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Principia Alchemica

The alchemical research of Isaac Newton has, in the time since his death, waxed and waned in perceived importance: sometimes seen as the youthful fantasy of a young genius and, in others, as the fruitless endeavor of—as the economist and fan of Newton’s, John Maynard Keynes, put it—“the last of the magicians.”¹

While much ink has been spent on the relationship between Newton’s alchemy and his science, it can be said with some certainty that the public’s view of alchemy during the turn of the eighteenth century was influenced by their evolving knowledge of his alchemical research. The public of his time shifted towards derision, a rather quick shift but one with its roots in previous centuries, and Newton’s work on the subject and his importance in the broader scientific community influenced the outcome of this change, not only in the realm of public opinion but also in the realms of science and law, where they inherited from and pertained to alchemy respectively.

A HISTORIOGRAPHY OF ALCHEMY

The lineage of alchemy is a complicated one, and its roots are not entirely agreed upon by the historical community, stemming largely from a disagreement over the part Hermeticism had to play in the average alchemist’s understanding of his art. In modern discourse, there are two schools of thought regarding this: the scientific and the mystic.

¹ Newman, William R. "The Problem of Alchemy." (*The New Atlantis*, no. 44, 2015), 65.

The first claims that alchemy was mostly or entirely scientific in nature, if only primitive in its methods. If this is the case, Newton's alchemy would have served as an extension of his other empirical studies, rather than an aberration in his otherwise scientifically-minded research. A prominent historian within this school is William R. Newman, a professor at Indiana University's Department of History and Philosophy of Science, whose essay—"What Have We Learned from the Recent Historiography of Alchemy?"—puts forward the idea that "medieval and early modern alchemists employed experiment in concert with theory to demonstrate" complex scientific theories and "employ[ed] laboratory-based analysis and synthesis" that fits more in line with the claim that their studies were scientific rather than mystic in nature. Newman describes older historiography surrounding alchemy as having a "reflexive dismissal" of its importance; it was seen as "a 'mystic science,' a 'pathology of thought,' and even 'the greatest obstacle to the development of rational chemistry.'"²

Newman puts forward the claim that most historians from the mid-twentieth century understood Newton as "one of the greatest scientists of all time [who] spent a large part of his most creative years on various unscientific quests, including a search for that most elusive of alchemical substances, the philosopher's stone." Newman finds this view disagreeable, believing it paints a poor portrait of the actual practices and beliefs of both medieval and early modern alchemy. His is the view that this search for the philosopher's stone was but one part of a larger field—a synthesis of chemistry "early modern pharmacology or

² Newman, William R. "What Have We Learned from the Recent Historiography of Alchemy?" (*Isis* 102, no. 2, 2011), 313.

chymiatría, and... chrysopoeia, which means transmutation into gold.” This “heterogeneous discipline,” according to Newman, better reflects how Newton understood his research, though Newman does not deny “that Newton’s involvement in chymistry *was* dominated by alchemy in the common modern sense of the transmutation of metals.”³

A member of the opposition, Florin George Calian of Central European University, describes adherents to this first school as “com[ing] from scholarly fields that require training in chemistry, the history of science and technology or connected disciplines.” To Calian, such a view is characterized by its focus on the “laboratory work aspect” of alchemy which places it firmly “as part of the history of science, as pre-chemistry, or proto-science.” However, Calian adheres to the second school which he defines as “an almost antithetic posture, compris[ing] a wide range of nuances in interpreting alchemy under a relatively common comprehension... label[ed] ‘spiritual alchemy.’” Within this school, alchemy is not simply the progenitor of the sciences; it does not fully divorce itself from the mystic roots of many of its symbols; and it should be understood “not as an important moment in the history of science but rather as a kind of religious phenomenon with its own particular rules.”⁴

With these two schools in mind, we can look closer at Newton’s alchemy and decide for ourselves whether it should be interpreted as a branch of his scientific research or as a vestige of older mystic traditions—an important distinction if one wishes to trace the impact of his studies on the reception of

³ Newman, “The Problem of Alchemy,” 65 - 67.

