# Encountering the Fields of Fire
## Neapolitan Networks from Bohemia to Pennsylvania and the Transformation of Regional Study into Global Science

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### Abstract

*Regional history, of southern Italy and especially the Neapolitan volcanic plains, allowed for the cohesion of international scientific connections and facilitated a more globalized study of the world's natural systems. Using the example of a well-known volcano, Mount Vesuvius and the adjacent Phlegraean Fields, or Fields of Fire, this article considers this close interplay between regional and global history from an environmental history perspective. Dissemination of regional observations of Vesuvius and its environs across the world enabled new scientific discourses around geology and later volcanology to develop and mature. In tracing this process of transformation, the role of certain individuals and their networks in underpinning such processes becomes apparent. The global presence of volcanoes, active and extinct, as well as their absence from certain world regions, allowed comparative frameworks for intrepid explorers and proto-scientists from Athanasius Kirchner in the seventeenth century to George Julius Poulett Scrope in the nineteenth century. The works of the British envoy Sir William Hamilton, in particular, abetted the popularity of such observation around Vesuvius and helped spread the interest in volcanic locations from Bohemia to Pennsylvania.*

Volcanoes are inherently a global phenomenon[1]. Scattered across the planet, volcanic landscapes continually shape and reform the Earth's surface. From the menacing Ring of Fire framing the Pacific basin to the tectonic fissures responsible for the Icelandic landmass, volcanoes have defined regional spaces across the globe. During the last geological blink of an eye – stretching back around 10,000 years – some 1,500 volcanoes have been active. Six hundred of these have erupted during the course of human history and right now, at any given moment, around 20 are smouldering or spewing forth lava. Roughly fifty volcanoes pose a threat to an estimated 800 million lives today.[2] The glo-

1 Research for this chapter resulted from the *Changing Social Representations of Political Order ca. 1800: Governmental Concepts in the Correspondence of Maria Carolina of Naples-Sicily* project funded by the Austrian Science Fund (FWF: P31415-G28) at the University of Innsbruck. I am grateful to the organisers and participants of the *Integrating Global and Regional Histories. Theoretical Reflections and Empirical Case Studies in Central Europe, 18-20th Centuries* workshop held at Innsbruck in September 2019 and the two anonymous reviewers for their insights and comments.

2 Loughlin/Sparks/Brown/Jenkin/Vye-Brown, Global Volcanic Hazards and Risk.

bal ubiquity of volcanoes is one aspect of their nature; another is their regional context. Aside from the topological definitions which volcanoes impart to their local environs, volcanic landscapes have come to define the understandings of humans who inhabit near them. Countless human physical and mental worlds have been shaped by volcanic features. The word volcano itself derives from the Roman belief in the geologically active Mt. Etna being the fiery forge of the deity Vulcan.[3] Volcanic sites have held religious significance for cultures across the world from Shintoism to Norse, from the Aztec myth of Iztaccíhuatl to the North Korean regime's dogmatic view of Mount Paektu as the 'sacred mountain of the revolution.' Even the world's most famous religious text, the Bible, owes portions of its own mythos to volcanic activity.[4] For examples of when volcanoes have transgressed the normalcy of human everyday physical life we need only to remember the most-well known accounts by Pliny the Younger on the destruction of Pompei in A.D. 79 and the contemporary reports of the 'Year without a Summer' following the eruption of Mount Tambora in 1815.[5] Volcanic presence, then, has continually affected the human experience.

The development of scientific knowledge is one area where the combination of the globality and regionality of volcanoes produced the greatest stimulus. For as long as people have co-inhabited a space with volcanic activity, some have been drawn to study the source of geological threat. By the eighteenth century, observations of such volcanic entities were shared across multiple networks in an effort to increase epistemic and hermeneutical insights into the natural world. These networks have often been referred to as the Republic of Letters.[6] Although this term recalls the international quality and singular focus of its constituents, such a label does not fully encapsulate the institutional dynamic many of them enjoyed. Authors within these networks frequently penned letters to audiences they did not know personally. Accounts aimed at meetings of other like minded enquiries reached an audience on a scale unimaginable to the original reporter. Once such work had been published by a society or club, this outreach increased again in scale and scope. A work printed in London could be read around the globe from individuals forwarding a physical copy to foreign contacts to second-hand views of scientific news being shared orally and in the memories of those who read or heard the original. The influence of a single regional observation in the eighteenth century could cast a large footprint on the global imagination.

This article serves as broad examination of how the study of one region became a globalised affair and in so doing participated in the development of

3 See *Roman Mythology* in Leeming, The Oxford Companion to World Mythology, p. 340–343.
4 Siversten, The Parting of the Sea, p. 23–34.
5 Radice (ed. and trans.), The Letters of The Younger Pliny, p. 166–168; Klingaman/Klingaman, The Year without Summer; Wood, Tambora.
6 Goodman, The Republic of Letters. For more recent approaches, see Edelstein/Edmondson (eds.), Networks of Enlightenment; Hotson/Wallnig (eds.), Reassembling the Republic of Letters.

global scientific models. Networks, from their nodal creators and distributors to the chain-link of information, form a useful crux on which this process rests. Networks were indispensable to elevating regional science into a global picture of conformity. A region's features could not be understood as unique or common without comparison to other locales across the world. Enabling this comparison required data. Volcanology could not have emerged in the eighteenth century without actors gathering localised information and assembling it in a cross-referenced global framework. Moreover, the field could not have become its own epistemic category without the emergence of norms and patterns in observation. Minerals and rock structures had to be analysed with a degree of uniformity before any cross-comparison was possible. At the heart of this development in volcanic fathoming was the city of Naples and its surrounding *Campi Flegrei* – the Phlegraean Fields, or Fields of Fire. From the time of Pliny the Younger through to the eighteenth century, numerous individuals made scientific accounts and recorded data about the region. In all of them, the volcano Vesuvius reigned as a focal point for their observations. The volatile majesty of Vesuvius along with its accessible, characteristic shallow slopes made closer study than on other volcanic peaks possible.[7] Exploiting this nature were individuals well-connected to the intellectual currents of eighteenth-century Europe and beyond. First-hand observations and subsequent international distribution allow for an interrogation into how regional phenomena were monitored, codified, and transmitted to other locales. Encountering the Fields of Fire became not only possible to Neapolitan residents but also a shared experience for intellectuals across the globe.

The transnational pollination of ideas through scientific networks opens up new avenues to explore the connections between the regional and global. Historians of science have revisited the old paradigm of centre-periphery in the dissemination of scientific knowledge, infusing it with a greater appreciation of the importance of local actors in epistemic and hermeneutical production.[8] Concurrently, historians of the Enlightenment have long moved past the notion of nation-state enlightenments, granting greater privilege to the view of the Enlightenment as a process of fusion between different locales as a result of technological and global developments. As Sebastien Conrad recently remarked, the Enlightenment "had many authors in many places" and was "the work of historical actors around the world."[9] The result produces an Enlightenment more as a story of many mini-Enlightenments, ones consisting of cross-border interaction and global integration. Such a view adds weight and merit to the efforts of regional explorers who sought to bring together localised studies of

7 Scarth, Vesuvius.
8 For a good examples of this, see Binnema, "Enlightened Zeal", p. 20–22 and *passim*; and Kontler, The Uses of Knowledge.
9 Conrad, The Enlightenment in Global History, p. 1001.

their environs with the wider investigations of the world. The locally grounded studies of such men and women enabled the contested combination of this raw data into ever-wider scientific models. It facilitated the most famous scientific disagreements of the day. What would have been the reputation of the Comte de Buffon and his theory of hemispheric degeneration without the provincial Virginian, Thomas Jefferson? "The Enlightenment was many before it became one" after all.[10]

## Encountering the Fields of Fire

Volcanoes do not need to erupt in order to impact the world. The city of Naples is framed by silent volcanic features. In the West lies the Fields of Fire, consisting of 24 half-submerged calderas which jag the landscape between Naples and Pozzuoli. The crater-ridden fields emerged around 40,000 years ago at a time when Neanderthals ceased to roam much of Eurasia. The subterranean intensity of molten rock forces the entire surface upwards at a steady rate with each passing year – it only depresses when the magma chamber beneath empties with devastating force. In 1780, the Austrian painter Michael Wutky rendered the area as a desolate foreboding mass replete with emanating sulphuric fumes. Across the bay rests the double crests of Mt. Vesuvius. The iconic peaks share the same origin as the Fields of Fire but have earned a larger space in the human imagination due to frequent eruptions. Sandwiched between a sinister underworld on the one hand and a visible threat on the other, Neapolitans find themselves in a constant state of wonder. "Surely the Neapolitan would be a different human being," remarked the poet Goethe after his journey there, "if he did not feel himself wedged between God and Satan."[11] The dormant Vesuvian peaks created lasting impressions in the minds of local inhabitants and visitors. Climbs to the summit had been common undertakings for all social classes for centuries. The rapid ascent made easy by the shallowness of the slopes allowed onlookers to gaze at the views of the city's volcanic neighbourhood as well as the chance to examine up close the exotic objects created through geological cycles. Sediment, minerals, and flowing lava attracted observation from inquisitive minds. The pull of the unknown has been a motivator for knowledge throughout the history of humanity. Curiosity played a significant role in shaping the contours of enlightened thought and discovery throughout the seventeenth and eighteenth centuries. For many Neapolitan and visiting scholars, Vesuvius served as a ready-made laboratory for enquiry into the natural world. "It was in Naples," writes Sean Cocco, "that volcano-watching grew into a science."[12]

10 Fillafer, Habsburg Liberalisms, p. 49. For Jefferson and Buffon, see Dugatkin, Mr. Jefferson and the Giant Moose, p. 10–31; Gerbi, The Dispute of the New World.
11 Goethe, Collected Works, vol. VI: Italian Journey, p. 173. On this point, see also Casapullo/Gianfrancesco (eds.), Napoli e il Gigante.
12 Cocco, Watching Vesuvius, p. 9.

