Introduction

The letter of America's great son, Franklin, describing his experiments in electricity made in Philadelphia, to Collinson in London, is dated October 19, 1752. The same was also pursued in Europe by a few men, among whom Beccaria particularly distinguished himself. Hell, too, was occupied exactly during this time by similar physical experiments and thoughts, but he never made them public. Several souls may possess the power of inventing the same thing, but the circumstances do not assist the one as they do the other. [...] The indefatigable Frantz appointed there [at the Viennese university observatory] Hell as director, and the tower owes its shape and arrangement to him. Why can such sons of the fatherland not have scope for their labors in their field here at home? Even if great minds are born to us, it is other lands that benefit from them. When Hell gave lessons in mechanics, so as to raise skilled and clever artists and craftsmen for Vienna, it was not our people who made progress.

GÁBOR DÖBRENTÉI, "Hell Maximilián élete" (The life of Maximilian Hell), in *Erdélyi Múzeum* (Pest: Trattner, 1817), 8:90, 91–92

...

In the life of this man, we see a happy coincidence of circumstances under which his faculties and powers could be developed and perfected, and which earned him reputation among the mathematicians and astronomers of our times. The future preoccupations of his mind were presaged early on; his mind received a clear direction already in his tender youth, and the various situations in which Hell was later placed provided him with an opportunity to pursue this unhindered, and to earn himself everlasting merits with the perfection of his science.

"Maximilian Hell," in *Nekrolog auf das Jahr 1792: Erhaltend Nachrichten von dem Leben merkwürdiger in diesem Jahre verstorbenen Personen*, ed. Friedrich Schlichtegroll (Gotha: Perthes, 1793), 1:282–283

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In the image on the opposite page, a man is sitting in a composed, elegant, yet casual posture in front of his desk. His right elbow is resting on the desk; sheets

of paper on the desk and in his left hand, and a quill in an inkpot identify him as a man of letters; his two fingers gently touching the visible parts of a quadrant also point to expertise in using instruments of astronomical observation. In the picture hanging on the wall behind him, a shining celestial body in the dark sky is shedding bright light on a wooden building; the stark silhouettes create a sense of cold freshness—a contrast with the coziness of the interior, intimated by the grandfather clock in the background on the right, and the graceful fall of the drapery on the desk. The central figure may be past the prime of his life, but an upright back and muscular legs reveal him to be in a good physical condition: while a scholar, he is agile, not averse to exertion. His look, too, is lively, confident, and penetrating, yet benign. His cheeks seem slightly frostbitten, as if he had just rushed across the chilly space that separates the small house from his present seat. He has still not shed the outfit that protects him from a hostile climate and helps him get around: pointed footwear, to facilitate easy movement in thick snow, warm socks and scarf, a full-length fur coat, and an all-round fur cap that can be fastened under the chin.

As the inscription tells the viewer, the sitter is

the reverend father Maximilian Hell of the Society of Jesus, royal and imperial astronomer, in his Lappish garment, having felicitously carried out the observation of the transit of Venus before the Sun's disc on June 3, 1769 at Vardøhus in Lapland, at the behest of Christian VII of Denmark and Norway.

The box-like structure attached to the wooden house in the picture is actually Maximilian Hell's (1720–92) and his associates' makeshift "observatory," its image being reproduced from Hell's own sketches. This mezzotint was executed, on the basis of a drawing by Wenzel Pohl, in 1771 by the Augsburg artist Johann Elias Haid (1739–1809)¹—a keen and accomplished portraitist of contemporary celebrities from Alessandro Cagliostro (1743–95) through Jean-Jacques Rousseau (1712–78) and Voltaire (1694–1778) to German scholars like Johann Jakob Moser (1701–85), Johann Stephan Pütter (1725–1807), and Johann Joachim Winckelmann (1717–68)—at what is generally viewed as the climax of Hell's career: right after his return from the Arctic region, having successfully participated, at the helm of an expedition sponsored by the king of Denmark–Norway, in one of the emblematic collaborative ventures of eighteenth-century field

¹ The print, at a price of one florin and twenty-five *kreuzers*, was recommended as "a nice present to the enthusiasts of Haid's works, and to scholars who appreciate the services of Mr. Hell" in the *Kayserlich königlich allergnädigst privilegirte Realzeitung* (hereafter: *Realzeitung*), no. 34 (August 17, 1771): 539–40.

science. Apart, perhaps, from the striking gaze of the protagonist and the reference in the inscription, it is hardly possible to identify him as a prominent Jesuit. The picture, while following iconographic traditions of representing “great men of science,” is unusual in representing the full body of the sitter. It marks, in a generic manner, the triumph of metropolitan science and civility, reinforced by an ability to accommodate to the circumstances of a rough field, and to adopt from local interlocutors the means of overcoming its adversity.

From visual representation, let us now turn to the written testimonies on Hell cited above, not as contemporaneous as the portrait, but excerpted from assessments conceived within a generation of his death, in the style of the academic *éloge* established a century earlier by Bernard le Bovier de Fontenelle (1657–1757) as permanent secretary of the Académie Royale des Sciences in Paris. The first one was written by the Transylvanian Hungarian poet Gábor Döbrentei (1785–1851), and published in one of the locally important serial publications of the time dedicated to the cultivation and refinement of manners and letters, arts and sciences in a Hungary perceived as backward, edited by Döbrentei himself. While the account focuses on Hell’s character, career, and achievements, and is generally imbued with appreciation and enthusiasm, the pessimistic tenor and substance of the selected passage conveys a sense of resignation deriving from such a perception of backwardness. “Circumstances” (*környülmények*) are alleged to set a major barrier for scholars from a marginal country, lagging behind in progress, which tends to prevent them from making a mark in the learned world. When they manage to rise to a recognized status, this supposedly occurs despite Hungary’s circumstances, and frequently with the result that the “benefits” they produce do not have any fertilizing effect in their homeland.

The notions informing Haid’s portrait and Döbrentei’s eulogy are readily discernible in several strands of literature discussing Hell’s life and work. Internationally, Hell has figured prominently in historical accounts of the “Venus transit enterprise,” and generally in histories of astronomy in the eighteenth century and more broadly. These are predominantly “internalist” histories of science, preoccupied with the accuracy of measurements, the peculiarities of instrumentation, and other features that enable contemporary practitioners to enter into a meaningful professional dialogue with figures they identify as their predecessors.² These studies faithfully record Hell’s contribution, as the

2 The Arctic expedition figures as an episode in Harry Woolf’s (1923–2003) standard *The Transits of Venus: A Study of Eighteenth-Century Science* (Princeton: Princeton University Press, 1959), as well as several more recent surveys, in no small measure occasioned by the 2004 and 2012 transits. Eli Maor, *Venus in Transit* (Princeton: Princeton University Press, 2004); William Sheehan and John Westfall, *The Transits of Venus* (Amherst: Prometheus Books, 2004); Christophe Marlot, *Les passages de Vénus: Histoire et observation d'un phénomène astronomique*

leader of one of more than two dozen expeditions committed to the same task and scattered all over the globe, to the 1769 Venus transit observations and the ensuing calculations of the solar parallax (and, by implication, the distance between the Earth and the Sun). They also dwell on the dispute the results occasioned between Hell and several colleagues, particularly the Parisian astronomer Joseph Jérôme de Lalande (1732–1807), as well as the subsequent accusations that Hell had falsified data, and his “vindication” from these charges several decades later. These accounts are marked by generally sound scholarship, a fine eye for detail, and, sometimes, excellent story-telling and hilarious anecdotes, a sense for the drama and heroism, the hope and despair, the triumph and failure involved in the cultivation and progress of scientific knowledge, especially in field expeditions. However, they usually capture their subjects in static moments rather than in the dynamics of their movement across temporal and spatial boundaries, in real and symbolic terms. Apart from gestures toward the perceived need of paying attention to factors of patronage and institutional setting, they fail, or make little effort, to systematically acknowledge the character of scientific knowledge production as a social and cultural practice, one thoroughly intertwined with other similar practices, determined by and determining agendas other than deriving from the desire to advance the disciplines. The premises on which they rest are different from this book, and they are insufficiently contextualized.

The other thrust of modern scholarship, in which Hell is not merely a supporting cast member but takes center stage, and in which the attitude of Döbrentei may be traced, is even more pronouncedly conceived in the heroic mold, although the framing is different. In this literature, Hell has been hailed as the first³ practitioner in his field in his home region who not only successfully adopted and applied the most recent—Newtonian—advances in the discipline but also made original and substantial contributions to its further development. As a statement of fact, this is not at all mistaken. What is noteworthy, however, is that this claim is combined not only with the sentimentalized

(Paris: Vuibert/Adept, 2004); Andrea Wulf, *Chasing Venus: The Race to Measure the Heavens* (New York: Penguin, 2012); Mark Anderson, *The Day the World Discovered the Sun: An Extraordinary Story of Scientific Adventure and the Race to Track the Transit of Venus* (Cambridge, MA: Da Capo Press, 2012).

3 Or, at any rate, one of the first: the Ragusan Ruggiero Giuseppe Boscovich/Ruđer Josip Bošković (1711–87) is a (more) famous contemporary counterpart. For overviews of his life and contributions, see Piers Bursill-Hall, “Introduction,” in *R.J. Boscovich: Vita e attività scientifica; His Life and Scientific Work*, ed. Piers Bursill-Hall (Rome: Istituto della Enciclopedia Italiana, 1993), v–xxiii; Jonathan A. Wright, “Ruggiero Boscovich (1711–1787): Jesuit Science in an Enlightenment Context,” in *Enlightenment and Catholicism in Europe: A Transnational History*, ed. Jeffrey D. Burson and Ulrich Lehner (Notre Dame: University of Notre Dame Press, 2014), 353–70.

image of a savant arising from a peripheral environment and heroically defying perceived marginality in order to advance mainstream Western science. It also implies the patriotic appropriation of Hell, by Hungarian and Slovak authors, for their own respective national scientific canons—based on the shaky foundation of his having been born and raised in a geographic territory then comprising the northern fringe of the Kingdom of Hungary, but transferred after the First World War to the new Czechoslovak state, and being part of Slovakia since the disintegration of Czechoslovakia in 1992.⁴

As a stepping stone for transcending the anachronism involved in such representations it is helpful to invoke the second quote introducing this introduction. The Thuringian teacher and scholar Anton Heinrich Friedrich Schlichtegroll (from 1808 von Schlichtegroll [1765–1822]) is best known for his short life of Wolfgang Amadeus Mozart (1756–91), published in the first volume of his obituaries on famous people who died in 1791, which was so successful that he launched a series (apparently, no longer writing the lives himself, but “collecting” them).⁵ The passage quoted from the biography of Hell, contained in the second volume, is remarkable on account of its strikingly different use of “circumstance” from Döbrentei, where it serves to denote limiting conditions or constraints. Here, by contrast, we learn of “a happy coincidence of circumstances” (*Umstände*) and “various situations in which Hell was later placed,” all providing him, as enabling conditions or stimulating provocations, with “opportunities” to exert active agency in “earning merits with the perfection of his science”—in negotiating and maintaining (if sometimes also losing) positions amid temporal and spatial transitions, in a career spanning half a century of significant political, intellectual, and cultural change, and traversing back and forth between local, regional, imperial, and global realms of experience.

Valuable contextualized historical studies of Hell have since been published, locating him more firmly and at the same time with greater plasticity in his contemporary milieu. Hell’s “scientific environment in Vienna” has been explored in a great deal of detail, looking not merely to Vienna but the

4 A two-volume work devoted to “the memory of Maximilian Hell,” a concise monograph on Hell as “an important figure of Slovak science,” a host of relatively short Hungarian- and Slovak-language articles, and references in survey histories of Hungarian and Slovak astronomy belong here. See mainly Ferenc Pinzger, S.J., *Hell Miksa emlékezete*, 2 vols. (Budapest: Magyar Tudományos Akadémia, 1920 and 1927); Elena Ferencová, *Maximilián Hell významná osobnosť slovenskej vedy a techniky* (Bratislava: Asklepios, 1995). Both of these make available a respectable number of sources. A comprehensive bibliography on Hell and his fellow Jesuit Venus observer János (Joannes) Sajnovics, listing over six hundred titles, is also available; see Sándor Hadobás, *Hell Miksa és Sajnovics János bibliográfiája* (Rudabánya: Érc- és Ásványbányászati Múzeum Alapítvány, 2008).