⁴ Calian, Florin George. “Some Modern Controversies on the Historiography of Alchemy.” *Annual of Medieval Studies at CEU*, VOL. 16, 2010, 166 - 169.

alchemy as a whole. Either he shepherded alchemy into the age of reason or, as John Maynard Keynes once put it, he was “the last of the magicians, the last of the Babylonians and Sumerians, the last great mind which looked out on the visible and intellectual world with the same eyes as those who began to build our intellectual inheritance....”⁵ Ultimately, public opinion regarding Newton’s alchemy shifted over the course of his life and the centuries after, driven first by the growing awareness that his alchemical research existed and later by the formation of narratives which tried to connect said research with his more respectable work. Early on, his alchemy was disregarded as a fruitless pursuit of his youth, but as the evidence piled up, later writers were forced to grapple with the possibility that Newton had much more of an investment in alchemy than they had first wanted to believe. In turn, this informed the public’s opinion and their understanding of the relationship between late alchemy and the early sciences.

ALCHEMY BEFORE NEWTON

Keynes’s portrait of Newton—as at least partially a spiritual alchemist—is supported by Newton’s translation of a work by the fifteenth-century alchemist, Basilius Valentinus, which draws explicitly from one of the foundational works of Hermeticism, the *Corpus Hermeticum*.⁶ Newton translated a passage from Basilius’s *Microcosm* regarding the creation of the Philosopher’s Stone, the transmutation of metals, and “the mastery of [the] seven planets, their essence

⁵ Newman, “The Problem of Alchemy,” 65.

⁶ Newton, Isaac. “Keynes MS. 63”. *The Chymistry of Isaac Newton*. Ed. William R. Newman 2006. Retrieved February 1, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00052>.

properties, powers and courses, also their hidden mysteries and wonders.”⁷ These three concepts are rooted in mysticism rather than science, and we can see this influence most obviously in Basilus’s introduction to *The Triumphant Chariot of Antimony*, in which he stresses that anyone who wishes to practice the alchemical arts outlined in the work must “prostrate himself before the Throne of Grace, for obtaining bodily health... that his body may be transmuted into a holy temple of God and be purged from every uncleanness.” Here we see that the “art” Basilus practices requires one’s adherence to faith, to the point that he claims that “no impious man shall ever be partaker of true Medicine.”⁸ One of the alchemists from whom Newton inherited his art, Basilus Valentinus practiced a form of alchemy that had inseverable ties to faith and mysticism; his epilogue explicitly draws upon the work of Hermes Trismegistus, the supposed author of the *Corpus Hermeticum*, rendering an analysis of his alchemy as an entirely scientific pursuit untenable.

As seen in his translation of Basilus’s work, Newton drew his understanding of alchemy from a heavily mystic background, though many contemporary and preceding alchemists worked in what might now be considered an early form of pharmacology or, as Newman described earlier, chemistry. One example of the former comes in the form of Eirenaeus Philalethes’s work, *Secrets Reveal’d*—with the ostentatious subtitle, *An Open Entrance to the Shut-Palace of the King Containing the Greatest Treasure in Chymistry, Never Yet so Plainly Discovered*. The author, largely anonymous, details his “attainment” of the

⁷ Newton, “Keynes MS. 63.”

⁸ Valentinus, Basilus, and Theodor Kerckring. *The Triumphant Chariot of Antimony*. London: Printed for Dorman Newman, 1678, 2.

Philosopher's stone at the age of twenty three, though much of the work is also dedicated to "medicinal, chymical and physical arcana."⁹ The attainment of the stone would allow its creator to "live a thousand years," and "transmute into perfect gold and silver all the imperfect metals that are in the whole world." Similarly, the stone allows for the "mak[ing] of precious stones and gems, such as cannot be paralleled in nature." A copy of this work having been owned by Newton himself, originally written in 1645, *Secrets Revealed* represents the alchemy as it was just before Newton's arrival—approaching science but still heavily steeped in mystic language and symbols, concerning itself with medicinal applications just as often as with the supernatural properties of metals and the attainment of the Philosopher's Stone.

The early portions of the text deal in numerous esoteric symbols, including the "Green Lion" and the "Caducean Rod of Mercury," both of which feature prominently in esoteric and occult works. These harkon to a pagan tradition—Hermeticism itself was born out of a synthesis of Greek and Egyptian thought—but equally often the author makes Biblical references, as with the "Wise Magi" who "knew that a most Serene King [Jesus] was born into the world" and "honour[ed] the Kingly Child, open[ed] the Treasury," and "offer[ed] the gift of Gold." These three acts are mirrored in the practices of the purification of gold by the alchemist, which the author says will be rewarded with "the highest Medicine in the three Monarchies of the Earth," or the gift of the Philosopher's