When volcanoes do erupt, their impact upon the surrounding environment is massive not only in terms of the potential for alterations in the physical realm but also in the cognitive world of the local observers and survivors. In the case of Vesuvius, an eruption in 1631 marked the end of a centuries-long era of dormancy and ushered in a prolonged period of activity stretching into the mid-twentieth century. After utilising the solemnity of the fertile volcanic soil for generations, the 1631 eruption ruined farmers' yields, precipitated a regional water crisis by destroying ancient aqueducts, and claimed the lives of around 4,000 local inhabitants.[13] Cataclysmic as the immediate effects of the volcanic event were, the eruption imparted a longer-lasting legacy for the understanding of the Neapolitan environment. Reports by local and foreign observers carried understandings of the natural phenomenon across national boundaries and introduced new concepts in various vernaculars.[14] Novel encounters with an awakened volcanic landscape produced new epistemologies in time which mixed the gradual emergence of scientific techniques with the older trappings of religiosity and superstitious belief.[15] As much as a scientific apparatus emerged around the figure of Vesuvius, faith as means to control and comprehend persisted into the eighteenth century.[16] The emergence of Vesuvius into the international dimension came about as a result of this first of many eruptive events, becoming a watershed both for the culture of witnessing and exploring natural phenomena and for the perceived relationship between Naples and its mountain.[17] The neologism of the 'Vesuvian city' accurately describes the historical dynamic of local Neapolitan life shaped by the volcanic presence of the Fields of Fire which gave rise to the international recognition of the metonymic relationship between Naples and Vesuvius.[18] The volcanism of the seventeenth and eighteenth centuries allowed for micro-frontiers of physical change around Vesuvius, which local and foreign explorers alike were keen to encounter for themselves.[19]

One man who first studied the abundance of natural clues adorning the Vesuvian plains was the Jesuit savant Athanasius Kircher. Born in Geisa in 1601, Kircher had come of age during the tumultuous Thirty Years' War, which drove him to find a more stable footing elsewhere. He found a brief sanctuary in Avignon before an imperial invitation to become the chief mathematician at the Habsburg court in Vienna set him on the road again. As if by divination, Kircher arrived in Rome after a storm forced his ship to land. The eternal city harboured him until his death in 1680. From his base at the

13 Nazzaro, Il rischio Vesuvio, p. 43.
14 Rodriguez Fernández, Vulcanologi spagnoli.
15 Tortora, Alle origini della "vesuviologia"; Cocco, Abbozzo di Nuovi Studi sul Vesuvio, p. 18–19. For the development of scientific practice, see Ogilvie, The Science of Describing.
16 Pingaro, Il Vesuvio nel Settecento; Gugg, The Missing *Ex-Voto*.
17 Tortora, L'eruzione vesuviana del 1631, p. 71–150.
18 Tortora/Cocco, Baroque Tectonics, p. 86.
19 Ibidem, p. 88.

Collegio Romano, Kircher turned his mind to various subjects before undertaking an extended travel of the southern Italian peninsula. In Sicily in 1638, he experienced the ferocity of a volcanic eruption at the footsteps of Mt. Etna. Enthralled rather than terrified, Kircher found a new muse for himself: the study of the "miracles of a subterranean nature."[20] On the return to Rome, he visited Naples in order to examine further the nature of volcanoes – he had already recorded the exact measurements of Etna and Stromboli on the way.[21]

The gentle giant proved life-altering for the devout Kircher. He hired an "honest countryman" as his guide and ascended up the slopes on one particular calm night. The lava flows, still unhealed from the great eruption of 1631, along with the magmatic bubbling of the open caldera shocked the German Jesuit. He desired to examine the molten rock as closely as possible and had his lackey lower him into the volcanic furnace in a basket. "I thought I beheld the habitation of Hell," he later recalled, "wherein nothing seemed to be much wanting besides the horrid phantasms and apparitions of Devils."[22] Kircher's religious terminology referenced his outlook on the natural world which he understood as compatible with biblical teachings and history. The creationist notion of the world being created within seven days had already fallen by this time, but religious adherents recalculated the true age to be roughly 6,500 years. Fossils might have proved a problem for such beliefs as they pose for Creationists today, but Kircher had already brushed them off as seeds which had matured in soft stone, encasing the plant-like results.[23] Kircher's newfound fascination with volcanoes struck a deeper trouble, however. At Pozzuoli, the uplift from the magma below produced a new hill formation a century earlier called, fittingly, Monte Nuova. Kircher's stare into hellfire at the crater and meander through the Fields of Fire convinced him of the expansion of the Earth's surface due to volcanic activity.

In 1664, Kircher published his *Mundus Subterraneus*. The work proved to be groundbreaking. Kircher laid out his theories on volcanic phenomena based on his regional observations in Naples and Sicily. Beneath the Earth's surface, according to his view, must lie a great ocean of inextinguishable fire channelled to the surface via tentacles reaching to the tops of volcanoes themselves.[24] Kircher's ideas, especially when illustrated below, seem convincingly similar to current understandings of the Earth's molten interior. Kircher's conceptions, however, still made room for divine order; there had to be someone to light the fire in the first place. Yet Kircher had advanced a reasoning for the cause of volcanic eruption and neatly tied it to the frequently observed earthquakes which accompanied such events. In Kircher's view, the same subterranean

20 Quoted in Glassie, A Man of Misconceptions, p. 94.
21 Fletcher, Life and Works of Kircher, p. 176.
22 Quoted in Glassie, A Man of Misconceptions, p. 95.
23 Fletcher, Life and Works of Kircher, p. 175–176.
24 Ibidem, p. 177.

channels acted as great wind ducts sustaining the fire but also whipping the rate of combustion to a frenzy and producing internal ignitions which rumbled and shocked the surface. The excess "spiritus" cooled into fiery rivers (lava) once it had burst out of *terra firma*.[25]

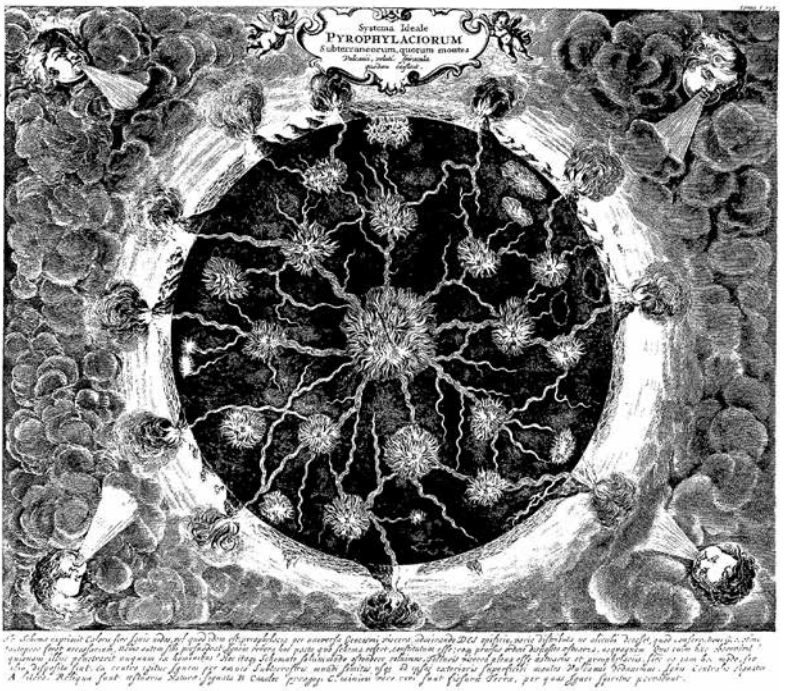


Figure 1: Athanasius Kircher's model of the System of subterranean fires; RBC Q155 .K6 1678 F from Mundus Subterraneus (1678 edn.) vol. 1, p. 194, courtesy of the Department of Special Collections, Stanford University Libraries.

The importance of Kircher's volcanic theorem cannot be understated. Published simultaneously, and unusually, in Amsterdam and Rome that year, his work reached a large European audience. One of the reasons for the lag between his hellish experience in 1638 and the printing of *Mundus Subterraneus* in 1664 was Kircher's painstaking reproduction of volcanic scenes and mineral specimens which he engraved for his published work.[26] Presaging Sir William Hamilton's use of volcanic imagery by a hundred years, Kircher's plates helped the reader visualize as much as it clarified his argument. His work proved wildly popular. In England a pirated abridgement soon went into print as *The Vulcano's, or, Burning and Fire-Vomiting Mountains*.[27] Sensationalist description cemented the exoticism surrounding volcanoes and Kircher's first-hand account of their nature. Kircher's theories found willing readers as a result. In

25 Fletcher, Life and Works of Kircher, p. 176–177.
26 Parcell, Signs and Symbols.
27 [Kircher], The vulcano's.

England, two proto-volcanological texts appeared in quick succession, both building upon aspects of Kircher's ideas.[28]

One of Kircher's most successful suppositions was the temperature increase in the deeper parts of the Earth's crust approaching the core. If the eternal fires raged below every part of the surface, then there would be a uniformity in such an increase. Kircher's notion gained substantiation from the observation of Johann Schapelmann in the mines of northern Bohemia.[29] But it was not until 1740 when the French engineer Antoine de Gensanne proved Kircher's temperature hypothesis correct and refined the rate of change to 1°C increase for every 114 feet in depth.[30] By that time, facets of Kircher's observations and conceptions had been picked up by thinkers across Europe. Giacinto Gimma advanced Kircher's schema of underground tunnels of fire to Italian-speaking audiences in his 1730 *Fisica sotterranea* while Noël-Antoine Pluche wrote of "spiracles through which all the [underground] air escapes along with everything which has been set ablaze in the bowels of the Earth" in his popular *Spectacle de la nature* in 1735.[31] Lingering remnants of Kircher's netherworld flames stretched far into the eighteenth century. In 1784, French naturalist Jacques Antoine Mourgue de Montredon stipulated a "trail of subterranean fire" across Western Europe and the Middle East as the responsible candidate for the poor weather of previous years.[32] Kircher's encounter at the Fields of Fire and in the gurgling jaws of Vesuvius ignited not only a passion within him for volcanology but also among a wider international cast of thinkers. A cast of thinkers who then set about validating Kircher's hypotheses in their own regional environments.