5 Bernhard Ebner, “Schlichtegroll, Friedrich von,” in *Neue Deutsche Biographie* 23 (Berlin: Duncker & Humblot, 2007), 72–73.

Habsburg monarchy as a whole, especially in regard of the activities of the Society of Jesus and other Catholic orders.⁶ Even more pertinently, the simplistic historiographical representations summarized above have also been challenged in a trans-regional study of Hell, looking at him in Central European and Scandinavian contexts, resorting to a combination of biographical reconstruction and the “relocation” of European and global astronomical knowledge as pursued in relation to the 1761 and 1769 transits of Venus.⁷ The ambition of this book is different from, and perhaps larger than both. It cannot aspire to be a biography in the ordinary sense: the scarcity of available “ego-documents” and other sources that may shed light on Hell as a person with a “self” requires caution in this regard. Rather, it proposes to utilize Hell’s embeddedness, simultaneously or in turns, in several eighteenth-century life worlds of differing scales, both real and symbolic, and the apparent facility with which he moved among them, for testing the permeability of the boundaries construed as separating them. By doing so, it hopes to reveal something interesting, from a non-metropolitan perspective, about the eighteenth-century European processes of shaping and exchanging knowledge. These worlds and “worlds” include the multi-ethnic and multi-confessional, small but prosperous and self-conscious urban centers of northern Hungary and Transylvania, with their traditions of mines, manufactures, good education, and self-government; the imperial metropolises of the Habsburgs and the Oldenburgs, both ambitious to consolidate their realms as empires and to enlist science in the service of this endeavor (and the staunch resistance it met in the case of the former from the elite of the Hungarian parts of the monarchy); the icy wilderness of the Arctic, with the opportunities it offered for scientifically penetrating unusual natural phenomena as well as human diversity; the cosmopolitan and Catholic hierarchy of the Society of Jesus; and the cosmopolitan and apparently non-hierarchical Enlightenment Republic of Letters. The “circumstances” that affected the ups and downs of Hell’s career, presenting him with chances and raising barriers that challenged him to develop ever new strategies of accommodation and self-assertion, arose from the changes—some of them gradual, others abrupt, all of them significant—in the relation between these “worlds” over the half century of his active life. A consideration of the *jeux d’échelles*,

6 Nora Pärri, “Maximilian Hell und sein wissenschaftliches Umfeld im Wien des 18. Jahrhunderts” (PhD diss., University of Vienna, 2011; published Nordhausen: Bautz Verlag, 2013).

7 Per Pippin Aspaas, “Maximilianus Hell (1720–1792) and the Eighteenth-Century Transits of Venus: A Study of Jesuit Science in Nordic and Central European Contexts” (PhD diss., University of Tromsø, 2012); <http://hdl.handle.net/10037/4178> (accessed April 8, 2019).

“scalar games”⁸—“trickster travels,” one might say⁹—pursued by Hell among these poles highlights hitherto unappreciated dimensions of the dynamics of science, state-building, Enlightenment, and Catholicism in the Habsburg monarchy and beyond, in a period of dramatic transformations.

Before delving into the depths of this saga, the remainder of this introduction briefly examines the relevance to our subject of recent developments in Enlightenment studies, especially with regard to their integration with the study of Catholicism (the literature on the “Catholic Enlightenment”), including the Jesuit order and Jesuit science, and with the processes of state-building and cultural realignment known as enlightened absolutism. Next, while this is not a biography, the “life” of an individual is central to its argument to an extent that it is pertinent to ask how the present account may benefit from the recent emergence of a new style of historical biography. The engagement with both of these topics is not meant to be exhaustive: rather, it is confined to the aspects that seem relevant to the present undertaking.

1 Enlightenment(s)

It is helpful to continue by turning to yet another appreciation of Hell, this time cited from a piece of modern scholarship on the Society of Jesus in the Eastern European periphery: “While Hell’s academic and scientific accomplishments place him firmly within the Enlightenment, he was also a product of the late Counter-Reformation culture of Hungary and one of several Jesuits who became identified with the development of Hungarian national consciousness.”¹⁰ Hell is only one, and by no means a central, figure in this analysis of “the politics of religious pluralism in eighteenth-century Transylvania.” Nevertheless, this brief characterization raises interesting questions about the relationship that an eminent mid- to late eighteenth-century Jesuit scientist of Hell’s peculiar background may have had to the various aspects, strains, and manifestations of the Enlightenment, and to the budding movements of national awakening in Central Europe that both incorporated the intellectual agendas of the Enlightenment and arose in response to them.

8 Cf. Jacques Revel, ed., *Jeux d'échelles: La micro-analyse à l'expérience* (Paris: Gallimard-Seuil, 1996).

9 The expression is borrowed, of course, from Natalie Zemon Davis, *Trickster Travels: A Sixteenth-Century Muslim between Worlds* (New York: Hill and Wang, 2006).

10 Paul Shore, *Jesuits and the Politics of Religious Pluralism in Eighteenth-Century Transylvania: Culture, Politics, and Religion, 1693–1773* (Aldershot: Ashgate, 2007), 105.

Our notion of the Enlightenment as a formative cultural and intellectual movement of European modernity is still very largely, and rightly, determined by Immanuel Kant's (1724–1804) famous 1784 essay "Answer to the Question: What Is Enlightenment?" As is well known, Kant defined Enlightenment as "daring to know" (*sapere aude*)—in broader terms, having the courage to rely solely on one's reason in making responsible moral decisions, to the exclusion of guidance by any real or supposed external authority—and as the pursuit of "emancipation of humanity from its self-incurred immaturity."¹¹ As such, the Enlightenment is supposedly predicated on a character and set of values that are universally human and "cosmopolitan," as well as essentially secular and anti-authoritarian¹² (even though some interpretations have stressed its tendency to assume a specific kind of intransigent dogmatism, capable of lapsing into an authoritarianism worse than had ever been known before¹³). According to textbook knowledge, while cosmopolitan, the set of cultural and intellectual attitudes styled as "enlightened" seems to have been specifically bred (after some English and Dutch antecedents) within the confined milieu of French, particularly Parisian, literary and philosophical ambiances, from which they were disseminated elsewhere: as far as "diversity" in the European Enlightenment¹⁴ emerged as a research question, it was explored in terms of the proximity achieved, or the distance still retained, vis-à-vis the Parisian model in a process of reception, the outcome of which was more or less predictable according to the level of overall social and cultural "development" in the recipient environment.¹⁵

Thanks to the more intense involvement of historians and in general contextually more sensitive scholars in academic work on the Enlightenment over the past two generations, this monolithic and "obvious" notion has undergone a series of important modifications. Overall, these changes amount to the extension of the very idea of the Enlightenment from a social and moral

11 Immanuel Kant, "Answer to the Question: What Is Enlightenment? [1784]," in *What Is Enlightenment? Eighteenth-Century Answers and Twentieth-Century Questions*, ed. James Schmidt (Berkeley: University of California Press, 1996), 58–64.

12 Peter Gay, *The Enlightenment: An Interpretation*, 2 vols. (New York: Knopf, 1967–69).

13 Theodor Adorno and Max Horkheimer, *Dialectic of Enlightenment* (Stanford: Stanford University Press, 2002 [1944/47]).

14 Roland Mortier, "Diversité des Lumières," in *Unité et diversité de l'empire des Habsbourg à la fin du XVIIIe siècle*, ed. Roland Mortier and Hervé Hasquin (Brussels: Editions de l'Université de Bruxelles, 1988), 15–24.

15 László Kontler, "The Enlightenment in Central Europe?," in *Discourses of Collective Identity in Central and Southeast Europe (1745–1945)*, vol. 1, *Late Enlightenment*, ed. Balázs Trencsényi and Michal Kopeček (Budapest: Central European University Press, 2006), 33–44.

philosophy of emancipation (and its literary manifestations) into a set of intellectual, cultural, and social practices. The goal of such practices was the accumulation and systematization of knowledge about man's natural, moral, and social environment, for the sake of improving this environment and thereby achieving happiness for humans—in this world, irrespective of beliefs held about the next one.¹⁶ Besides allowing a more directly meaningful engagement, from the vantage point of Enlightenment studies, of areas from legislation, government, and policymaking through manners and sociability to the arts and sciences (pursuits governed by agendas deriving from beyond their narrowly conceived boundaries), this has also led to the rise of a new notion of the Enlightenment's much-vaunted “secularism,” one less militant and dogmatic and more compatible with cultivating Christian belief and worship. To some, this seemed to be a dilution of the concept of Enlightenment, while to others it was an opportunity to understand the phenomenon in a dynamic, elastic, and perhaps historically more authentic manner. The emerging “plurality of Enlightenments” has been understood and analyzed from several perspectives, including “national,”¹⁷ ideological (“radical” versus “conservative”),¹⁸ and religious¹⁹ contexts. It has been suggested that while the questions that exercised the minds of “the enlightened” were the same or at least very similar across the European continent and its colonial extensions, the answers depended on a broad variety of local or regional considerations and

16 See the overviews in John Robertson, *The Case for the Enlightenment: Scotland and Naples 1680–1760* (Cambridge: Cambridge University Press, 2005), 1–51; László Kontler, “Introduction: What Is the (Historians’) Enlightenment Today?,” *European Review of History/Revue d’histoire européenne*, special issue, “Enlightenment and Communication: Regional Experiences and Global Consequences,” ed. László Kontler, 13, no. 3 (2006): 337–55.

17 Roy Porter and Mikuláš Teich, eds., *The Enlightenment in National Context* (Cambridge: Cambridge University Press, 1981)

18 J.G.A. [John Greville Agard] Pocock, “Clergy and Commerce: The Conservative Enlightenment in England,” in *Letà dei lumi: Studi storici in onore di Franco Venturi*, ed. R. [Raffaello] Ajello, E. Cortese and Vincenzo Piano Mortari (Naples: Iovene Editore, 1985), 1:523–62; Pocock, *Barbarism and Religion*, 5 vols. (Cambridge: Cambridge University Press, 1999–2011); Jonathan Israel, *Radical Enlightenment: Philosophy and the Making of the Modern World* (Oxford: Oxford University Press, 2001); Israel, *Enlightenment Contested: Philosophy, Modernity, and the Emancipation of Man 1670–1752* (Oxford: Oxford University Press, 2006); Israel, *A Revolution of the Mind: Radical Enlightenment and the Intellectual Origins of Modern Democracy* (Princeton: Princeton University Press, 2009); Israel, *Democratic Enlightenment: Philosophy, Revolution, and Human Rights 1750–1790* (Oxford: Oxford University Press, 2011).

19 David Sorkin, *The Religious Enlightenment: Protestants, Jews, and Catholics from London to Vienna* (Princeton: Princeton University Press, 2008).

allegiances—while it is also true that subsequently they were again capable of assuming broader significance.²⁰

What this leads us to acknowledge is that we need to pay more attention to the multilayered intellectual gravitation, cultural loyalty, social experience, and realms of existence or “life worlds” (*Lebenswelten*) of individual actors who move among these (national as well as sub- and supra-national; religious, professional, institutional, socio-cultural) realms with considerable ease.²¹ In other words, it points to the recognition that if we want to understand springs of action, actions, and agents in the Enlightenment as they *were*, in and of themselves both “national” and “trans-national” frameworks of interpretation are inadequate, and we need one that takes account of the possibility and the reality of shifting accents and flexible adaptability between the one and the other of these “realms.” Two metaphors are especially helpful in elucidating such a framework. One is the idea of the Enlightenment Republic of Letters as an “echo chamber.”²² In it, thanks to the medium of print culture and the proliferation of review journals, a plurality of voices would be rendered almost cacophonous by the near-inevitability of one’s own utterances being critically responded to by a commentator with whom one was personally unacquainted. At the same time, and for the same reason, in this space it was always possible to appeal to an authority beyond one’s immediate environment. As a matter of fact, this is inseparable from the larger phenomenon of “the rise of the public (sphere)” in eighteenth-century Europe, with its myriad venues and vehicles of polite and scholarly sociability.²³ Second, it is also useful to approach the Enlightenment as a “system” in a sense similar to Immanuel Wallerstein’s

20 Franco Venturi, *Settecento riformatore*, 6 vols. (Turin: Einaudi, 1969–90); John Robertson, “Franco Venturi’s Enlightenment,” *Past and Present* 137 (1992): 183–206; Robertson, “The Enlightenment above National Context,” *Historical Journal* 40 (1997): 667–97.