⁹ Philalethes, Eirenaeus. *Secrets Revealed: or An Open Entrance to the Shut-Palace of the King: Containing the Greatest Treasure in Chymistry, Never Yet So Plainly Discovered, Composed by a Most Famous English-man, styling himself Anonimus, or Eiraeneus Philaletha Cosmopolita: Who, by Inspiration and Reading, Attained to the Philosopher's Stone at his Age of Twenty three Years, Anno Domini, 1645.* London: Printed by W. Godbid for William Cooper, 1669.

stone to the practitioner of these arts.¹⁰ That Eirenaeus Philalethes would use such language to describe alchemy shows not just how suffused with religion and mysticism the whole practice was but also the sort of material that Newton would have been drawing on for his own understanding of alchemy.

Returning to Basilius Valentinus, we can look to his work, *The Last Will and Testament of Basil Valentine* for a better understanding of the relationship between the scientific and the mystic aspects of alchemy which Newton would have inherited. While, as illustrated before, alchemy intertwined these two seemingly contradictory subjects, it is more accurate to say that alchemy was a science capped with mysticism, or a proto-science which aspired to attain the mystic. *The Last Will and Testament* deals primarily with the classification of various metals, from the “pure metals” such as gold to the “impure metals” which resemble in description what we would call alloys. Valentinus describes how the “cunning and subtle artists may... get silver out of iron... as they do in Sweden,” a process which proved difficult due to each metal “require[ing] special working to be seperated,” often through “melting and casting” or other, similarly laborious processes.¹¹ In many ways, the categories and processes Valentinus lays out in his *Last Will and Testament* resemble metallurgy and have an attention to detail that resemble the sciences. Valentinus notes that the aspiring alchemist should “be careful in observing” the names of the metals and disregard “the miners’ expressions and terms, for the names they give to ores are false.” Here, we can see

¹⁰ Philalethes, *Secrets Revealed*, 7.

¹¹ Valentinus, Basilius. *The Last Will and Testament of Basil Valentine, Monke of the Order of St. Bennet, Which being alone, he hid under a table of marble behind the high altar of the Cathedral Church in the imperial city of Erford: leaving it to him, whom God's Providence should make worthy of it*. London: Printed by S.G. and B.G. for Edward Brewster, to be sold at the sign of the Crane in St. Paul's Church-yard, 1672, 26 - 27.

the empirical traditions which Newton would have inherited from alchemists before him. His alchemy would have—in accordance with Calian’s claims—straddled the line between proto-science and mysticism, with one foot in the Hermetic traditions preceding him and another in the sciences that followed. This is corroborated by *Secrets Revealed*, which speaks in equal measure of the natural and supernatural properties of various substances and their real or imagined processes of refinement.

Newton’s own alchemy more closely resembles the sort of proto-chemistry which Newman described. In line with his other scientific studies, it focused on laboratory experiments and empirical knowledge rather than the more mysterious domain of his predecessors. This is most obviously seen in the notes he took on his own experiments; notable among these is that which he wrote on January 15th of 1679, in which he describes his work producing and recording the properties of a mixture of metals and various compounds. In one section, he wrote that he had “sublimed 80 grains of this precipitate of [iron] mixed with thrice as much bole Armonack powdered,” which he then heated until “the matter was almost as hot as could be made without bringing it to a dark red,” at which point “there ascended in white fumes an humidity which settled in clear water.”¹² This detail-oriented recording of the various mixtures and processes he experimented with reflects a greater attention to something resembling the scientific method, a clear shift away from the more spiritual language of his predecessors. In *Secrets Revealed*, Philalethes wrote that “there is nothing in our

¹² Newton, Isaac. "Portsmouth Add. MS. 3973". *The Chymistry of Isaac Newton*. Ed. William R. Newman 2006. Retrieved February 14, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00109>.

work secret but [mercury] only, the magistry of which, is rightly to prepare it, and extract the hidden [gold] it contains, and to marry it in a just proportion with gold, and to govern it with fire as the [mercury] requireth because gold doth not of it self fear the fire.”¹³ This sort of mystic language, in which the secrets of mercury and the properties of the elements—described with human “fears” and “souls”—must be understood to draw forth gold from other metals contrasts with Newton’s writings as described previously. Newton’s draw upon the more scientific elements of his predecessors but take a very different path. As Keynes said, Newton was the last magician, but he was also among the first of the modern scientific tradition.