## Hamilton

One hundred years after the publication of Kircher's *Mundus Subterraneus*, Sir William Hamilton arrived in Naples for the first time as the British ambassador to the court of Ferdinand IV of Naples-Sicily. He would remain in this post for thirty-seven years until 1800. From his first day in service, he became infatuated with the volcano; instigating an interest which Susan Sonntag immortalised in her novel, *The Volcano Lover*.[33] There was a good reason for his obsession. Mount Vesuvius began erupting just as Hamilton arrived as if to offer him some welcoming fete. Enthralled by the spectacle, Hamilton feverishly wrote to the President of the Royal Society of London – Britain's premiere national academy of science – to inform him of the scenes of wond-

28 Burnett, The Theory of Earth; Robinson, The Anatomy of the Earth.
29 Sapper, Athanasius Kircher als Geograph, p. 355, n 5.
30 von Zittel, History of Geology and Palaeontology, p. 176.
31 McCallam, Volcanoes in Eighteenth-Century Europe, p. 55.
32 Mourgue de Montredon, Recherches sur l'origine, p. 760–761; see, McCallam, Volcanoes in Eighteenth-Century Europe, p. 229.
33 Sonntag, The Volcano Lover.

rous terror in Naples. "I have attended particularly to the various changes of Mount Vesuvius from the 17th November 1764 the day of my arrival in this capital," he wrote.[34] It is a stroke of fortune for Hamilton that Vesuvius was more active in his day than at any time since Pliny's ancient times.[35] In addition to the 1764 winter eruption, Vesuvius erupted again in 1767, 1779, and 1794. Hamilton left Naples on a few sojourns to neighbouring regions and one lengthy trip to England but he was present in Naples for every one of Vesuvius's fiery displays. These successive eruptions enabled Hamilton to observe changes to the volcano, especially the crater which towers prominently above the bay of Naples.

In January 1765, Hamilton started observing the volcano daily and talking to local Neapolitans about volcanic signs and actions. In other words, he began to study it right away. He examined his obsession up close, ascending the still semi-active slopes on foot. On one of his first occasions, Hamilton hiked up to observe the caldera only to be "nearly brained" by a stone three times the size of his head which struck the ground inches away from him.[36] His luck sometimes failed him on subsequent expeditions, leaving him with burns and bruises from flying stones and burbling lava. In spite of the danger, Hamilton ascended the volcano more than sixty-five times during his stay in Naples – a minimum of twice a year on average.[37] He shared his passion with his numerous guests to Naples, leading them up the volcanic circuit to its peak. On one occasion he escorted the Holy Roman Emperor Joseph II to the crest of Vesuvius – Joseph enjoyed the views but was in a rather cantankerous mood after having met his boorish brother-in-law Ferdinand IV for the first time.[38] Companionship on route to the summit formed a central pillar of Hamilton's excursions. He frequently entertained guests in this manner to strengthen their bonds of friendship. Hamilton's greatest homo-social experience came in October 1767 when he shepherded the papal antiquarian Johann Joachim Winckelmann, the art connoisseur Pierre-François Hugues better known as the Baron d'Hancarville, and the diplomat Baron Hermann von Riedesel. Spurred on by one another, each pushed the limits of endurance to reach the inner walls of the caldera where the intensity of the heat forced them to strip naked but where they could also dine on a feast of pigeons roasted perfectly by the nearby lava flows.[39] Picnicking on top of Vesuvius's peak became a common pastime among the locals and visitors of Naples.[40]

34 Quoted in Constantine, Fields of Fire, p. 20.
35 Cocco, Watching Vesuvius.
36 Quoted in Constantine, Fields of Fire, p. 34.
37 Wood, Making and Circulating Knowledge, p. 69; see William Hamilton's report in Philosophical Transactions 70 (1780), p. 44.
38 Hamilton related the story of his contemporary Wraxall, see Wraxall, Historical Memoirs of my Own Time, p. 152. For the role of scientists and rulers in Naples, see Galasso, La filosofia in soccorso de' governi.
39 Harris, Pompei Reawakened, Chp. VI.
40 See *Tourist Picnics on Vesuvius* in McCallam, Volcanoes in Eighteenth-Century Europe, p. 32–39.

Two factors were behind Hamilton's steady stream of visitors wanting an accomplice to the top of Vesuvius. The first factor rested in the shift in eighteenth-century sensibilities which came to see curiosity and its yearnful urges as positive characteristics. Impulse to seek the unknown fuelled discovery rather than lead an individual to vice. Unlike Eve who satisfied her curiosity in the Garden of Eden to the detriment of mankind, appeasing one's curious inclinations in the eighteenth century enabled the progress of humanity. Even the enlightened thinkers in Catholic Austria indulged in curiosity.[41] The paradigm shift around curiosity from vice to virtue gave license to travellers wanting to explore the majesty and mystery of the volcanic scenes at Naples. Linked to this is the second factor; the popularity of Naples as a destination on the Grand Tour of Europe. Situated within a reachable distance from the city of Rome, Naples became a popular extension to individuals on the Grand Tour of Europe. Filled with newly excavated Roman ruins, the city's environs offered tangible lessons to young aristocrats seeking an exemplary education in the classical world of the ancients.[42]

As mobility became fashionable in the eighteenth century, amateur observations could be extrapolated into scientific data. The 'grand tourist', embarking on a journey of self-discovery and indulgence throughout Europe, could unwittingly become the eyes, ears, and mouthpiece for a scientific enquirer unable to leave home.[43] Tourist sites in the Fields of Fire could yield insights through amateur experience. Take, for example, the popular *Grotta del Cane* – the so-called Cave of Dogs – where paying tourists where enchanted by the spectacle of fainting animals, mainly dogs, who passed out due to the low-lying carbon dioxide fumes emitted from a cavernous volcanic complex near Pozzuoli. Johann Caspar Goethe, father of the famous German poet, witnessed such a show and later printed an account of it in the memoirs of his Italian journey of 1740.[44] Such afterlives of tourism communicated wider understandings of the natural world laid out as curious phenomena.[45] By extending the guiding hand as sharper to visiting tourists, Hamilton not only kindled bonds of friendship but also helped foreigners to encounter and disseminate more intimately the volcanic landscape surrounding Naples.

Hamilton himself began to note the changes he could perceive each time on his mountainous climbs. His documentary evidence grew with passing years and from 1779 to 1794, he maintained a record of the daily activity of Vesuvius which eventually ran to eight volumes. He was guided by the eighteenth-century spirit of record keeping. From Bohemia to Virginia, enlighte-

41 Robertson, Curiosity in the Austrian Enlightenment.
42 Acton, The Bourbons of Naples, p. 85–99; Dodero, Ancient Marbles in Naples, p. 246–251.
43 Bourguet, A portable world; Cassano, Il Vesuvio.
44 Goethe, Letter dated 8th April 1740, in Idem, Reise durch Italien, p. 183.
45 Williams, The Inner Lives.

ned individuals maintained meteorological diaries containing minute datasets from rainfall to temperature.[46] Partaking in the common spirit of quantification, allowed Hamilton to correlate the density of the volcano's smoke and ash clouds, to make comparisons with local weather charts, and to analyse the volcano's effect on the fertility of the soil in the region. In other words, Hamilton was particularly keen not just to understand the volcano but to comprehend the volcano within its regional context and to recognise both its creative and destructive potentialities.[47] This 'modern Pliny' – a contemporary sobriquet for Hamilton – did not require an eruption to stimulate his studies on Vesuvius but could observe daily the volcanic wonder from his window.[48]

Hamilton's studies also situated Vesuvius in familiar regional contexts of his homeland. In describing the eruptions of 1764 and 1767, he referred to his travels in England and Wales, finding parallels to the industrial factories of middle England and the sublime Welsh hills of Pembrokeshire. Hamilton still saw the need for wider comparison in his notes and letters. It obviously evoked a sense of familiarity and easy comprehension in his mind and the imagination of his correspondents. This aim combined with another to flaunt his worldly experience and knowledge to his recipients. In one account, for instance, Hamilton compared the types of volcanic rocks he collected with those in the Giant's Causeway in Ireland and regions in France.[49] These descriptions, filled with elaborate and detailed remarks contrasted the earlier writings about Vesuvius; they were comparative, joining pieces of a puzzle not just siloed observations. The volcano had long been a point of fascination among travellers but in Hamilton's work, the minutiae were mixed with marvel.[50] In his private letters such as ones to friend Joseph Banks, Hamilton alluded to more coarse metaphors about the power of volcanoes. From the perspective of Vesuvius, Hamilton wrote of one recent eruption, it was "no more than having let out three farts, a sneeze and a Shite."[51] Familiarity and humour, even with an inanimate object as a volcano, proved a powerful tool in Hamilton's transmission of volcanic news to his contacts abroad.

From the beginning of his diplomat mission in Naples, Hamilton disseminated his careful studies to the members of the Royal Society in London via personal letters addressed to the Society's president. Read aloud at meetings, these letters catapulted Hamilton's position for they were widely recognised

46 For Virginia, see the most famous examples of Thomas Jefferson's meteorological habits: "Thomas Jefferson, 1776–1818, Weather Record", Thomas Jefferson Papers, Library of Congress; Martin, Thomas Jefferson, chp. V: *Meteorology*. For Bohemia, see Brázdil/Valášek/Macková, Climate. For the more generalised view: Frängsmyr/Heilbron/Rider (eds.), The Quantifying Spirit.
47 Knight, Il Vesuvio di Hamilton; Knight, I luoghi di delizie.
48 Thackary, The Modern Pliny; Constantine, Fields of Fire, p. 29.
49 Sleep, The Geological Work, p. 324.
50 Everson, The Melting Pot of Science.
51 Constantine, Fields of Fire, p. 197.

both for their accuracy and their captivating narrative. He was elected a fellow in 1767 as a result and following his further writings, he was awarded the Society's most prestigious prize, the Copley Medal, in 1772. Hamilton's letters were also disseminated further beyond the Society through its journal, *Philosophical Transactions*. The journal featured an impressive subscription list of some of the finest minds across the globe as all Fellows of the Royal Society were automatically forwarded a copy. This meant Hamilton's letters from the 1760s and 1770s reached at least 418 Fellows within and 140 Fellows outside of Great Britain through reprint in the *Philosophical Transactions* alone.[52]