21 Cf. “The Enlightenment is perhaps best framed as a transnational process characterized by secular and religious motives and implications, and by which a constantly evolving series of movements dynamically intersect and dialectically constitute one another.” Jeffrey D. Burson, “Introduction,” in Burson and Lehner, *Enlightenment and Catholicism*, 1–37. On the centrality of spatial dimensions to the Enlightenment’s concerns and contents, see Charles W.J. Withers, *Placing the Enlightenment: Thinking Geographically about the Age of Reason* (Chicago: University of Chicago Press, 2007).

22 Lorraine Daston, “Afterword: The Ethos of Enlightenment,” in *The Sciences in Enlightened Europe*, ed. William Clark, Jan Golinski, and Simon Schaffer (Chicago: University of Chicago Press, 1999), 495–504.

23 The concept derives from Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society* (Cambridge, MA: MIT Press, 1989 [1962]). See the joint review of the English edition of Habermas’s book with Reinhart Koselleck’s *Critique and Crisis*, Anthony LaVopa, “Conceiving a Public: Ideas and Society in Eighteenth-Century Europe,” *Journal of Modern History* 64, no. 1 (1992): 79–116; also

“capitalist world system.” According to Wallerstein, while capitalism as a peculiar set of relations of production continued to be confined to portions of the Western world in the sixteenth and seventeenth centuries, thanks to the special dynamism it assumed during this period, it was capable of drawing into its orbit and turning to its own purposes regions where those relations were not capitalist, to an extent that, complementing the West as the “core,” they all formed parts of the same global system as “semi-peripheries” and “peripheries.”²⁴ One may not need to agree with the Wallersteinian analysis of the capitalist world system, nor even adopt the language of center and periphery, in order to conceive of the Enlightenment, by the same token, as a “system” of eighteenth-century culture and thought possessing its own intellectual and ethical priorities and agendas as well as more or less clear boundaries, while at the same time capable of involving, affecting, enlisting, or even swallowing entities whose own logic and mode of operation was not necessarily altogether or pervasively “enlightened.”

2 Catholic Enlightenment—Enlightenment Catholicism

One obvious candidate for the role of such an ambiguously located entity in the Enlightenment world is the Christian church and religion, especially its Catholic version, which according to classic accounts so thoroughly imbued the structures of tradition and authority that were the prime target of critique by the eighteenth-century’s “little flock of philosophers.”²⁵ Renaissance humanism and the Protestant Reformation have long been credited with preparing the ground for the enlightened assault on dogma, superstition, and fanaticism, but Catholicism, with its continued attachment to devotional practices such as the adoration of saints and belief in miracles, its maintenance of armies of apparently idle monks, ostentatious baroque pomp, and universal monarchy as the appropriate form of ecclesiastical government, was deemed antithetical to the ideals of emancipation, utility, and progress associated with the Enlightenment. It is true that a Catholic Enlightenment was discovered in German scholarship as long ago as the beginning of the twentieth century, as part of a more comprehensive attempt to deliver the Enlightenment from the

James van Horn Melton, *The Rise of the Public in Enlightenment Europe* (Cambridge: Cambridge University Press, 2001).

24 Originally developed in Immanuel Wallerstein, *The Modern World System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York: Academic Press, 1976).

25 For this famous epithet, see Gay, *Enlightenment*, 1:3–8.

conservative-ultramontanist charge of complicity in bringing about the revolutionary tide. Already at that time, the Roman Catholic Church of the eighteenth century was claimed to have included significant forces that relied on enlightened tools in their endeavor to implement reforms aiming at adaptation to the requirements of modern times.²⁶ However, while the subject assumed a special significance in the post-*Kulturkampf* intellectual and political milieu of Germany and gained some currency in German scholarship,²⁷ from the point of view of international Enlightenment research it has remained an undercurrent—and “Catholic Enlightenment” as a compound looked to most mainstream specialists a contradiction in terms—until the past generation.

This more recent thrust of scholarship—initially also dominated by Germanophone historians, with the incrementally more intense involvement of other scholars—has been marked by significant debates, even fissures, but one can eventually discern a rough consensus in the treatment of some major themes. Still acknowledging Enlightenment and Catholicism to be strange bedfellows, some have preferred the term Reform Catholicism, but others objected that this obliterates the palpable enlightened influences on the reform processes.²⁸ Somewhat inversely, “enlightened Catholicism,” which has also been proposed, met resistance, especially on the part of French historians because in their view it drew emphasis on the secularizing momentum gaining ground in the church at the expense of the aspect of religious renewal.²⁹ Another fault line concerned the question of the reconcilability of the Enlightenment with Catholicism (and religion more generally). A negative answer to this question implied, first, a wedge between the mainstream Enlightenment and

26 Sebastian Merkle, *Die katholische Beurteilung des Aufklärungszeitalters* (Berlin: Curtius, 1909).

27 Burson, “Introduction,” 3–5.

28 Bernhard Schneider, “Katholische Aufklärung: Zum Werden und Wert eines Forschungsbegriffs,” *Revue d'histoire ecclésiastique* 93 (1998): 354–97; Rudolf Schlögl, “Secularization: German Catholicism at the Eve of Modernity,” *German Historical Bulletin* 25, no. 1 (2003): 5–21.

29 Louis G. Rogier, “L’Aufklärung catholique,” in Louis G. Rogier, Guillaume de Bertier de Sauvigny and Joseph Hajjar, *Nouvelle histoire de l’église*, vol. 4, *Siècle des Lumières, révolution, restauration* (Paris: Seuil, 1966), 137–61; Bernard Plongeron, “Wahre Gottesverehrung und das Problem des Unglaubens: Debatten um Inhalte und Wege von Religiosität und Seelsorge,” in *Die Geschichte des Christentums*, vol. 10, *Aufklärung, Revolution, Restauration (1750–1830)*, ed. Bernard Plongeron (Freiburg: Herder, 2000), 233–93. See, however, albeit on a different context, Richard Butterwick, “Between Anti-Enlightenment and Enlightened Catholicism: Provincial Preachers in Late-Eighteenth-Century Poland–Lithuania,” in *Peripheries of the Enlightenment*, ed. Richard Butterwick, Simon Davies, and Gabriel Sánchez-Espinosa (Oxford: Voltaire Foundation, 2008), 201–28.

the Catholic Enlightenment as altogether different species; and second, the inevitable failure of the latter.³⁰

Yet, as hinted above, the broader, comparative, and transnational studies of the Catholic Enlightenment have been pointing toward a more synthetic picture. A central motif of this picture is the continuity established between the reform movement within the Catholic Church initiated by the Council of Trent (1545–63) and the Catholic Enlightenment, on the grounds that the Tridentine spirit—in full force at the turn of the seventeenth and eighteenth centuries, thanks to the efforts of Popes Innocent XI (1611–89, r.1676–89) and Innocent XII (1615–1700, r.1691–1700) to revive it—contained elements that were congenial to the Enlightenment and received a new impetus from it.³¹ One of these elements was a more rational, utilitarian, and practical understanding of the essence and the role of the Christian religion, with a view to enabling it to penetrate the capillaries of society, to attain a more intense and intimate presence in believers' everyday lives and to genuinely improve their spiritual well-being. To be sure, one of the means was the awe-inspiring aesthetic offensive of baroque. But from the outset, these goals were also pursued by an appeal to the understanding: greater concern with education for the clergy and the laity, and some liberality in religious practices, such as the use of the vernacular in the

30 Peter Hersche, *Der Spätjansenismus in Österreich* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1977), 390–405; Karl Otmar von Aretin, "Katholische Aufklärung im Heiligen Römischen Reich," in von Aretin, *Das Reich: Friedensgarantie und europäisches Gleichgewicht 1648–1806* (Stuttgart: Klett-Cotta, 1986), 403–33. Cf. Harm Klüeting, "Der Genius der Zeit hat sie unbrauchbar gemacht': Zum Thema Katholische Aufklärung; Oder: Aufklärung und Katholizismus im Deutschland des 18. Jahrhunderts; Eine Einleitung," in *Katholische Aufklärung: Aufklärung im katholischen Deutschland*, ed. Harm Klüeting, with Norbert Hinske and Karl Hengst (Hamburg: Meiner, 1993), 1–35, where the "irreconcilability" claim is combined with a forceful statement of the continuity between the Trent reform and the Catholic Enlightenment.

31 On the stretch of Tridentine reform into the late seventeenth and eighteenth centuries, see Owen Chadwick, *The Popes and the European Revolution* (Oxford: Clarendon Press, 1981), esp. 94–95; Mario Rosa, *Cattolicesimo e lumi nel settecento italiano* (Rome: Herder, 1981), esp. 1–48; Bernard Dompnier, "Die Fortdauer der katholischen Reform," in *Die Geschichte des Christentums*, vol. 9, *Das Zeitalter des Vernunft (1620/30–1750)*, ed. Bernard Plongeron (Freiburg im Breisgau: Herder, 1998), 211–300; Derek Beales, "Religion and Culture," in *The Eighteenth Century: Europe 1688–1815*, ed. Tim C.W. Blanning (Oxford: Oxford University Press, 2000), 131–77; Plongeron, "Wahre Gottesverehrung," 268; Peter Hersche, *Muße und Verschwendung: Europäische Kultur und Gesellschaft im Barockzeitalter* (Freiburg: Herder, 2006), 1:152–211; Ulrich L. Lehner, "Introduction: The Many Faces of the Catholic Enlightenment," in *A Companion to the Catholic Enlightenment in Europe*, ed. Ulrich L. Lehner and Michael Printy (Leiden: Brill, 2010), 1–62, here 18–21; Burson, "Introduction," 6–9. Most contributions to these two latter volumes also underline the continuity between Trent and Enlightenment Catholicism.

liturgy. These were regarded just as instrumental in enhancing the accessibility of theological truths as the renewed emphasis on the priestly duty of pastoral care. Such objectives could well be understood as consonant with the Enlightenment's pursuit of happiness; in turn, eighteenth-century Catholics engaged in that pursuit could well understand the preservation of the moral vitality of their church as fundamental to it.³² Catholic clergymen of sound learning and virtue, like their Protestant counterparts, would then also emerge as, more than spiritual leaders, also providers of authentic guidance to their flock on other aspects of conducting their lives, from hygiene through child-raising to farming.

It has also been argued that it is reductive to conceive of the pursuit of happiness via the accumulation and critical examination of knowledge as a purely secular one, and that it was far from alien to the religious, including Catholics. This claim has been combined with the reminder that the theology of the Catholic Reform was permeated by Molinist notions asserting free will, and its accompanying anthropology was optimistic about the capacity of humankind to attain moral as well as intellectual improvement.³³ The Protestant Reformation and Catholic Reform of the sixteenth and seventeenth centuries are now seen as having together inaugurated a new era in the full Christianization of Europe, implying a war on superstitious beliefs and practices of a popular culture in which the remnants of heathen tradition allegedly still survived. Roman Catholicism itself was perceived as in need of purging itself of superstitious elements, even by subjecting accounts of miracles and other interventions of the supernatural to the test of modern advances in natural knowledge, based on empiricism, experiment, and observation.³⁴ Though canonization was perhaps the area of the greatest intransigence, human virtue, besides martyrdom and the performance of miracles, assumed greater importance among its criteria.³⁵ Physico-theology in the style of Isaac Newton (1643–1727)—with the new science highlighting the status of God as the creator of the most harmonious system imaginable—had many Catholic followers, especially in Italy.³⁶ The tradition of the church itself came under scrutiny with the stringent

32 Cf. Burson, "Introduction," 14.

33 Lehner, "Introduction," 17–18.

34 Francis Young, *English Catholics and the Supernatural, 1553–1829* (Aldershot: Ashgate, 2013), 74; Ulrich L. Lehner, *The Catholic Enlightenment: The Forgotten History of a Global Movement* (Oxford: Oxford University Press, 2016), 16, 126–53.