To further bolster this point, we can look to Newton’s work with metals as part of his broader attempt to develop, as Newman puts it, “a physical theory that unifies and accounts for all known natural phenomena” as evidence of his inheritance of mystic traditions from previous alchemists. He describes the “vegetation” of metals as “the sole effect of a latent spirit,” and goes on to explain that “this spirit is the same in all things only discriminated by its degrees of maturity....” These spirits are explained as “God’s mechanisms” and part of “why the two Elixirs are the most amicable and universal medicine to all beings,” calling to mind Paracelsus’s writings—from *Of the Supreme Mysteries of Nature*—which state that “this art [alchemy] was by our Lord God the Supreme Creator, ingraven as it were in a book in the body of metals, from the beginning of the creation, that we might diligently learn from them.”¹⁴ Newton’s description of

¹³ Philalethes, *Secrets Revealed*, 45.

¹⁴ Newton, Isaac. "Dibner MS. 1031 B". *The Chymistry of Isaac Newton*. Ed. William R. Newman 2006. Retrieved February 14, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00081>; Paracelsus, and Robert Turner. *Of*

the “spirit” of metals, while being situated in the broader Medieval understanding of the world, still reflects an understanding of the properties of matter that draws on the work of alchemists such as Paracelsus or Basilius Valentinus, whose own “theories of everything” ascribed these properties to a sort of knowledge hidden within the metals themselves by God, to be pieced together by the diligent alchemist through experimentation and no small dedication to the god who created these mysteries. In her article on the subject, Betty Jo Teeter Dobbs writes that a key part of Newton’s understanding of the world was that “a divine spirit was necessarily at work behind any active force that generated motion,” which necessitated the existence of a “divine,” or at least incorporeal, spirit behind each mechanism of the physical world. Dobbs goes on to posit that Newton spent as much time as he did attempting to tie together the corporeal and the incorporeal—here, seen in the chemical and theological aspects of alchemy—because such a connection “would be direct evidence of the operation of divinity in the universe.”¹⁵ This reflects the inherently spiritual element of Newton’s alchemy—a subject we will touch on more as we compare Newton’s alchemy and the scientific (or alchemical) pursuits of his contemporaries.

SCIENCE & NEWTON’S ALCHEMY

Newton takes a more scientific approach to this idea that God gave matter its properties—an approach that resembles many modern Creationists’ arguments

the supreme mysteries of nature. Of the spirits of the planets. Of occult philosophy. The magical, sympathetical, and antipathetical cure of wounds and diseases. The mysteries of the twelve signs of the zodiack. London, Printed by J.C. for N. Brook and J. Harison, 1656. Pdf. <https://www.loc.gov/item/35031040/>.

¹⁵ B. J. T. Dobbs. "Newton's Alchemy and His Theory of Matter." *Isis* 73, no. 4 (1982): 511-28. Accessed April 20, 2021.

that attempt to reconcile faith and science. He argues that “the world might have been otherwise than it is (because there may be worlds otherwise framed than this). T’was therefore not necessary but a voluntary and free determination that it should be thus. And such a voluntary determination implies a God.” This translates into a belief that the material circumstances of our world indicate intelligent design; he claims that “the whole series of causes” that have resulted in our present reality “might from eternity have been otherwise” but it was by God’s will that they were as they were, thus resulting in the properties of matter that we see today.¹⁶ In short, God—being necessarily omniscient as was then near-universally accepted—created the circumstances of creation such that all things would be as they are now. Newton’s reconciliation of science with faith was necessarily more complex than that of his predecessors, in keeping with his more rigorous understanding of science and the properties of matter, but he inherits the core of his argument from those who came before: that God ascribed properties to matter and that any alchemist who wishes to understand these properties must improve their understanding of both God and his creation. More broadly, this embodies Newton’s inheritance from alchemy but also his departure from the more mystic elements of it—a departure that paved the way for the sciences as a whole.

