find local substitute goods, or simply by introducing thousands of people to the pleasures of a cup of hot tea.

2.2.5.3 Settling Policies: Northern Expansion

Information was key to understanding and directing the internal processes of Sweden as well, and its role became even more eminent after the territorial and political losses of the Great Northern War and the unsatisfying outcomes of Sweden's colonial endeavours as demonstrated in the last chapters. Strategy changes were needed so that they would allow the country to work with what was available or easily attainable.

In the spirit of cameralist-mercantilism, Swedish economists, entrepreneurs, and (Hat) politicians – in short, the people who realized the potential of strategic use of data – pushed an agenda to make the best of the country's arguably most valuable resource: human capital

(manpower).[372] The idea was simple: the more people there were to generate demand, the more wealth they would produce as a result.

This theory further stated that the shorter people's metaphorical leashes – i.e., the less surplus they got out of their daily work efforts and the bigger their struggle to survive – the more motivated they would be to work to get by. To add to the appeal of the concept, the country's population reproduced by itself, and people would settle just anywhere if offered adequate perks.[373] The same logic suggested that if people were given *just enough*, they would remain motivated to work. If people were allowed *more than enough*, they found themselves in danger of becoming lazy.[374]

In the cameralist-mercantilist economic system, every individual was required to put their own wellbeing second for the sake of a higher goal: the wealth and prosperity of the nation. Similar to what had happened with knowledge, the monetary value of labour became congruent with the value of the person providing it – a mere number in an equation at the end of which stood profit.[375]

Cheap female labour was a strong driving force behind manufactures built all over the country, but also for work produced at home.[376] Johannisson, in *Det mätbara Samhället*,[377] paints

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[372] Johannisson, *Det mätbara samhället*, 96-97.

[373] Somewhere along the lines of land, tax reductions, and free merch. Cf. Koerner, *Linnaeus: Nature and Nation*, 61.

[374] Johannisson, *Det mätbara samhället*, 99-100.

[375] Ibid.

[376] Lindqvist, *History of Sweden*, 353.

[377] Although dating back to 1988, Johannisson's is probably the most comprehensive work on the history of statistics and its career as a political tool in Sweden. She follows the concept from Britain to

a contrast-rich picture of the economic environment: on the basis of statistics, social engineering was used to optimize the population and its profitability.[378] Workers were, she writes poignantly, the way to wealth, and not its target.[379]

While the cameralist-mercantilist model was based on the principle of God's natural order, surprisingly (and maybe slightly counter-intuitively), a lot of support for this world view also came from 'secular' 'science:' it taught people to "examine everything without prejudice, from the constellations of the universe to the tiniest insect on Earth, the purpose being to find what was good and useful to mankind and thus to the whole nation."[380]

Many naturalists, indeed, went to great lengths to marry the principle of natural order with the empiricism of their research, fuelled by the conviction that nature was mankind's to take and measure. Among them were many members of the influential *Akademi* as demonstrated earlier through the example of Jacob Faggot's article on land usage,[381] as well as several of the most outstanding Swedish economists. Their exploitative reach extended all the way up to the North: in Sápmi, the land's resources of animals – "brown bear, lynx, ermine, otter, wolverine, marten, and wolf," as well as a few different kinds of foxes – were depleted by the 1730s for furs.[382]

Germany to Scandinavia, while diligently listing influences, adaptations, and legal developments. At the same time, the work is surprisingly timely and appropriately sceptical towards the political implications of 18th century decisions on (still) current discourses about racism, the economy, and social politics. Lastly and ironically, Johannisson masters the skill of lightening things up with dark humour. The only problem with this book is how hard it is to come by.

[378] Johannisson, *Det mätbara samhället*, 186.

[379] Ibid., 182-183.

[380] Lindqvist, *History of Sweden*, 353.

[381] Cf. e.g. Faggot, "Tankar om Landsbruk;" cf. chapter "3.2.1 Organization of Knowledge."

[382] Koerner, *Linnaeus: Nature and Nation*, 61.

Thereafter, mining became Lapland's prime export industry, exploiting the rich iron, copper, and silver mines without any regard for the negative consequences for the local eco-systems or cultures.[383]

From the idea that nature was mankind's to rule, it was only a small step to justifying human exploitation of natural resources, and it was legitimized through the notion of physico-theology (or natural philosophy, at the time) – a conviction held by many intellectuals in the 17th and 18th century, including Isaac Newton. The concept was derived from the assumption that the biblical accounts of nature represented factual events or places – the deluge, paradise, etc.

Inspired by the 'information' from the bible, Swedenborg and many of his contemporaries took scripture as a point of origin for naturalist works – setting out to prove the empirical accuracy of the big flood through geological analysis, or locating the garden of Eden in Sweden's North.[384] In this world view, writes Stengel, physics was still the only reliable source of knowledge, but it did not contradict the creation narrative of the Bible.[385]

Naturalists like Swedenborg and his contemporaries had set out to prove the accuracy and factuality of their naturalist interpretation of scripture. In their understanding, nature was a finely balanced economy – in the original Greek meaning of household – wherein "everything is so complexly interdependent."[386] Probably the most well-known physico-theologist of 18th century Sweden was Carl Linneaus himself. The son of a minister by birth and a physician by training, he

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[383] Koerner, *Linnaeus: Nature and Nation*, 61.
[384] Stengel, *Aufklärung bis zum Himmel*, 71; Koerner, *Linnaeus: Nature and Nation*, 73.
[385] Stengel, *Aufklärung bis zum Himmel*, 71.
[386] Koerner, *Linnaeus: Nature and Nation*, 83.

possessed the right qualifications to combine both world views, and executed his profession with great fervour.[387] As important as Linnaeus' taxonomy was and still is for modern science, his and many others' works also helped to justify and perpetuate a political model exploiting human labour and natural resources, and it rationalized the well-being of the state as of higher priority than that of the environment and of individuals.[388] In the context of individual vs. national wellbeing, Johannisson brings up the example of holidays: while considered essential by the Church and the people as days of worship and recreation, they constituted in the view of the state and economists a loss of potential profits through wasted time, resulting in the forfeiture of several tons of gold per year.[389]

Since there was no gain without an increase of population size in this pre-Malthusian utopia, the state did whatever possible to keep people working in the country, to maintain them alive and healthy, and to draw in newcomers from outside. In the early 18th century, Sweden's native population was a meagre 1.5 million; France, for comparison, had over 20 million inhabitants.[390] When the *Tabellverk* reported in 1751 that the country had a population of only over 2 million people (including the Baltics), the report led the government to pass laws to immediately increase the number of people in the work force: per decree, everyone over the age of 15 had to find a job, or "forced labour would be arranged" for them.[391]

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[387] Johannisson, *Det mätbara samhället*, 103.
[388] Ibid., 100.
[389] Ibid.
[390] Evans, "Where in the World was Sweden?," 34.
[391] Ibid.

Incentives were offered to those who worked towards increasing population numbers, be it through immigration or procreation. Emigration was actively discouraged, and some recommendations even called for a law against it.[392] The German cameralist theorist Johann Peter Süssmilch (1707-1767) suggested four main strategies to increase population numbers: eliminating obstacles in the way of new marriages, bolstering fertility rates in existing marriages, investing in health prophylaxis, and keeping emigration at bay while encouraging immigration.[393]

On the immigration side, Sweden's relative freedom of religion was a popular selling point to potential immigrants, at least after the reforms put in place by King Gustav III in the 1770s: cameralist-mercantilism, Swedish style, did not give a *skit* about the religious convictions of its potential labourers; in this philosophy, will and skill trumped religious drill.[394] There was, however, a long list of people excluded from entering the country on a wild card. Among them were Roma ["Zigeuner"], Jews, soothsayers, thieves, and – very importantly – comedians.[395] The wealth of the nation was not a laughing matter.

As far as the production and maintenance of children was concerned, the Swedish state was willing to accept whoever was brought its way: illegitimate and parentless children – born out of wedlock or to prostitutes – were raised in state-sponsored children's homes and usually put to work very soon.[396] Among those parents who were able to take care of their children, self-help

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[392] Johannisson, *Det mätbara samhället*, 86.
[393] Ibid., 86.
[394] Ibid., 86-87, 100.
[395] Lindqvist, *History of Sweden*, 356.
[396] Villstrand, *Norstedts Sveriges Historia* 4, 504.

books enjoyed growing popularity among the literate.[397] Maternity clinics were built, and additional orphanages established all over the country.[398] The latter would, in time, serve as a recruitment facility for the numerous manufacturers: child labour was as good or better than any other and a driving force behind expanded manufacturing.[399] During the 18th century, this practice was usual both in urban and rural areas; 10 years was the minimum age for an apprentice. The average age of boys leaving home was 14 years in 1730, and 16 years for girls.[400]

Complementing the measures intended to encourage population growth were a set of laws discouraging unwanted behaviours: women, for instance, were not allowed to marry above the age of 40 so as not to waste their fertile years on being childfree; furthermore, children had to be put to work from an early age, strict conventions regulated moral life, and fines targeted those unwilling to procreate.[401]

Around the same time – and certainly not by coincidence – the medical specialization of pediatrics was established in Sweden. The pioneer in this field was a physician called Nils Rosén (1706-1773), later ennobled as Nils Rosén von Rosenstein in honour of his accomplishments. Just like Swedenborg and Linnaeus, he happened to be a minister's son.[402] Rosén helped to keep more children alive long enough for them to become contributing members of the labour market,

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[397] Johannisson, *Det mätbara samhället*, 86-87, 90.
[398] Ibid., 86.
[399] Lindqvist, *History of Sweden*, 357.
[400] Elisabeth Mansén, *Norstedts Sveriges Historia*, bd. 5 (Stockholm: Norstedts, 2009), 144-145.
[401] Johannisson, *Det mätbara samhället*, 87.
[402] Mansén, *Norstedts Sveriges Historia* 5, 138.

saving thousands of lives per year.[403] This was a crucial and remarkable feat: in the mid-18th century, the average life expectancy at birth was 33 years for men and 36 for women, implying high infant and child mortality rates as well as high maternal mortality; three out of ten children did not live to see their tenth birthday.[404]

The developments in legal and practical population policy constitute an applied manifestation of Sweden's cameralist-mercantilist data policy and its efficiency. Knowledge of the population numbers and statistical information made it possible for economists and political decision-makers to implement legislation (e.g. marriage laws, mandatory labour), push the development of research-based solutions to wide-spread medical issues (e.g. infant mortality, pediatrics, women's health), or control migration (e.g. immigration laws). The country's biggest asset – its population – had to be promoted so that it could in turn promote the country.

2.2.5.4 The North: Uncommon Borders

Once Sweden's labour force was busily working away, procreating and growing, the one problem left was the question of where to put them to realize their best effort. Luckily, a vast, 'uninhabited' land full of promising plants and minerals lay just a stone's throw away to the north – waiting to be woken from its provocatively unproductive Sleeping-Beauty-ness through the gentle kiss of Swedish saws, picks, and hammers.

Material and cultural exchange had been a part of the trade relations between the inhabitants of northern Scandinavia throughout the Viking and Middle Ages, following the natural

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[403] Johannisson, *Det mätbara samhället*, 172-173.
[404] Ibid., 104.

fluctuations in supply and demand. During the Middle Ages, border relations in the Scandinavian North had been consistent and very stable. Indigenous peoples living in the area maintained a "territorial balance" that was the "condition for and reflection of the reciprocity and cooperation which to that point had characterized the relationship between the ethnic groups."[405] For a long time, the Sámi of Lapland and their country had been of little interest to Sweden – it was just a faraway corner at the cold end of the peninsula. Relations between the Sámi and the Swedish slowly began to change in the late Middle Ages when neighbouring peoples started to settle in the area. The onset of missionizing efforts by the Church exacerbated the situation because it served the political pretext to gain influence in the region.[406]

By the end of the 17th century, Sápmi was largely assimilated and missionized.[407] At the top of the new hierarchy stood the powerful Swedish state and the Church, and at the bottom were the nomadic Sámi as their subjects. Consequently, "in the course of the seventeenth to nineteenth century [the Sámi] became the subject of pejorative 'othering', 'civilising' colonial policies, exploitation and displacement."[408]

The southern neighbours realized soon that the North bore hidden treasures, and much more valuable ones than lost souls ready for salvation: in 1630, silver was discovered in the Piteå area, a township at the far end of the Gulf of Bothnia (cf. Fig. 1), a discovery that led to "push further

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[405] Lars Ivar Hansen, and Bjørnar Olsen, *Hunters in Transition: An Outline of Early Sámi History* (Boston: Brill, 2014), 141.

[406] Hansen and Olsen, *Hunters in Transition: An Outline of Early Sámi History*, 141.

[407] Koerner, *Linnaeus: Nature and Nation*, 58.

[408] Naum and Nordin, "Situating Scandinavian Colonialism," 4.

the colonisation efforts."[409] Over the following decades, homegrown resources became especially valuable because they were 'free,' although their availability was usually unknown or limited.

Sweden's geographical sphere of influence had shrunk considerably over the previous century and was, from a colonial standpoint, in a dire state. During the 17th century, Sweden had dominated the whole Baltic sea region under what they called *dominium maris Baltici*. The Baltic provinces held a special position within the Swedish state as they were too big to fully integrate and control them, but highly important as a source of income and thus too valuable to forfeit. As a compromise, the Baltic provinces payed taxes to the Swedish crown, and otherwise remained to a large degree self-governed.[410] After the Great War, the provinces went to Russia.[411] Sweden's colonial possessions in Cabo Corso and the Delaware area, as discussed above, had faltered as well, and they were both abandoned by the 1660s. Those developments put even more pressure on the internal colony of Sápmi, the lands in the Scandinavian North, as Sweden's only remaining source of colonial income.

During the 18th century, the full extent of Sweden's economic expansion reached Sápmi, and cameralist-mercantilist colonialism hit its peak in the area both in regard to quantity and intensity.[412] Trade goods from the North scored high prices on the European market, especially metal products. In exchange, Sweden *volens nolens* let the Sámi enjoy a few relative freedoms

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[409] Lindmark, "Colonial Encounter in Early Modern Sápmi," 131.
[410] Lindkvist et al., *A Concise History of Sweden*, 75.
[411] Kasekamp, *A History of the Baltic States*, 51; Lindqvist, *History of Sweden*, 335-336.
[412] Johannisson, *Det mätbara samhället*, 98.

such as being exempt from military service and receiving lowered tax rates. The value of this concession was strongly diminished by the fact that the Sámi were not considered Swedish citizens in the sense of receiving full legal benefits and protections.[413]

On an administrative level, controlling a nomadic people proved difficult. The Sámi would just pack up their things and leave for the bordering regions of Norway if their patience was stretched too thin. The Swedish government thus had, as Mansén puts it, a certain interest in treating them well.[414] While this vantage point might be accurate to a degree, I believe it needs to be taken with a spoonful of salt. It is a rather romanticized and idealistic view of the relations between colonizers and indigenous peoples, and fits neatly into the recent criticism of the narrative of Swedish exceptionalism and colonialist benevolence as portrayed in Fur, Naum/Nordin, and others.[415] More recent publications have been keen to point out the often colonialist nature of interactions between the Swedish and the Sámi, painting an overall more nuanced picture of the situation.

Historically, state and Church tried to impose their standards on the Sámi over the course of many centuries. The success of their approach was mixed, often due to the delusional and

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[413] Mansén, *Norstedts Sveriges Historia* 5, 43.

[414] Ibid., 43.

[415] Cf. Fur, "Colonialism in Swedish History;" Magdalena Naum and Jonas M. Nordin, "Situating Scandinavian Colonialism," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin, 3-16. New York: Springer, 2013; Lindmark, "Colonial Encounter in Early Modern Sápmi," *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin, 131-146. New York: Springer, 2013; Audrey Horning, "Insinuations: Framing a New Understanding of Colonialism," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin, 297-305. New York: Springer, 2013.

unrealistic nature of the new rules that were bound to fail in the face of Northern life reality. For example, mandatory church service was installed across Sápmi – an indicator for how myopic the Swedish imagination and understanding of the nomad lifestyle was. According to this requirement, the Laps were supposed to convene in a church regularly. Adding injury to insult, the Swedish also "introduced […] tithes, catechism exams, and inspection tours of Sami households."[416] Besides detailed information on births, deaths, and marriages, the churches in Sápmi kept records on "husförhör och nattvard" ("house inspection and communion") as one example from the parish of Jokkmokk shows. The categories demonstrate the amount of scrutiny and forced assimilation the Sámi were exposed to.[417] The records also point towards the qualities the Lutheran Church was looking to foster in the nomad population: punctuality, regularity, compliance with Swedish social standards, piety, and obedience.

Collecting ethnographical and statistical information about the Sámi people was in the best interest of the Swedish – for economic reasons as much as for satisfying people's exoticist cravings. Carl Linnaeus, for example, was keen on gathering information about local customs and culture during his travels through Lapland, guided by locals and heavily relying on their expertise and help.[418] In 1732, after his return from Sápmi, Linnaeus "presented his Lapland strategy to the Uppsala Science Society."[419] He was willing to offer the Swedish state and Church information on the population in order to enforce legislation and control, as well as to

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[416] Koerner, *Linnaeus: Nature and Nation*, 58.

[417] Filip Hultblad, *Övergång Från Nomadism Till Agrar Bosättning i Jokkmokks Socken* (Stockholm: Almqvist & Wiksell/Geber [distr.], 1968), 40.

[418] Skott, "Expanding Flora's Empire," 247; Koerner, *Linnaeus: Nature and Nation*, 60.