35 Lehner, *Catholic Enlightenment*, 155–79.

36 Vincenzo Ferrone, *The Intellectual Roots of the Italian Enlightenment: Newtonian Science, Religion, Politics in the Early Eighteenth Century* (Atlantic Highlands: Humanities Press, 1995); Lehner, *Catholic Enlightenment*, 42–43.

methods of historical and philological criticism,³⁷ one of the outcomes being the assertion that the ever greater scarcity of miraculous events recorded in that tradition is proof that while in the remote past God resorted to such devices in order to convince a primitive folk about the truth of the Gospel, in a more progressive era these give way to rational demonstration.

The other outcome of historical criticism was the reinforcement of existing initiatives that challenged the tradition of authority and hierarchy in the Roman Catholic Church. Even apart from the Protestant Reformation and the secession of national Lutheran, Calvinist, or other churches from Rome, these important precedents included the late medieval conciliarist movement that urged a collegiate form of ecclesiastical government, the humanist critiques that unveiled the impostures on which old claims for papal supremacy were founded, and the rise of a Gallican church that remained Catholic in matters of doctrine and worship, but over which the pope had to cede a substantial part of his jurisdictional control to the king of France. The 1648 compromise peace settlement of Münster and Osnabrück, which put an end to the Thirty Years' War (1618–48) and made the demise of the vision of a unitary Christendom under papal sovereignty irrevocable, gave further encouragement to the voices within Catholicism itself that expressed dissatisfaction with the interference of the curia in diocesan affairs. Jansenism and later especially Febronianism—the former insisting on the legal autonomy of parishes, the latter explicitly calling for the emancipation of national churches, both formally condemned by the curia on several occasions, but retaining their influence throughout Catholic Europe—supplied solid intellectual and theological ammunition to the repudiation of monarchical government in the church.³⁸ Such efforts within the church, aiming to make parishes the centers of religious activity and bishops the genuine pastoral and administrative supervisors of that activity, found powerful political support among the enlightened rulers of the age, who also regarded any degree of extraneous intervention, including papal intervention,

37 This was especially prominent among the Benedictines of St. Maur and their followers elsewhere. See Ulrich L. Lehner, *Enlightened Monks: The German Benedictines 1740–1803* (Oxford: Oxford University Press, 2011).

38 Bernard Plongeron, "Recherches sur l'Aufklärung catholique en Europe occidentale, 1770–1830," *Revue d'histoire moderne et contemporaine* 16 (1969): 555–605; Plongeron, *Théologie et politique au siècle des Lumières* (Geneva: Droz, 1973); Ulrich L. Lehner, "Johann Nikolaus von Hontheim and His *Febronius*: A Censored Bishop and His Ecclesiology," *Church History and Religious Culture* 88 (2008): 93–121; Dale K. van Kley, "Jansenism and the International Suppression of the Jesuits," in *Enlightenment, Reawakening, and Revolution, 1660–1815*, ed. Stewart J. Brown and Timothy Tackett (Cambridge: Cambridge University Press, 2006), 302–28.

in the affairs of their legal subjects and their resources as a barrier to their endeavors of overhauling their regimes and countries as territorial sovereigns. Thus, if this governmental aspect of the Catholic Enlightenment was, on the one hand, firmly established on scholarly advances in several fields of knowledge, it was also politically bonded, in a sometimes uneasy alliance, with the absolutist reformers of the Iberian and Italian Peninsulas, the Habsburg monarchy, and the Catholic states of the Holy Roman Empire.³⁹

Admittedly, this is an all too “unproblematic” representation, as if everything fell neatly in place in a symbiotic relationship between Enlightenment and Catholicism. In the given space, it is impossible to do justice to the complexities, indeed tensions, that, according to the now sizeable literature, characterized this relationship—so let these be acknowledged here generically. We have also avoided a roll call of more or less celebrated names whose bearers can be associated with the diverse trends, endeavors, and groups within the Catholic Enlightenment, which could have given these tensions sharper relief. The aim of this deliberately smoothly drawn, concise summary has instead been to emphasize features of seventeenth- and eighteenth-century Catholicism that made it a cultural entity⁴⁰ not merely exposed to enlightened stimuli in response to which, somewhat reluctantly, it performed the modicum of accommodation necessary for survival or reacted defensively,⁴¹ but one that

39 The case of France, where “the monarchy found itself set against the conciliarist, regalist, or Jansenist strain of Enlightenment Catholicism,” was unique. See Burson, “Introduction,” 24. For the other regions, see Anton Schindling, “Theresianismus, Josephinismus, katholische Aufklärung,” *Würzburger Diözesansgeschichtsblätter* 50 (1988): 215–24; Elisabeth Kovacs, “Katholische Aufklärung und Josephinismus,” in Klüeting, *Katholische Aufklärung*, 246–59; Michael Printy, “Catholic Enlightenment in the Holy Roman Empire,” in Lehner and Printy, *Companion to the Catholic Enlightenment*, 165–214, here 181–92; Gabriel Paquette, *Enlightenment, Governance, and Reform in Spain and Its Empire, 1759–1808* (Basingstoke: Palgrave Macmillan, 2008), 70–78; Andrea J. Smidt, “*Luces por la fe*: The Cause of Catholic Enlightenment in 18th-Century Spain,” in Lehner and Printy, *Companion to the Catholic Enlightenment*, 403–52, here 423–32.

40 Brian Young, “Religious History and the Eighteenth-Century Historian,” *Historical Journal* 43 (2000): 849–68.

41 Such defensive reactions supposedly comprised the “Counter-Enlightenment” that, according to some scholars, is the inevitable outcome of Enlightenment Catholicism. See Israel, *Democratic Enlightenment*, 1–35. But see also others, who have stressed the creativity of Catholic conservative thought, and the difficulties created by a much too stark dichotomy between Enlightenment and Counter-Enlightenment. Darrin McMahon, *Enemies of the Enlightenment: The French Counter-Enlightenment and the Making of Modernity* (Oxford: Oxford University Press, 2001); James Schmidt, “Introduction,” in Schmidt, *What Is Enlightenment?*, 5–28; Carolina Armenteros, *The French Idea of History: Joseph de Maistre and His Heirs, 1794–1854* (Ithaca: Cornell University Press, 2011).

offered positive inroads for those stimuli to take effect, and even participated in preparing the ground for some aspects of the Enlightenment to strike roots.

3 The Society of Jesus and Jesuit Science

Yet, there is one aspect of the seventeenth- and eighteenth-century Catholic world that has quite stubbornly resisted integration in the “smooth” picture, and is described in most of the literature as standing apart from—indeed, in antagonism to—the Enlightenment trend in Catholicism: the Society of Jesus (somewhat ironically, an organization whose close association with the Tridentine church has also been widely acknowledged). To contemporary reformers within and outside the Roman Catholic Church, as well as to posterity, the Jesuits seemed the major obstacle to achieving Enlightenment in Catholicism and more broadly. The order’s expulsion from various European countries beginning in 1759 and the general papal suppression of 1773 was even hailed as a major triumph for the cause of the Catholic Enlightenment (although subsequently the polarization of European thought into more radical trends and anti-*philosophie* made the integration of secular and Catholic Enlightenment discourse complicated indeed).⁴²

Anti-Jesuitism came to be regarded as an almost defining feature of the Catholic Enlightenment for three main reasons. The first was internal: the need for ideological and rhetorical tools to be employed—such as the alleged laxity of Jesuit moral theology and spirituality, for example⁴³—by rivals jealous of the Jesuits’ excessive control over the sinews of power and resources within the church. The second was political: given the Society’s quasi-autonomous global organization, and the mechanism of its management strongly centralized in Rome, it was seen as an embodiment and the main supporter of papal universalism, thus a barrier both to the ideals and the program of decentralization pursued at that time by nearly all other religious orders and many in the secular clergy and the chief tool of Roman intervention in affairs increasingly understood as pertaining to the sovereigns and the administrative personnel of secular states. One of these was schooling, and indeed the third reason for widespread resentment toward the order was its alleged “near-monopoly” in the

42 Burson, “Introduction,” 18; cf. Dale K. van Kley, “Religion and the Age of Patriotic Reform,” *Journal of Modern History* 80 (2008): 252–95.

43 Richard van Dülmen, “Antijesuitismus und katholische Aufklärung in Deutschland,” in van Dülmen, *Religion und Gesellschaft: Beiträge zur einer Religionsgeschichte der Neuzeit* (Frankfurt: Fischer, 1989), 141–71.

field of education, combined with its reluctance to modernize the curriculum enshrined in the *Ratio studiorum* (in full: *Ratio atque institutio studiorum Societatis Jesu* [Method and system of the studies of the Society of Jesus [1599]]), with Scholastic theology as its centerpiece.⁴⁴ This, scholars suggested, set the Jesuits apart in an era when Benedictines, for instance, were integrating in their own work the ideas of Nicolas Malebranche (1638–1715) and John Locke (1632–1704), Christian Wolff (1679–1754), and Gottfried Wilhelm Leibniz (1646–1716), and the methods of empirical science and critical scholarship, while enlightened monarchs sought to reform universities by upgrading or introducing subjects more closely related to the goals of efficient governance and the public good: law, state sciences, finance and economics, and medicine.

It is only relatively recently that scholars have begun to diversify this picture.⁴⁵ They have pointed out that Jesuit scientists, in particular, were met with a great deal of appreciation and support among the enlightened, while in turn not a few Jesuits themselves were sympathetic to certain Enlightenment ideas and contributed significantly to crucial debates about them.⁴⁶ The notion of a “Jesuit Enlightenment” has even been proposed, on the basis of the centrality of a synthesis of Locke, Malebranche, and Newton to Sorbonne apologetics in the first half of the eighteenth century, and to the defense of Catholic theology against the radical Enlightenment.⁴⁷ These developments in the assessment of

44 For the text itself, see the excellent bilingual edition by Claude Pavur, trans., *The Ratio studiorum: The Official Plan for Jesuit Education* (St. Louis, MO: Institute of Jesuit Sources, 2005).

45 As an exception, see Robert Palmer, “The French Jesuits in the Age of Enlightenment,” *American Historical Review* 45 (1939): 44–58.

46 Thanks to their “cultural modernity,” and despite their theological conservatism, “the Jesuits were participants in, rather than enemies of, the Enlightenment.” Joan-Pau Rubiés, “The Jesuits and the Enlightenment,” in *The Oxford Handbook of the Jesuits*, ed. Ines G. Županov (Oxford: Oxford University Press, 2019), 85–90. Cf., for the French context, Jeffrey D. Burson, “Between Power and Enlightenment: The Cultural and Intellectual Context of the Jesuit Suppression in France,” in *The Jesuit Suppression in Global Context: Causes, Events, and Consequences*, ed. Jeffrey D. Burson and Jonathan Wright (Cambridge: Cambridge University Press, 2015), 40–63.

47 Antonio Trampus, *I gesuiti e l'Illuminismo: Politica e religione in Austria e nell'Europa centrale (1773–1798)* (Florence: Olschki, 2000); Jeffrey D. Burson, *The Rise and Fall of the Theological Enlightenment: Jean-Martin de Prades and Ideological Polarization in Eighteenth-Century France* (Notre Dame: University of Notre Dame Press, 2010). Cf. Lehner, “Introduction,” 31–32; Burson, “Introduction,” 10, 17; Burson, “The Catholic Enlightenment in France from the *Fin de siècle* Crisis of Consciousness to the Revolution,” in Lehner and Printy, *Companion to the Catholic Enlightenment*, 63–125, passim; and Burson, “Refracting the Century of Light: Alternative Genealogies of the Enlightenment in Eighteenth-Century Culture,” in *Let There Be Enlightenment: The Religious and Mystical Sources of*

the relationship between the Enlightenment and the Jesuits have not been explicitly linked with the overall, massive, and consequential re-evaluation, seen in the past generation, of the character and contributions of the Society of Jesus during the early modern period. It is nevertheless instructive to sketch such longer-term lineages, in whose light the affinities between even Jesuitism and the Enlightenment seem less of an anomaly.