Hamilton's epistles to the Society followed the norms of contemporary scientific enquiry. For example, he submitted soil and rock samples along with one letter in 1766. He referred to earlier works of Renaissance proto-volcanologists such as Antonio Bulifon, Giulio Cesare Braccini and Giovanni Spinola.[53] All of them he held in high esteem but disparaged the spectacle they described in favour of a more rationalist, empirical perspective. This did not mean Hamilton discounted earlier works, rather the opposite, he sought to build upon them by scouring their works for quantifiable sources. In his *Observations on Mount Vesuvius* published as a collection of letters in 1774, Hamilton relied upon Spinola's work, *Discorso sopra l'origine de'fuochi gettati dal Monte Vesuvio* for discerning the patterns of volcanic clouds above Vesuvius upon the eruption 1631.[54] Hamilton contrasted this with the Bulifon's *Salatoris Varonis Vesuviani Incendii* which recorded the level of ashfall in the streets of Naples during the same eruption.[55] Historical comparison allowed Hamilton to rightfully conclude the eruption of 1767 had been less powerful than the one of 1631 as described by the Renaissance observers.[56]

Hamilton refrained at first from calling himself a scientist and his work scientific, however. In spite of his empirical detective work both in the present and the past, Hamilton hid behind his persona as a noble diplomat. He declined to pass any scientific judgement on his volcanic writings, preferring to merely act as a scientist's eyewitness on the ground and providing detailed observational accounts in his letters; leaving, as he put it humbly, "explanation to the more learned in natural philosophy."[57] Yet Hamilton broke out of his observational mode as time wore on and his confidence grew. In one letter, for example, he entered the debate over the depth of a volcano's magmatic core

52 Lists of the Royal Society members, available via URL: https://catalogues.royalsociety.org/CalmView/personsearch.aspx?src=CalmView.Persons [16.2.2021].
53 Wood, Making and Circulating Knowledge, p. 69.
54 Cocco, Watching Vesuvius, p. 83.
55 Hamilton, Observations on Mount Vesuvius, p. 34.
56 Ibidem, p. 49.
57 Philosophical Transactions, 57 (1767), p. 192.

offering his view not just his observations.[58] His confidence may have grown as he sought to globalise his understanding, evolving beyond the geographic confines of the Neapolitan region. He struck up a correspondence with the noted volcanologist Giuseppe Gioeni, whose correspondence Hamilton forwarded and had published by the Society in London.[59] In a similar effort, Hamilton opened up channels of communication with other Sicilian eyewitnesses such as the canon Gasparo Recupero who could supply him with updates and comparisons of Mt. Etna. Hamilton used Recupero's description of local stones and shells to work out the aggregation of sediment due to volcanic eruption.[60] By linking together networks of observers and cross-stitching their accounts, Hamilton exercised scientific judgement even if he chose to reject the label. In doing so, he also evaluated the value of regional studies and began to formulate wider, more systematic patterns of understanding.

Hamilton's scientific prognostication was best expressed in his *Campi Phlegraei*, his 'Fields of Fire' published first in 1776. It was the most extensive collection of his writings, letters, and findings on the volcanic region to date. Accompanying the three volumes were drawings by the artist Pietro Fabris among others whom Hamilton had commissioned to produce a series of fantastical images.[61] These volumes were unlike anything that had ever come before them. Rich textual description, scientific analysis, and first-person perspective in images combined together as if to present the fiery region in full view of the reader. In one plate, Fabris – on Hamilton's instruction – painted in Hamilton explaining the volcano to the King and Queen of Naples-Sicily and the artist even took the liberty to depict himself; a scene that "made it doubly explicit that the picture could be taken to be a reliable proxy, an accurate representation."[62] Despite the immersive quality of the work, it is clear Hamilton intended his magnum opus for the scientifically inclined. The work had cost an inordinate amount to produce largely because of the imagery but also because of Hamilton's desire for the volumes to resemble works of art within themselves. He donated many copies at huge personal cost, however. He gave one copy to the Public Library of Cantania in Sicily, so that "it may awaken some ones [sic] curiosity to attend a little to the motions of the Sublime Volcano in its neighbourhood."[63] Hamilton had honed his work towards the prevailing sensitivity for local curiosity, designed for maximum popularity.

58 Philosophical Transactions, 59 (1769), p. 7.
59 Gioeni's letter was translated by Hamilton and published in Philosophical Transactions 72 (1782), p. 1–7.
60 Constantine, Fields of Fire, p. 75–76.
61 For details of Hamilton's illustrators, see Cocco, Watching Vesuvius, p. 218.
62 Rudwick, Picturing Nature, p. 300.
63 Wood, Making and Circulating Knowledge, p. 94; quoting Hamilton to Banks, s. d. July 1781.

Figure 2: The eruption of Mount Vesuvius in the night of 8 August 1779, coloured etching by Pietro Fabris, 1779; Wellcome Collection, Library no. 43803i (CC BY 4.0).

Hamilton sought also to dispel the mysticism surrounding volcanoes for the general readership. Illustrations were one means of achieving this but Hamilton levelled scepticism upon the religiosity around volcanic entities. Whereas Kircher had still viewed volcanism as an inherent part of a divinely preordained plan, Hamilton objected in muted tones.[64] His reports included stories of the terrified reactions by local inhabitants to Vesuvian eruptions. Such narratives revolved around the local faithful praying for the intercession of St. Januarius (San Gennaro) and the parading of his relics and ikons in times of peril as if to ward off the incoming devastation. Such narratives underscored the prevailing stereotype of superstitious Neapolitans placing their faith before reason or as Hamilton put it more bluntly, the "usual misture [sic] of riot and bigotry."[65] Hamilton and Fabris encoded the futility of such actions in one

64 For a discussion of Kircher's account of miraculous ashen crucifixes forming in the churches near the eruption of 1631, see Fletcher, Life and Works of Kircher, p. 177.
65 Quoted in Cocco, Watching Vesuvius, p. 220.

illustration where four figures huddle in awe across the bay from an cataclysmic Vesuvius; one of them, arms outstretched, seems to reference the defeated Christ on the cross, and is accompanied by one woman kneeling, praying with her head to the trembling ground and another projecting a rectangular relief – presumably of the patron saint – towards the scene in desperate hope of protection.[66]

Hamilton's motivation for creating his *Campi Phlegraei* stemmed from his advocacy of the necessity of regional study. He saw this as a fundamental basis for any advancement in the sciences. In the introduction to his first volume, he argued that "accurate and faithful observations on the operations of nature […] are not met with often," and "that those who have wrote most […] have seldom been themselves the observers."[67] The key to scientific inquiry as far as Hamilton was concerned was not to construct grand universal claims but to extrapolate upon small regional phenomena and to connect this with other regional studies. It was for this reason that Hamilton had reached out in time and space to the historical accounts of the Renaissance writers and those further South like Recupero and Gioeni. It is this ethos that we shall now consider in other regional contexts.

## Bohemia

Hamilton's fascination with the Fields of Fire resonated beyond Naples. In the first of two sections, attention now turns to how scientific communities acquired and adapted such regional knowledge of the Neapolitan example and how volcanology emerged from regional study to the inclusion of such wider perspectives. In Bohemia, a land not famous for volcanoes, eighteenth-century interests in volcanology were awakened by the Kammerbühl mountain known also as Komorní hůrka in the westernmost hills near the border with Thuringia. Known for centuries as an intriguing geological feature on account of its unusual topology, the first excavations took place in 1766 under Count Heinrich Siegmund von Zedtwitz. A tunnel spanning nearly 400 feet reached into the various layers of sediment before the attempt was abandoned as loose rock poured through and hindered any further penetration.[68] For years the geological mystery surrounding the Kammerbühl awaited further exploration.

Bohemia's volcanic secret was unveiled by two curious individuals. The first was Ignaz von Born who was one of the leading scientific minds of the Habsburg Monarchy and one of the premiere European scholars of his day. Born in Transylvania, von Born rose to prominence after stints at studying among the Jesuits in Vienna and jurists in Prague before he became enamoured with the study of mineralogy and metallurgy. He acquired fame – and his

66 Provided in Hamilton, Supplement to the Campi Phlegraei.
67 Hamilton, Campi Phlegraei, p. 5.
68 Proft, Kammerbühl und Eisenbühl, p. 44–45.

ennoblement – through multiple channels: chiefly through his perfection of the amalgamation process which allowed for the faster and cheaper production of metals but also through his mineralogical travels and collecting as well as his prominent role as a leading freemason in Vienna during the 1780s.[69] In Bohemia, von Born acted as a catalyst for the promotion of scientific collaboration, founding in 1772 an informal progenitor of the Bohemian Society of Sciences.[70] By the time of Hamilton's fame, von Born was an established figure of the Bohemian intelligentsia. The second individual was the Swedish mineralogist, Johann Jacob Ferber, a student of Carl von Linné who had embarked upon an educational tour of Europe after completing his mineralogical studies in Stockholm in 1770. Visiting von Born's residence at Alt Zedlisch / Staré Sedlišt in Bohemia was part of the itinerary for the keen Ferber and together the pair ventured to the mystery at Kammerbühl.