[419] Koerner, *Linnaeus: Nature and Nation*, 77.

give them an opportunity to 'fix' the area's ailing economy. Unfortunately, the meeting did not yield the desired outcome. Instead, the members of the Society were interested only in the mineralogical finds Linnaeus had made.[420]

Taken together, political measures, systematic data collection, and literary representation led to the simultaneous eradication and romanticization of Sámi culture. Those processes were spearheaded substantially by the empirical efforts of people such as Johannes Schefferus[421] and Carl Linnaeus[422] who uncovered the land's natural riches for all to see and exploit. Through their accounts, they also contributed to the mythology of an exotic land in the north and its uncivilized yet morally superior people who were just waiting for Sweden to come to explore and exploit their land and culture.

Other policies put in place for Sápmi followed a detailed strategy of assimilation explicitly through school education and religious missionizing in the spirit of the Lutheran faith as its doctrine, claiming that "unity in religion was the necessary prerequisite to a functional social order."[423] This school system predates Canadian residential schools by over a century, but is in all other respects strikingly similar. Children – boys, to be clear, since sexism did not stop at the threshold of colonialism – were educated in centralized schools with the goal of assimilating them into Swedish culture: "The residential school education aimed at reforming the students, reshaping their will and transforming their spirituality."[424]

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[420] Koerner, *Linnaeus: Nature and Nation*, 77.
[421] Kent, *The Sámi Peoples of the North*, 180.
[422] Koerner, *Linnaeus: Nature and Nation*, 80-81.
[423] Lindmark, "Colonial Encounter in Early Modern Sápmi," 133-134.
[424] Ibid., 135.

The Sámi youth were forced to part with their traditional nomadic way of life, language, and shamanistic religion as these aspects conflicted with the goals of the Swedish state.[425] Although the first efforts to educate the Sámi according to Swedish standards go back to the 17th century, the peak of the Sámi residential school system occurred in the 18th century. The first parliamentary degree to lay the foundation for opening a residential school in every Sápmi parish dates to 1723; the first two schools to actually open their doors were those in Åsele and Jokkmokk almost ten years later.[426]

By the middle of the 18th century, all seven parishes in Sápmi were actively participating in the residential school system.[427] It followed a "curriculum to inculcate knowledge, values and attitudes deemed necessary to controlling the colonised" by providing them with basic skills in mathematics, reading, and writing so as to allow them to effectively serve as members of the work-force.[428] In parallel, Sámi children were taught 'soft skills' "[b]y instilling virtues like order, precision, punctuality and obedience, […] to fulfil the demands of colonial society."[429]

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[425] Lindqvist, *History of Sweden*, 364.

[426] Once the site of a residential school, the town of Jokkmokk is now famous for lending its name to an IKEA dining set.

[427] Lindmark, "Colonial Encounter in Early Modern Sápmi," 133-134.

[428] Ibid., 133.

[429] Ibid. Since the Middle Ages, having reliable time keeping methods had been extremely important for the prayer cycle in monasteries. Oftentimes, monks would take shifts to stay awake at night so as to reliably wake up their peers for the first prayer of the day. In contrast, bad time keeping was associated with the idle and lazy – a popular French nursery rhyme, *Frère Jacques*, warns against such digressions. During the early modern era, when time keeping methods had developed to become moderately reliable and clocks were at least somewhat common at least in cities, good timekeeping and punctuality became vital qualities to the functioning of the economy. They allowed for the day to be split up into sections of equal length, independent of seasonal fluctuations, and for production standards to be held up and regulated. Especially in a place like northern Scandinavia where the discrepancy between the length of

Through such early and strategic indoctrination, the Swedish state hoped to spread its ideology among the most malleable members of the colonized society, with the intention of overriding and eradicating all traces of their traditional ways of living through their own notions of progress. Information policy and education – through schooling and cultural assimilation in key areas such as time standards, permanent housing, religious beliefs, or the legal system – were crucial to ensuring seamless integration of the colonized peoples. Information policy was a vital part of the emerging narrative of Swedish colonizers on the one side and the Sámi on the other, creating the frame for nationalistic self-identification as mirrored in the 'other.'

In many cases, the Sámi resisted Swedish efforts of oppression in masterful ways, using signs of assimilation as a shield to protect their conserved traditional knowledge. The same arrogance that gave the Swedish colonizers their justification to impose their ways on the Sámi also convinced them of the successful implementation of their reforms. The Swedish failed to realize that their own weapons could be used against them: "In the stubborn attempt to educate and Christianise, missionaries equipped their students with valid tools of writing, Western models of thinking and acting and with an appropriate vocabulary enabling them to question, ridicule and fight back the colonial encroachment."[430]

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natural and artificial days over the seasons is so significant, having a reliable way of measuring time was of utmost importance. Moreover, clocks brought order and prestige to municipalities who could afford them, and they were a sign of cultural sophistication and economic progress. In short, clocks were a technological shorthand for progress. Cf. David S. Landes, *Revolution in Time: Clocks and the Making of the Modern World* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1983), 63, 69-72, esp. 72.

[430] Lindmark, "Colonial Encounter in Early Modern Sápmi," 138.

A unique and compelling example – in the context of Sápmi, but also in that of global colonialism – "of verbal resistance on behalf of the colonised […] in which the latter formulated themselves on paper"[431] is the story of Olof Sjulsson, a Sámi youngster who appealed to the king in his fight against Swedish oppression.[432] Sjulsson took the argumentative tools given to him by the Swedish and turned them against his oppressors. At one point, he wrote to the king to have his people reassigned to a different church district on the grounds of it being closer for them to go to church, although his actual intention was for his people to evade inquisition and trials.[433] While his appeals and requests remained for the most part unsuccessful, the case of Olof Sjulsson serves as a prime example of the resistance and resilience displayed by the Sápmi, fighting their assimilation to the ways of the Lutheran Church and the Swedish state.

The Swedish colonial system in Sápmi remained in place until the 20th century. Through the Nomad School reform of 1913, the Sámi were finally allowed an educational system closer to their traditional ways of living. However, the reform came with a bitter taste of preservationist agenda and racial hygiene as it was informed "by ideas of the inferiority of the race and culture of the Saami."[434] According to this notion, they had to be kept separate from "civilized society at large" in order to survive as a people.[435] Similarly, the socio-political considerations of the 18th

[431] Lindmark, "Colonial Encounter in Early Modern Sápmi," 143.
[432] Ibid., 138-142.
[433] Ibid., 140.
[434] Ibid., 144.
[435] Ibid.

century would rear their ugly heads once more in the racist politics of the 1930s which were again based on a quantification and hierarchical ranking of human lives.[436]

At this point, it should be sufficiently clear that Sápmi colonialism was not an act of kindness from Sweden. Neither was it a lesser case of colonialism as some accounts suggest. Economic, political, and religious interests on the Swedish side were bundled together and resulted in the non-consensual assimilation of the Sámi, as well as the occupation of their land that cannot be rejected on grounds of lacking criteria for 'proper' colonialism. A longer discussion of the environmental exploitation of Sápmi's natural resources and nature will follow in more detail in the chapter on Linnaeus.

At this point, further discussion of the North is in order to understand the special importance the Sámi and their land held for 18th century Sweden, and the ramifications for ensuing socio-economic and political developments. "The North," write Sarah Jaquette Ray and Kevin Maier, "holds a powerful and often paradoxical place in the Western imaginary. As a region, it is often seen as simultaneously empty of life and full of promise, the home of indigenous communities yet utterly conquerable, pristine and desolate yet marked by a long human history, and isolated from the problems of civilization while at the same time the stage for a planet's climate drama. Symbolically, the North as resource has justified explorations both scientific and colonial, and it

[436] Johannisson, *Det mätbara Samhället*, 103.

continues to attract prospectors and adventurers in search of escape, transcendence, and fortune."[437]

In recent years, the North and Northern studies have turned into a booming subject among both young and seasoned scholars, especially in North America and Scandinavia.[438] In their research, they "revisit colonialism as European in terms of agency and origins, while other approaches turn a postcolonial gaze on the North."[439] Drawing from a wide variety of methodologies and topics, scholars of Northern studies utilize post-colonial, history, gender studies, anthropology, sociology, geography, art history, and various scientific methodologies to define a new field. Those interdisciplinary approaches serve as important tools to shed new light on global histories, as well as on the present because they grant a means of control and self-determination to a notoriously overlooked region and its people, enabling them to assume an assertive political stance and defend their interests against those of outsiders.

However, many obstacles on the way still await clearing. Perhaps most importantly, internal colonialism – although no less harmful and oppressive than the overseas varieties – still does not get broadly acknowledged as 'real' colonialism, even in works on colonial discourse. Reducing the events in Sápmi to 'merely' a case of internal expansion downplays the dimension of the harm done to the Sámi, their land, and their culture: besides euphemizing the forceful and unsolicited interventions and invasions through the Swedish state and settlers, it also asserts an

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[437] Sarah Jaquette Ray, and Kevin Maier, "Approaching Critical Northern Issues Critically," in *Critical Norths: Space, Nature, Theory*, eds. Sarah Jaquette Ray and Kevin Maier (Fairbanks, AK: University of Alaska Press, 2017), 1.

[438] I am unfamiliar with the situation in Russia but would assume that there are similar movements.

[439] Fur, "Colonialism and Swedish History," 22.

implicit claim on Sápmi as inherently Swedish, and thus not as the land of the Sámi people. Such claims can serve as an implicit or explicit justification for (ongoing) invasion and occupation.[440]

The Swedish invasion of Sápmi is, in any case, a textbook example of classical colonialism, with the minor difference that the so-called saltwater test does not apply. It was modeled after the most extensive cases of unsolicited European expansion, and at its core states that a large body of (salt) water has to be between the place of origin of the invaders and the place of invasion to constitute 'proper' colonialism.[441]

The saltwater test is, in my opinion, a rather arbitrary rule to determine whether the invasion of a place and people constitutes colonialism, and many other, more unambiguous factors are at play. As key elements of colonialism, Nayar in *Colonial Voices. The Discourses of Empire*, a recent study of British colonialism in India, names the following:

> Colonialism was a process by which European nations found routes to Asian, African, and South American regions; conquered them; undertook trade relations with some of the countries and kingdoms; settled for a few centuries in these places; developed administrative, political, and social institutions; exploited the resources of these regions; and dominated the subject races. Colonialism was characterized by military conquest; economic exploitation; the imposition of Western education, languages, Christianity, forms of law and order; the development of infrastructure for a more efficient

[440] Daniel Lindmark, "Colonial Encounter in Early Modern Sápmi," in *Scandinavian Colonialism and the Rise of Modernity: Small Time Agents in a Global Arena*, eds. Magdalena Naum and Jonas M. Nordin (New York: Springer, 2013), 132.

[441] Fur, "Colonialism and Swedish History," 25, esp. FN8.

> administration of the Empire – railways, roadways, telegraphy; and the documentation of the subject races' cultures.[442]

I chose this example a) because it is very recent, and b) because it limits potential goals of colonialism exactly to Asia, Africa, and South America. While the author, a scholar of English Literature and Colonial Studies, is understandably focussed on India under British imperialist rule, it is still remarkable that he completely disregards North America, Scandinavia, Siberia, and Oceania (with Australia and New Zealand)[443] as locations of colonialism.

With this narrow definition, Nayar is in good company: traditionally, the regions around and beyond the polar circle are often ignored on the global map of non-consensual cohabitation; the former British colonies Australia and New Zealand are, at least to some extent, included in most works on British colonialism or naval history.

Many possible explanations can be found for the lack of scholarly scrutiny on Northern colonialism, and why many researchers have problems with it. The concept itself is a rather young and bulky one. A halo of exoticism – both geographically and culturally – surrounds the notion of a colony: they are assumed to be faraway places somewhere in the Pacific Ocean or Asia, white spots on the map reachable only through storm, danger, and adversity. That much, at least, can also be said for travelling North in winter.

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[442] Pramod K. Nayar. *Colonial Voices: The Discourses of Empire* (Chichester, West Sussex: Wiley-Blackwell, 2012) 2-3.

[443] Evidently, New Zealand also gets forgotten on maps quite frequently: https://www.atlasobscura.com/articles/new-zealand-left-off-world-map.

To acknowledge the possibility and reality of internal colonialism particularly seen in the case of Scandinavia and adjacent parts of Siberia[444] requires some adjusting and re-thinking of prior convictions. The peaceful and mutually beneficial connections between Swedes and the indigenous populations of Sápmi through trade and naturally occurring cultural exchange in the border regions over centuries, before the actual invasion, explain partially why the label of colonialism does not fit easily.

However, making the abovementioned saltwater test a shibboleth for determining the factuality of colonialism falls miserably short of taking into consideration the presence of virtually all other factors of colonialism in the case of Sápmi: its forceful invasion and subjugation, assimilation to the 'superior' culture, the tokenization of the colonized culture, the exploitation of labour and natural resources – the list goes on. As a matter of fact, there is an official explanation through a Swedish government report[445] which Gunlög Fur, in a pivotal chapter on Colonialism and Swedish History analyzing the historiographical representation in Swedish text-books from the 20th century, summarizes as follows:

> (1) Sápmi is not located at a distance from the national states that established borders cutting across Sámi lands (the so-called saltwater test is not applicable);
> (2) the extent and influence of colonisation (meaning the establishment of non-Sámi settlements) and assimilation policies have been much more radical and successful than, for example, the Danish influence on Inuit culture on Greenland; and

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[444] Many parallels exist in the American North with Alaska and Canada, too.

[445] Statens Offentliga Utredningar (SOU), *Samernas folkrättsliga ställning: delbetänkande av Samerättsutredningen*, 1986:36 (Stockholm: Liber/Allmänna förlaget, 1986), 163-164, https://doi.org/10.1515/iasl.2011.010.

> (3) the Nordic states have claimed the area as part of their kingdoms ever since the sixteenth century and have never expressly carried out a colonial programme in this region.[446]

Those considerations will be crucial to understanding the ramifications of the case studies in the second part, and particularly the lasting ecological and economic consequences of Linnaeus' work for the Sápmi area and its peoples.

Summed up, the report implies that Sweden did a 'better,' less 'dirty' and more subtle job at colonizing. For those reasons, Sweden was never forced to revisit its involvement in colonialism to the same degree as e.g. Britain or the Netherlands. In her article, Fur meticulously lays out the specific circumstances that allowed for Sweden to get through the 20th century without having to revisit or process its colonial past, while cementing its status as "champions of minority rights and mediators in global politics."[447]

Over recent years, the case of Sápmi has attracted attention from researchers of many disciplines and countries who are working towards a comprehensive understanding of the events and consequences of internal colonialism, drawing many parallels to global occurrences. More than that, Sápmi has also become a prominent example for the catastrophic outcomes of Northern colonialism for the cultural and political sovereignty of affected communities, as well as the environmental repercussions they are faced with every day. Mining in particular is one of the most harmful industries regarding its social and environmental impact. The negative outcomes associated with it range from insufficient waste and by-product management, damage

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[446] Fur, "Colonialism and Swedish History," 25-26.
[447] Ibid., 18.

to water sources, disruption of local economies and traditional lifestyles, mental health issues, destabilizing effects on eco-systems, intensification of greenhouse gas emission, and many more.[448] Some (if not all) of those outcomes affect the northern regions of the world in particular, e.g. melting sea ice or the thawing of permafrost regions.

Meanwhile, the Sámi, much like other indigenous peoples in the circumpolar and northern regions of Russia, Canada, and America, work towards fully asserting their right to cultural and political sovereignty. Within Sweden, since 1993 the legal claims of the Sámi have been protected and represented through the *Sametinget*[449] (Northern Sámi *Sámedigge*; Lule Sámi *Sámiediggie*; Southern Sámi *Saemiedigkie*), a parliament elected by the Sámi population of Sweden.[450] This is a commendable outcome, but their right to govern themselves had been a long time in the making. Much of their loss of sovereignty was in the first place owed to Sweden's entitlement to know and decide what was best for the Sámi: civilization, assimilation, and a good portion of empirical thinking.

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[448] Cf. for Canada and the US e.g. the article by Langston demonstrating the influence of iron extraction on the adjacent communities and eco-systems in and around Lake Superior: Nancy Langston, "Iron Mines, Toxicity, and Indigenous Communities in the Lake Superior Basin." In *Mining North America: An Environmental History since 1522*, edited by McNeill J. R. and George Vrtis, 313-38. Oakland, California: University of California Press, 2017. http://www.jstor.org.login.ezproxy.library.ualberta.ca/stable/10.1525/j.ctt1pwtchf.16.

[449] The Sámi have parliamentary structures in place in all of the Nordic countries, with the exception of Russia. Cf. Kent, *The Sámi Peoples of the North*, 259.

[450] Cf. https://www.sametinget.se.

2.3 Conclusions to Part I

In the chapters of this first part, we have learned that the status of knowledge in 18th century Sweden changed fundamentally from a neutral, academic necessity to a commodity in economic progress. The value of knowledge was measured indirectly through its usefulness, empirical reliability, and marketability as technological innovation. Highest in this hierarchy was useful and empirical knowledge (such as that deriving from an empirical knowledge system), lowest was any knowledge of unlearned and non-useful status that failed to produce empirically reliable and marketable results.

Building up on existing connotations, different systems of knowledge accumulated different amounts of prestige. For example, in a top-down scenario, members of higher-ranking knowledge systems would tag members of a lower-ranking system or the knowledge it contained as belonging to a certain gender, ethnicity, religion, social status, income-bracket, class, profession, and so on. Such connotations could be established or emphasized in many different ways or combinations, for example through writings (e.g. Cronstedt's critique of alchemy), art (e.g. Gillray's caricature), education (e.g. Sámi residential schools), policies (e.g. Sweden's immigration laws), hiring practices (e.g. restrictions for foreigners or women), or social norms (e.g. pressure to marry and procreate).

However, not all connotations with lower ranging systems of knowledge were necessarily negative: in certain cases, time-honoured medical expertise and traditions of Indigenous people were appropriated by adherents of higher ranking knowledge systems (such as that of empiricism) for the purpose of developing medicines; occasionally, they were used as templates on which to project a socio-economic critique and mirror image of Swedish society as the examples of Linnaeus and Polhem have shown.