The revisionist literature has emphasized the extent to which the Jesuit order was “distinctive” within Catholicism,⁴⁸ so that internal suspicion and resentment toward it was quite widespread from the very beginning: the theological faculty of the Sorbonne condemned it in 1554 as “a danger to the Faith, a disturber of the peace of the Church, destructive of monastic life, and destined to cause havoc rather than edification.”⁴⁹ Jesuit distinctiveness consisted partly in the Society’s manner of governance, not by provincial and general chapters but by a superior general with expansive authority. This was a combination that led to an uncommon degree of international outlook and mobility, especially important when it came to the staffing of overseas missions: it enabled Italian, German, Bohemian, or other Jesuits from Europe’s landlocked regions to obtain first-hand experience of Spanish and Portuguese colonial possessions in a measure way beyond the means of their fellows from other orders, and thanks to the peculiar network for reporting and the mechanism for storing information at the Society’s headquarters, these experiences were molded into a stock of global knowledge controlled by the Jesuits.⁵⁰ Next, it must be stressed that the three Jesuit ministries of preaching, confession, and teaching envisaged by the order’s founders were to be performed “in the world,” a trait accentuated by the Jesuits’ refusal to wear a distinctive habit, and retaining their family names. The explicit commitment of the famous *Formula vi-vendi* (1539)—a thoroughly reasoned plan, true to the character of the founders of the order as university-educated men—to serve, besides the glory of

Rationality, ed. Antony M. Matytsin and Dan Edelstein (Baltimore: Johns Hopkins University Press, 2018), 227–46, esp. 229–32.

48 John W. O’Malley, “The Distinctiveness of the Society of Jesus,” *Journal of Jesuit Studies* 3, no. 1 (2016): 1–16.

49 John W. O’Malley, *The First Jesuits* (Cambridge, MA: Harvard University Press, 1993), 289.

50 Steven J. Harris, “Confession-Building, Long-Distance Networks, and the Organization of Jesuit Science,” *Early Science and Medicine: A Journal for the Study of Science, Technology, and Medicine in the Pre-modern Period*, special issue, “Jesuits and the Knowledge of Nature,” 1, no. 3 (1996): 287–318. On the “cultural effort” behind the rise of Jesuit bureaucratic governance based on the production, recording, and exchange of information, see Markus Friedrich, *Der lange Arm Roms. Globale Verwaltung und Kommunikation im Jesuitenorden 1540–1773* (Frankfurt: Campus Verlag, 2011).

God, the “common good,” rests not on theological but philosophical foundations, and it has been demonstrated that the sources of the qualities and virtues listed in Ignatius of Loyola’s (c.1491–1556) *Constitutions* as necessary to succeed in this undertaking include secular ones like Cicero’s *De officiis* (Of duties).⁵¹ It is owing to the all-inclusive character of the common good that while the *Constitutions* are firm in defining certain goals, in the pursuit of these goals they provide for expediency and ways of procedure “according to times, places and circumstances,” from which the famous bent of Jesuits to flexibility and adaptability—criticized by adversaries as concessions to the profane and other sorts of opportunism—derives.⁵²

Finally, in searching for Jesuit distinctiveness, it is worth looking more closely at the third ministry mentioned above, that of teaching, which rose to special prominence thanks to a 1560 decree of Ignatius’s successor as general, Diego Laínez (1512–65, in office 1558–65), requiring all Jesuits to teach at some point in their career. Being a teacher thus became fundamental to Jesuit identity.⁵³ The Society created and maintained an international public education system, consisting in the mid-eighteenth century of around seven hundred schools of various kinds in Europe and around an additional one hundred in other continents, everywhere based on the same curriculum, texts, and pedagogy. The schools broadened and redefined the mission of the Society of Jesus as cultural and, indeed, as civic: located in cities, they served the burghers who might be indifferent to liturgy, but were concerned about the education of their offspring, and were willing to make donations.⁵⁴ As the purposes of Jesuit education were attuned to the larger aspirations mentioned above—saving souls and helping neighbors while contributing to the common good, including that of civil society as well as the church, understood in unison—it is little surprise that while the *Ratio studiorum* actually imposed limitations of philosophical and theological speculation in teaching, the curriculum had a strong “unclerical” component in the *studia humanitatis*, implying a dedicated study and emulation of Latin and Greek classics as recommended by Renaissance

51 Kevin Spinale, “The Intellectual Pedigree of the Virtue of Magnanimity in the Jesuit Constitutions,” *Journal of Jesuit Studies* 2, no. 3 (2015): 451–69.

52 “Few religious superiors can have told members of their order so firmly to forget the rules and do what they thought best.” John Bossy, “Editor’s Postscript,” in H. Outram Everett, *The Spirit of the Counter-Reformation*, ed. John Bossy (Cambridge: Cambridge University Press, 1968), 126–45, here 130. Cited in O’Malley, “Distinctiveness of the Society of Jesus,” 5.

53 O’Malley, *First Jesuits*, 200–1; Paul F. Grendler, “Jesuit Schools in Europe: A Historiographical Essay,” *Journal of Jesuit Studies* 1, no. 1 (2014): 7–25; Grendler, “The Culture of the Jesuit Teacher 1548–1773,” *Journal of Jesuit Studies* 3, no. 1 (2016): 17–41.

54 O’Malley, “Distinctiveness of the Society of Jesus,” 14.

pedagogical humanists. Jesuit education, which has been described as highly competitive, aimed to prepare students for leadership roles in the church, state, and society to the benefit of all, so that some have found it justified to style its conceptual foundation as “Jesuit civic humanism.”⁵⁵ Having said this, it must be admitted that while mathematics (also with a view to its applications) had a strong foothold in schools and universities controlled by the Jesuits, they were slow in adjusting the dominant Aristotelianism of the philosophy curriculum to new currents in natural philosophy, and staunchly resistant to any temptation to introduce the teaching of law or medicine.

As a matter of fact, utility was a prime and hardly concealed consideration from another point of view, too: by providing good education and more generally sound learning as a social good to the rising elite, Jesuits could ingratiate themselves with the culturally powerful—including not only the *virtuosi* (i.e., the mostly aristocratic patrons of the arts and sciences) but also the *cognoscenti* (the citizens of the Republic of Letters)—and thus promote the goal of confessionalization.⁵⁶ In this way, the matter of Jesuit education leads us to consider the topic that, even amid the general efflorescence of Jesuit studies, has received a disproportionate amount of attention: the intriguing field of Jesuit science.⁵⁷ As the thrust of a great deal of recent work on the Enlightenment has been to assert the centrality of the “new science” to its gestation,⁵⁸ this topic is of crucial importance to this section; and similarly to this thrust, the more contextualized approach to Jesuit science owes its existence to the larger revisionism in the history of science, particularly with regard to the “scientific revolution.” Even in the traditional narrative, the sixteenth- and seventeenth-century revolution in science, with its discoveries in physics and astronomy that reaffirmed the idea of a heliocentric cosmos and with its inauguration of an altogether mathematized nature, figured as the twin brother of the Enlightenment drive to emancipation and toleration in bringing about the modern world.⁵⁹ This account of early modern science was largely conceived

55 Grendler, “Culture of the Jesuit Teacher,” 31–36; cf. John W. O’Malley, “Jesuit Schools and the Humanities Yesterday and Today,” *Studies in the Spirituality of Jesuits* 47, no. 1 (2015).

56 Harris, “Confession-Building,” 292.

57 For a concise overview, see Sheila J. Rabin, “Early Modern Jesuit Science: A Historiographical Overview,” *Journal of Jesuit Studies* 1, no. 1 (2014): 88–104. For a comprehensive account, see Agustín Udías, *The Jesuit Contribution to Science: A History* (Cham: Springer, 2015).

58 Cf. William Clark, Jan Golinski, and Simon Schaffer, eds., *The Sciences in Enlightened Europe* (Chicago: University of Chicago Press, 1999), especially the editors’ “Introduction,” 3–31.

59 For classic examples of this interpretation, see Herbert Butterfield, *The Origins of Modern Science, 1300–1800* (London: G. Bell and Sons, 1950); Alexandre Koyré, *From the Closed*

as a series of heroic intellectual exertions by a select group of visionaries, resulting in disembodied theorems thrown out into a socio-cultural void or, at best, mechanically associated with other acknowledged forces of progress. The more recent departures in the field have, instead, questioned the very idea of a revolution in science.⁶⁰ They established their inquiry into the production, circulation, and certification of knowledge in the early modern period on the premise that it is one of so many social and cultural practices influenced, besides the pure striving for discoveries of truths about nature, by personal and institutional ambition, networks of communication and patronage, political leverage, and religious affiliation—to mention but a few crucial factors whose exploration has thrown the casting of heroes and villains, protagonists and supporting roles in the familiar story (indeed, the very logic of such a casting) into disarray.

In this climate of research, it has become possible to acknowledge the relevance of studying areas of early modern natural philosophy that fall outside “science” as (anachronistically) defined in the old master narrative, as well as the contributions of individuals or institutions that clung to, or were slow in abandoning, Aristotelian physics and Ptolemaic astronomy—including the Society of Jesus, which “stands out of all others as the scientific order without rival in seventeenth-century Catholicism.”⁶¹ A typical example of the adoption of a more contextually sensitive approach is the treatment accorded to that *cause célèbre* of the history of heliocentrism: the Galileo affair. Jesuits, formerly unequivocally condemned as the story’s villains, have been shown to have cultivated relations with Galileo Galilei (1564–1642) that were conducive to the development of the new sciences⁶² (and were particularly close between him and the “modern Euclid,” Christoph Clavius [1538–1612], who established

World to the Infinite Universe (Baltimore: Johns Hopkins University Press, 1957). For a critical overview of the literature, see H. Floris Cohen, *The Scientific Revolution: A Historical-geographical Inquiry* (Chicago: University of Chicago Press, 1994).

- 60 For a few synthetic attempts, see (despite its title) Steven Shapin, *The Scientific Revolution* (Chicago: University of Chicago Press, 1996); Margaret J. Osler, ed., *Rethinking the Scientific Revolution* (Cambridge: Cambridge University Press, 2000); Katherine Park and Lorraine Daston, eds., *The Cambridge History of Science*, vol. 3, *Early Modern Science* (Cambridge: Cambridge University Press, 2006). But see also Peter Dear, *Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500–1700* (Princeton: Princeton University Press, 2009), where the new approach is employed while keeping the label.
- 61 William B. Ashworth Jr., “Catholicism and Early Modern Science,” in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, ed. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), 133–66, here 154.
- 62 William A. Wallace, *Galileo and His Sources: The Heritage of the Collegio Romano in Galileo’s Science* (Princeton: Princeton University Press, 1984).

mathematics as a key part of the Jesuit curriculum⁶³). Some of Clavius's students also flirted with Copernican cosmology, and after its firm condemnation in 1616 did not revert to Ptolemy but compromised on the "geo-heliocentric" system advanced by Tycho Brahe (1546–1601). Most interestingly, internal conflicts between Jesuits and Dominicans are proposed to be as important for the denouement of 1633 as the (far from unanimous) Jesuit hostility to Galileo.⁶⁴

Somewhat similarly to, or as a counterpart of the cautious feelers toward Copernicanism, while seventeenth-century Jesuit natural philosophy in general firmly remained on Aristotelian grounds, not only did Aristotelianism mean a commitment to an ideal of public demonstration of scientific knowledge but this also entailed meaningful participation in developing the concept and practices of experiment.⁶⁵ Jesuit men of science went "public" in a different sense, too: as any other savant, they keenly and openly engaged in the discussions that excited the contemporary Republic of Letters.⁶⁶ Perhaps no individual figure exemplifies this more strikingly than "the last man who knew everything": Athanasius Kircher (1602–80), whose interests and works ranged across virtually all known disciplines, and under whose leadership the Collegio Romano emerged as the major hub of a network for collecting and filtering scientific information as well as displaying it in objectified form to a select public.⁶⁷ If Jesuit science was, in this sense, sociable, it also put an emphasis on utility. Mathematics as conceived by Clavius and his colleagues was a practical discipline, with applications in chronology (as in the case of the calendar reform of 1582, associated with his name), astronomy, geography, navigation, surveying, hydraulics, and military technology. This was, of course, strongly tied to curricular needs as mentioned above. Thus, many Jesuits became not only poets, historians, and artists but also astronomers, physicists, cartographers, and—most peculiarly of all—military architects and hydraulic engineers, advising governments on the building of fortresses and on flood control

63 Antonella Romano, *La Contre-Réforme mathématique: Constitution et diffusion d'une culture mathématique jésuite à la Renaissance* (Rome: École française de Rome, 1999).