Close examination of the minerals and sediment strata allowed the pair to conclude the anomaly was in fact an extinct volcano. One which had formed the unusual local powdered rocks and the scorched basalt used in the nearby 'Black Tower' of Eger / Cheb castle. In his *Schreiben über einen ausgebrannten Vulkan bey der Stadt Eger* of 1773, von Born expounded their ideas in print in an eerily similar pattern of study to Hamilton's letters, mixing local anomalies with parallels to elsewhere. In doing so, von Born referred to the study of volcanic fossils in Italy – though he failed to specify – and used these two examples ('Italy' and Eger) to postulate that rocks were formed through the volcanic process, positioning himself (like Hamilton) against the Neputunist theory that rocks were formed by crystallisation in the Earth's oceans.[71] Intent on raising his international profile and connecting with volcanologists in the Italian territories, von Born sent his work to Giovanni Arduino, a translator and publisher who printed the work in the *Giornale d'Italia* in Venice a few years later.[72]

Although there is no direct evidence that von Born read and digested Hamilton's works, it certainly likely that he was at least aware of them. Of the 140 foreign members of the Royal Society's subscription list, von Born was one of them meaning he would have received copies of the *Philosophical Transactions* containing Hamilton's works.[73] He certainly knew of Neapolitan discoveries in mineralogy as he used the term *Puzzolan-erde* (Pozzolans), for instance, which owed its origin to the rocks studied near Pozzuoli.[74] Von Born

69 Lindner, Ignaz von Born; Reinalter (ed.), Die Aufklärung in Österreich.
70 Teich, The Scientific Revolution, p. 72.
71 The theory had been championed by Abraham Gottlob Werner. von Born, Schreiben des Herrn Ignaz von Born an Grafen Kinsky.
72 von Born, Lettera. I am grateful for this reference from the presentation of Teodora Shek-Brnardić, *Private Letters, Public Interests. The Roles of the Published scientific Correspondence in central and South-eastern Europe* at the International Congress on Eighteenth-Century Studies, Edinburgh, 15.7.2019.
73 Ignaz von Born was elected to the Royal Society in 1774.
74 See letter of von Born to Johann Christian von Scherber, 27.5.1773 quoted in Linder, Ignaz von Born, p. 70.

was in contact with Hamilton by the mid-1780s as a letter to his son-in-law testifies – but von Born's letter is unfortunately lost.[75] The most substantive evidence of Hamilton's influence is to be found in von Born's own works such as the 1773 work about the Kammerbühl. A direct influence can be seen in the overall tone of von Born's text. He deployed his arguments in an epistolary nature – von Born published the book as a series of letters to his Bohemian friend Count Franz Joseph Kinsky – to call for the advancement of volcanic study and Bohemian institutional science. Harshly critiquing the nascent state of scientific enquiry in the Habsburg lands, von Born compares their relative backwardness to the development of volcanology in general. At the same time, he argues for the promotion of studying one's own backyard, especially in the richly varied geography of the Habsburg lands.[76] Such a call for attention closely echoed Hamilton's own views and presaged his passages in the *Campi Phlegraei*. For both von Born and Hamilton, regional study was an imperative prerequisite to the progression of science and worldly knowledge. Moreover, evoked the role of the nobility in forming new scientific ideas. In his opening passage laying out the defects of Bohemian inquisition, he states: "But who among our nobility has ever even thought of encouraging talents to seek out, bring together, and make known the treasures which the generosity of nature has so extensively allocated to the extensive Austrian states?"[77] The lines seem to draw a sharp contrast of Bohemian aristocrats with the active, enlightened, and exploring character of the noble knight Hamilton.

As time wore on, von Born promoted the study of Italian volcanic landscapes in addition to his scientific endeavours in the Habsburg Monarchy. He encouraged Ferber to write German accounts about Italian geography which complemented his own on the Kammerbühl, which he later translated and had published in Prague seemingly without Ferber's explicit permission.[78] Later Ferber continued in the tradition of comparing regional phenomena in order to uncover the deeper underlying processes of geological formation with his examination of various mountain sites in Hungary.[79] Meanwhile, Born upheld the trend through his support of Alberto Fortis, a Venetian naturalist and ethnographer. Fortis's book was originally a compilation of letters addressed to Michele Sorgo, the uncle of von Born's son-in-law Tommaso Bassegli from Dubrovnik. Family politics may have played a role in the switch of addressee when Tomo replaced his uncle in the German-language edition a few years

75 "Mimi doit déjà avoir reçu la lettre de l'Archiduchesse Marianne a la Reine de Naples, que je lui ai envoyé par Mr Henry il y a 5 Semaines. La semaine prochaine elle je Vous enverrai une lettre du Prince Dietrichstein pour Calzapici à Naples, une autre pour notre Ministre le Baron de Thugutt, et puis j'écrirai moi meme une a Hamilton." Ignaz von Born to Tommaso Bassegli, 6.7.1786, Dubrovnik State Archives, Bassgli Family Fonds, Nr. 253, Correspondence of Tomo Bassegli.
76 von Born, Schreiben über einen ausgebrannten Vulkan, p. 4.
77 Ibidem, p. 16.
78 Ferber, Briefe aus Wälschland.
79 Ferber, Physikalisch-metallurgische Abhandlungen.

later, but Fortis thanked von Born in both editions for his inspiration and dedication to seeing Fortis's ideas brought to a wider audience.[80] Fortis's works made specific reference to both von Born's study and that of Ferber, suggesting the concerted effort to study cross-referenced regional phenomena.[81] Though Hamilton's direct intellectual fingerprint in Bohemia was light, the same forces were at play. Networks of institutionalized scientists collaborated and connected wider epistemologies in order to better understand the local geological and volcanic landscapes of their native environment.

## Pennsylvania

The Neapolitan connection with Pennsylvania stretches beyond the time of William Hamilton. Like Hamilton, another British envoy was responsible for this linkage: his name was Isaac Jamineau. Serving in his post as consul-general from 1753 to 1779, Jamineau, like Hamilton, found himself fortunate to observe Vesuvius's active period. In December 1754, Jamineau wrote a series of letters on the most recent eruption to the Royal Society. His missives were read aloud and subsequently published in the *Philosophical Transactions*, but unlike Hamilton who wrote with an audience in mind and enlisted teams of artists, Jamineau's efforts failed to garner any great success at home. Jamineau's lacklustre reception can be attributed to his paucity of scientific rigour and the overall blandness of his work. Compared to Hamilton's sparkling brilliance regaling the reader with descriptive scenes, Jamineau's three short letters were dry powder containing none of the personal trekking or the regional context that so filled Hamilton's writings. This was consistent with his personality. When the Hamiltons arrived ten years later, they found Jamineau "insufferable" and someone who "presumed too much, far beyond his station."[82] Jamineau became something of a *bête noire* for Hamilton over subsequent years and someone to match his scientific works against. Jamineau also lacked a wider understanding of scientific thought, something which Hamilton, as we have seen, took lengths to obtain through corresponding with experts and his personal examination of the Vesuvian slopes.

Whilst Jamineau failed to meet with success in London, he received great acclaim in Philadelphia. This was in no doubt thanks to John Morgan, a leading physician in the city and member of the American Philosophical Society, the première scientific institution in the American colonies and brainchild of Benjamin Franklin. Morgan had likely met Jamineau on his trip to Naples in early 1764.[83] Unfortunately Morgan's diary, composed during his European travels, is missing for his portion of his Italian journey, so it is not definitive

80 Fortis, Mineralogische Reisen; Fortis, Lettere geografico-fisiche, p. vi.
81 Fortis, Travels into Dalmatia, p. 21.
82 Constantine, Fields of Fire, p. 23.
83 Pace, Notes on Dr. John Morgan; Morgan/Pace, Two New Letters.

when or how exactly they made their acquaintance.[84] It is probable Morgan relied upon Jamineau's consular role as Americans were still British subjects at the time. It is clear they maintained contact, however. [85] Morgan helped to secure Jamineau's scientific reputation through his work on volcanoes in North America. In 1771, following the wake of Hamilton's successful series of letters, Morgan had published an account of the 1767 eruption of Vesuvius "from an English gentleman residing in Naples."[86] Given Morgan's arrival in Naples before Hamilton and his surviving correspondence with Jamineau, it is without doubt the work of Jamineau.

Unlike the Royal Society which published works of an acceptable standard regardless of utility, in order to be published in the *Transactions of the American Philosophical Society* a text needed to have some value for learned Americans, suggesting that Morgan saw such value in Jamineau's descriptions of the eruption.[87] The absence of any major volcanic activity in the thirteen mainland British colonies undermined any first-hand exploratory accounts of volcanic systems in North America. Moreover, the culture of early and colonial American natural science leaned more towards botanical sciences and limited mineralogical examination.[88] Given the resulting paucity of geological instruction in America, descriptions of European volcanic events were not only rare but valuable accounts to a growing American interest in the functioning of the Earth's systems.[89] By importing Jamineau's accounts, Morgan presented American intellectuals with an opportunity to learn about volcanology.

Aspects of Jamineau's work contained relevant information for colonial Americans. Understanding more about the fertility of soil, a point discussed within Jamineau's text, mattered of course to North American planters and farmers. The same utility was seen by American readers of Hamilton's *Campi Phlegraei* which, among everything else, added to the debate of calculating the age of the Earth and the origin of basalt rock.[90] The same note of usefulness was observed when the Hanoverian-born librarian and writer, Rudolf Erich Raspe, translated the works of von Born and Ferber into English.[91] He subsequently shared these with Benjamin Franklin, who commented that these works "contain[s] a great deal of observation useful to America."[92] The same went for Raspe's own 1776 study on German volcanoes which he supplemen-

84 Morgan Harding (ed.), The Journal of Dr. John Morgan.
85 Isaac Jamineau to John Morgan, 3.11.1767, College of Pennsylvania Archives, Philadelphia, John Morgan Papers.
86 [Jamineau], An Account of the Eruption of Vesuvius.
87 On the printing habits of the Royal Society editors, see D'Amore, The Royal Society, p. 9–10.
88 Scott Parrish, American Curiosity; Johnson, American Eden.
89 Corgan, American Geological Education.
90 Winterer, American Enlightenments; Sleep, The Geological Work, p. 325.
91 von Born, Travels through the Banat. See also, Tindall Kareem, Forging Figures.
92 Benjamin Franklin to Rudolf Erich Raspe, 4.5.1779, in: Oberg, The Papers of Benjamin Franklin, 29, p. 430; see also, Raspe to Franklin, 14.8.1777, in: Kahn, Some Unpublished Raspe-Franklin Letters, p. 129.

ted as an addendum to an edition of Hamilton's work.[93] By emphasising utility and compatibility, Morgan and Raspe tapped into one of the central occupations of enlightened thinkers everywhere: the applicability of scientific observation to their own local context. In exploiting such interests, Morgan utilised institutions like the American Philosophical Society to widen the scientific horizons of his fellow citizens. The *Transactions* published by the Society along with later publications such as the *Memoirs* of the sister American Academy of Arts and Sciences in the 1780s, engendered the next generation of Americans with an emerging understanding of earth sciences and volcanism.[94]

## Post-Hamilton: Regional Science and the Global Transformation

Hamilton was not the last Englishman to make the volcanic Neapolitan landscape his muse. The long period of turbulence in the 1790s in the wake of the French Revolution all but closed off the Neapolitan environment to foreign observation. In 1799, a republican revolution sympathetic to the French ideals broke out in Naples and established the short-lived Parthenopean Republic. Hamilton fled with the Neapolitan dynasty to Sicily and only returned briefly to see the city for a final time aboard the British warship *HMS Foudroyant*.[95] In 1800, Sir Arthur Paget officially replaced Hamilton as the British envoy to Naples. During that tumultuous decade, little foreign observation could be made of the Fields of Fire and Vesuvius fell dormant after the last eruption in 1794. Even the English-born, Oxford-educated, Naples-resident volcanologist and mineralogist, William Thomson fled to Sicily in 1802.[96] Alexander von Humboldt arrived in Naples in 1805 as a leisure extension to his diplomatic mission to Rome that year. Unequipped, his brief stint provided no scientific results except for the experience of a minor earthquake which was quickly shared through the scientific community in Europe.[97] Humboldt would return again during peacetime in 1822. By that time, a new volcanologist had come to prominence.