As we have seen through the examples in this first part, knowledge and generalized information in the form of data were increasingly used to create an us-vs.-them-narrative driven by strategic 'othering' of people and the knowledge they carried. The shunning of alchemy as a foreign art, for instance, shows how quickly formerly sought-after specialist knowledge could turn into a form of unwanted 'superstition' almost overnight. Internal colonialism in 18th century Sápmi is a telling example for how statistical data ("political arithmetic"), information policy, and the education system were used to define the Swedish state against the Sámi 'other', creating a dualistic narrative and reinforcing nationalist boundaries. Similarly, the establishment of Swedish as a common scientific language and the founding of the *Handlingar* created a feeling of belonging within a very small and dispersed research community, increased the vernacular's prestige, and restricted to a certain degree access for people from the outside.

Facilitated by the cameralist-mercantilist methods based on William Petty's concept of political arithmetic, reliable empirical methods could be applied to previously unmeasurable variables and social processes, encouraging the state to strategically shape and direct demographic developments according to its own interests.

In accordance with said principles of cameralist-mercantilism, the Swedish state – namely the *Riksdag* (the policy-making body of the government), foreign and national investors, and Swedish economists, as well as analytical institutions of the government such as the *Tabellverk* or the Bureau of Mines – recalibrated its organization towards the goal of maximizing economic profits and national independence by using its population and natural resources, as well as by colonizing foreign land and people.

Moral and theological justification for this course of action came from a concept called physico-theology which put the search for God's great plan that was assumed to be hidden in

nature at the centre of empirical practice; as God's greatest creation, nature and everything within it was humankind's to take and exploit.

Internal and external colonialism as well as global connections of trade and written correspondence extended the reach of the Swedish 'empire of knowledge' beyond the borders of the Scandinavian core country. Following the guiding principles of cameralist-mercantilism, Sweden strove for national autarky through substituting native plants for imports, achieving the highest possible degree of independence from imports, or the purposeful transplantation of crops. In order to reach that goal, knowledge about the natural world had to be acquired, notably through researchers such as Carl Linnaeus and his students, or the people working at the *Bergscollegium*.

While Sweden is just one of many examples, it is a particularly underexposed one, especially in North American literature, yet also highly compelling and insightful as a point of comparison. As we have seen in the chapters of Part I, there are many ways in which public and private institutions or individuals appropriated, misrepresented, adapted, or marginalized knowledge from different systems (as well as its practitioners) in order to elevate the credibility of their own work, frame their critique of current conditions, or simply further their own goals, always in the name of the nation's well-being. Those mechanisms shall now be explored in the context of two case studies.

3 Case studies

3.1 Introduction

The two Swedes whom I have chosen as the protagonists of my case study section – Emanuel Swedenborg (1688-1772) and Carl Linnaeus (1707-1778) – have a lot in common. Both were born as the sons of ministers and spent most of their lives in southern Sweden. Both showed great promise in the natural sciences and medicine from an early age on. Both helped to advance their home country and made a career in the service of the crown. Both were polarizing figures among their international colleagues all over Europe. And finally, both found their last resting place side by side in Uppsala's *Domkyrka* – Swedenborg in a sarcophagus that occupies a side niche,[451] Linnaeus under a rather simple stone plate in the church's floor.[452]

As much as unites the two, there is one major difference: Linnaeus' most important work – the binomial nomenclature that is universally used today – became immortalized as one of the most influential works on modern biology, and so did Linnaeus as the author. On the other hand, Swedenborg and his works – the empirical ones more so than the theosophical ones – were forgotten and pushed away into the oblivion of the archive. The *How* and *Why* will be the focus of the following chapters.

Examples such as Swedenborg and Linnaeus demonstrate that different knowledge systems co-existed in parallel, within the same country, learned circles, and even the works of one and the same author. Both Swedenborg and Linnaeus also exemplify the effects of utilitarian

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[451] Swedenborg's body was transferred from its final resting place in London, where he had been buried originally, to its *final* final resting place in Uppsala in the early 20th century.

[452] Much like his publications, one cannot help but stumble across it.

eclecticism in a Euro-centric, mercantilist world view. In this part of the dissertation, I explore how the oeuvres of two so similar men could follow such fundamentally different careers.

3.1.1 Emanuel Swedenborg

Born in 1688 in Stockholm, Emanuel Swedenborg was the third of nine children of Sara, née Behm (1666-1696), whose family owned a mining business, and Jesper Swedberg (1653-1735),[453] bishop of the Lutheran Church and an important figure of religious life in 17th and 18th century Sweden.[454] After Sara Behm's death in 1696, Swedenborg spent most of his youth in the household of his older sister and his brother-in-law, Erik Benzelius, in Uppsala; his father had moved to Skara to assume the position of a bishop. Due to a lack of reliable sources, how much influence his mother had had on the young Swedenborg or how strongly he was drawn to her side of the heritage as a child comes down to speculation, but it appears safe to assume that Swedenborg's upbringing and interests were in one way or another determined by his parents' backgrounds: the connection to the mining industry through his mother's family and his father's theological profession run through his life like a red thread.[455] The relationship with the latter seemed contentious and ambivalent already during Swedenborg's early teenage years.[456]

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[453] The name Swedenborg was awarded to Jesper Swedberg's (sometimes also spelled Svedberg) children at the event of their ennoblement, as was often the case with the offspring of bishops. Emanuel would have been known as Swedberg in his first decades, but most literature refers to him as Swedenborg to avoid confusion.

[454] Friedemann Stengel, *Aufklärung bis zum Himmel: Emanuel Swedenborg im Kontext der Theologie und Philosophie des 18. Jahrhunderts* (Tübingen: Mohr Siebeck, 2012),13.

[455] Ibid., 13-14.

[456] Ibid., 14.

Besides his apparent interest in philosophical and theological topics, Swedenborg showed talent for mathematics and the natural sciences from an early age.[457] His early study career led him to the intellectual hubs of Europe – Britain, the Netherlands, Germany, France – and after his return, he worked for the Swedish Bureau of Mines.

After his first revelation experience in 1747, Swedenborg began to withdraw from the active empiricist life more and more, and started publishing his theosophical works, although his interest in spiritual topics had been a constant in his life early on. During his later life, when not on one of his frequent travels, he spent most of his days working in his Stockholm property and the attached garden.[458] Swedenborg died in 1772 in London, where he was first buried in the Swedish Church, his resting place for the next 140 years. In the early 1900s, when the church was taken down, his remains were transferred back to Sweden where they lie in the *Uppsala Domkyrka* in close proximity to those of Linnaeus.[459]

3.1.1.1 Historiographical Notes

The better part of the scholarship on Emanuel Swedenborg's life and work suffers from one, some, or all of the following afflictions: it is old, biased, romanticised, or nationalistic. Realists might argue that the same can be said about *any* scholarship, but in this specific case, the situation is exacerbated by the relative paucity of secondary sources. While this scenario certainly simplifies the historiographer's work, it speaks to the academic oblivion still generally

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[457] George F. Dole, and Robert H. Kirven, *A Scientist Explores Spirit: A Biography of Emanuel Swedenborg with Key Concepts of His Theology* (West Chester, Pa.: Chrysalis Books, 1997) 7, 11.

[458] Ibid., 41-44.

[459] Dole and Kirven, *A Scientist Explores Spirit*, 62.

conferred upon a figure who has proven highly influential in a wide variety of fields – the sciences, theology, theosophy, literature, and fine arts (the Church founded on his teachings notwithstanding).

Most works on Swedenborg are in some way related to or financed by the Swedenborg Foundation – a theological organization with headquarters in the US. The publication list includes works by 'independent researchers' who use the series 'Swedenborg Studies' as a convenient publication platform – for example Hanegraaff's *Swedenborg, Oetinger, Kant* was published this way. Hanegraaff is one of the most prolific and eminent writers within the academic field of esotericism and occultism – including works on Swedenborg – and produces very reliable results. While there is, implicitly, nothing wrong with publishing through a theological (or any other) organization, it lends cause to doubt the complete independence and objectivity of the thoughts presented in the book.[460]

For over half a century, one of the most frequently consulted sources on Swedenborg was Ernst Benz' biography, originally published in 1948, which was available until recently only in the German version.[461] A translation was published by the Swedenborg Foundation only in 2002, attesting to the fact that it is still considered by them to be a worthwhile source – or, considering a more pessimistic alternative, that there had been no noteworthy improvement on the field since Benz.[462] Martin Lamm's Swedish classic *Swedenborg: En Studie öfver Hans Utveckling till*

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[460] Cf. "Acknowledgements" in Hanegraaff, *Swedenborg, Oetinger, Kant*, xv.

[461] Cf. Benz, *Emanuel Swedenborg*.

[462] To the credit of the Swedenborg Foundation, while being a branch of the Swedenborgian Church and thus following its implicitly theological self-interest, they have taken it upon themselves to edit,

Mystiker och Andeskådare, experienced a similar trajectory with an English translation being published through the Swedenborg Foundation in 2000.

Most Swedenborg biographies published during the second half of the 20th century are either filled to the brim with moralizing pathos and implicit theological agenda (e.g. Jonsson [*Emanuel Swedenborg*, 1971]; Toksvig [*Emanuel Swedenborg, Scientist and Mystic*, 1983]; Trobridge [*Swedenborg: Life and Teaching*, 1955]),[463] or New Age-y to a degree that makes Woodstock look conservative (Beaman, [*Swedenborg and the New Age*, 1971]).[464]

A few other works could be added to the list, especially within the national Swedish context – Harry Lenhammar (*Tolerans och bekännelsetvång: studier i den svenska swedenborgianismen 1765 – 1795*, 1966), for instance, a splendidly detailed account of Swedenborgianism in Sweden and abroad. Given their formal and thematic limitations, they are pertinent and linguistically accessible to a very small peer group, and never reached the Anglophone sphere. Other works, like Sten Lindroth's monumental classic, *Svensk Lärdomshistoria*, almost completely disregard Swedenborg – supposably a problem of visibility or politics.[465] He did, however, write a full book on Swedenborg's mentor, Christoph Polhem.[466]

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translate, and make available online and for free most of Swedenborg's bigger works, while adhering to rather commendable editing standards.

[463] It does not surprise that two out of the three were publications of the Swedenborg Foundation.

[464] The biography I use as a reference for life events here is Dole and Kirven's (*A Scientist Explores Spirit: A Biography of Emanuel Swedenborg*). It is another publication by the Swedenborg foundation, but it serves the purpose well enough as it is less pathos-laden and very concise (unlike e.g. Benz).

[465] Cf. Lindroth, Sten. *Svensk lärdomshistoria* 4 (Stockholm: Norstedt, 1981).

[466] Sten Lindroth, Chri*stopher Polhem Och Stora Kopparberget: Ett Bidrag Till Bergsmekanikens Historia* (Uppsala: Amqvist & Wiksells, 1951).

In his study on Swedenborgianism, Lenhammar notes that an 'almost confusing amount' of literature on Swedenborg had been published in the 20th century up to his time, naming not quite a dozen publications on the topic (among them the biographies by Lamm and Benz) – Sweden in the 1960s had different standards.[467]

More recently, in a work of over 800 pages that borders on the excessive, Friedemann Stengel has contributed a highly detailed and structured account of Swedenborg's writings in the larger 18th century context – again in German (we shall see how long the translation takes this time). Given Swedenborg's importance for so many different fields, such a work was overdue, and the proverbial dryness of German academic prose might help to counteract the explicitly theological inclinations of many other publications.

Also not too long ago, some smaller works have contributed to the analysis of Swedenborg's influence on different fields, such as Dunér's *Metaphors* (2013),[468] or Schaffer with "Swedenborg's Lunars" (2014).[469] Their overall impact on the larger field is important, but they are nonetheless addressed to a small group of specialists. It is worth noting that in publications from approximately the last two decades, references to Swedenborg are on the rise. They attest to the growing visibility of Swedenborg's legacy and his significance for a broad range of fields.

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[467] Harry Lenhammar, *Tolerans och bekännelsetvång: studier i den svenska swedenborgianismen 1765 – 1795* (Uppsala: Boktryckeriaktiebolag Karlskrona, 1966), 28-29.

[468] David Dunér, *The Natural Philosophy of Emanuel Swedenborg: A Study in the Conceptual Metaphors of the Mechanistic World-View* (Dordrecht: Springer, 2013).

[469] Simon Schaffer, "Swedenborg's Lunars," *Annals of Science* 71, no. 1 (2014): 23, http://dx.doi.org/10.1080/00033790.2013.791226

3.1.1.2 Swedenborg in His Time

From a young age on, Jesper Swedberg had instilled an interest in the spiritual world in his oldest son.[470] Among his childhood lessons were some of the most influential ideas later found in Swedenborg's works, for instance the language or nature of Angelic beings, or the connection between souls.[471] As mentioned at the beginning of the section on Swedenborg, he was lauded as a gifted student in his youth; he attended university classes at *Uppsala Universitetet* when only eleven years old and displayed an aptitude especially for Latin, philosophy, theology, and mathematics.[472]

Although many details are missing from Swedenborg's early years, he evidently received an excellent education as well as support from his family. His brother in law, Eric Benzelius the younger (1675-1743), who was a librarian at *Uppsala Universitet*et, took Swedenborg in after Jesper Swedberg had moved to Skara to assume his position as bishop. During those years in Uppsala, Benzelius wielded lasting positive influence on the youth's intellectual development.[473] It was he who awakened Swedenborg's interest in the mathematical and technical arts through his position at the university and by introducing him to eminent naturalists of the time, among them the botanist Olof Rudbeck the younger (1660-1740).[474] He would influence Swedenborg's thinking and naturalist methodology for decades to come.[475]

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[470] Lamm, *Emanuel Swedenborg*, 3.
[471] Ibid., 7.
[472] Tore Frängsmyr, *Geologi och Skapelsetro* (Stockholm: Almqvist & Wiksell, 1969), 133; Stengel, *Aufklärung bis zum Himmel*, 13-14.
[473] Lamm, *Emanuel Swedenborg*, 18-19.
[474] Frängsmyr, *Geologi och Skapelsetro*, 133-134; Lamm, *Emanuel Swedenborg*, 20.
[475] Ibid., 21-22.

In his early twenties, Swedenborg originally intended to study with the engineer and naturalist Christopher Polhem as an apprentice, but instead ended up embarking on a study trip to England after his father had finally granted him permission to do so.[476] Like many of his contemporaries, he intended to meet with and learn from the most influential minds of his days during his extensive study travels through Europe's intellectual hubs – England, the Netherlands, Germany, France. Among the people he encountered were famous names such as Edmond Halley (1656-1742), John Flamsteed (1646-1719), and Isaac Newton (1642-1727) who inspired his creativity and ambition. Swedenborg would write home, for instance, from a visit to England about plans for "a submarine, a steam engine, and an aircraft"[477] – ideas not all of which he would see realized during his lifetime.

Lamm describes Swedenborg as someone who thought in big contexts and who did not waste time with meticulous, painstaking details when formulating a new hypothesis, although he proved very diligent as a researcher and employee in the service of the *Bergscollegium* when conducting field research. Some of Swedenborg's biggest discoveries and visions tended to connect big ideas to form even bigger ones and were then left for later generations to prove – be it another universal language or his take on a submarine. That is not to say Swedenborg did not understand or use empiricism, but that his ingenuity was guided by the "boldly constructive spirit of conquest, which inspired the sciences at Uppsala under the aegis of Rudbeck."[478]

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[476] Lamm, *Emanuel Swedenborg*, 24.
[477] Ibid., 24-25.
[478] Ibid., 21.

Back in Sweden after his European study trips, Swedenborg wanted to apply the vast knowledge he had acquired during his travels and interactions with the great empiricists of his time. Seeing the best use and application for his talents in the mining industry, Swedenborg fought[479] his way into the *Bergscollegium* (Bureau of Mines) where he served for many years, improving the already high standards of Swedish ironmaking, smelting, and metallurgy.[480] Given the economic and strategic importance of mining for Sweden – metal products were the one asset setting Sweden apart on the international trade market – Swedenborg's contributions can hardly be over-estimated (although not all of them were equally ground-breaking).