64 Rivka Feldhay, *Galileo and the Church: Political Inquisition or Critical Dialogue?* (Cambridge: Cambridge University Press, 1995).

65 Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago: University of Chicago Press, 1995), 32–62; Marcus Hellyer, *Catholic Physics: Jesuit Natural Philosophy in Early Modern Germany* (Notre Dame: University of Notre Dame Press, 2005).

66 Mordechai Feingold, ed., *Jesuit Science and the Republic of Letters* (Cambridge, MA: MIT Press, 2003).

67 Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994); Findlen, ed., *Athanasius Kircher: The Last Man Who Knew Everything* (New York: Routledge, 2004).

projects.⁶⁸ In addition, thanks to the nature and dimensions of their missionary activity, Jesuits played a pre-eminent role in integrating the natural and human-cultural universe of the overseas world into European knowledge structures, as well as in the processes of negotiation between European and non-European forms of knowledge.⁶⁹

At the end of this overview of Jesuit science in the early modern period, a final issue that needs brief consideration is raised by the scholarly preoccupation with the sixteenth and especially the seventeenth century. The question of how much vitality Jesuit science preserved in the Age of Enlightenment, when Jesuits were supposedly regarded with ever greater hostility as obstacles to progress, is of particular relevance to the subject of this book. After the consolidation of the decades between 1620s and the 1680s, when Jesuit science represented a “well-defined intellectual alternative on the European cultural map,” a growing marginalization ensued because of the inability to integrate elements of the new science, such as Cartesian analytical geometry or Johannes Kepler’s (1571–1630) laws.⁷⁰ Yet, while a great deal of work remains to be done, it is safe to assert that “flexibility and adaptability,” identified as characteristic Jesuit traits, continued to operate reasonably well. The Jesuits were particularly adept in facilitating the circulation and wider appeal of scientific achievements: the *Mémoires pour l’histoire des sciences et des beaux-arts* (Memoirs for the history of the sciences and the fine arts, commonly known as the *Journal de*

68 Denis De Lucca, *Jesuits and Fortifications: The Contribution of Jesuits to Military Architecture in the Baroque Age* (Leiden: Brill, 2012); Geert Vanpaemel, “Jesuit Mathematicians, Military Architecture, and the Transmission of Technical Knowledge,” in *The Jesuits and the Low Countries: Identity and Impact (1540–1773)*, ed. Rob Faesen and Leo Kenis (Leuven: Peeters, 2012), 109–28; Alessandra Fiocca, “Ferrara e i gesuiti in materia d’acque,” in *Gesuiti e università in Europa (secoli XVI–XVIII)*, ed. Gian Paolo Brizzi and Roberto Greci (Bologna: CLUEB, 2002), 339–59; Fiocca, “I gesuiti e il governo delle acque del basso Po nel secolo XVII,” in *Giambattista Riccioli e il merito scientifico dei gesuiti nell’età Barocca*, ed. Maria Teresa Borgato (Florence: Olschki, 2002), 319–70.

69 Of the extensive literature, see Steven J. Harris, “Mapping Jesuit Science: The Role of Travel in the Geography of Knowledge,” in *The Jesuits: Cultures, Sciences, and the Arts 1540–1773*, ed. John W. O’Malley et al. (Toronto: University of Toronto Press, 1999), 1:213–40; Florence C. Hsia, *Sojourners in a Strange Land: Jesuits and Their Scientific Missions in Late Imperial China* (Chicago: University of Chicago Press, 2009); Andrés I. Prieto, *Missionary Scientists: Jesuit Science in Missionary South America, 1570–1810* (Nashville: Vanderbilt University Press, 2011); Antonella Romano, *Impressions de Chine: L’Europe et l’englobement du monde (XVI^e–XVII^e siècle)* (Paris: Fayard, 2016).

70 Rivka Feldhay, “The Cultural Field of Jesuit Science,” in O’Malley et al., *Jesuits*, 107–30. Feldhay also emphasizes the dynamics of the nexus of scientific discourse, institutional setting, and wider political context in circumscribing the “field” (in the sense introduced by Pierre Bourdieu [1930–2002]) of Jesuit science.

Trévoux, launched in 1701) and the various editions of the *Dictionnaire de Trévoux* (1704–71) were fundamental Jesuit contributions to the Enlightenment.⁷¹ In terms of substantive matters of science, the key breakthrough of the removal of books defending the motion of the Earth from the Index—apparently on the initiative of Ruggiero Giuseppe (Ruđer Josip) Boscovich (1711–87)—did not come about until 1757.⁷² However, the heliocentric system and Newtonian astronomy, which Boscovich was also the first Jesuit fully to embrace and develop, had gained a foothold in Jesuit colleges already in the first half of the eighteenth century, in tandem with the rise of algebra besides geometry, in the style of René Descartes's (1596–1650) idea of a mathematically based universal science. In Jesuit mathematics, this notion, known as *mathesis universalis*, also implied an openness to incorporating Newton's and Leibniz's integral and differential calculus in their teaching (though not yet publications) by Jesuit professors.⁷³ The same holds for the introduction of modern physics in the courses on mathematics as well as natural philosophy,⁷⁴ including even atomism (with Boscovich again playing an important role⁷⁵). The analysis of the “macro structures” of the Jesuit scientific tradition also demonstrates the unbroken continuity of this tradition into the eighteenth century, up to the suppression of 1773—a revival that needs to be viewed as part of the overall acceleration of scientific work in mid-eighteenth-century Europe. After a decline in Jesuit scientific publications in the first decades of the eighteenth century, there was substantial and sustained growth after about 1730, together with a marked shift from Aristotelian subjects toward the mathematical and physical sciences, as well as a change in patterns of authorship: a smaller scientific elite within the order contributed a considerably larger number of works, undoubtedly thanks to the expansive internal control over the allocation of talent and duties. The institutional setting also continued to develop dynamically, with a large number of chairs in mathematics and experimental physics, physical cabinets, and no fewer than twenty-five astronomical observatories

71 Rubiés, “Jesuits and the Enlightenment,” 7.

72 Jesuits had long acknowledged the uses of Copernicanism for calculations but refused to accept its cosmological implications because of their incompatibility with notions of Aristotelian physics such as the incorruptibility of the heavens.

73 Udías, *Jesuit Contribution to Science*, 23–40.

74 Marcus Hellyer, “Jesuit Physics in Eighteenth-Century Germany: Some Important Continuities,” in O'Malley et al., *Jesuits*, 1:538–54; Hellyer, *Catholic Physics*, 165–80, 221–27.

75 Gordon G. Brittan, “The Role of the Law of Continuity in Boscovich's Theory of Matter,” and Henk K. Kubbinga, “La théorie de la matière de Boscovich: L'atomisme de points et le concept d'individu substantiel,” in Bursill-Hall, *R.J. Boscovich*, 211–24, 281–306; Hans Ullmaier, *Puncta, particulae et phaenomena: Der dalmatinische Gelehrte Roger Joseph Boscovich und seine Naturphilosophie* (Hannover-Laatzten: Wehrhahn Verlag, 2005)

added to the existing stock of Jesuit or Jesuit-staffed facilities between 1700 and 1773.⁷⁶ To venture a pun on the title of this book, the Society of Jesus pursued its scientific ends with perseverance and vigor until the very end.

4 What's in a Life?

At this point, it is appropriate to revert to the central character of this book, who directed one of these new observatories over a period of thirty-seven years, almost exactly half of it stretching beyond the suppression of the Society of Jesus. Hell was hyper-active in the creation and dissemination of "Catholic knowledge," employing a wide range of strategies and practices to represent and assert in the public space the agendas, interests, and values of science and the scientist. As that space was fluid and changeable, subject to the impact of power relations and socio-cultural dynamics, the study of such practices is at the same time the study of so many attempts at accommodation and negotiation at each of the levels and spaces mentioned previously.⁷⁷ Before a sketch of these attempts is drawn as a means of laying out the specific agenda of the chapters of this book, we also need to ask, by interrogating recent approaches to historical biography, what lessons such accommodations as revealed by the life of a single individual may hold about the relations of those levels and spaces.

Biography is one of the oldest genres of historical rendition, which enjoyed a decent amount of popularity with the general public even at times of disparagement among professional historians.⁷⁸ It is only quite recently that it has re-emerged from the latest of such periods,⁷⁹ when the main objection against it was the untenability of the idea of the self as a singular, coherent entity, and of the individual self as an autonomous being capable of acting in accordance with its own will. While this might still have looked an adequate framework for interpreting the historical role of important political leaders, the long eclipse in the prestige of political history itself altogether relativized the interpretative value of biography during the ascendancy of large-scale, quantitative,

76 Steven J. Harris, "Boscovich, the 'Boscovich Circle,' and the Revival of Jesuit Science," in Bursill-Hall, *R.J. Boscovich*, 527–48.

77 Cf. above, 6.

78 For a helpful overview, see Barbara Caine, *Biography and History* (Basingstoke: Palgrave Macmillan, 2010).

79 On the first phases of this revival, see Lloyd Moote, "New Bottles and New Wine: The Current State of Early Modernist Biographical Writing," *French Historical Studies* 19 (1996): 911–26; Hans Erich Bödeker, ed., *Biographie schreiben* (Göttingen: Wallstein Verlag, 2003).

structural analysis hallmarked by the *Annales*. “Inside every historian there lies a biographer struggling to come out,” a distinguished historical biographer wrote during this period, acknowledging that “the biographer [...] has become a deplorable example any historian should avoid.”⁸⁰ Biography was dismissed as the rearguard-fight of (German) historicism, based on a dogmatic principle of individuality, risking heroization and mythicization, and as an obstacle to a theory-oriented historical science.⁸¹ The subsequent, poststructuralist emphasis on language and cultural encoding led not only to new ways of thinking about (literally and metaphorically) texts, writing, and reading and the “death of the author”⁸² as the creator and the owner of meaning but generally to the reduction of scope for individual agency from yet another angle.

As a matter of fact, these tendencies in later twentieth-century historical scholarship were indifferent, rather than outright hostile, to biography, and they did contain elements that were instrumental in its recent recovery. Such was the interest of some of the *Annalistes* in the psychological and emotional components of the collective mentalities of past societies,⁸³ or the acknowledgment that languages as paradigms, and cultures as systems are far from being fixed and rigid: while imposing certain constraints on members of the communities whose expressive performances they contextualize, they are sufficiently flexible to offer opportunities of creative adaptation and even boundary-testing.⁸⁴ In addition, partly as a response to the inadequacy of large-scale structural analysis to deal with “the negotiations, circulations, and

80 A.J.P. [Alan John Percivale] Taylor, “The Historian as Biographer,” in *Biographie und Geschichtswissenschaft: Aufsätze zur Theorie und Praxis biographischer Arbeit*, ed. Grete Klingenstein, Heinrich Lutz, and Gerald Stourzh (Munich: Oldenbourg, 1979), 254–61, here 254–55.

81 The low appreciation of biography among historians has been detectable ever since the nineteenth-century ambition of framing their discipline on the model of the natural sciences, with seriality and “laws” superseding the individual and the contingent. Sabina Loriga, “La biographie comme problème,” in Revel, *Jeux d'échelles*, 209–31; Loriga, “Biographical and Historical Writing in the 19th and 20th Centuries,” *Transitions to Modernity Colloquium*, the MacMillan Center, Yale University, February 18, 2008.