Although the name of Teodoro Monticelli is not widely known today, his careful observations of Neapolitan geology mimicked the hard efforts of Hamilton and Kircher in the centuries previous. In the first half of the nineteenth century, every major scientific figure who visited Naples met with Monticelli, who took over the mantle from Hamilton by escorting them up the slopes of Vesuvius.[98] Born in Brindisi, Monticelli's prodigious mind car-

93 Raspe, An account of some German volcanos.
94 Hazen/Hazen, Emergence of Geology.
95 Constantine, Fields of Fire, p. 224–253.
96 Mentioned in William Tilloch to Pictet, résumé, 25.1.1802, in: Sigrist (ed.), Correspondance, vol. III: Les correspondants britanniques, p. 507. Thomson is a little-known figure who spent his years in Naples and Sicily after leaving Oxford in some sort of disgrace in 1790. See Clarke, William Thomson.
97 Humboldt sent an account of the experience to the Geneva-based Marc-Auguste Pictet who in turn forwarded a copy to Alexander Marcet. See Pictet to Marcet, 1.9.1805, in: Sigrist (ed.), Correspondance, vol. III: Le Correspondants britanniques, p. 329.
98 Brewer, Scientific networks, p. 57.

ried him to Rome for tuition in philosophy and the natural sciences before he relocated to Naples in 1792 as a professor of philosophical studies. A man of liberal even Jacobin tendencies, Monticelli fell foul of the Bourbon regime until his fortune changed under the French-installed Muratist monarchy rehabilitated his career by entrusting him with the Collegio del Salvatore and a secretarial position in the Royal Academy of Sciences. By the time the Bourbons returned to power in 1815, Monticelli had enough of a scientific reputation to safeguard his position.[99] Vesuvius figured prominently in Monticelli's fame. Humboldt referred him as "the learned and zealous observer of the Volcano."[100] Together with Nicola Covelli, Monticelli published two highly scientific worthy books on the volcano: *Storia de'fenomeni del Vesuvio* and *Prodromo della mineralogia vesuviana*.[101] Monticelli's works rested on Hamilton and Thomson's observations of the late eighteenth-century Vesuvian eruptions as well as the older accounts by Kircher and Pliny.[102]

Monticelli embraced a sense of healthy dose of scepticism about such texts, however. He preferred to "study their doctrines, without embracing any one of them," and insisting in print that "we only intended to give exact reports of things observed by us."[103] He intended to weave a path through volcanology which did not end up in the quagmire debates between the Neptunists and Plutonists on the origins of the Earth's rocks.[104] Monticelli's adherence to empiricism over theory echoes the Hamiltonian approach but Monticelli, as a fervent believer in the Neapolitan value for world science, also acted out of a determination to "insert Vesuvius (both materially and intellectually) into the international geological narrative."[105] Monticelli's curation of Vesuvius as an object of fascination, a "*fenomeni*," and as an indispensable scientific tool to understanding the world's geological formations ensured the growth of Neapolitan networks on the international scale. Monticelli's agenda was aided by the colossal eruption of Vesuvius in 1822. It was the first major eruption since the one in 1794. Humboldt flocked for a second time to see the aftermath but unequipped and unable to take measurements, he relied upon the generosity of Monticelli to complete his three observations at the summit.[106] In subsequent years, Monticelli's visitor network, again much like Hamilton, expanded from professors to princes, from poets to picnickers.

99 De Ceglia, Monticelli, Teodoro; Ceva Grimaldi Marchese di Pietracatella, Elogio del commendatore Teodoro Monticelli; Nicolini, Teodoro Monticelli.
100 Brewer, Scientific networks, p. 56.
101 Monticelli/Covelli, Storia de' fenomeni del Vesuvio; Monticelli/Covelli, Prodromo della Mineralogia Vesuviana.
102 See for example, Monticelli/Covelli, Prodromo della Mineralogia Vesuviana, p. 43–44.
103 Quoted in Nazzaro/di Gregorio, The Contribution, p. 427.
104 For an example of contemporary debate, see Master, Plutonism versus Neptunism.
105 Brewer, Scientific networks, Vesuvius and politics, p. 57.
106 Alexander von Humboldt to Karl Ludwig Willdenow, 20.4.1799 and in Edition Humboldt digital, edited by Ottmar Ettevia, URL: https://edition-humboldt.de/v5/H0001200 [16.2.2021]; for his ascent, see ibidem via URL: https://edition-humboldt.de/v5/H0005428 [16.2.2021].

Two Englishmen proved a boon to Monticelli's efforts to integrate Vesuvius into a global geological narrative. The first was Sir Humphry Davy, the noted Cornish chemist responsible for the safe introduction of flame lamps in mines with his eponymous invention, the Davy lamp. A scientific savant, Davy quickly rose to the top of the scientific elite in Britain, becoming a member of the Royal Society and given an honorary professorship in chemistry at the Royal Institution. He gave a Baker lecture in the Society's famous gallery to much acclaim and won the prestigious Copley Medal as well as a baronetcy for his scientific achievements.[107] When Davy arrived for the first time in Naples in 1814, Monticelli offered him immediate assistance, accompanying him to the peak, helping to gather mineral samples, and opening his own private collections for Davy's perusal. Davy wrote to his mother about his joy of Monticelli's gift of "a very fine collection of minerals from Vesuvius."[108] Davy enabled an exchange of minerals between Monticelli and members of the Royal Society so both sides may study the secrets of rock samples from across the world, in Monticelli's case, and from the Neapolitan region, in the case of Society members.[109] Davy's time in Naples also allowed him to postulate his own ideas on the geological process. In contrast to Monticelli, he was not afraid to take a side in the Neptunist-Plutonist debate. After examination of the "saline products of the *solfaterra* [of] Vesuvius" in 1814, he wrote to the Genevan scientist and publicist Marc-Auguste Pictet, of his conviction "on the igneous origin of basalt."[110] Pictet was a well-networked figure within the European scientific community. His passion for English science led him to publish the annual *Bibliotheque Britannique* from the 1790s onwards, something which he boasted one Scottish subscriber, connected places "reaching so far as Naples, Vienna and Petersburgh."[111] Through Davy, Monticelli acquired supporters who carried his work to new and wider international audiences. The English astronomer John W. F. Herschel, for example, shared Monticelli's *Prodromo di Vesuvio* among friends in Catania.[112]

Davy's attachment to Naples went beyond Monticelli due to Davy's desire to unstick damaged Roman manuscripts excavated from the ruins of Heracleum. In 1819, Davy returned to Naples for a second time via Innsbruck and the Brenner Pass in order to conduct further experiments on the Herculaneum papyri. In a procedure that entailed subjecting the ancient sources to a cham-

107 Knight, Humphry Davy.
108 Humphry Davy to Grace Davy, 14.9.1814, quoted in Brewer, Scientific networks, Vesuvius and politics, p. 59.
109 Brewer, Scientific networks, Vesuvius and politics, p. 59.
110 Davy to Pictet, 26.5.1814 quoted in Sigrist (ed.), Correspondance, vol. III: Les Correspondants britanniques, p. 137–138. Davy and Pictet's full correspondence lasted from 1801 to 1825, see Sigrist (ed.), Correspondance, vol. III: Les Correspondants britanniques, p. 128–143.
111 Pictet to John Playfair, 2.12.1796, in Sigrist (ed.), Correspondance, vol. III: Les Correspondants britanniques, p. 386–387. For Pictet's widest correspondence, see Sigrist (ed.), Correspondance, vol. IVb: Les Correspondants italiens, allemands et autres.
112 Brewer, Scientific networks, Vesuvius and politics, p. 64.

ber filled with chlorine to loosen the bonded fibres, Davy claimed to be better able to read and unfurl the manuscripts. Understandably alarmed, Neapolitan antiquarians prevented his successive experiments.[113] With one diversion blocked, Davy again focused on his exploits with Monticelli. He sought to expand his knowledge of mineralogy and to export greater amounts of mineral samples back to Britain for further analysis. This time he arranged for an exchange of several Neapolitan volcanic specimens for an assortment British minerals through Spencer Compton, 2nd Marquess of Northampton, the president of the Geological Society of London. In 1821, Davy went one step further and facilitated the wholesale purchase of Monticelli's entire Vesuvian collection by the British Museum, noting its worth and value for British geologists.[114] Through Davy's connections and mutual friendship, Monticelli had succeeded in projecting his "great Vesuvian laboratory" to the world.[115]

Over successive winters between 1816 and 1819, another prodigious Englishman arrived in Naples. George Julius Poulett Scrope was in the midst of his bachelor studies at St. John's College, Cambridge when he took to Naples for its milder climes.[116] The daily sight of Vesuvius awoke within him a "great interest" for volcanology and his perception of the Bay of Naples being the result of "volcanic action on an extensive scale" intrigued him so much that he devoted the rest of his scholarly attention to volcanoes.[117] In 1819, he visited other volcanic structures on Sicily and the Lipari Islands but it was his return journeys through central France which provided an even greater stimulus. For the next few years until 1823, Scrope visited suspected volcanic sites in France searching for traces of previous geological activity. In the Auvergne region he found such evidence. Throughout the period, he continued his practice of wintering in Naples where in 1822, he observed first-hand the power of a Vesuvian eruption; it was, in his opinion, "by far the most important eruption of Vesuvius that ha[d] occurred during this century."[118] Like Monticelli – whom he surely knew personally given their overlap in interests – Scrope was spellbound. He acquainted himself with the expansive literature on Vesuvius from Pliny to the 'modern Pliny' Hamilton.[119] The constant physical oscillation between two volcanic regions sparked greater insights in the young Scrope. In his published work on the volcanoes of central France, Scrope identified wider patterns between chimneys of the extinct Mont Dore in the Auvergne region with the new sight of Vesuvius's crater "torn through the bowels of the

113 For his procedure and results, see Davy, Some Observations.
114 Petti/Toscano, From Vesuvius to the World.
115 "Gran laboratorio vesuviano" in a letter from Davy to Monticelli, 19.10.1819, quoted in Petti/Toscano, From Vesuvius to the World, p. 494.
116 Rudwick, Scrope, George Julius Poulett.
117 Scrope, The Geology, p. v–vi.
118 Ibidem, p. vi.
119 See, for example, his references to Hamilton's work in ibidem, p. 117.

mountain by the eruption of 1822."[120] Scrope's comparison connected the Neapolitan and central French regions together in a manner which allowed him to draw larger geological parallels and conclusions.