During the first decades at the *Bergscollegium*, he published extensively on a broad variety of research fields, for instance *Om jordenes och planeternas gång och stånd* ("On the revolutions of the Earth and the Planets," 1718), another one on the tides (*Om watnens högd och förra werldens starcka ebb och flod*, "On water levels and the previous world's strong tides," 1719), or works on fossils. In Latin, he published *Prodromus principiorum rerum naturalium* (1721) and a volume on Miscellaneous observations on nature (*Miscellanea observata circa res naturales*, 1722). After a twelve-year break, Swedenborg released his final naturalist work, the *Prinicpia rerum naturalium*, in 1734.[481]

Swedenborg's position at the Bureau of Mines was that of an assessor.[482] He dealt primarily with geological and cosmological questions, specifically the geological composition of Sweden,

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[479] As a newly ennobled man, he was met with resistance from many a colleague of older nobility.
[480] Heckscher, *Economic History of Sweden*, 176, 202.
[481] Frängsmyr, *Geologi och Skapelsetro*, 131.
[482] For the constitution of the *Bergscollegium*, cf. Fors, *Limits of Matter*, 47.

and theoretical considerations about geological processes to advance metallurgy processes for the country's mining industry. At this point, conflicting readings between the empirical evidence and his readings of the bible and other ancient mythological sources had already arisen and would only grow stronger later on in his work. Such readings were not at all uncommon among European intellectuals: the British astronomer and theologist William Whiston (1667-1752) or Newton, among others, held similar deluvianist beliefs that seemingly reconciled empiricism and fieldwork with the accounts of Genesis.[483] For example, Swedenborg would use scripture as evidence and try to make sense of it in the light of natural phenomena: the impossibly high age of biblical people was, according to his logic, accurate because the length of years before the Deluge had been different due to the Earth's faster turning.[484]

Swedenborg simply assumed the accounts of genesis to be "allegorical, if not literal, expressions of historical truth."[485] In that sense, he could observe a very literal reading of the bible, and at the same time claim their true interpretation as being *sensus internus*.[486] Nationalistic and patriotic tendencies in the spirit of Rudbeck were also at play, for example when he Swedenborg made a case for Sweden having once been an island – namely the mythical Atlantis – or the when claiming that Sweden "was the cradle of humanity."[487]

Swedenborg's naturalist publications gathered significant following across Europe and provoked a variety of critical as well as positive reactions from international colleagues, and

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[483] Frängsmyr, *Geologi och Skapelsetro*, 131; Stengel, *Aufklärung bis zum Himmel*, 71-73.
[484] Ibid., 72.
[485] Lamm, *Emanuel Swedenborg*, 22.
[486] Stengel, *Aufklärung bis zum Himmel*, 73.
[487] Ibid., 21.

many scholars interpret the twelve-year interval in the 1720s as a consequence of harsh criticism he faced for the *Miscellanea*.[488] For two works on metallurgy, *De cupro* and *De ferro*, published after the intercession, Swedenborg received widespread praise and recognition. Especially his colleagues in Germany with its mining-friendly industry were keen on his publications; a translation ensued almost instantaneously. Besides its usefulness, Swedenborg's work was lauded above all for his staying clear of alchemy.[489] His contemporary reviewers were eager to point out Swedenborg's exceptional attention to detail and the broadness of accounts that he had meticulously gathered in a variety of mines across Europe and smelting facilities at home in Sweden and abroad, and pointed specifically to the value of his approach for the international mining community.[490] The same reviewer lauded Swedenborg's unusual willingness to share his findings with the international mining community – a rare occurrences in a field that feared industrial espionage as much as evil mountain spirits.[491]

The accounts of Swedenborg's contemporaries show a very differentiated picture of his publications and their reception by international research colleagues. They imply that Swedenborg's contributions – like it was the norm at the time – were judged by a 'peer-reviewed' process that had as its objective the utilitarian principle and economic benefit of empiricism for industrial purposes, and the advancement of the research community and industry across Europe. The criticism Swedenborg faced for his early works and praise for his research on

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[488] Stengel, *Aufklärung bis zum Himmel*, 95-96.
[489] Ibid., 96.
[490] Ibid., 96-97.
[491] Ibid., 96. Cf. also Fors, *Limits of Matter*, 67.

improving metallurgic processes point to an overall qualified judgement of his works according to broadly agreed upon utilitarian and empirical standards. The fact that Swedenborg chose to publicly share his detailed findings with other specialists instead of keeping them as a trade secret made his work popular and accessible, and it was overall well-received. Swedenborg had a good reputation based upon the high quality and usefulness of his empirical work, and he was known in specialist circles throughout Europe.

In the second half of Swedenborg's life, starting in the 1730s, a new-found interest in the spiritual world and, consequently, a series of revelation experiences caused him to gradually turn away from naturalism: "discover[ing] for himself the inherent limitations of reason,"[492] he first began to apply empirical methods to topics of non-naturalist nature. Swedenborg's first explicitly theological work, the *Hieroghlyphic Key* – written at the beginning of the 1740s (it is unclear whether in 1741 or 1742) – was based upon the mathematical principles of rationalism and logic, but towards the end of that decade, when he published the first volume of his *magnum opus*, the *Arcana Coelestia* (Secrets of Heaven), Swedenborg almost entirely relied on theosophical sources and inspirations.[493]

Swedenborg published his major work, the *Arcana*, anonymously and over the course of eight years (1749-1756). By the end of this period, he had fully embraced his existence as a

[492] Hanegraaff, *Swedenborg, Oetinger, Kant*, xix.
[493] Ibid., 3.

theosopher.[494] In this work he compiled the "doctrinal, exegetical, and visionary foundations of his highly innovative theological vision."[495]

Due to the convoluted and complex nature of Swedenborg's exegetical and theosophical works, they are generally very cryptic and if they are to make sense, extensive explanations that are mostly available through secondary sources are necessary. Through the dream journals (Sw. *Drömbok*) which Swedenborg kept meticulously, we can get some direct insight into his thought processes, although a large number of new questions arises due to the nature of the records and his rather unorthodox use of language. Some of the entries were nothing more than a couple of key words, and even the more extensive ones often consisted of a confusing mix of Swedish interspersed with Latin and vice versa, leaving much of the interpretative burden with the reader.

The parts of Swedenborg's work that appear to the modern ear as very esoteric did not necessarily strike 18th century naturalists as unusual. Swedenborg's approach, in fact, agreed with many contemporary assumptions about how nature functioned. There is, for one, Swedenborg's notion of subtle matter which he probably picked up during his early study travels to England – Newton, for instance, was a champion of the concept in his book on *Opticks* from 1704 – and through the influence of his first mentor, the Swedish engineer Christopher Polhem.[496]

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[494] Fors, *Limits of Matter*, 135; Hanegraaff, *Swedenborg, Oetinger, Kant*, 13.
[495] Hanegraaff, *Swedenborg, Oetinger, Kant*, xvii.
[496] Lamm, *Emanuel Swedenborg*, 24.

Figure 3: Swedenborg at the age of 75, holding the soon to be published manuscript of Apocalypsis Revelata (1766).[497]

[497] Per Krafft d. ä., *Emanuel Swedenborg, 1688-1772, ämbetsman*, n.d., oil on canvas. Wikimedia Commons, s. v. "Emanuel Swedenborg full portrait," https://commons.wikimedia.org/wiki/File:Emanuel_Swedenborg_full_portrait.jpg.

With the concept of subtle matter, Polhem intended to work the existence of God into a naturalist paradigm: pervading everything in existence, subtle matter constituted the opposite of formal matter (which can be perceived through the senses). Finer than ether and air, subtle matter was thought of as consisting of round, extremely tiny particles. It had the ability to pervade all other matter, and therefore, everything in existence was a result of the motions of its particles.[498]

In its essence, subtle matter was assumed to be invisible and indiscernible to human perception, and it was used to "explain all spiritual functions."[499] Contradicting – or, one might argue, developing further – the principles of Cartesianism, subtle matter was the medium that allowed for the transmission of "thought at a distance."[500] It accounted for the connection between close friends and loved ones who could sense each other when separated or even deceased, and provided a rational explanation for ghost apparitions.[501] Drawing from principles of both Christian demonology and natural philosophy, the mechanical philosophy of subtle matter "left open the theoretical possibility that a host of angels, devils, ghosts, and trolls inhabited the mechanical universe."[502] Taking into account this at its core empirical assumption, the idea that all sorts of supernatural beings were thought to be living beneath Sweden's mountains and fields is not far-fetched – allowing even the most learned circles to embrace them and integrate them into their naturalist worldview.[503]

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[498] Motion is used here in the Hobbesian sense.
[499] Lamm, *Emanuel Swedenborg*, 35; Fors, Limits of Matter, 123.
[500] Fors, *Limits of Matter*, 123.
[501] Lamm, *Emanuel Swedenborg*, 36.
[502] Fors, *Limits of Matter*, 124.
[503] Ibid., 123, 144.

What is surprising about Swedenborg is the direction his interests and studies took, "moving from natural science to the spiritual doctrine, from rationalism to mysticism, from mathematics to angelic song,"[504] rather than the opposite way. Like many of his contemporaries and colleagues at the Bureau of Mines, Swedenborg's career had started with a strong interest in mathematics and technology – a useful and promising occupation by all cameralist-mercantilist and utilitarian standards.

Swedenborg's early years were dedicated almost exclusively to the study of mechanics, anatomy, and engineering, although he never quite forgot his religious upbringing as the son of a minister. But even so, he was not alone with his interest in the occult, even within the boundaries of the Bureau, as already mentioned in previous chapters.[505] Urban Hiärne himself, while being very progressive and outspoken in his stance against witch trials, was "a lover of alchemy and astrology and published an ardent defense of Paracelsus."[506] Similarly, Christopher Polhem was drawn to occultism and mysticism for his work.[507] It seems that as the questions asked by naturalism got bigger and the less it was possible to obtain reliable measures through experiments, the separation of the religious and empirical became blurrier.

Swedenborg's exegetical undertakings were a thorn in the side of the Lutheran Swedish Church because they went directly against the doctrine of *sola scriptura* and any non-literal interpretation of the word of God.[508] Even worse, Swedenborg claimed that God had spoken

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[504] Dunér, *Natural Philosophy of Emanuel Swedenborg*, 8.
[505] Cf. e.g. chapter "3.2.1.1 Places of Knowledge."
[506] Lamm, *Emanuel Swedenborg*, 28.
[507] Ibid.; cf. chapter "3.2.4.4.3 Infringement and Appropriation."
[508] Hanegraaff, *Swedenborg, Oetinger, Kant*, 23-24.

directly to him, revealing the secrets of Scripture, Heaven, and the Universe through direct message.[509]

In Hanegraaff's understanding, Swedenborg differentiated between a physical, a human, and a divine dimension. The individual dimensions were not causally connected, i.e., one could not be explained through or reduced to the others. Instead, an element in the human dimension had a correspondence in the divine dimension – comparable to a cube being the three-dimensional correspondence to a two-dimensional square. Physical reality gradually became less and less important to Swedenborg's work as he progressed, reducing his focus to the human and the divine. Additionally, he considered the realm of nature as full of simulacra – a fact that "helps explain why—reluctantly and after much inner struggle, for his heart was with science—Swedenborg chose largely to ignore it in his subsequent writings."[510]

Be it from a theological or naturalist perspective, Swedenborg's works "provoked strong reactions from all sides."[511] After a meeting during which matters "regarding human destiny after death and the various heavens and hells"[512] were discussed, the prominent Swedish statesman Count Carl Gustaf Tessin (1695-1770) commented wryly: "Jag vet intet, om jag skall kalla lycklig eller olycklig en svagsint människa, som finner nöje i sin inbillning."[513] Similarly,

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[509] Hanegraaff, *Swedenborg, Oetinger, Kant*, 25.

[510] Ibid., 10.

[511] Ibid., xvii.

[512] Lamm, *Emanuel Swedenborg*, 18.

[513] "I am unsure whether to call a feeble-minded person who revels in his own imagination lucky or not." Emanuel Swedenborg, and Per Erik Wahlund, *Drömboken*, (Stockholm: Wahlström & Widstrand, 1964), 5.

Immanuel Kant was highly bemused about the stories surrounding Swedenborg's alleged clairvoyant abilities, and enjoyed ridiculing him for claiming to be in contact with angels and ghosts as much as criticizing his frequent leisurely travels while living "ohne Amt oder Bedienung von seinem ziemlich ansehnlichen Vermögen."[514] It is fair to say that Swedenborg's eccentric life-style and unapologetic dedication to his theosophical interests contributed to his reputation among contemporaries.

Friedrich Christoph Oetinger likewise experienced a change of heart in regard to Swedenborg's work: an initially positive interest was superseded by aversion, especially after the publication of Swedenborg's *Vera christiana religio*.[515] A partisan of naturalism and kabbalistic mysticism alike, Oetinger had first been drawn towards Swedenborg's writings on empirical topics and soon developed an interest in his early theological works as well.[516] It was Oetinger who made Swedenborg and his writings known to a German audience through his own publications and translations, resulting in a good deal of interest in Swedenborg's theosophy. To an extent, Oetinger's actions backfired as Swedenborg and his teachings soon faced scrutiny from the German authorities, and a censorship debate ensued on the grounds of the works containing what was considered dangerous theological thoughts.[517]

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[514] "With neither office nor occupation, living off his handsome fortune [my translation]." Immanuel Kant, *Träume eines Geistersehers, erläutert durch Träume der Metaphysik* (Königsberg: Johann Jacob Kanter, 1766), 84.

[515] Lenhammar, *Tolerans och bekännelsetvång*, 22-26, esp. 24.

[516] Ibid., 22.

[517] Ibid., 23.

Early on, Swedenborg enjoyed astounding popularity in Germany, and almost exclusively in German-speaking areas, which was probably a consequence of Oetinger's 1765 translations. Interest spread not only among the censorship authorities, but also among many other theologians and philosophers, leading to much controversy among them as well. In France, reception of his writings started much later with the first translation of Swedenborgiana in 1841; the first English editions, too, were released relatively late in the last two decades of the 18th century.[518]

Pressure from censorship at home and in many parts of Europe led Swedenborg to publish his works anonymously in the Netherlands, at least for the first years, where a relatively liberal publication culture and attitude towards religious minorities existed. The 18th century was – despite the establishment of freedom of the press in Sweden in the 1760s – a dangerous time to spread innovative theological ideas, whether they were accounted as heresy or not. In fact, the act excluded critique of the Swedish constitution and religious writings.[519]

Swedenborg's "transition to mysticism took place precisely during the decade that marked the triumph of Swedish Pietism," a movement dedicated to the individual's relation to God, and considered a threat to the status of the Church.[520] Many aspects of Swedenborg's theosophical works – for instance the dream revelations and prophecies – fit right into the criteria for Pietism, although he would not have called or considered himself a pietist.[521] In summary, to the Lutheran

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[518] Hanegraaff, *Swedenborg, Oetinger, Kant*, 60-61.
[519] Lindkvist et al., *A Concise History of Sweden*, 134; cf. chapter "3.1.2.4 The Riksdag."
[520] Lamm, *Emanuel Swedenborg*, 58.
[521] Ibid., 58-59.

Church, Swedenborg's theology was in more than one respect on the edge of legality, due to his beliefs and the subversive nature of his teachings.

During his later years, Swedenborg became convinced that through careful exegesis (often with the help of 'empirical' methods), the secrets of scripture could be revealed. He had given up on fieldwork, opting instead for 'discoveries' that he believed were brought to him by a higher power. Throughout his theosophical career that lasted over several decades (and for the rest of his life), Swedenborg claimed to be inspired by the divine itself, receiving his revelations directly from God, and he maintained some of his mathematical methods for exegetical works alone. It is easy to imagine how this claim turned many – empiricists, Church, or even the esoterically inclined community – against him.

3.1.1.3 Knowledge in Swedenborg

Through his prolific works in a wide range of fields, Swedenborg created a reputation for himself across Europe. He was, however, widely criticized by many contemporaries as only pretending to subscribe to empiricism, while actually adhering to outdated standards and knowledge systems.[522] Considering that the conventions for empirical methodology were at the time very much in flow, the question remains what standards his critics were referring to. One could justifiably argue that Swedenborg simply applied empirical methods – mathematics and physics, nonetheless – to research objects outside of the strictly empirically observable realms of nature. This sort of experimenting with new topics and methodologies was common and – from a

[522] Stengel, *Aufklärung bis zum Himmel*, 185.

meta-theoretical standpoint – a necessary exploration of possibilities. The most telling example in Swedenborg's oeuvre might be found in his "drafts of a universal language in conjunction with his studies in anatomy and physiology while seeking to find the abode of the soul"[523] – the inspiration for which he found in Polhem and Descartes who had 'located' it in the pineal gland.[524] Swedenborg used their works as a model to build upon and augment with elements of Neo-Platonism.[525]

Swedenborg's methods (as displayed for instance in his naturalist works) were at the height of 18th century standards – his contributions to metallurgy and resulting reputation show that[526] – but some of his research questions were guided by unattainable aspirations. Nonetheless, Heckscher names Swedenborg together with Polhem as one "of the outstanding technologists of the time."[527] Given the original publication date of Heckscher's book (1941), that description might constitute nationalistic glorification of a historical figure, but there is certainly some truth to his assessment considering Swedenborg's many valued contributions to metallurgy and mine engineering.

While Swedenborg was certainly a skilled researcher, he was also responsible for some terrible failures. For example, he (like so many others) tried to convince the British Royal

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[523] David Dunér, "The Language of Cosmos: The Cosmopolitan Endeavour of Universal Languages," in *Sweden in the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén (Farnham, Surrey, England: Ashgate, 2013), 49.

[524] Stengel, *Aufklärung bis zum Himmel*, 185-186; Fors, *Limits of Matter*, 24.

[525] Stengel, *Aufklärung bis zum Himmel*, 185-186.

[526] Cf. e.g. Schaffer, "Swedenborg's Lunars," 23, esp. FN 89. Their praise was not for the Lunars themselves. Swedenborg never got that part right, and the Academy let him know.

[527] Heckscher, *Economic History of Sweden*, 202.

Society of his method to determine longitude at sea via the position of the moon. He made more than one attempt – probably incentivized by the large prize money and eternal prestige in the case of success – but only earned himself ridicule for the mathematical inconsistencies in his approach. However, the Society was full of praise for his achievements in the field of metallurgy.[528]

In summary, as in the works of many of his contemporaries, a physico-theological thread ran through Swedenborg's works from beginning to end. He (and others) regarded the mechanical, animated, and spiritual universe as deeply connected with God – a notion Swedenborg wanted to prove through his empirical work.[529] The spiritual element became far more pronounced in the second half of his life, after the revelation experiences of 1745 which happened to occur during a visit to London for the purpose of presenting his longitude schemes.[530] Despite all setbacks, Swedenborg remained convinced of his physico-theological ideals, and stated in a 1760 presentation before the Royal Society, "Longitude, properly understood, signified the Heavenly Good."[531] Swedenborg truly believed that everything was connected on a higher level, and empiricism, if used correctly and by the right person, held the key to understanding it.