82 Roland Barthes, “The Death of the Author,” in Barthes, *Image, Music, Text* (New York: Hill and Wang, 1977), 142–48.

83 This is a trait as old as Lucien Febvre's (1878–1956) *Un destin: Martin Luther* (first published 1928, Paris: PUF, 1968) and his *Le problème de l'incroyance au 16e siècle: La religion de Rabelais* (Paris: Albin Michel, 1947).

84 See concise statements by the classics of “linguistic contextualism.” J.G.A. Pocock, “Introduction: The State of the Art,” in *Virtue, Commerce, and History: Essays on Political Thought and History, Chiefly in the Eighteenth Century* (Cambridge: Cambridge University Press, 1985), 11–34, here 4–15. Quentin Skinner, “General Preface,” in Skinner, *Visions of Politics*, vol. 1, *Regarding Method* (Cambridge: Cambridge University Press, 2002), vi–viii, here vii.

appropriations that go into the molecular foundations of power and social relations,”⁸⁵ micro-history arose as a trend that refocused attention on lived experience at ground level. Thus, while micro-history itself is not conceived as biographical—if anything, it resorts to biography as a procedure in its quest to explain culture⁸⁶—it provided a great deal of inspiration and impetus to historical biography in a new key.

With the exhaustion and the dwindling self-confidence of quantitative, structurally, and functionally arguing social history—a “history without humans”—pre-eminent *Annalistes* themselves began to speak out in favor of a resuscitation of biography in which, however, the individual was to be “historicized.”⁸⁷ In the same vein, almost simultaneously it was one of the classics of micro-history that called attention to the fundamental “ambivalence” of biography, in some cases employed to demonstrate the futility of explaining individuals and their behavior with reference to normative systems, while in others, conversely, the life story appears as a terrain to assess the value of hypotheses about the practical operation of social rules and regularities.⁸⁸ In this regard, the chief concern of biographical research is with the degree of freedom an individual has in making choices and decisions, and the kind and degree of rationality she or he is capable of asserting in the face of the prevailing social norms and web of institutional power, assuming that these, while more or less solid, are never fully devoid of gaps and contradictions that enable individual actors to consciously interpret, manipulate, or negotiate constraining rules and structures.⁸⁹ The emphasis on both the possibilities and the limitations of the scope of agency and individual rationality, and the additional implication that these scopes are subject to temporally and spatially changeable contexts, amounts to a compelling response to the critique of biography as a genre with reference to the “biographical illusion”: the assumption that life *is* a history, “a coherent and finalized whole, which can and must be seen as a unitary expression of a subjective and objective ‘intention’ of a project.”⁹⁰ The

85 Lynn Hunt, “Jacques Revel and the Question of Scale,” in *La forza delle incertezze: Dialoghi storiografici con Jacques Revel*, ed. Antonella Romano and Silvia Sebastiani (Bologna: Il Mulino, 2016), 35–45, here 42.

86 Jill Lepore, “Historians Who Love Too Much: Reflections on Microhistory and Biography,” *Journal of American History* 88, no. 1 (2001): 129–44, here 133.

87 Jacques Le Goff, “Comment écrire une biographie historique aujourd’hui,” *Le débat* 54 (1989): 49–53.

88 Giovanni Levi, “Les usages de la biographie,” *Annales ESC* 44, no. 6 (1989): 1325–36, here 1325.

89 Levi, “Les usages de la biographie,” 1335–36.

90 Pierre Bourdieu, “The Biographical Illusion [1986],” in *Identity: A Reader*, ed. Paul de Gay, Jessica Evans, and Peter Redman (London: Sage, 2000), 299–305, here 299. Of course, the

response to this critique has also implied the redefinition of the object of biography: the historical person is no longer understood as an individual, morally expressed, stable self closed in itself and divorced from the social-cultural environment shaping, and shaped by, her or him. The concept of historical personality is an open one, enabling an insight into the social constitution of identity at any point: it presupposes an individual with different manifestations over time, reacting to the requirements and opportunities presented by diverse spaces of action—s/he is the subject of her or his own life story and the constructor of her or his own biography. The existence of a person is not conceived as “given” but as emerging continuously—but by no means in a linear fashion—in reactive processes, day-to-day transactions between the subject and the complex influences of the surrounding world.⁹¹

These transformations have given occasion to a wide array of incisive “life studies” in historical scholarship. Some of these—in avowed opposition to “modal” biographies, chiefly interested in the common and measurable traits in individual lives that may shed light on the relationship between individual and group *habitus*—were dedicated to “liminal” case studies highlighting the margins of the social and cultural horizons within which all other cases are imaginable.⁹² Others have used the prism of individual lives for re-inserting peculiar manners of procedure into the context of the cultural practices and forms of behavior characteristic of their age, and making each more intelligible.⁹³ Conversely, such contextualization has been employed—remarkably, long before the recent surge—to fill gaps in the information gleaned from the available sources, like in the case of the life of the young Denis Diderot (1713–84), reconstructed by his biographer from examples taken from parallel career

“illusion” faulted by Bourdieu was recognized long ago: eighteenth-century novelists were fully aware of the difficulties posed by the fragmentation of personal life paths, and the resulting difficulties for narrative representation.

- 91 Hans Erich Bödeker, “Biographie: Annäherungen an die gegenwärtigen Forschungs- und Diskussionsstand,” in Bödeker, *Biographie schreiben*, 9–64, here 19–22, 27–28. Cf. Peter André Alt, “Mode ohne Methode? Überlegungen zu einer Theorie der literaturwissenschaftlichen Biographik,” in *Grundlagen der Biographik: Theorie und Praxis des biographischen Schreibens*, ed. Christian Klein (Stuttgart: Metzler, 2002), 23–40. For lives as “processes” rather than “units” specifically in the history of science, see Mary Jo Nye, “Scientific Biography: History of Science by Other Means?,” *Isis* 97 (2006): 322–29; Marianne Klemun, “‘Living fossil’—‘Fossilized life’? Reflections on Biography in the History of Science,” *Earth Sciences History* 32, no. 1 (2013): 121–31.
- 92 Carlo Ginzburg, *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller* (Baltimore: Johns Hopkins University Press, 1980 [1976]).
- 93 Daniel Roche, ed., *Journal de ma vie: Jacques-Louis Ménétra, compagnon vitrier au 18e siècle* (Paris: Montalba, 1982); Natalie Zemon Davis, *The Return of Martin Guerre* (Cambridge, MA: Harvard University Press, 1983).

paths and other circumstantial material.⁹⁴ Yet others have asked disturbing questions about personhood, whether regarding the “existence” of a medieval royal figure whose identity has been obliterated by tradition,⁹⁵ or the level of continuity that can be established between a young seventeenth-century Dutch orphan suffering from mental and physical paralysis and the high-handed minister of New Amsterdam that the same individual became in later life.⁹⁶ In intellectual history, the biographer of Johann Gottlieb Fichte (1762–1814) has appealed to the historical sociology of knowledge (as against the previous preoccupation with language) as a source of new conceptual and methodological rigor, employing the notion of the intellectual field—“the realm of the culturally preconscious, of tacit beliefs and cognitive dispositions”—as a non-reductionist way to take account of social context: not a simple cause-and-effect mechanism, but “mediation and refraction.”⁹⁷

Philosophers have worried that attempts at recovering the historical meaning of their predecessors with reference to the contextual origins of their thought jeopardizes the very status of philosophical ideas as transcending such contexts. This kind of skepticism might look even more pertinent in the case of scientists: critical commentary on scientific biography appeared to be in need of beginning with a “defense.”⁹⁸ On this reckoning, science is defined by rigorous methods leading to verified results and tested theories, and the accumulation of scientific knowledge as a steady process of incrementally adding particular truths to the larger edifice of established truths; as soon as such additions have been completed, those particular truths become detached from the past, rendering the process of discovery uninteresting, and the advances of science impersonal.⁹⁹ To both philosophers and scientists, it can be objected

94 Franco Venturi, *Jeunesse de Diderot (de 1713 à 1753)* (Paris: Albert Skira, 1939).

95 Jacques Le Goff, *Saint Louis* (Paris: Gallimard, 1996).

96 Willem Frijhoff, *Fulfilling God's Mission: The Two Worlds of Dominie Everardus Bogardus 1607–1647* (Leiden: Brill, 2007 [1995]). Cf. Frijhoff, “Experience and Agency at the Crossroads of Culture, Mentality, and Contextualization: *The Biography of Everhardus Bogardus* (c.1607–1647),” in Bödeker, *Biographie schreiben*, 65–105.

97 Anthony La Vopa, “Doing Fichte: Reflections of a Sobered (But Unrepentant) Contextual Biographer,” in Bödeker, *Biographie schreiben*, 107–72, a meta-discussion of the same author's *Fichte: The Self and the Calling of Philosophy, 1762–1799* (Cambridge: Cambridge University Press, 2001).

98 Thomas L. Hankins, “In Defence of Biography: The Use of Biography in the History of Science,” *History of Science* 17, no. 1 (1979): 1–16.

99 For an early, magisterial departure from this position, and an attempt (although not conceived biographically) to understand and reconstruct scientific discovery as a process consisting of equally relevant episodes, see I. Bernard Cohen, *Introduction to Newton's Principia* (Cambridge, MA: Harvard University Press, 1978).

that while contextual reconstruction does not necessarily deny the possibility of more lasting truth value, the point of properly historical inquiry into past intellectual performances is not finding something familiar (or to dismiss it as unfamiliar in order to confirm our position), but being challenged by its historical alterity.¹⁰⁰

As part of the overall recovery of historical biography—of which only a partial and impressionistic sketch could be provided here, in the hope that it nevertheless suffices for the present purposes—historians of science have turned to biography as a theoretically and empirically rewarding form of exploration and expression. Naturally, this turn is also indebted to the general opening up of the history of science toward a more expansive cultural history of knowledge. Especially striking is the emphasis on each scientist's struggle for "existential authenticity" in the face of social, political, and other constraints: the "ability to handle the enabling conditions of self-assertion lies at the heart of the life and work of every scientist."¹⁰¹ With this in mind, it is also possible to avoid the schematism of earlier contextualist endeavors, in which the individual is reduced to a "sampling device" that helps us understand the culture and the time:¹⁰² otherwise excellent "social biographies" of scientific practitioners like Charles Darwin (1809–82), in which the parallel currents of history are tied together "at the level where the events and ideas occur."¹⁰³

Imbued with the recently conceived premises, but still close to the ideal of pure "existential" biography, we find those of Francis Bacon (1561–1626) and Descartes. These have shown that the philosophical and scientific achievement of Bacon and Descartes is indissolubly wedded to their reflection of what it means, among the significantly altered circumstances of their day, to be a natural philosopher: no longer an individual seeker after arcane mysteries of the natural world, employing an esoteric language and protecting the discoveries from others, but a public figure in the service of the public good in the one case, and an *honnête homme* using his natural faculty of clarity and distinctness

100 La Vopa, "Doing Fichte," 153–57.

101 Thomas Söderqvist, "Existential Projects and Existential Choice in Science: Science Biography as an Edifying Genre," in *Telling Lives in Science: Essays in Scientific Biography*, ed. Michael Shortland and Richard Yeo (Cambridge: Cambridge University Press, 1996), 45–84, here 66. Cf. Söderqvist, "Introduction," in *The History and Poetics of Scientific Biography*, ed. Thomas Söderqvist (Aldershot: Ashgate, 2007), 1–16.