In 1825, Scrope published his *Considerations on Volcanoes*.[121] It was a masterpiece of scholarly practice, bold in ambition and all-encompassing in scope. He intended it to be nothing less than a complete and definitive theory of volcanology and its relationship with the construction of the Earth's crust and mantle. Scrope marshalled an array of volcanic examples which spanned the globe in its entirety. He listed out the then known volcanoes of the Earth from those well-known in Europe to those in the Azores, to the new discoveries in the Pacific and the Mesoamerican structures of Mexico and Peru.[122] He compared the eruptions of Vesuvius and Etna to those in the Pacific and America.[123] As if to brag his worldly outlook, Scrope appended a short History of the Earth which reiterated the global vision already running thick through his work. In doing so, Scrope levelled evidence upon evidence against Neptunist notions of the Earth's formation. Volcanoes, in his astute view, were the engines of the world's land masses made clear through "a chain of inductive evidence" across the globe.[124] Scrope's comprehensive work provided cohesion to geological science. His book became a core textbook of the nineteenth century and went through several variations.[125] His work rested upon the previous endeavours of Hamilton, Humboldt and Monticelli along with many more.[126] In his introduction, Scrope pointed out his original indebtedness to the sight of Vesuvius in 1818 which first ignited his interest and set him on the journey to other volcanic sites around the Italian peninsula and France.[127] The Hamiltonian instinct of the importance of Vesuvius and the Monticellian aim to configure its importance in a globalised setting were manifested in Scrope's work. It was a true meld of regional study transformed into a global science.

Advancements in the fields of volcanology and geology are unimaginable without the influence of Mt. Vesuvius and Neapolitan Fields of Fire. Fascination with these structures animated the progress of scientific understanding about the Earth's geological functions. For millennia, Vesuvius has captivated the minds of its spectators.[128] Starting in the seventeenth century, Vesuvian activity provoked observers into generating new theories of the

120 Scrope, The Geology, p. 167.
121 Scrope, Considerations. It was distributed simultaneously in Edinburgh and Dublin.
122 Scrope, Considerations, Appendix No. 1: *List of Known Volcanoes in Recent or Habitual Activity*.
123 Scrope, Considerations, § 10 "Phase of moderate activity, of frequent occurrence – Examples from Vesuvius, Ætna, volcanoes of the Pacific, of Mexico and Quito &c."
124 Scrope, Considerations, p. viii; Rudwick, Poulett Scrope on the Volcanoes of Auvergne.
125 In addition to his 1858 version above, see Scrope, Volcanos, which received a second edition in 1872.
126 Scrope, Considerations, p. vii, 7.
127 Ibidem, p. vii.
128 Moormann, Pompeii's Ashes; Scarth, Vesuvius, passim.

world from Kircher's subterranean suppositions to Monticelli's comparative phenomena.[129] Such intrigue continued throughout the centuries, and lasts arguably until today. Intrepid investigation from the British isles continued with increasing intensity and supported by professional institutions such as the 1889 Geologists' Association of London expedition under Henry James Johnston-Lavis.[130] In 1897, the Austrian publisher and bookseller, Friedrich Furchheim, came to Naples in order to compile an exhaustive list of the works on Vesuvius.[131] Interpersonal networks were key to the transmission of these new ideas formulated in print and shared through epistolary and institutional networks. Intrinsic human motivations from enlightened curiosity to pleasure-seeking tourism aided the spread of such discussions. The motivations of several individuals identified here – von Born, Morgan, and Monticelli – to integrate their respective regions into emerging global epistemologies also played a significant role. But it was not until the eighteenth century, with its decentralized Republic of Letters and centrally organized academies and learned societies that such knowledge could be effectively transmitted from one region to another, parallels and discrepancies noticed, resolved, and discussed by a plethora of individuals from multiple fields and backgrounds. By looking at transmission within these scientific connections, we are better positioned to appreciate how one region, and the study of the aspects of one region, tied into and influenced the development of other regional studies combining into a globalised understanding of natural phenomena.

Regional investigations of the Neapolitan volcanic plains allowed for the cohesion of such international scientific interests, facilitating a more globalized study of the world's natural systems. Just as Kircher offered the notion of an underground mass of fire serving as the source of ignition for all volcanoes, Scrope's knowledge of the global occurrence of volcanic activity underpinned a more nuanced understanding of the world's volcanoes and their shared dynamics. Both based their works on a few regional examples at their core. Scrope's monumental study of the Earth's volcanism in its entirety not only conceived an interconnected system but also unlocked newer insights into regions well-studied. By contrasting the similarities between locales, in this case between South America and the Italian peninsula, Scrope was able to recast familiar terrain in a newer, broader perspective. In other words, he was able to harness the power of the global to reform the understanding of regional and local phenomena. The rebounding effects of this global reconceptualization upon the regional space reinforces homogenic aspects of global history; global

129 For further examples, see Tortora/Cassano/Cocco (eds.), L'Europa moderna e l'Antico Vesuvio.
130 Johnston-Lavis, The South Italian Volcanoes; Kirk/Siddall/Stead, The Johnston-Lavis Collection.
131 Tortora, *Alle origini della bibliografia vesuviana*. In: Idem, L'eruzione vesuviana del 1631, p. 11–51; Idem, A Partire da Friedrich Furchheim.

conceptions of the world and its systems depend as well as widened scientific understanding.

Regional history, therefore, refocuses the need for historians to be aware of exchanges, movements, transfers, and re-transfers of people and ideas across space and time – all hallmarks of the global approach.[132] Moreover, the networked nature of Enlightenment investigators – from Kircher to Scrope, Hamilton to Davy, von Born to Jamineau – reaffirms this necessity. In order to understand "how the local and specific have interacted with the supra-local," we must also remember *who* did the interacting, the travelling, and the reporting.[133] We must also think *why* they upheld this level of interaction. Curiosity offers one explanation for their motivation to do so. Enlightenment sensibilities around discovery and recording offers a second possibility. The innate desire to impart order upon the natural world is a further temptation. Yet in encountering the Neapolitan Fields of Fire, one factor common to all the examples discussed above becomes apparent: scenic inspiration. From Pliny's terror to Ishmael's inkstand, Vesuvius inspired awe and trepidation in the minds of its beholders.[134] The visual and spatial component of the encounter with the volcanic landscapes surrounding Naples provoked the curiosity of its wanderers, the diligence of its record-keepers, and the obsession of its examiners. Recent interrogations into the role of mountains in the shaping of human ideas have borne out similar experiences where the uplands served as crafting spaces for modernities.[135] The global presence of volcanoes ensured these regional modernities could be perceived, utilised, and reconstructed by various actors across the world into a more uniform global concept.[136]

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132 Conrad, What is Global History?.

133 Subrahmanyam, Connected Histories, p. 745.

134 Ishmael's inkstand refers to the lines by Captain Ishmael in Herman Melville's *Moby Dick* where Ishmael decries, "Give me a condor's quill! Give me Vesuvius's crater for an inkstand." Melville, Moby Dick, p. 220.

135 Simpson, Modern Mountains.

136 See, for example, Neumann van Pandang, History of the volcanology; Igler, On Coral Reefs.

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## Jonathan Singerton, L'incontro con i Campi Flegrei. I *networks* napoletani dalla Boemia alla Pennsylvania e il passaggio dallo studio regionale alla scienza globale

Il contributo vuole esplorare l'interazione tra storia regionale e globale nell'ambito della storia naturale, assumendo come esempi il Vesuvio e i vicini Campi Flegrei. Esso mostra come le indagini su scala regionale sulle aree vulcaniche napoletane abbiano stimolato la sinergia e la coesione degli interessi scientifici internazionali, promuovendo uno studio più globalizzato dei sistemi naturali del pianeta. I vulcani, infatti, rappresentano un elemento onnipresente del mondo naturale: esistono in tutti i continenti e oceani. E la loro natura distruttiva e dominante non può essere ignorata.

Su scala locale e talvolta globale, l'incommensurabile potenza dell'attività vulcanica ha costretto e costringe le popolazioni coinvolte a riadattarsi alla loro presenza. Considerando la storia campana, questo è stato senz'altro il caso di uno dei vulcani più "famigerati" al mondo, il Vesuvio, che si trova nelle immediate vicinanze dei Campi Flegrei. L'imprevedibile, maestoso Vesuvio, con i suoi accessibili versanti, permise uno studio più diretto e ravvicinato rispetto ad altre cime vulcaniche. Gli elementi visivi e spaziali dell'incontro con i paesaggi vulcanici nell'area di Napoli suscitarono così la curiosità degli osservatori. L'esperienza dell'incontro con i Campi Flegrei (i cosiddetti Campi del Fuoco) non rimase più limitata agli abitanti di Napoli, ma si allargò a intellettuali di tutto il mondo, aprendo infine la via a un discorso comune sui sistemi geotermici planetari.