3.1.1.4 Taming of the Shrewd

The question sneaks up between the lines: why exactly was Swedenborg shunned by his own and following generations alike, considering that he was a "man of good social standing, and

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[528] Schaffer, "Swedenborg's Lunars," 23.
[529] Stengel, *Aufklärung bis zum Himmel*, 185.
[530] Ibid., 185; Schaffer, "Swedenborg's Lunars," 20.
[531] Schaffer, "Swedenborg's Lunars," 26.

with an impressive publishing record," nonetheless. I am inclined to follow Fors' line of argumentation in this case: Swedenborg's decision to quit his day job at the Bureau of Mines and become a full-time writer of disputable contents that were neither empirical nor Lutheran must have rubbed many of his contemporaries the wrong way and left others stunned.[532]

During his lifetime, Swedenborg was well known throughout the learned circles of Europe, as the broad reception of his works discussed in the last chapter shows. At the same time, he was often criticized for only pretending to be empirical, and this is even more true for his theological and theosophical works. Part of the issue lay in his accepting the authority and truthfulness of revelations (i.e., his own), and connecting them with observations made by others. His idea was that an axiomatic authority (i.e., God) as perceived by himself in combination with the knowledge of many would lead to the truth.[533] The concept stands in harsh contrast to the principles of empiricism – to be exact, with the idea that a piece of information should be verifiable (or falsifiable) and reproducible by another person.[534]

Revelations experienced by an individual are by their very nature excluded from verification through another person, and Swedenborg's colleagues were aware of that fact. Immanuel Kant, for instance, after an initial period of admiration, in 1766 published a long treatise in response to Swedenborg's teachings that he disapprovingly called *Träume eines Geistersehers* ("Dreams of a spirit-seer"). Focusing exclusively on Swedenborg's revelations and leaving out his theological stances, the overall tone Kant applies is very polemic – against Swedenborg, but also more

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[532] I like to think of Swedenborg as an intellectual platypus – something that exists against all odds.
[533] Stengel, *Aufklärung bis zum Himmel*, 186-187.
[534] Ibid.

generally against the field of philosophy which he ridicules for failing to balance doubt and belief, and thus vainly exposing itself to the scrutiny of ill-meaning critics.[535] Similarly, Oetinger went from initial admiration to outright disdain for Swedenborg's work.[536] Both seem to have focussed almost entirely on the controversial aspects of his oeuvre, dismissing the highly sophisticated and innovative exegetical parts of it.[537]

The reaction of the research community might be more comprehensible given the implications for their system of knowledge, empiricism. Swedenborg's new methods of theosophy and exegesis did nothing to further their cause; instead, it undermined his prior naturalist accomplishments. Keeping in mind the repercussions for adherents of other systems of knowledge – "women, inexperienced youths, immigrants, and forest-dwelling rurals" – Swedenborg's offence weighed even heavier as he was one of their own – a traitor in their midst. In conclusion, the strict social conventions that tagged 18th century empiricism as elite, white, Swedish, and male – the same conventions that kept lower-ranking knowledge systems in their assigned places – were used on a rogue 'dissenter' from his own ranks.

Once Swedenborg had turned away from empirical research to embrace theology and theosophy, he faced a new backlash. The Lutheran Church – spooked by the threat of radical pietism – took not too kindly to his endeavours as they stood in stark contrast to some key Lutheran teachings, and tried to suppress their dissemination as much as possible.[538] While

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[535] Kant, *Träume eines Geistersehers*, 82.

[536] Lenhammar, *Tolerans och bekännelsetvång*, 22-26; cf. chapter „3.1.1.2 Swedenborg in His Time."

[537] Hanegraaff, *Swedenborg, Oetinger, Kant*, 115.

[538] Lenhammar, *Tolerans och bekännelsetvång*, 17.

Sweden had relative freedom of religion, heresy was still forbidden on pain of death.[539] Through a network of influential friends – Swedenborg was after all the son of a bishop – he was personally protected from direct prosecution, but censorship threatened his works as much as the followers his teachings had already attracted during his lifetime.[540]

3.1.1.5 Swedenborg After His Time

By the end of his life, Swedenborg had made many lasting contributions to empirical research – for instance in astronomy, hydrology, metallurgy, or engineering – and as an assessor for the *Bergscollegium*, gaining him a reputation in Sweden and Europe. As a writer of theosophical and theological works, he had achieved notoriety, and many eminent theologians and philosophers responded to his works – although not always positively.

While many of Swedenborg's achievements lived on in theory or practice, his name, at least outside of the Swedenborgian Church, fell into oblivion. After Swedenborg's death, the theological and theosophical teachings continued several ways. Early followers founded the New Jerusalem Church in what they assumed to be his spirit.[541] Some of his most influential ideas about heaven, angelic beings, or the human spirit were absorbed into art and literature. The list of people his theological writings inspired is long. It includes, but is not limited to: "William Blake (1757– 1827), Friedrich Wilhelm Joseph von Schelling (1775– 1854), Johann Wolfgang von Goethe (1749– 1832), Johann Caspar Lavater (1741– 1801), Honoré de Balzac (1799– 1850),

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[539] Fors, *Limits of Matter*, 136.
[540] Ibid., 137-138; Lenhammar, *Tolerans och bekännelsetvång*, 34.
[541] Swedenborg never intended to be the founder of a Church.

Fjodor Michailowitsch Dostojewski (1821– 1881), Charles Baudelaire (1821– 1867), August Strindberg (1849– 1912), Ralph Waldo Emerson (1803– 1882), Helen Keller (1880– 1968), Arnold Schönberg (1874– 1951), and Jorge Luis Borges (1899– 1986)."[542]

The list goes on: the works of Swedish modernist artist Hilma af Klint (1862-1944) crawl with Swedenborgian exegetic symbols which she worked into her paintings as a main source of inspiration; while classified by art historians as modern, her works predated modernism by several decades. In accordance with her will, they were not to be released until decades after her death in the mid-20th century because she deemed the world 'not ready.'[543]

Similarly, occultists like Aleister Crowley (1875-1947) and Madam Blavatsky (1831-1891) used Swedenborg's teachings as the foundation for their own works. Artists and theologists, adherents of Western esotericism, poets, and writers – all the systems of knowledge tagged by 18th century empiricists as unreliable and non-useful – welcomed Swedenborg's ideas into their circles. His naturalist studies, on the other hand, – discredited in most cases not by content, but by association – became the subject of a *damnatio memoriae* and fell into oblivion.

Swedenborg's work developed an afterlife in unexpected places all across the globe: the Swedenborgian Church is nowadays most active in North America, but also in Asia and his native Sweden. In the past, late 18th and 19th century England experienced a veritable boom of occult matters that extended to Swedenborg's teachings. This development was fired by

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[542] Hanegraaff, *Swedenborg, Oetinger, Kant*, 59.

[543] On Hilma af Klint's life and works, see e.g. Kurt Almqvist, Louise Belfrage, and Hilma af Klint, *Hilma Af Klint: The Art of Seeing the Invisible*, Stockholm, Sweden: Axel and Margaret Ax:son Johnson Foundation, 2015.

commercial exploitation as well as broad appropriation and adaptation through a variety of esoteric movements, and a "relative indifference to empirical or scientific 'proof' of occult claims."[544] It attracted artists, writers, and naturalists alike.

Besides the strictly esoteric afterlife and revival, Swedenborg – that is, his teachings which his followers developed further after his death – were fondly taken up by religious movements of the evangelical convictions as they provided a decidedly spiritual counterargument to the rationalist traditions of David Hume and Conyers Middleton.[545] People wanted to believe, not to know.

In Sweden, the situation for Swedenborg's followers and his teachings immediately after his death was much more complex. Swedenborg's writings were hardly found outside of learned circles, and even they could not agree what to make of his legacy as it was considered too fantastical by many.[546]

In the late 18th century, a number of small fellowships in the name and spirit of Swedenborg existed in the larger cities of Sweden – Skara, Göteborg, and Stockholm; the congregation in the latter was led by the Nordenskjöld brothers who were eager to connect with other circles abroad and developed Swedenborg's ideas further.[547] They and a handful of other highly active supporters contributed to the spread of Swedenborgianism across the planet. August

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[544] Monod, *Solomon's Secret Arts: The Occult in the Age of Enlightenment*, 227.
[545] Ibid., 247-248.
[546] Lenhammar, *Tolerans och bekännelsetvång*, 28.
[547] Cf. the chapters on Swedenborgianism in the respective cities in Lenhammar, *Tolerans och bekännelsetvång*.

Nordenskjöld, in fact, died in Sierra Leone while building a "free community among the Africans."[548] For a few years, in Sweden a "'Philanthropic and Exegetic Society' devoted to publication and translation of his works existed […] (1786– 1789) but managed only to get a few small parts into print; publication of Swedenborg's works long remained impossible due to suppression by the ecclesiastical and secular authorities."[549]

It is difficult to say how exactly Swedenborg and his teaching spread in art, literature, or religious movements because so many of his ideas were passed on indirectly or unknowingly, especially after a few generations of reception. Much of the influence he had on artists, writers, occultists, and others occurred through unwitting adoption of his ideas.[550]

In any case, his ideas developed a wide-spread life of their own in unsuspected areas of academia as well as pop-culture or esoteric fields that cannot be explained away as the work of a mediocre thinker. Swedenborg's empirical works might have fallen prey to oblivion, but many of his theosophical ideas thrive to this day and speak to his innovative way of thinking that was in some regards ahead of his time.

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[548] Inge Jonsson, "Commentary," in *Solomon's House Revisited: The Organization and Institutionalization of Science*, ed. Tore Frängsmyr (Canton, MA: Science History Publications, U.S.A., 1990), 123.

[549] Hanegraaff, *Swedenborg, Oetinger, Kant*, 61.

[550] Ibid.

3.1.2 Carl Linnaeus

Among the cultural and scientific achievements of the Swedish people, that of Carl Linnaeus (1707-1778) ranks at the top: the binomial system of nomenclature. It is likely one of the biggest accomplishments and the skeletal structure of modern biological science. Linnaeus' system is comparable in its importance to Mendel's discovery of the laws of genetics, and Darwin's theory of evolution. His research was, however, motivated not only by the prospect of eternal glory (something he could not have predicted, anyway), but by nationalist and physico-theological considerations.

3.1.2.1 Historiographical Notes

Concerning the historiographical *status quo* on Linnaeus, his disparately higher popularity and importance entail a bounty of secondary source material on the man and his scientific work – there is certainly enough material to fill two volumes just with the references. Lisbet Koerner's critical rendering of literature on the topic up to the late 1990s is a comprehensive starting point, especially given that her own work adds a new side to the discussion that diverges from traditional presentations, namely that of Linnaeus' economic views and their impact on the early modern world.[551] Koerner concludes that since the beginning of source-critical historiography on Linnaeus in 1875 (with Julius Sachs) and up until the mid-20th century, he had been presented by different scholars as a "medieval scholastic," mere "collector and classifier," an "antiquated natural historian," or "a last Aristotelian."[552] Historians of her own generation, Koerner states,

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[551] Koerner, *Linnaeus: Nature and Nation*, 8-9.
[552] Ibid.

were predominantly concerned "not with his era's epistemic inability to practice modern biology, but its deplorable lack of gender equity, racial equality, and ecological sensibility,"[553] and she is right to point out the moralizing and anachronistic double-standards of objectivity that are at play in many classics of those decades.

Since the 1990s and especially since the turn of the millennium, many authors have built upon the foundation laid out by Koerner and her colleagues to set up a more differentiated view of Linnaeus and his work. For instance, Patricia Fara published a very small yet enticing book titled *Sex, Botany & Empire* in 2004. Not much more than a chapter in a regular monograph in length, she skillfully connects two of the most eminent personalities of 18th century botany – Joseph Banks and Carl Linnaeus – through an interdisciplinary approach taken from sociology, history, and gender theory to illuminate questions of social norms, colonialism, and the search for glory in the unknown. Sources and bibliographical entries, unfortunately, are not abundant in this work, making it a product for the interested connoisseur or the avid fact checker.[554] More recently, Christina Skott contributed to *The Routledge History of Western Empires* with an article called "Expanding Flora's Empire. Linnaean science and the Swedish East India Company" (2014), wherein she concentrates on the significance of botany for the 18th century naturalist landscape and economy, and Linnaeus' role in it.[555]

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[553] Koerner, *Linnaeus: Nature and Nation*, 9.

[554] Fara's methodology and sources are reliable, but one needs to do some digging in other sources just to be on the safe side.

[555] Christina Skott, "Expanding Flora's Empire. Linnaean science and the Swedish East India Company." In *The Routledge History of Western Empires*, edited by Robert Aldrich, and Kirsten McKenzie, 238-254. London; New York Routledge: 2014.

Numerous books as the result of international conferences, symposia, and workshops speak to the continuing popularity of Linnaeus as a research subject, for instance Beretta and Tosi's *Linnaeus In Italy: The Spread of a Revolution in Science* (2007) as well as Hodacs, Nyberg, and van Damme's *Linnaeus, Natural History and the Circulation of Knowledge* (2018). In another cooperation between Hodacs and Nyberg, *Naturalhistoria på resande fot* (2007), the authors explore the teacher-student relationships between Linnaeus and his disciples and make a case for the importance of traveling as a vital element of their research methodology.

Meanwhile, there is a whole field of Linnaean Studies dedicated to the person and his works, as well as the numerous disciplines they influenced. Linnaean studies are pertinent to a variety of fields from linguistics to biology and botany, from economics to history, anthropology, geology, and many more.[556] As a multi-disciplinary field, they are concerned with the biography of Linnaeus as much as with his contributions to naturalism at the centre of an international paradigm shift into a new era of research, and what would eventually become the foundation of modern sciences. The number of interdisciplinary publications and conferences shows that clearly. Most importantly, the discipline helps to identify and situate Linnaeus' connections in and impact on the global and historical context since the 18th century.[557]

Linnaeus was a prolific writer of many influential treatises, articles, and pamphlets; while many of his *opera magna* are available as critical academic editions, numerous smaller

[556] Hodacs, Nyberg, and van Damme, "Introduction: de-centring and re-centring Linnaeus," 2.
[557] Ibid., 2-3.

manuscripts remain unpublished to this day in archives, or they age away in private collections, waiting for their rediscovery.

3.1.2.2 In the Service of Naturalism

Linnaeus' system of nomenclature is the result of loss and failure as much as of persistence and eventual success. The son of a minister, young Carl Linnaeus – Linnaeus being his birth name by which he is commonly known in North America, and which after his ennoblement in 1761 changed to Carl von Linné[558] – was introduced to the joys of botany by his father, an avid gardener. From an early age on, the boy (to his parents' despair) began showing a passion for plants instead of for preaching.[559] Driven by his love for everything that grew in and on the ground, he followed his interest to study medicine (the umbrella discipline that included among others pharmacology and botany), and became one of the most reputable physicians of Sweden. For many years, he served the royal family and held a professorship at the University of Uppsala, his *alma mater*.

In 1732, driven by his thirst to explore nature in person, twenty-five-year-old Linnaeus undertook his influential expedition to Lapland to investigate the plants of the North.[560] The Lapland journey was followed by a trip to Dalecarlia, "where his task was to investigate the

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[558] Linnaeus was ennobled as a gesture of gratitude for his valuable reports in the service of Swedish society and economy, as well as for his scientific contributions in 1757. Cf. Carl-Olof Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," in *Linnaeus In Italy: The Spread of a Revolution in Science*, eds. Marco Beretta, and Alessandro Tosi (Sagamore Beach: Science History Publications/USA, 2007), xviii; Skott, "Expanding Flora's Empire," 239.

[559] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xv-xvi.

[560] Hodacs and Nyberg, *Naturalhistoria på resande fot*, 10.

mineral resources."[561] The years between 1733 and 1737 Linnaeus spent in Holland, studying and connecting with local colleagues in the field. Through their involvement with the Dutch East India company, Linnaeus gained access to specimens of exotic plants and animals for the first time.[562]

Some of Linnaeus' most important works were published during his time in Holland: the *Systema naturae* in 1735, and the *Fundamenta botanica* one year later. They set the stage for his role as an expert and empiricist of European standing.[563] Through his works, Linnaeus set the stage for his classification and naming conventions for plants and animals: in 1753, he published the first edition of *Species plantarum*, and five years later (1758) the tenth edition of *Systema naturae*; these two works featured the naming conventions for the kingdoms of plants and animals respectively.[564] The system was deemed so simple and so "straightforward that even women could understand it."[565] Furthermore, he influenced naming conventions in geology, the "kingdom of stones."[566] Up to this day, newly discovered organisms and materials are still named according to Linnaeus' model.[567]

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[561] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xvi.
[562] Skott, "Expanding Flora's Empire," 239.
[563] Ibid., 239-240.
[564] Koerner, *Linnaeus: Nature and Nation*, 16.
[565] Fara. *Sex, Botany & Empire*, 19-20.
[566] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xv.
[567] Koerner, *Linnaeus: Nature and Nation*, 16.

The new taxonomy was an immense achievement. It categorized, ordered, and (re)named thousands of plants[568] according to one coherent system.[569] In *Critica botanica*, Linnaeus simplified and shortened plant names that struck him as too complex – and not always to the delight of his colleagues.[570] In Linnaeus' system, plants were classified into 24 categories (according to the letters of the Swedish alphabet) and received a unique name with two parts, sometimes additional ones for sub-species: the first part indicated a plant's *genus*, and the following epithet distinguished it from other members of that *genus*.[571]

Among his colleagues, Linnaeus was perceived as a polarizing figure – respected by most and disputed by many.[572] With naturalism constantly getting more complex, he had many competitors in the race for the best taxonomy; probably the closest competitor was the Frenchman Buffon with his *Histoire Naturelle*, a massive collection of 36 volumes and intentions similar to that of Linnaeus' works.[573]

The binomial nomenclature also faced a lot of criticism, particularly because Linnaeus struck a nerve with his naming conventions: many moralist Christians perceived them as

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[568] Koerner, *Linnaeus: Nature and Nation*, 248.

[569] Dear, *Revolutionizing the Sciences*, 123.

[570] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xvii.

[571] Hodacs, *Silk and Tea in the North*, 152; Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation*. 2nd ed. (London: Routledge, 2008), 24-25.