Newton’s departure from the mysticism of previous alchemists can be attributed, in part, to the works of those scholars preceding him who dedicated themselves to the furthering of empiricism and the scientific method; these

¹⁶ Newton, Isaac. "Dibner MS. 1031 B". *The Chymistry of Isaac Newton*. Ed. William R. Newman 2006. Retrieved February 14, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00081>.

include such figures as Descartes. In his work, *De Gravitatione*, Newton refuted a set of Descartes's claims regarding the nature of motion and bodies, situating himself in conversation—not only with this work but also with his *Principia*—with previous empiricists; Newton stands as inheritor and innovator, transforming the ideas of Copernicus, Bacon, and Descartes. As J. A. Ruffner writes in his article on the relationship between Newton's *De Gravitatione* and Descartes's *Principia Philosophiae*, one of the motives behind *De Gravitatione* was “to dispose of Descartes' fictions about space and motion expressed in his *Principia Philosophiae* and *Epistolae*.”¹⁷ This is most obviously seen in Newton's refutation of Descartes's understanding of objects as solely “*extensam in longum, latum et profundum*” or extended in the three dimensions; Newton believed that objects had certain qualities that were separate from, or at least not directly arising from, this extension.¹⁸ But it is less important *how* Newton interacted with those philosophers, scientists, and mathematicians and more important *that* he did; Newton embodies a synergy of two approaches to studying the natural world: the sciences, which picked apart the nature of God's creation with what was then approaching a secular lens; and mysticism, which attempted to grapple with much of the same material with a markedly nonsecular approach. But Descartes's work reflects the leash which still bound the sciences. A not insignificant portion of the *Principia Philosophiae* attempts to reckon with the mysteries of the natural world with arguments founded on certain theological axioms, such as God's honesty and omnipotence, as well as his great intelligence. Descartes claims, for example, that

¹⁷ Ruffner, J. A. "Newton's "De Gravitatione": A Review and Reassessment." *Archive for History of Exact Sciences* 66, no. 3 (2012): 241-64.

¹⁸ Descartes, René. *Principia Philosophiae*. Amsterdam: Printed by Pietro Frambotti, 1644. 34.

all things revealed by God are to be believed, “credenda esse omnia que a Deo revelata.”¹⁹ Newton’s writings are similarly built on a religious foundation; this is evidenced by his various notes and treatises on the subject of religion, its evolution, and the history of the church.²⁰ This lends itself well to the school of thought which deems the history of alchemy to be part of both the history of science and the history of religion, as to place it solely within either would be to project our modern understanding back to their time. It is more accurate to say that Newton would have conceived of his alchemy, mathematics, and science as facets of a single pursuit—understanding the mysteries of God’s creation.

For all that some of his scientific works seem purely secular—namely the *Principia Mathematica*—the distinction which we make between science and religion was not so clear in his time; he understood natural philosophy as just another way to grasp the works of God, and we can see this in the mixture of scientific and esoteric language he wields in his notes and in the excerpts from which he draws his understanding of the mechanisms of the world. In a passage appended to his *Principia* in the first American edition, his biographer, N.W. Chittenden, described Newton as arriving at the conclusion that light “consist[ed] of small material particles emitted from shining substances.” Chittenden explains that Newton “thought that these particles could be re-combined into solid matter, so that ‘gross bodies and light were convertible into one another.’”²¹ This

¹⁹ Descartes, *Principia Philosophiae*, 10.

²⁰ Newton, Isaac. “Part of an exposition of 2 Kings, 17:15-16.” Ms. 437, The Babson College Grace K. Babson Collection of the Works of Sir Isaac Newton, Huntington Library, San Marino, California, USA (1670s); Newton, Isaac. “Theological Notes (part 1, 2, and 3).” Yahuda Ms. 5.1, National Library of Israel, Jerusalem, Israel (post-1700); Newton, Isaac. “Notes from Petavius on the Nicene Council.” Keynes Ms. 4, King’s College, Cambridge, UK (1670s).

²¹ Newton, Isaac. *The Mathematical Principles of Natural Philosophy*, First American ed. Translated by Andrew Motte. New York: Daniel Adee, 45 Liberty Street, 1846.

understanding of matter as internally homogenous and capable of being transformed from one form to another is reflective, if not descended from, an alchemical understanding of the nature of matter and its capacity for transmutation.