Attraverso le osservazioni dirette e la loro successiva diffusione internazionale si possono affrontare diverse questioni relative alle modalità con cui i fenomeni regionali venivano osservati, codificati e trasferiti in altri luoghi.

L'ubiquità di vulcani attivi e dormienti in tutto il mondo, come pure la loro assenza in altre regioni del mondo, stimolò le ricerche e le analisi comparative di intrepidi esploratori e proto-scienziati che cercarono di interrogare da vicino il paesaggio naturale, da Athanasius Kircher nel Seicento a George Julius Poulett Scrope nell'Ottocento. Kircher, ad esempio, elaborò la nozione di una massa infuocata sotterranea come fonte di alimentazione di tutti i vulcani e le conoscenze di Scrope sul carattere globale del fenomeno portò a una comprensione più avanzata dei vulcani di tutto il mondo e delle loro comuni dinamiche. Entrambi basarono il loro lavoro su alcuni esempi regionali, che finirono così col trovarsi al centro della scena internazionale.

Il contributo indaga le motivazioni che spinsero diversi intellettuali a integrare le loro rispettive regioni nelle epistemologie globali emergenti. Viene sottolineato comunque come soltanto a partire dal Settecento ciò sia stato possibile. Solo grazie alla sua *Repubblica delle Lettere* (decentralizzata) e alle sue accademie e società di intellettuali (centralizzate) si sono potute raggiungere non solo un'efficace trasmissione di conoscenze da una regione all'altra, ma anche l'individuazione, la discussione e la risoluzione di analogie e discrepanze tra i fenomeni da parte di un'ampia cerchia di individui di diversa formazione e specializzazione. In particolare, le pubblicazioni dell'inviato britannico Sir William Hamilton contribuirono notevolmente alla divulgazione delle osservazioni sul Vesuvio, attraverso istituzioni come la Royal Society di Londra.

In questo caso la chiave dell'indagine scientifica non coincise con la costruzione di grandi sistemi universali, bensì con l'estrapolazione di piccoli fenomeni localizzati e la loro comparazione con altri contesti regionali. Le predilezioni scientifiche di Hamilton si espressero al meglio nei suoi *Campi Phlegraei*, pubblicati per la prima volta nel 1776. Mentre Kircher aveva interpretato il vulcanismo come elemento interno di un piano divinamente preordinato, Hamilton presentò, in toni più sommessi, la necessità di studi più rigorosi a livello regionale. I suoi popolari volumi suscitarono un'attenzione internazionale e accelerarono lo studio di paesaggi vulcanici anche in altre regioni del mondo, dalla Boemia alla Pennsylvania.

La diffusione di queste osservazioni regionali sul Vesuvio e i suoi dintorni innescò nuovi dibattiti scientifici in campo geologico e vulcanologico. Tali progressi sarebbero stati inconcepibili senza il fruttuoso esempio del territorio napoletano. Ad analoghe considerazioni portano recenti studi sul ruolo delle montagne nella formazione delle idee umane, là dove esse sono servite come spazi di elaborazione di alcuni elementi di modernità.

Attraverso lo studio di questo processo di trasformazione emerge il ruolo avuto da determinate personalità e soprattutto dalle loro reti. In questo senso la produzione di un "mondo illuminato", cioè scientifico, si basava su diverse "micro-illuminazioni" collegate tra loro dall'interazione transnazionale e dall'integrazione globale.

Sotto tale prospettiva acquistano significato e merito gli sforzi degli osservatori regionali, come Hamilton, che miravano a combinare i propri studi locali con una più ampia esplorazione del mondo. Concentrandosi sugli esempi del Vesuvio e dei Campi Flegrei, il contributo illustra la storia di queste connessioni dal Seicento all'Ottocento, in direzione dell'interrelazione tra storia regionale e globale. Vi è sottolineata, infatti, la necessità in campo storiografico di rivolgere la massima attenzione agli scambi, movimenti, trasferimenti e ritrasferimenti di persone e idee nel tempo e nello spazio.

## Jonathan Singerton, Begegnung mit den Phlegräischen Feldern. Neapolitanische Netzwerke von Böhmen bis Pennsylvania und die Umformung regionaler Forschung in globale Wissenschaft

Dieser Beitrag spürt die Wechselwirkungen zwischen Regionalgeschichte und Globalgeschichte in naturwissenschaftlicher Perspektive anhand des Beispiels des Vesuvs und der anliegenden Phlegräischen Felder auf. Er zeigt auf, wie die regionalen Erforschungen der neapolitanischen Vulkangebiete zur Kohäsion internationaler Wissenschaftsinteressen beitrugen und dabei eine stärker globalisierte Betrachtung der Natur der Welt ermöglichten. Vulkane sind nämlich ein allgegenwärtiges Phänomen der Naturwelt, sie kommen in allen Kontinenten und Ozeanen vor, ihre zerstörerische und dominante Kraft treten allerorts vor Augen.

Auf lokaler und bisweilen auch auf globaler Ebene zwingen die unermesslichen Kräfte der vulkanischen Aktivitäten die betroffenen Menschen, ihre Existenz an ihnen auszurichten. Dies zieht sich durch die gesamte Geschichte Neapels hindurch mit einem der berüchtigtsten Vulkane weltweit, dem Vesuv, in unmittelbarer Nähe zu den Phlegräischen Feldern. Der majestätische, unberechenbare Vesuv mit seinen zugänglichen, flachen Hängen erlaubte – im Gegensatz zu anderen Vulkanen – Erforschungen aus nächster Nähe. Die visuellen und räumlichen Besonderheiten dieser Vulkanlandschaft erweckten bald die Neugierde der Beobachter. Die Begegnung mit den Phlegräischen Feldern, den sogenannten Feuerfeldern, stand nicht nur den Bewohner*innen Neapels, sondern auch Gelehrten aus aller Welt offen und sie bahnte somit den Weg für eine allgemeine Diskussion über geothermale Weltsysteme.

Anhand der Beobachtungen aus erster Hand und ihrer darauffolgenden weltweiten Verbreitung können verschiedene Fragen gestellt werden, etwa wie regionale Phänomene beobachtet, kodifiziert und auf andere Räume übertragen wurden. Die Allgegenwart aktiver und schlafender Vulkane auf der gesamten Erde wie auch deren Abwesenheit in anderen Weltregionen schufen vergleichende Rahmenbedingungen für unerschrockene Forschungsreisende und Proto-Wissenschaftlern wie Athanasius Kircher im 17. oder George Julius Poulett Scrope im 19. Jahrhundert. Diese Männer wollten Naturlandschaften in Nahansicht erforschen. Kircher etwa vertrat die Idee einer unterirdischen

Feuermasse, die allen Vulkanen als Energiequelle diene; und Scropes Wissen um ein globales Auftreten von Vulkanaktivitäten trug zu einem nuancierten Verständnis der Vulkane rund um den Erdball sowie den ihnen gemeinsamen Dynamiken bei. Beide bauten ihre Werke auf der Beobachtung regionaler Beispiele auf, die bald ins Zentrum internationaler Aufmerksamkeit rückten.

Dieser Beitrag arbeitet die Gründe heraus, weshalb diese Individuen ihre jeweiligen Regionen in ein aufkommendes globales epistemologisches Raster einzuordnen versuchten. Er zeigt auch, dass erst das 18. Jahrhundert mit seiner dezentralen *Republic of Letters* sowie den zentral organisierten Akademien und Gelehrtenzirkeln es möglich machte, dass dieses Wissen wirksam von einer Region zur nächsten übermittelt, Parallelen und Diskrepanzen festgestellt, behoben und diskutiert werden konnten und zwar von vielen Individuen aus unterschiedlichen Disziplinen und Kontexten. Besonders die Veröffentlichungen des britischen Gesandten Sir William Hamilton begünstigten die Popularität der Beobachtungen zum Vesuv bei Institutionen wie der *Royal Society* in London. Der Schlüssel zur wissenschaftlichen Untersuchung lag in diesem Fall nicht darin, große universal gültige Systeme zu entwerfen, vielmehr ging es darum, Rückschlüsse für kleine lokale Phänomene aus anderen regionalen Kontexten zu ziehen. Hamiltons wissenschaftliche Vorlieben kommen am besten in seinem Werk *Campi Phlegrai* (1776 erstmals veröffentlicht) zum Ausdruck. Hatte Kircher Vulkanismus noch als Teil eines göttlich vorbestimmten Planes aufgefasst, erhob Hamilton dagegen in leisem Ton Einspruch und betonte, wie notwendig, weiterer beobachtende Untersuchungen auf regionaler Ebene seien. Seine populären Bände ernteten weltweit Beachtung und beschleunigten überall, von Böhmen bis nach Pennsylvania, die Erforschung von Vulkanlandschaften.

Die Verbreitung dieser regionalen Beobachtungen des Vesuvs und seines Umfeldes führten zu neuen wissenschaftlichen Debatten in der Geologie und Vulkanologie. Fortschritte in diesen Wissenschaftsfeldern wären ohne das ergebnisreiche Beispiel der neapolitanischen Landschaft unvorstellbar.

Die Analyse dieser Transformationsprozesse macht die Rolle bestimmter Persönlichkeiten und ihrer Netzwerke, die diese Prozesse stützen, sichtbar. Auf diese Weise zeigt sich, wie die „aufgeklärte Welt" aus mehreren „Micro-Aufklärungen" zusammengesetzt und durch transnationale Interaktionen und globale Einbindung erbaut wurde. Diese Sichtweise schreibt den Leistungen regionaler Beobachter wie Hamilton Bedeutung und Verdienst zu, da sie versuchten, Lokalstudien ihres Umfeldes mit einer breiter angelegten Erkundung der Welt zu verknüpfen. Mit dem Fokus auf das Beispiel des Vesuvs und der Phlegräischen Felder beleuchtet dieser Beitrag die Geschichte dieser Verbindungen vom 17. bis zum 19. Jahrhundert, betont das Wechselspiel von regionaler und globaler Geschichte und unterstreicht, wie wichtig es für Historiker*innen ist, ihre Aufmerksamkeit auf Austausch, Bewegung, Transfer und Rück-Transfer von Menschen und Ideen in Raum und Zeit zu richten.