[572] Koerner, "Purposes of Linnaean travel," 119.

[573] Cf. Hanna Roman, *The Language of Nature in Buffon's Histoire Naturelle* (Oxford: Liverpool University on behalf of Voltaire Foundation, 2018), 171; Phillip R. Sloan, "The Buffon—Linnaeus controversy," *Isis* 67, no. 3 (1976): p. 356-375, https://doi-org.login.ezproxy.library.ualberta.ca/10.1086/351629.

offensive because of the very explicit sexual references they contained.[574] As his categorization of plants was organized according to a specimen's reproductive organs and often named metaphorically, Linnaeus soon was confronted with the religious prudery of the day which concluded that his naming conventions – although obscured through the Latin and sometimes Greek origin of the terms – deserved an R-rating.[575]

Many contemporaries considered them especially unfit to be read by women: botany was traditionally one of the few naturalist hobbies considered appropriate for the genteel female class and enjoyed huge popularity (among those who could afford the leisure and materials). Some of Linnaeus' critics feared that sexually explicit language would taint the purity of the subject and its readers, although the ambiguous writing of Erasmus Darwin (1731-1802), an ancestor of Charles Darwin, was far more infamous than Linnaeus' – especially in England.[576]

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[574] Alan Bewell, "On the Banks of the South Sea," in *Science and Empire in the Atlantic World*, eds. James Delbourgo, and Nicholas Dew (New York: Routledge, 2008), 174-175.

[575] Fara, *Sex, Botany & Empire*, 21.

[576] Janet Browne, "Botany in the boudoir and garden," in *Visions of Empire: Voyages, Botany, and Representations of Nature*, eds. David Philip Miller, and Peter Hanns Reill (Cambridge [England]: Cambridge University Press, 1996), 156-159.

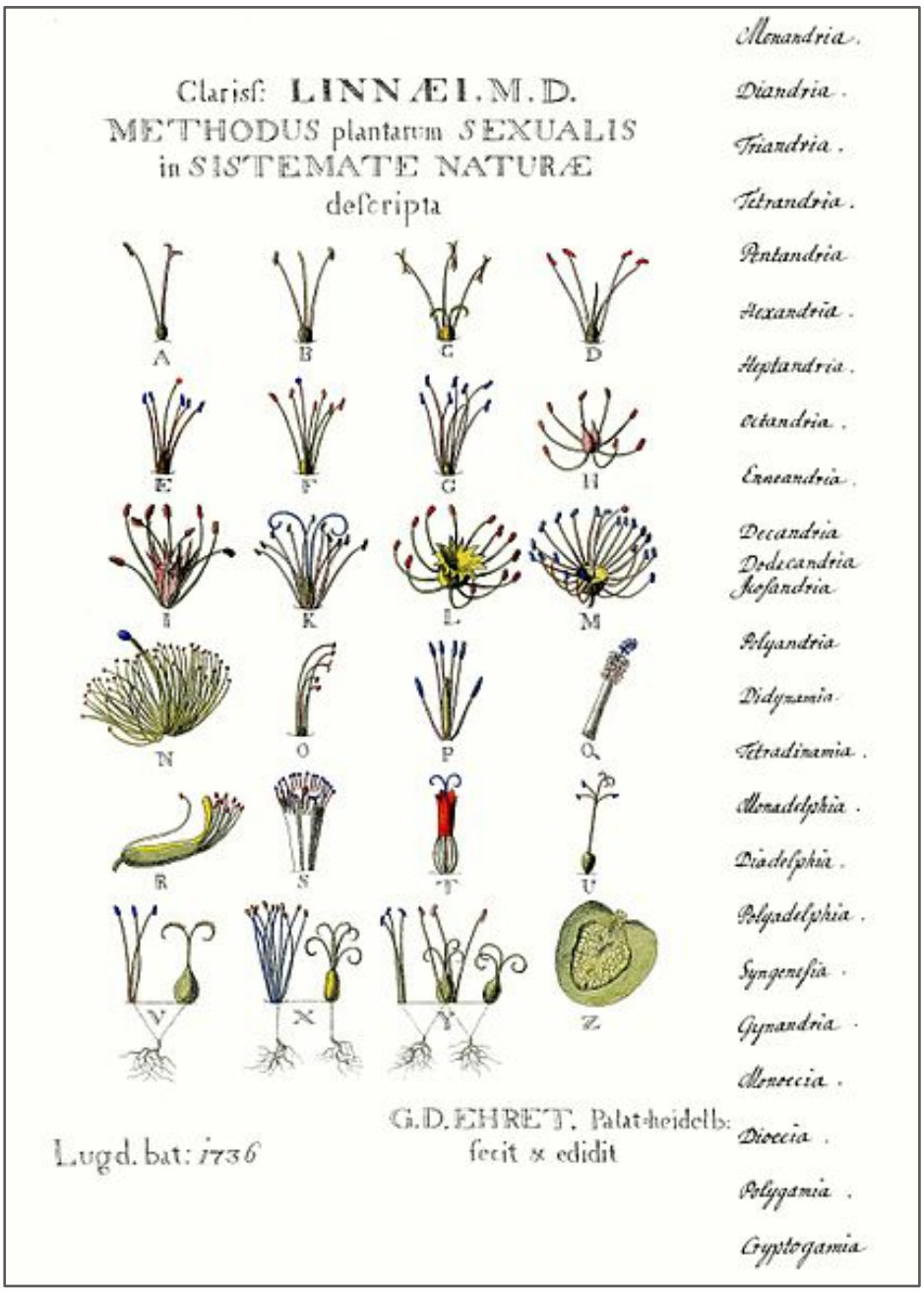

Figure 4: G. D. Ehret, Methodus Plantarum Sexualis in sistemate naturae descripta (Leiden 1736). Classification system according to Linnaeus.[577]

[577] Ehret, G. D., *Methodus Plantarum Sexualis*, 1736, coloured print. Wikimedia Commons, s. v. "Ehret-Methodus Plantarum Sexualis," https://commons.wikimedia.org/wiki/File:Ehret-Methodus_Plantarum_Sexualis.jpg.

However, Linnaeus had not just dreamt the explicit associations into existence: rather, he had followed a long-standing tradition of Greco-Roman botanical taxonomy that originated with Theophrastus, the "father of botany."[578] In general, it is not very likely or plausible that Linnaeus intentionally sought to offend. More likely, he followed the gender conventions of his time according to which he "simply tended to see anything female as a wife."[579] Similarly, Darwin described the curcuma plant's "solitary female pistil as an unwilling wife, who prefers the company of eunuchs to that of her spouse."[580] His work titled *The loves of the Plants* (itself part of an educational book of poems named *The Botanic Garden*) was well received and left little about his inspiration to the reader's interpretation.[581]

Many ancient botanical terms were based on explicit folk etymologies and anecdotal stories: the orchid, for example, derives its name from the Greek word for testicle, *ὄρχις*. The graphic reference stems from the twin tubers some species possess; coincidentally, that is also the origin of the orchid's reputation as an aphrodisiac.[582]

Just as with any polarizing matter, the explicit portrayal of sexual conventions and terminology in Linnaeus' works also garnered supporters – sometimes from unsuspected corners. Plant metaphors offered a welcome loophole to talk and read about sexual matters unscathed by censorship or social pressure so that "[s]uggestiveness and downright explicitness rampaged

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[578] Jim Endersby, *Orchid: A Cultural History* (The University of Chicago Press, 2016), 12.

[579] Schiebinger, *Nature's Body: Gender in the Making of Modern Science*, 26; Fara, *Sex, Botany & Empire*, 21-22; Browne, "Botany in the boudoir and garden," 155-156.

[580] Browne, "Botany in the boudoir and garden," 158.

[581] Ibid., 157.

[582] Endersby, *Orchid: A Cultural History*, 14.

through popular botanical tracts through the next half century, picking up political and other cultural connotations as they ran."[583] Even Mary Wollstonecraft saw botany as "useful propaganda in her *Vindication of the Rights of Woman* [italics original]."[584]

While Linnaeus' binomial nomenclature found many supporters throughout the learned circles of Europe, it attracted perhaps just as many enemies – be it for reasons of prudery or rivalry, or just because change takes time. At the end of the day, his taxonomy had one big advantage: it was more understandable than his competitors' systems, and it unified the nomenclature of plants and animals.[585] His binomial categorization system stood out from other models because it allowed for simplification and consolidation of the convoluted and confusing jungle that was (pre-)18th century botany (cf. Fig. 4).

With his nomenclature system, Linnaeus significantly contributed to create a universally understandable, simple language – one of the preconditions for a public sphere of research.[586] Taking into account the system's inherent biases – modelling plant categories after human social norm – it was not perfect, and to this day, researchers are balancing its values with the problematic aspects. However, Linnaeus' binomial nomenclature was the most advanced system of his time. Soon, the majority of the naturalist community had agreed on the advantages of his taxonomy. *Canis lupus* had killed the dogs.

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[583] Browne, "Botany in the boudoir and garden," 159.
[584] Ibid., 160.
[585] Pratt, *Imperial Eyes*, 25.
[586] Koerner, "Purposes of Linnaean travel," 119-120.

3.1.2.3 Higher Goals

Linnaeus' writings were not serving the simple goal of revolutionizing the natural studies of his days alone – more importantly, the well-being of the nation was at stake: "Linnaeus believed he had identified a *scientific* solution to the *political* problem of a negative trade balance [italics original]."[587] He was convinced of the reformative potential of his approach, seeing "science in all its forms, and botany in particular, as a deeply patriotic enterprise, with a strong emphasis on the useful."[588]It is no coincidence that the Swedish Academy of Science was initially named Swedish *Economic* Academy of Science, and neither is it a coincidence that Linnaeus was one of its founding members.[589] However, economic gain for Linnaeus did not equal profit as much as betterment of God's nature.[590]

First and foremost, Linnaeus was concerned with the divine plan, but he readily welcomed its intersections with the political fortune of his homeland. Piety and patriotism were not mutually exclusive – on the contrary. One of the primary purposes of the Linnaen institution was to further the cameralist-mercantilist rationale of naturalist research in the service of national autarky:[591] "Sweden had emerged from the ravaging contests on the European continent as a weakened military power, but in searching for alternative routes to greatness had settled on a

[587] Koerner, "Purposes of Linnaean travel," 119.
[588] Skott, "Expanding Flora's Empire," 239.
[589] Ibid., 125.
[590] Koerner, *Linnaeus: Nature and Nation*, 111-112.
[591] Cf. chapter "3.2.1.1 Places of Knowledge."

more peaceful path. In this perspective the work of Linnaeus and his students represented an equally valuable, and possibly morally superior, platform than war and military prowess."[592]

Naturalism and research occupied a prominent spot in the equation of peaceful greatness as they were essential to securing the economic means that would otherwise have to be acquired through warfare or colonialization, or both. The cameralist-mercantilist system was focused on keeping Sweden's hard-earned currency in the country: by substituting imported goods, crops and animals through local alternatives, by transplanting organisms to Sweden and growing them inland, and finally by further encouraging local alternatives through import bans.[593]

Linnaeus' research agenda mostly tackled the first two points: to find local alternatives to expensive imported plant-based trade goods such as tea, coffee, or chocolate, and to transplant crops so they could be grown locally. His work was vital to the success of the cameralist-mercantilist model of this consumerist era as Sweden – unlike the big colonial powers of Europe[594] – had no substantial overseas colonial possessions to draw silver or luxury goods from.

Linnaeus was aware that for his plans to succeed he needed profound knowledge about all the native plants in the kingdom – even the ones growing in the most remote areas of the

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[592] Fur, "Colonialism and Swedish History," 21.

[593] Koerner, "Purposes of Linnaean travel," 139; Mats Morell, "Swedish Agriculture in the Cosmopolitan Eighteenth Century," in *Sweden In the Eighteenth-Century World: Provincial Cosmopolitans*, ed. Göran Rydén (Farnham, Surrey, England: Ashgate, 2013), 91.

[594] Other European states attempted similar things – regardless of whether they had colonies or not. Britain, for example, succeeded to transplant tea plants from China to its colony India in an attempt to meet the caffeine demand of its home population because the British market's dependence on illegal imports washed enormous amounts of cash out of Britain and into the coffers of the Chinese and of European smugglers (such as the Swedish). Cf. Hodacs, *Silk and Tea in the North*, 159-162.

country: Lapland. In 1732, he set out to explore the land on behalf of the Uppsala Science Society, the fatherland, and – not least – himself.[595]

At the time of his expedition, Sweden was already crazed with exoticized Sápmi-hysteria kindled by Johannes Schefferus' *Lapponia* from 1673: it was the "West's first anthropological monograph on a single people," based solely on second-hand sources as Schefferus had never visited the place in person.[596] Written in Latin and printed in Frankfurt a. M., the historical and ethnographical account of Lapland with its rich illustrations of Sámi clothing and objects became an instant bestseller all across Europe.[597]

A well-known portrait by Martin Hoffmann from 1737, titled "Linnaeus in his Lapponian costume with flower *Linnaea borealis*," showing him in 'traditional' Sámi clothing and ceremonial drum, attests to his personal fascination und unquestioned comfort with appropriating Sápmi and Sámi culture.[598] He brought the ensemble with him during a tour of Europe following his Lapland expedition,[599] and even wore the dress during a lecture in Paris.[600]

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[595] Koerner, *Linnaeus: Nature and Nation*, 59; Skott, "Expanding Flora's Empire," 240.

[596] Koerner, *Linnaeus: Nature and Nation*, 57.

[597] Neil Kent, *The Sámi Peoples of the North: A Social and Cultural History* (London: Hurst, 2014), 4.

[598] Koerner, *Linnaeus: Nature and Nation*, 78; Naum and Nordin, "Situating Scandinavian Colonialism," 11.

[599] Koerner, *Linnaeus: Nature and Nation*, 65.

[600] Kent, *The Sámi Peoples of the North*, 15.

Figure 5: Frontispiece of Flora Lapponica (1737), showing Linnaeus in traditional Sámi dress in romanticized northern landscape, surrounded by reindeer and Sámi people.[601]

[601] Linnaeus, Carl, *Flora Lapponica* (frontispiece), Amsterdam: Salomon Schouten, 1737. Wikimedia Commons, s. v. "Flora Lapponica (frontispiece)," https://commons.wikimedia.org/wiki/File:Flora_Lapponica_(frontispiece).jpg#filelinks.

An engraving on the frontispiece of *Flora Lapponica* (cf. Fig. 5) again shows Linnaeus in Sámi dress, sitting in front of a traditional tent while holding (and presumably playing) a ceremonial drum; he is surrounded by reindeer and Sámi people engaged in daily activities.[602] The engraving, much like Linnaeus' travel accounts, portrays a romanticized, utterly unrealistic account of Sápmi living and landscape with the Swedish researcher at its centre. In this world, the locals have neither face nor name.

During his journey through Lapland, Linnaeus relied heavily on the help and expertise of his local native guides who led him around, functioned as carriers, and were his source of "food, shelter, and pack animals."[603] Despite their vital roles in Linnaeus' success, they remained largely unnamed and unmentioned in his accounts.[604]

Linnaeus' findings were nonetheless of huge importance as a research contribution and were published under the title *Flora Lapponica*. The work constituted the first empirical study of Lapland's nature.[605] Besides the noble goal of mapping his fatherland's crop assets and mineral resources, Linnaeus had higher, international aspirations for his system. By making Latin his weapon of choice, he deliberately opted to open his nomenclature to the world – and the world to his nomenclature: "The Linnaean system epitomized the continental, transnational aspirations of European science."[606] The fact – once more – emphasizes the importance of language politics and the different purposes they served. Seen from a practical angle, Linnaeus was infamously

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[602] Koerner, *Linnaeus: Nature and Nation*, 65, 79.
[603] Ibid., 60.
[604] Ibid., 60-61.
[605] Kent, *The Sámi Peoples of the North*, 15.
[606] Pratt, *Imperial Eyes*, 25.

unconversant in modern European languages other than his native Swedish, and his options were thus limited to begin with.

The importance of Linnaeus' research for the field of botany (as well as for biology and modern science in general), for Sweden as a research nation, and not least for his own career can hardly be overstated. Quoting a textbook from the early 20th century, Fur emphasizes that what "Gustavus Adolphus and his host of heroes meant for Sweden in political terms, Linnaeus and his disciples was for the natural sciences. Each people, who have performed in the history of the world, have had their age of heroes; each science that has won greater development its time of chivalry. For botany that was the time of Linnaeus."[607]

3.1.2.4 Making the Economy Bloom

Comfortable in his research chair at *Uppsala Universitetet*, Linnaeus himself was not an avid traveler – at least not outside of Europe, and certainly not in his later years. He did, however, time after time, emphasize the importance of travelling for the naturalist – and even more so for the botanist. His motto was to inquire about everything – *Det frågas om allt*.[608] As a result, he sent out students or colleagues to destinations all over the planet while working on his extensive collection and refining his own research.[609]

After his travels to Holland and expeditions within the Swedish domains, Linnaeus delegated the discovery of new plants and acquisition of new specimens to his numerous

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[607] Fur, "Colonialism and Swedish History," 21.
[608] Skott, "Expanding Flora's Empire," 240.
[609] Ibid., 239-240.

students.[610] There must have been a sufficient number of apprentices to make them replaceable, and even if the adventurers returned alive from a research trip, their findings often ended up in archives or did not have any practical application in the cold climate of Sweden.[611]

The network of specimen collectors and colleagues Linnaeus employed and cultivated over the years allowed him to work from the relatively remote and small location of Uppsala, and to establish it as a center of empirical research.[612] In addition to Linnaeus' armada of disciples who constantly supplied him with fresh research material, he was corresponding with "more than 400 persons, not counting his Swedish correspondents," via letters which were often accompanied by plant seeds from destinations all around the world.[613] He used them to colonize the orangery and beds in the Uppsala University Gardens.[614]

Thanks to an agreement between the SOIC and the *Vetenskapsakademi* reached by Linnaeus and Carl Tessin, "naturalists appointed by the Academy" could board the ships to Asia for free, often functioning as surgeons or taking up other responsibilities on board, for instance as chaplains.[615] Secure travel arrangements did, however, not mean the ensuing trips were easy:

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[610] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xvii-xviii; Skott, "Expanding Flora's Empire," 239-240.