102 Charles Rosenberg, "Woods or Trees? Ideas and Actors in the History of Science," *Isis* 79 (1988): 565–70.

103 Söderqvist, "Existential Projects," 51. Cf. Adrian Desmond and James Moore, *Darwin* (Harmondsworth: Penguin, 1992); Desmond and Moore, *Darwin's Sacred Cause: Race, Slavery, and the Quest for Human Origins* (Chicago: University of Chicago Press, 2011).

to the highest degree in the other. Both cases highlight the transformation of traditional humanist concerns into a natural philosophical context via a study of the type of *persona* as shaped by the protagonists in their work.¹⁰⁴ It must be added that according to the author of these accounts, the studying of this type is not, strictly speaking, biography, but closer to biography than the history of philosophical or scientific discovery and doctrine.¹⁰⁵ It is helpful to invoke here another “non-biography” of a crucial figure of the early modern Republic of Letters: the great seventeenth-century facilitator of communication and collection in the world of learning, Nicolas-Claude Fabri de Peiresc (1580–1637).¹⁰⁶ Peiresc’s life—corresponding to a period of relative calm in Europe, marked by openness to learning and a confidence in the ability of reason to solve problems—is used as a means of “summoning” this lost world via the answers it gave to questions like “what is a scholar and why be a scholar?”¹⁰⁷ The answers were based on the combination of values from skepticism, stoicism, and sociability: precision of observation and suspension of judgment; humility, tranquility of mind, and constancy of endeavor; conversation and friendship. Peiresc’s *persona* was widely regarded as embodying these values and virtues associated with scholarship, and the answer to the “why” question was nothing less than the indispensability of these as bonds of human society.

In the recent thrust of contextualized science biography, two deserve special mention here as dedicated to characters with whose careers that of Maximilian Hell intersected in different ways. One of these is the biography of the French mathematician, physicist, and *philosophe* Pierre-Louis Moreau de Maupertuis (1698–1759), endeavoring to illuminate the place of science in the cosmopolitan Republic of Letters, and the role of science in making the protagonist’s *persona*.¹⁰⁸ Below, the uses to which Maupertuis turned the experience of his memorable Lapland journey of 1736 will briefly be compared with those of Hell with regard to the 1768–69 Venus transit expedition. In another recent revisionist study, the “self-invention” of a figure working in the same

104 Stephen Gaukroger, *Descartes: An Intellectual Biography* (Oxford: Oxford University Press, 1995); Gaukroger, *Francis Bacon and the Transformation of Early Modern Philosophy* (Cambridge: Cambridge University Press, 2001).

105 Stephen Gaukroger, “Biography as a Route to Understanding Early Modern Natural Philosophy,” in Söderqvist, *History and Poetics*, 37–50, here 47.

106 Peter N. Miller, *Peiresc’s Europe: Learning and Virtue in the Seventeenth Century* (New Haven: Yale University Press, 2000). Cf. Miller, *Peiresc’s Mediterranean World* (Cambridge, MA: Harvard University Press, 2015).

107 Miller, *Peiresc’s Europe*, 4, 14.

108 Mary Terrall, *The Man Who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment* (Chicago: University of Chicago Press, 2002).

environment as the protagonist of this book, the Viennese botanist and chemist of French Dutch background, Nikolaus Joseph von Jacquin (1727–1817), has been presented with an explicit attempt at redefining the principles of science biography. Preoccupation is with the shaping of von Jacquin's "scientific persona"¹⁰⁹ through unraveling his "communicative actions" and self-representation in the shifting contexts of places and spaces—geographic locations and institutional and other zones of acting and interacting—relationships with persons, communities as well as objects, and strategies that include self-positioning vis-à-vis trends in contemporary scientific thought and practice, transactions with wielders of political, administrative, and academic authority, and activities of organizing and networking.¹¹⁰ Key to this was von Jacquin's high-level of public visibility from the moment he appeared on the Viennese scene and the consequent possibility for contemporaries and posterity to "grasp" him. The careers of Hell and von Jacquin, the Jesuit astronomer's junior by a mere seven years, and just like him central to the project of transforming Vienna into a capital of science from the 1750s, may offer more parallels and comparative possibilities than hitherto attempted, even in the pages that follow.¹¹¹ Besides their eminent role on the local scene, the two men were also distinguished as *the* mid-eighteenth-century Habsburg expeditionists, even though the status of von Jacquin's voyage to the Caribbean in the 1750s in the making of his scientific persona was very different from that of Hell's northern journey: while in the case of the latter, the invitation to lead the Venus transit observation was the acknowledgment of his already-established reputation, for von Jacquin the expedition was a breakthrough, marking his transformation from *botanophilus* (lover of plants) to *verus botanicus* (genuine botanist).¹¹² The extent to which a research and narrative agenda similar to Maupertuis the libertine and the also quite flamboyant von Jacquin can be pursued in the case of a Jesuit father is limited: for instance, "ego-documents" in the strict sense are scarce, similarly to "private" relationships, which nevertheless substantially

109 For a now classic study of an emblematic figure of a different period from this perspective, see Mario Biagioli, *Galileo Courtier: The Practice of Science in the Culture of Absolutism* (Chicago: University of Chicago Press, 1993). See also Lorraine Daston and H. Otto Sibum, "Introduction: Scientific Personae and Their Histories," *Science in Context* 16, nos. 1–2 (2003): 1–8, and the whole thematic issue it introduces, dedicated to the application of the notion of "anthropological persona" (Marcel Mauss [1872–1950]) to situations in the history of science.

110 Marianne Klemun and Helga Hühnel, *Nikolaus Joseph Jacquin (1727–1817): Ein Naturforscher (er)findet sich* (Göttingen: V & R unipress, Vienna University Press, 2017).

111 Hell is not mentioned at all in the magisterial study cited in the previous note.

112 Klemun and Hühnel, *Nikolaus Joseph Jacquin*, 111–28.

contributed to the shaping of the central figure's public persona in both of the other two cases. Still, as much as possible, a similar endeavor has guided us in writing this book.

The present venture is thus also conceived as both less and more than a biography. Let us now provide a brief sketch of our protagonist's life—more details will naturally follow in the ensuing chapters—and then assess its possible broader implications that we hope to highlight. Maximilian Hell was one of the foremost Jesuit scholars in eighteenth-century Central Europe. He was the scion of a family of German mining engineers of Bohemian or Bavarian descent, born in Štiavnické Bane¹¹³ (Szélakna, Windschacht), a suburb of Banská Štiavnica (Selmecbánya, Schemic[z]ium, Schemnitz), a prosperous chartered town in northern Hungary (now Slovakia). Having graduated from the gymnasium at nearby Banská Bystrica (Besztercebánya, Neosolium, Neusohl), he joined the Society of Jesus in 1738 and was ordained in 1751. Between these dates, he spent his novitiate at Trenčín (Trencsén, Trenchinium, Trentschin) and studied philosophy, mathematics, and theology at the University of Vienna. Simultaneously, from 1745, while teaching at a gymnasium and college in Levoča (Lőcse, Leuchovia, Leutschau) and later in Cluj (Kolozsvár, Claudiopolis, Klausenburg) in Transylvania, he participated in the planning or personally directed the construction and equipping of several observatories in the country. Having come to the attention of leading Viennese officials during his student years and attaining some reputation as a scholar, in 1755 Hell was appointed by Empress and Queen Maria Theresa (1717–80, r.1740–80) as imperial and royal astronomer in Vienna. His appointment coincided with the first important wave of systematic attempts at enlightened reform in administration, taxation, education, health, and other spheres initiated by the Habsburg government. In his new capacity, Hell supervised the building of a new university observatory tower and edited the annual *Ephemerides astronomicae ad meridianum Vindobonensem* (Astronomical ephemeris for the Viennese meridian),

113 Geographic names in the territory of the old Kingdom of Hungary and the Habsburg monarchy in general are given as they are currently used in the state where they belong today, regardless of ethnic composition, suzerainty, or any other factor in the eighteenth century (for no other reason than the convenience of the reader in finding them on the map). Historic alternatives are provided on first appearance. The Latin name forms are given as used in Hell's own texts, or in [Michael Bonbardius and Nicolaus Csáky de Keresztzeghy], *Topographia Magni Regni Hungariae olim a quodam Societatis Jesu Sacerdote conscripta, nunc Studio cujusdam ex eadem Societate Sacerdotis emendata et aucta* (Vienna: Joannes Kaliwoda, 1750). See also our list accompanying the map of the Austrian province of the Society of Jesus in appendix 2.

the success of which soon earned him wide respect in the European Republic of Letters and made him a nodal figure in a scholarly network.

It was owing to the renown—the social–cultural capital—established on a carefully constructed career that Hell received an invitation from King Christian VII (1749–1808, r.1766–1808) to lead, with the sponsorship of the Danish–Norwegian monarchy, an expedition beyond the Arctic circle within the context of the grandest collective international enterprise of eighteenth-century astronomy (perhaps field sciences altogether): the observation of the transit of Venus between the Earth and the Sun in 1769. The expedition was highly productive, yielding not only precise astronomical, geomagnetic, and other measurements and calculations but also a wealth of empirical material about the language of the indigenous Sámi¹¹⁴ people, which associated Hell's name with heated controversies in yet another field of scholarship: Finno-Ugrian linguistic kinship and, by implication, the early history of the Magyars. The suppression of the Society of Jesus in 1773 left Hell's status as a state servant unaffected, and he continued as director of the observatory and editor of the *Ephemerides* until his death, but his overall situation as an ex-Jesuit became more precarious. What has been called the breakthrough of the Enlightenment in Austria in the 1780s, both in its top-down form known as Josephism and other manifestations, as well as responses to these by various stakeholders (especially the Hungarian political elite), further complicated this situation. He nevertheless—or precisely for this reason—remained highly active as a networker and a man of science, dedicating his energies to various institutional projects as well as to research and writing on diverse fields from astronomy through magnetism to language and history.

This summary points, first, to the anachronism of attempts to appropriate and highlight Hell as a member of the Hungarian and the Slovak national scientific pantheon (as “Miksa” and as “Maximilián,” respectively). Upon enrolment in the gymnasium, Hell seems to have known (besides German and Latin) the “Slavic” (obviously, Slovak) language, and later on he claimed to have picked up Hungarian, but his personal attachments can hardly be styled as “national” in any modern sense. His identity can instead be located in four, partially overlapping spaces, which include: (1) loyalty to the house of Habsburg and the Viennese court, (2) commitment to the Society of Jesus and Catholic universalism, (3) status enjoyed as a citizen of the also international Republic of Letters, and finally (4) veneration of the Latinate, “Hungarus” cultural

114 Throughout this book, in accordance with current usage, this is the designation used in the authors' own discussion. In quotations from sources and references, however, eighteenth-century alternatives (Lapp, Lappish) have been retained.

heritage of the historic, multi-ethnic and multi-confessional Kingdom of Hungary. The harmony or disharmony of these four poles—a highly unstable relationship—hugely influenced Hell's scope of action, the prospects of asserting the species of knowledge he represented, and the strategies he chose to achieve this. From a different perspective, Hell's choices, the development and turning-points of his career, and his movement among these poles throws light on the peculiar Habsburg/Central European version of the unity and diversity of the Enlightenment, together with its cleavages and the possibilities and limits of transgressing them. This is because these poles of loyalty roughly correspond to, and raise the issue of, Hell's engagement with the following: (1) bureaucratic-governmental Enlightenment, intending to enhance the infrastructural effects and efficacy of the state in permeating the capillaries of society; (2) Catholic Enlightenment, which, as a renewal of the tradition of confession-alization in the sixteenth and seventeenth centuries, set the same goals with regard to strengthening religious sentiment and loyalty toward the church; (3) mainstream Enlightenment, with universal progress and human solidarity on its banner; and (4) the aspirations of the “national awakening” among the elites of the Habsburg monarchy—in this case, the Hungarian one—to preserve and strengthen the status of their leadership through modern knowledge practices. The steadily upward trend in Hell's early career may be interpreted as being thanks to, and illustrates the relative harmony among, these trends until the 1770s, while his subsequent frustrations, carefully planned or improvised attempts at accommodation and adjustment, point to the disruption of this harmony. The successes and failures of his strenuous efforts to maintain and advance himself and the cause of Jesuit science by moving among, even simultaneously existing in “life worlds” that can be described as local, regional, imperial, and global, and especially exploiting and transferring the capital of recognition and connections accumulated between them, throw a uniquely interesting light on the dynamics of power and knowledge, continuity and change, metropolis and provinces in Central Europe in the era of enlightened reform.