[611] Koerner, "Purposes of Linnaean travel," 131.

[612] Skott, "Expanding Flora's Empire," 239-240.

[613] Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xvii.

[614] On a side note: Anders Celsius (1701-1744), inventor of the thermometer scale, was a teacher of Linnaeus'. The latter used Celsius' scale to measure the environment temperature for experiments with plants under controlled conditions. As a result, Linnaeus was the first to publish a work utilizing degrees Celsius in the year 1748. Cf. Jacobson, "Opening Remarks. Linnaeus: The Man and His Image," xviii.

[615] Skott, "Expanding Flora's Empire," 243-244; Hodacs, *Silk and Tea in the North*, 162.

Hodacs, citing a paper by Koen Vermeir, notes that the "relative willingness of the Swedish Company to accommodate Linnaeus's students is noteworthy," as "[t]heir work, at least in theory,

once in Asia, research opportunities were often limited by international politics and resistance from other European competitors (the British in particular), as well as through access restrictions for European traders imposed by China.[616]

Had a mission been successful, the next big problem Linnaeus and his students faced was the complicated transport of specimens via ship back to the home country: due to a lack of appropriate technology to provide consistent environmental conditions that kept live plants (or animals) from dying and seeds or rhizomes from rotting, many of the collected samples did not make it to Sweden.[617] An alternative was to send back dried plants or plant parts, but they were at risk of damage through humidity and water.[618] Additionally, the 'Apostles' (as Linnaeus called them) themselves were at risk of getting sick; one student even committed suicide.[619] As if that was not enough, shipwrecks, piracy, and mutinies added to the risk of losing plants and animals on the journey (students notwithstanding), but they were seen as noble sacrifices for the wealth of the fatherland.

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threatened to undermine the whole business idea of the company." That conclusion is only justifiable if one assumes that the goal of the SEIC was profit for its private investors alone, not taking into account the SOIC's importance to the cameralist-mercantilist agenda and the state. Furthermore, I argue that the list of imported luxury goods was too long to lead to a collapse of the company had tea successfully been transplanted to Sweden. (Cf. Hodacs, *Silk and Tea in the North*, 162; Koen Vermeir, "Openness versus secrecy? Historical and historiographical remarks," *The British Journal for the History of Science* 45.2 [2012]: 165–188).

[616] Skott, "Expanding Flora's Empire," 243.

[617] Koerner, "Purposes of Linnaean travel," 130-131.

[618] Skott, "Expanding Flora's Empire," 244.

[619] Ibid., 240.

While the economic benefit for the country was apparent, Linnaeus was concerned first and foremost with "the betterment of flora and fauna," seeing in the knowledge and technology he developed an opportunity for "a qualitative elaboration of this living world which he inhabited."[620] He was driven not as much by the search for economic growth as by the desire to work within God's plan – economic profit was almost a serendipitous by-product.

Diverse plants and animals were considered for import and consequently for transplantation to support the economic autarky of Sweden. Linnaeus' targeted research promised imminent realization of those goals. Anything from medicines to tea, from tobacco to silkworms, from Kashmir goats to cocoa could be shipped to Sweden and forced to grow there. If a species did not comply, it would be replaced by native substitutes.[621] For example, Linnaeus had concrete plans to transplant tea from China to Sweden which he considered both a welcome opportunity to "highlight the potential role of natural history," as well as a practical way to help his home country.[622]

The local Scandinavian climate disagreed in the case of tea, but another plant proved highly successful: tobacco. Large and numerous plantations were set up in Sweden in 1745, around 300 square meters for each bigger city. By the 1760, every self-respecting community had a snus or tobacco plantation or factory of its own.[623] Formerly considered an unnecessary luxury, the government had eventually come around from decrying tobacco as a vain commodity to

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[620] Koerner, *Linnaeus: Nature and Nation*, 111-112.
[621] Koerner, "Purposes of Linnaean travel," 130.
[622] Hodacs, Nyberg, and van Damme, "Introduction: de-centring and re-centring Linnaeus," 5-6.
[623] Mansén, *Norstedts Sveriges Historia* 5, 121; Morell, "Swedish Agriculture," 85-87.

subsidizing it as a literal tax crop.[624] If grown in the country, whatever sum the population paid for tobacco went up in smoke through consumption only, while a substantial part of the revenue was redirected into the national treasury. Money, indeed, grew on shrubs.

Unsurprisingly, most attempts at transplanting organisms were a terrible failure in the cold and unsuitable climate that could simply not support fragile plants and caterpillars, but that did not keep Linnaeus and his colleagues from trying. At one point, Linnaeus attempted to come up with alternatives to expensive imported dyes by deriving dyeing agents from local Northern plants. Lichens enjoyed particular popularity, having been used as dyes since at least the time of the Phoenicians.[625] However, Linnaeus did not appreciate them much because they caused him intellectual headaches: his classification system which was based on sexual characteristics was not applicable to lichens which are hybrids between fungi and algae and accordingly procreate very differently from plants.[626]

Even if most of Linnaeus' attempts at transplanting cash crops failed him, he was at least able to turn the specimens contained in his large collection into personal wealth: firstly, they served to stock cabinets of curiosities for the educational enrichment of the public,[627] but more

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[624] Morell, "Swedish Agriculture," 86.

[625] Cf. Preeti Shukla, and D. K. Upreti. "Lichen Dyes: Current Scenario and Future Prospects." In *Recent Advances in Lichenology: Modern Methods and Approaches in Lichen Systematics and Culture Techniques.* Volume 2. Edited by Upreti, Dalip Kumar, Pradeep K. Divakar, Vertika Shukla, and Rajesh Bajpai, 209-229. New Delhi, India: Springer, 2015. Due to their symbiotic nature, lichens are a "valuable source for commercially interesting compounds including antimicrobial agents, dyeing agent, ingredient of spices and perfumes," and "the main source in production of dyes which can colour fibres," 210.

[626] Hodacs, *Silk and Tea in the North*, 171-172.

[627] Hodacs, Nyberg, and van Damme, "Introduction: de-centring and re-centring Linnaeus," 4. See further Hodacs and Nyberg, *Naturalhistoria på resande fot*, 155.

importantly mid 18th century Sweden possessed a "booming market for natural history specimens," and so did other places in Europe such as Amsterdam and London.[628]

3.1.2.5 The Pious Naturalist

One aspect of Linnaeus' person and work that so far has only been discussed in passing deserves proper attention: his religious convictions. Linnaeus was a devout Christian and member of the Lutheran Church, although maybe not in the way his critics wanted him to be. Linnaeus believed that God's plan was inherent in every living thing, true to the doctrine of physico-theology. He also believed in empirical research and did not see a contradiction therein.

The concept of physico-theology – in the 18th century often tantamount to natural theology – gained popularity in the 1710s, and Linnaeus was one of its prime supporters in Sweden.[629] A conferment speech he held during a graduation ceremony in 1763 was titled *Oratio de fine Creatoris* – perhaps one of the most blatantly obvious passages indicating his convictions. The manuscript is, unfortunately, one of many unedited and unpublished ones aging away in British archives,[630] and only available online as photographs through the Linnaeus Society London.[631]

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[628] Hanna Hodacs, "The price of Linnaean natural history: materiality, commerce and change," in *Linnaeus, Natural History and the Circulation of Knowledge*, eds. Hanna Hodacs, Kenneth Nyberg, and Stéphane van Damme (Oxford: Voltaire Foundation, 2018), 110.

[629] Johannisson, *Det mätbara Samhället*, 79.

[630] Many of Linnaeus' belongings had been sold to collectors in Britain after his death, much to the chagrin of Swedish collectors. Cf. Hodacs, "The price of Linnaean natural history," 86-87.

[631] Available is a bit of a stretch, but better than none.

The speech's beginning reads as follows: "Remember your Creator in your youth, most honourable colleagues. This virtue was once widespread among mortals [my translation]."[632] The first paragraph is crossed out (indicating that it was not actually presented during the speech), and heavily edited by a second hand, pointing at a rather creative usage of grammar and vocabulary on Linnaeus' side.[633] Nonetheless, the beginning is indicative of the status religious thinking held for Linnaeus and his work. In the speech, after a few rather emotional lines on the circle of life (and the shortness thereof), he goes on to praise God as the creator of the planet and all of nature's things living within it.

This section shows very clearly that the empirical lifestyle of the naturalist was openly and publicly compatible with theological convictions. In some respects, they proved very advantageous: Linnaeus' religious convictions were part of his upbringing and certainly helped to get him on track for an academic career. Moreover, the concept of physico-theology helped legitimize empirical research with respect to the Church, which was even in the 'enlightened' 18th century a powerful institution to be reckoned with. Being an atheist was, evidently, not a prerequisite for empiricism – but being a believer could indeed be useful.

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[632] The original passage from the excerpt reads as follows: "*Mementote Creatoris vestri, commilitones Honorabissimi* [sic]*, in iuventute vestra. Hoc meritum quondam erat inter mortales omnium* [sic]." His over-usage of the genitive case must have carried over from the grammatical default structure of his binomial nomenclature.

Carl Linnaeus, *Oratio de fine Creatoris* (Address delivered on the occasion of the conferment of the degree of Medical Doctor on 7 June 1763, n/A), http://linnean-online.org/156924/.

[633] The profession of the editor deserves more respect for making veritable authors out of mediocre writers.

Despite all his great achievements, Linnaeus got a few things very, very wrong. For instance, he firmly believed that swallows hibernated on the bottom of lakes,[634] and that washing one's hair led to epilepsy.[635] In the 10th edition of the *Species* (1758), Linnaeus added the genus *homo*, assuming that "besides the white, black, red and yellow races on the Earth, there was a fifth race, in which category he counted the Hottentots and a variety of other 'savages'."[636]

In this case, Linnaeus did not even possess dried or live specimens to deduct from or conduct research on, but "relied heavily on eyewitness accounts from Southeast Asia provided by his own countrymen."[637] In the tenth edition from 1758/1759, Linnaeus incorporated details about "hair and eye colour, temperament, body type, traits, clothing and customs," with the most desirable qualities being reserved for Europeans.[638]

Once naturalists had recognized the benefits of Linnaeus' proto-ethnographic approach, they spread quickly and were adapted into many fields, and via the Scottish school of moral philosophy, it gained a foothold in America as well – William Robertson was the first to publish an account of Native Americans in the History of America (1777).[639]

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[634] Lindqvist, *History of Sweden*, 360.

[635] Koerner, *Linnaeus: Nature and Nation*, 56.

[636] Lindqvist, *History of Sweden*, 360. Cf. also Fara, *Sex, Botany & Empire*, 101-104, esp. 104.

[637] Skott, "Expanding Flora's Empire," 248.

[638] Linda Anderson Burnett and Bruce Buchan, "The Edinburgh connection: Linnaean natural history, Scottish moral philosophy and the colonial implications of Enlightenment thought," in *Linnaeus, Natural History and the Circulation of Knowledge*, eds. Hanna Hodacs, Kenneth Nyberg, and Stéphane van Damme, 161-186 (Oxford: Voltaire Foundation, 2018), 164; Pratt, *Imperial Eyes*, 32.

[639] Anderson Burnett and Buchan, "The Edinburgh connection," 173.

While the stories of "half-humans" and "troglodytes" living in remote corners of Asia[640] were based on second-hand information, they were nonetheless considered empirical and served an important function: to promote and justify the colonial agenda. Linnaeus and his 'apostles' contributed with their work to a colonial system of knowledge based on empiricism that "often overwrote indigenous knowledge"[641] – through the usage of Latin names, the imperial gaze, racial hierarchies to categorize humans, and many other tools of oppression. Mary Louise Pratt's notion that "in exchange for free rides with trading companies and so forth, [naturalists] produced commercially exploitable knowledge"[642] sells their accomplishments short but is, at its core, true: the knowledge provided by naturalists such as Linnaeus and his students was central to the success of colonialism and served in many ways as a justification for oppression.

From a modern (and post-Darwinian) point of view, what makes Linnaeus' categorization of *homo* controversial is not the biological relation between human and non-human animals as much as the assumptions that informed his beliefs. However, in the 18th century, resistance towards his system formed over his association of humankind with the natural world of animals, pre-empting Darwinian notions of the close relation between humans and apes. Europe's intelligentsia did not take well to the alleged accounts of the tailed 'cousin of man,' forcing Linnaeus to abandon the concept of different human species altogether.[643]

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[640] Skott, "Expanding Flora's Empire," 248; Anderson Burnett and Buchan, "The Edinburgh connection," 164.

[641] Anderson Burnett and Buchan, "The Edinburgh connection," 164.

[642] Pratt, *Imperial Eyes*, 33.

[643] Skott, "Expanding Flora's Empire," 248-249.

The way Linnaeus depicted and categorized different human 'races' sheds much light on the inherent superiority bias of Western culture, and its way of thinking that guided the interpretation and analysis of empirical evidence for a long time to come. It also speaks to a certain sensationalism and exoticism originating in Linnaeus' eagerness to collect, describe, publish, and preserve as much as possible about the cultures and specimens he researched. Therein lies the biggest weakness of his modus operandi: relying on secondhand information, and pushing quantity over quality.[644] Evidently, new criteria for secure knowledge had yet to be developed, and that might explain why being empirical was not always a prerequisite for early modern empiricism.

[644] Skott, "Expanding Flora's Empire," 249.

3.2 Preliminary Conclusions to Part II

The comparison between Swedenborg and Linnaeus shows that the two were about as close as the DNA of human and bonobo: 99 percent the same, but with a few important differences in critical areas.[645] Two very similar careers originated in two very similar upbringings: Swedenborg's in the technical field of engineering, and Linnaeus in the medical area, later specializing in botany. Both men practiced naturalism and abided by the empirical method, and both were equally adherents of physico-theology: while Linnaeus tried to find God's big blue-print in the natural order of plants and animals, Swedenborg intended to create a universal language that would allow him to locate the place of the soul in the human body. Both men were lauded for their successes in research and their theoretical and technological contributions to botany and metallurgy, respectively.

The one percent that differs cannot be found in their research or writings *per se*: both were praised and criticized for their contributions, both followed comparable empirical approaches, both got a few things terribly wrong, both were deeply religious. Rather, what sets them apart are the reactions Swedenborg faced from the research community when he turned away from empiricism for good to fully dedicate himself to the study of theology and theosophy. The examples presented here include the reactions of Kant, Oetinger, Tessin, Hiärne, and others.

Swedenborg's actions were perceived as an unforgivable move from which his empiricist reputation would never recover and his image as a theosopher would at least suffer. As a result,

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[645] I believe Linnaeus would have appreciated the comparison.

Swedenborg and his work were erased from the metaphorical annals of empiricism and exiled to the realm of the fine arts, theology, occultism, and literature. There, they developed a second life – although often not directly associated with his name.

One could argue that Swedenborg's scholarly achievements were just not important and that was the reason why they did not survive, but the evidence presented earlier speaks a different language: while the responses were mixed depending on the quality of his research, the criticism he faced was based on relatable principles based on a sort of 'peer-reviewed' feedback process that looked for reliability and usefulness in new research. Especially Swedenborg's contributions to the fields of metallurgy and smelting early in his career garnered him a high reputation and prestige among his international colleagues all over Europe.[646] The evidence indicates that both Swedenborg's scientific *and* theosophical achievements were sufficiently well-known to garner varied responses – negative as well as positive – from internationally acclaimed scholars and institutions, as demonstrated above.

Under this light, the hypothesis that Swedenborg was actively exiled by his colleagues is much more convincing and in line with the source material. In summary, the *damnatio* that affected Swedenborg's work and name was not a result of the scholarly value of his work and the knowledge it produced, but of the perceived threat it posed to contemporary empiricism. The predominant value system of the day gave higher prestige and power to the empirical faction who opposed Swedenborg's change of mind. The *damnatio* was a consequence of the repercussions resulting from his switch to a different knowledge system that was regarded as less

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[646] Cf. chapter "3.1.1.3 Knowledge in Swedenborg."

valuable and non-useful by his peers, and this reaction can be considered a protective measure to maintain the integrity of the conventions surrounding the knowledge system of empiricism.

4 Analysis

The sources on 18th-century Sweden presented here show a very clear and differentiated view of the mechanisms of commodification that applied both to humans and to nature, and they are particularly telling for many reasons: as a comparatively small, decentral country in the European north, Sweden was an integral part of Europe and the international trade community. In some instances, the country experienced developments at a distance, to a different degree, or with delay – colonialism, industrialization, urbanization, religious influences, and so on. Other developments, such as missionization through the Church, occurred at a less distinct level than elsewhere, particularly in the remotest parts of the country. In all of those developments, knowledge and information policy played an integral role in consolidating, expanding, or establishing power structures, thus creating new boundaries and frame works for the developing nation state.

The internal colonization of Sápmi followed goals and patterns very similar to those of settler colonialism in North America, yet its execution appeared to be more subtle because invaders and invaded populations had been in contact for centuries as close geographical neighbours. In both cases – Scandinavia and North America – the indigenous populations (and their lands) became the subject of dehumanization, romanticization, exotic fetishism, exploitation, misguided preservationism, commodification, and forceful attempted assimilation. In the North American case, cultural genocide must be added to the list.

In the wake of the Great Northern War, Sweden had lost its status as a political superpower in Europe. Its finances were drained and so was its population. After several attempts at entering the stage of overseas colonialism had proven unsustainable, Sweden resorted to putting a strong

emphasis on growing the profitability of its own natural and human resources through mostly non-militant means.[647]

Unlike the large colonial powers who maintained their global influence – in many cases until far into the 20th century – Sweden was forced to make do with what was available; industrialization and urbanization would not set in on a large scale until the late 1800s. The constant pressure to be creative under less than ideal circumstances probably helped to establish an environment conducive to solidarity and creative problem-solving – both qualities for which the country is known today.

The technologies and knowledge – here demonstrated through Swedenborg's work in the field of metallurgy and Linnaeus' binomial nomenclature – created in an attempt to make Sweden independent from military-based politics inadvertently contributed to the consolidation and perpetuation of the colonialist system and the triumph of empiricism as the emerging dominant system of knowledge: the biological 'justification' of racial hierarchies, trade advantages from improved metallurgic processes, ethnographical fetishization, or the systematic exploitation of exotic species are just a few examples for how information was used to further colonial strategies, and justify the large-scale oppression and appropriation of other knowledge systems.

While being located in the periphery of Europe and operating on a political level far from its pre-Northern-War level of influence, Sweden was well connected to intellectual circles all over

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[647] Fur, "Colonialism and Swedish History," 21.

Europe and established itself as a driving force in academic research: it is not a coincidence that the Nobel Prizes (established in 1895) are awarded by the Nobel Foundation in Stockholm every year.[648] Its geographical and political position at the same time forced and allowed Sweden to develop a niche for itself and make a virtue out of necessity.

For all those reasons, Sweden constitutes a fascinating case study of its own, but it also reflects on larger European developments that often drown in the sea of international political and economic developments. "The early modern world," Paula Findlen concludes, "was an expansive landscape of interconnected people and things whose relations were increasingly defined by long-distance trading ventures, overseas colonies, and dreams of empire."[649] 18th century Sweden, too, saw a number of significant changes to its political, economic, demographic, and cultural make-up – a result of an ongoing process to determine a middle ground "between the information needs of territorial states where relatively small élites were composed largely of landowners primarily interested in extracting surplus value from land ownership and use, and trading states controlled by more complex commercial élites interested mostly in controlling the flows and nodes of goods and capital"[650] that defined the 18th century.

Because of the strict cameralist-mercantilist, utilitarian mandate of 18th century Sweden's politics, research and knowledge were increasingly distinguished into the useful and non-useful

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[648] Alfred Nobel was the inventor of dynamite, an explosive he primarily developed for its application in – you guessed it – mining. He installed the Nobel Prizes to honour outstanding achievements in the sciences, literature, and towards peace. The Prize for Economic Sciences was not part of his vision, but is awarded in his memory by the Bank of Sweden.

[649] Findlen, "Early modern things," 5.

[650] Black, *The Power of Knowledge*, 409.

varieties. Anything that fell outside the narrow category of economically valuable and directly applicable knowledge generated through empirical methods was – fully or partially – discarded or rejected as esoteric, female, lower-class, foreign, youthful foolery, or folkloric superstition.[651] Technological and naturalist expertise were a key asset in this process as they allowed the former military power to occupy a peaceful yet powerful economic niche on the competitive European and global market, making the economy directly dependent on the empirical system of knowledge.

To bridge the disconnect between the History of Science and History of Economy, Jessica Ratcliff suggests the concept of the "Great Data Divergence." Her idea is to model a scientific divide after the so-called Great Divergence, a concept that describes the early modern period during which "Europe's economy began to grow significantly faster than that of any other part of the world."[652] I certainly believe that there is value to this approach, and especially agree with her notion that the history of science is too concentrated on a very narrow geographical and cultural context.[653] However, her approach suffers from one big problem: science – a concept so inherently Western and elitist that it can hardly be considered global, even if its consequences have been felt around the globe like a meteor strike. By juxtaposing science with economy, the potential for a truly interdisciplinary and intersectional discourse gets lost.

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[651] Fors, *Limits of Matter*, 122, 124, 125-126.

[652] Jessica Ratcliff, "The Great Data Diverge," in *Global Scientific Practice in an Age of Revolutions, 1750-1850*, eds. Patrick Manning, and Daniel Rood (Pittsburgh, Pennsylvania: University of Pittsburgh Press, 2016), 238-239.

[653] Ibid., 237.

Alternatively, I suggest combining the History of Economy with the History of Knowledge, thereby utilizing two concepts much more broadly applicable as they are universal, and – at least in the case of knowledge – much less overused. Science is not global – knowledge is.
If one is to take Ratcliff's suggestion, substitute knowledge for science, and apply it to 18th century Sweden, the following picture emerges: a formerly strong military power – whose attempts at establishing itself as a colonial player failed spectacularly – secured its piece of the global trade pie by using the power of knowledge instead of military prowess.

Unlike other European countries such as Britain, France, Germany, or Russia who maintained their military strength and political influence throughout the 17th and 18th century, Sweden could not rely on warfare and population strength. It thus stands to reason that Sweden's 18th century emphasis on empirical research and the creation of 'useful' knowledge with the goal to turn it into economically valuable and marketable technology was a result of necessity and strategic considerations. Knowledge, if used intelligently, could increase the production of innovative technology, and stakeholders in Sweden – politicians, economists, industrials, empiricists – realized early on that therein lay its chance, and unlike other European countries, it did not have many alternatives. The pursuit of strictly utilitarian knowledge explains how two scholars such as Swedenborg and Linnaeus – men of surprisingly similar origins, with very similar career paths, who made important contributions to the empirical fields of botany and metallurgy respectively, could be perceived and remembered so differently: after Swedenborg's decision to leave empiricism behind, he was faced with backlash from his former naturalist colleagues as well as from the Church, while the reputation of Linnaeus (who had not strayed from the 'right' path) was heightened to that of a pioneer.

To implement the social conventions that kept the hierarchy among different systems of knowledge intact, invasive and oppressive actors (empiricists, the state, the Church, etc.) went to great lengths to ridicule, romanticize, dehumanize, and in general to 'other' different targeted groups at home and abroad, and as the case of Swedenborg shows, this process could under certain circumstances target individuals from their own ranks.

As a criterion for group membership, knowledge hierarchies were used to stabilize power structures and the rules were bendable according to the principles of utilitarianism. The examples of German alchemists, Eva Ekeblad, or the Surinamese botanist Kwasi have shown this clearly: their cases stand out because they went against the norms of their time. Their social classes – foreigners, women, or former slaves (as well as other minority groups) – were usually denied access to elite academic circles. It was only under very specific circumstances that they could transgress class boundaries and gain access to learned circles. The outstanding contributions of Ekeblad and Kwasi, or a temporary scarcity of local Swedish specialists in the case of the foreign alchemists constitute such circumstances: the value they added outweighed the metaphorical cost of admitting them to a higher tier of the hierarchy.

As data, knowledge was used in 18th century Sweden to measure, control, and guide a wide range of social and economic processes, because it increased the power of those already in power as long as they knew how to utilize it advantageously – for individual gain as much as in the interest of the state or a company. As a result, the uneven distribution of knowledge and information increased social stratification, and the solidification of national boundaries.

Looking at a society – past and present – always means looking at its individuals, as well as at the hierarchies among the groups they comprise. On the topic of gender, Merry Wiesner-Hanks writes that all individuals are affected by "[*e*]*very* political, intellectual, religious,

economic, social, and even military change [italics original]."[654] However, gender is only one way of many in which a person can 'deviate' from a society's prevalent normative conventions. In the case of 18th century Sweden, the standard according to which all others were measured was demonstrably that of the rich, white, domestic, married, Christian man. People belonging to this group were, nonetheless, in regard to numbers a minority within a much broader social and political community – a network which they happened to control qualitatively, but not to dominate quantitatively.

As a result, the value of a gender-based methodology on its own to analyze such a complex social constellation is fascinating but limited. While it can be successful at partially explicating the life experience of people on the male and on the female end of the spectrum, and at shifting the focal point onto one of many denominators of minority, it also creates a set of new problems by replacing one norm through another. For example, it brings up the questions of hierarchy within targeted communities: is a white woman's life experience comparable to that of a black man?[655]

Far more promising is an intersectional approach that assumes a critical perspective on all factors that can potentially influence a person's role in a society, as well as on the norms to which they are compared. In the same way that the field of History in the 20th century had to walk away from the standard of the elite, white, male as its norm, so does gender theory have to

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[654] Merry Wiesner-Hanks, "Gender theory and the study of early-modern Europe," in *Practices of Gender in Late Medieval and Early Modern Europe*, eds. Megan Cassidy-Welch, and Peter Sherlock (Turnhout: Brepols, 2008), 9.

[655] Wiesner-Hanks, "Gender theory and the study of early-modern Europe," 11.

"decenter white, economically advantaged, heterosexual, and Western women" and assume critical, fully intersectional viewpoints of human life.[656] Extending this intersectional notion even further, the History of Knowledge allows us to reconcile traditional historical viewpoints with those of Material Culture and Environmental History to include inanimate objects and nature as carriers and subjects of knowledge.

The dogmas of the early modern and modern economy were focussed on one-dimensional measures of wealth for too long. Moving away from traditional world-views has been a necessary step to create an attainable and equitable foundation of living for everybody.[657] Similar things can be said for individual knowledge systems. An important driving factor in creating imbalances was and is information – as a control tool (e.g. in the context presented here as political arithmetic and statistics), and as an exacerbating factor in the global stratification of societies where access to information and education equals power and potential social advancement.

Historical analysis and awareness of the origins of the predominant knowledge system of modern economy and society – Western empiricism – is essential to the creation of a balanced, decolonized, and equitable global market in a sustainable and lasting way. Most importantly, the global community – political stakeholders, economists, policy makers, investors, and consumers – needs to understand the structures and biases inherent in empirical knowledge and Western

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[656] Sandra Harding, *Whose Science? Whose Knowledge?: Thinking From Women's Lives* (Ithaca, N.Y.: Cornell University Press, 1991), 13.

[657] Kate Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (White River Junction, Vermont: Chelsea Green Publishing, 2017), 22.

academia that led to its oppressive stance towards other knowledge systems. This kind of critical approach is needed – not to eliminate empiricism, but to allow individuals and the global community to make better-informed decisions, drawing from the experiences of the past, and with present and future generations in mind.

As an essential part of a critical approach, History of Knowledge serves as a powerful instrument in uncovering hidden normative conventions within social environments, but intersectionality does not and should not stop at human matters: any given society is directly and indirectly defined and affected by, and dependent on its natural environment. In the same way, environments are necessarily defined and affected by human action. The two sides can, reasonably, never be thought completely separated from each other, and therefore a proper understanding of their mutual interactions and dependencies is crucial.

Over the course of the last few centuries, the relation between social and natural environment has changed dramatically due to a variety of reasons – including among others industrialization, commodification, and colonialism. This process has resulted in a dehumanization of the global environment through human action – in the double sense of people moving away from the environment, as well as humans devaluating nature and other humans to the status of simple, readily exploitable commodities. The main examples addressed here were:

- Sweden's involvement in the Atlantic slave trade and colonialism that was to a large degree made possible through its superior metal manufacturing techniques as the main trade commodity;
- Governmental information policies and control through political arithmetic (statistics);

- Hierarchical knowledge systems that were created and kept in place through socio-economic and cultural factors;
- Empirical 'justification' for racial hierarchies and patriarchal gender norms expressed in and through research conducted by Linnaeus and his students, as well as their followers;
- Strategic exploitation of human labour and natural resources in Sweden and abroad based on cameralist-mercantilist economy models;
- Attempted forced cultural and religious assimilation of the Sámi, occupation of their land, and destruction of their traditional life style under Swedish colonialist control;
- And not least: the *damnatio memoriae* of Emanuel Swedenborg and his works as a consequence of his leaving behind naturalism and 'deserting' to the non-empirical field of theosophy.

The process of dehumanization was essential to enabling and justifying the exploitation of human and non-human animals, as well as that of natural resources. Mechanisms of dehumanization and exploitation have been exemplified in this work through the cases of internal and external colonialism under 18th century Sweden's cameralist-mercantilist government, and through the case studies on Emanuel Swedenborg and Carl Linnaeus. All of those cases involved processes for which knowledge and information was essential: not just a vehicle or means to an end, but a control mechanism and a powerful weapon.[658]

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[658] Black, *Power of Knowledge*, 409.

The big concepts in historiography – "imperialism, capitalism, industrialization, commercialization, patriarchy, racial formations" – have consistently maintained a very strong focus on social processes, often sacrificing a more comprehensive worldview for theoretical consistency.[659] I am convinced that History of Knowledge as an inherently intersectional field offers an opportunity to reconcile many of the aspects that traditional methodologies lack. Knowledge is an intrinsic part of all human life and thus of the environments they inhabit. Suggesting an intersectional History of Knowledge is not a panacea, but it offers a first step at understanding the relationships between human society and the natural environment as complementary and reciprocal instead of antagonistically hyphenated.

[659] Moore, "Introduction," 4.

5 Epilogue: Predominance of Knowledge Systems

Throughout my academic career, I have often heard the words: "You know so much about science *for a girl/woman/classicist/historian*." The underlying assumption is that a student of the Arts or Humanities or a woman is not *supposed to* or *considered capable of* understanding the sciences. This insight was bitter as it confirmed the preconceived, outdated and harmful social conventions put in place to uphold a false standard of seriousness and credibility in Western academia.

Indeed, interdisciplinarity and intersectionality are both useful and enriching, and should come naturally, considering that no discipline exists in a vacuum. In an ideal academic world, every student and faculty member would strive to understand enough of somebody else's research field to get into a constructive discussion about it – or at least ask the right questions to achieve better understanding of it.

The distinction between arts and sciences is, like so many others, a rather recent and arbitrary invention of Western academia, and while it serves its purpose – defining subjects and sub-subjects and sub-sub-subjects of diverse -ologies[660] – it follows an arbitrary and oftentimes destructive principle of measuring knowledge according to its economic and empirical value: science on top, arts on the bottom. Additionally, it is also inherently patriarchal, elitist, racist, sexist, and overall biased against minorities as seen in student and faculty demographics of recent centuries and decades.

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[660] The term is taken from Ali Ward's wonderful eponymous podcast. Remember to ask smart people stupid questions.

In an essay on gender theory in early modern Europe, Merry Wiesner-Hanks asks: "If a particular development had little, or indeed a negative, effect on women, can we still call a period a golden age, a Renaissance, or an Enlightenment? Can we continue to view the seventeenth century, during which hundreds or perhaps thousands of women were burned as witches on the European continent, as the period of 'the spread of rational thought'?"[661] Similarly, we should dare to ask if the Western system of knowledge with its claim to absolute certainty and disregard for other systems that do not revolve around empiricism like the sun around a little blue planet is *really* the epitome of knowledge it is hailed to be.

Critiquing a concept means one must provide a better alternative. In this case, I do not have one. Neither can I foresee, at this point in time, a realistic alternative of how to better organize secondary education, nor am I aware of a panacea for the predominance of neo-liberal education values in North America. What I can do is make visible the historical grounds on which the empirical world-view grew, point directly towards its weaknesses, and emphasize the ramifications.

The example of 18th century Sweden, with Linnaeus and Swedenborg as its representative case studies, is, in my opinion, a uniquely telling one because it demonstrates how pervasive and lasting the commodification of knowledge under a cameralist-mercantilist system was. Personally, I find the 18th century to be the first time in history that is – without *much* adjusting – relatable from a 20th or 21st century perspective, and I believe that is to a big part due to the similarities in the way knowledge was generated and utilized.

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[661] Wiesner-Hanks, "Gender theory and the study of early-modern Europe," 13-14.

The concept of scientific realism states that the ideal science is capable of describing the real world *as it is*. That is, however, not the science we currently *have*.[662] While this description necessarily is written from an empirical view-point, it stands to reason that in order to achieve a higher standard of accuracy in representation, the knowledge system of Western empiricism has to become more aware of the presence of other systems of knowledge and their validity. That is not to say that empiricism as a standard has to or should be abolished. It is a broadly agreed upon standard to produce reliable research outcomes, and it has proven very useful. However, accepting empiricism and science also means that they have to be seen as individual systems of knowledge among many others, and that means that historically targeted systems of knowledge need to be acknowledged, too.

At the same time, critical self-assessment and reflection within Western academia is due in order to provide equity and equal opportunities to members of minority groups. Not just because it is fashionable in the post-#metoo era or even because it is the *right* thing to do, but because empiricism mandates that the whole data set is taken into account – even the parts that lie outside the researchers' personal comfort zones.

Colonialism has many parallels in the world of Western, Euro-centric academia – from the exploitation and cheapening of labour (student labourers as well as faculty), especially in North America the commodification of education within the neo-liberal economic model, underrepresentation of black and minority history in curricula, or the lack of diversity and

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[662] Nicholas Rescher, *Priceless Knowledge?: Natural Science In Economic Perspective* (Lanham, MD: Rowman & Littlefield, 1996), 59.

representation among students as well as instructors that is more pronounced in some traditionally white disciplines than in others.

Empiricism – and science itself – is not perfect. The mathematician and logician Kurt Gödel (1906-1978) defined a mathematical system that allowed him to speak about the truth-value of mathematical sentences – meta-mathics, so to say.[663] In this so-called *Incompleteness Theorem*, he demonstrated that there are true mathematical statements that cannot be proved within that same system. Even if added as axioma, the statements can be replaced by an infinite number of similar ones – that way, Gödel showed (in a very complicated, non-straight-forward way, admittedly) that mathematics is incomplete.[664] He ultimately questioned the certainty and expressive power of mathematics itself. This result is – ironically – deeply consistent with empiricism and the ideal of academic cultures: only science that can question itself is good science. In this regard, maybe the humanities are ahead of the sciences.

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[663] One might say that Gödel finished what Polhem and Swedenborg started.

[664] Marcus Du Sautoy, *The Great Unknown: Seven Journeys to the Frontiers of Science* (New York: Viking, 2016), 379.

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