On a series of sheets entitled “Of Ye First Gate,” Newton compiled extracts from various alchemical sources which—compared to the irreligious language of the *Principia*—seem fit for a different mind entirely. For example an early passage commands the budding alchemist to “seek the source of the liquor of the sages which conteins [sic] all that is requisite for the work.” This magical liquor, it says, is “hidden under a stone” which the alchemist must “strike... with the rod of the magical fire, and then it [the liquor] will come out of it [as] a clear fountain.” With striking similarity to Newton’s description of the nature of light and solid matter and the transmutability of the two, this passage claims that “the heaven and stars and particularly the sun and moon are the principle of this fountain of our living water.” The water of this fountain is said to be “useless unless drawn out of the rays of the sun or of the moon.”²² It is more accurate to understand the theory of the natural world Newton puts forward in works such as the *Principia* not as distinct from his alchemy but, in no small part, born of it. While he leaves the explicit discussion of transmutation to other treatises, the *Principia* inherits parts of Newton’s understanding of the world—an understanding born of the natural philosophy of his predecessors, such as Descartes, and the alchemy of his other, less prestigious forebearers, the mystics

²² Newton, Isaac. "Keynes MS. 53". *The Chymistry of Isaac Newton*. Ed. William R. Newman 2006. Retrieved February 22, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00042>.

and alchemists. The synthesis of philosophies, as expressed in Newton's writing, cannot easily be divided into the scientific and the alchemical in the way we are now accustomed to.

ALCHEMY & LEGALITY

Well before Newton's time, a number of important state and religious institutions saw fit to ban the practice of alchemy, coloring the public's opinion of the art and its practitioners in the following centuries. One of the first such moves came from Pope John XXII who issued a papal decretal known as the "Spondent Pariter" whose purpose was to punish those practitioners of alchemy who "promise[d] riches which [were] not forthcoming" and "deceive[d] the ignorant populace as to the alchemic fire of their furnace." This decretal was sent out in 1317, some three centuries before Newton, and clearly represents a view of the time that many alchemists were "delinquents" and "criminals." Knowing that some number of alchemists were themselves ranking members of the Catholic Church, the Pope went as far as to say that if they were "clerics, beside the aforesaid penalties they shall be deprived of any benefices they shall hold and shall be declared incapable of holding any further benefices." However, this decree is not necessarily evidence that the Pope viewed all alchemists as deceivers; he himself, according to the historian of medicine, James Walsh "had studied medicine before he became a clergyman" and "made a special study of chemistry," and he is known to have authored a book titled *The Elixir of the Philosophers, or the Art of*

Transmuting Metals.²³ Instead, this decree was intended to bar false practitioners of the alchemical arts and ensure that no wealth of such “alchemic metals” could rival the wealth of the church. While this decree might initially have appeared to reflect a view of alchemists as deceivers of the ignorant masses and snake oil salesmen, worthy of excommunication, understanding the Pope’s relationship to alchemy indicates instead that this decree comes from a more nuanced position: one in which false practitioners of alchemy abound but there is still value in the research itself, so long as its purpose isn’t entrepreneurial in nature. Similarly, alchemy was viewed as a concrete threat to the financial position of the church, if it were to succeed in its purpose, and this is shown in a later decree by the English government in 1404.

A similar fear regarding the economic impact of the practicing of alchemy prompted Henry IV and Parliament to pass a law in 1404—which was not repealed until 1689—which made it illegal “to multiply Gold or Silver, nor use the Craft of Multiplication,” a crime which would “incur the Pain of Felony.”²⁴ The Venetian government passed a similar law which the historian Lynn Thorndike described as having “severely condemn[ed] any practice of alchemy and threaten[ed] professional alchemists, whom it stigmatized as pseudo-savants and charlatans.”²⁵ These two laws, as well as the papal decretal, reflect the popular outlook on alchemists—at least, by those authorities who saw fit to ban

²³ Walsh, JJ. “Pope John XXII and the Supposed Bull Forbidding Chemistry.” (*Medical library and historical journal* vol 3, 1905), 251 - 252.

²⁴ Linden, Stanton J. “Posers and Impostors: Sixteenth-Century Alchemical Satire.” In *Darke Hieroglyphicks: Alchemy in English Literature from Chaucer to the Restoration*, 62-103. Lexington, Kentucky: University Press of Kentucky, 1996.

²⁵ Thorndike, Lynn. *A History of Magic and Experimental Science*. Vol. IV. New York: Columbia University Press, 1934.

it—as separated largely into two groups: those who scammed the people and those who legitimately practiced the mystic arts.

This mirrors the language used in many alchemical treatises, such as Paracelsus's *Of the Supreme Mysteries of Nature*, in which no small amount of ink is spent railing against the false practices of magicians “which blindeth the eyes of the spectators, deceiving them of their money; but in truth is not to be esteemed worth a half-penny, scarce a straw or rush.” Paracelsus divides alchemists into two camps as well: those who have faith and gain their legitimacy from God, and those who practice “Negromancy with all its Ceremonies [which] is absolute wickedness.”²⁶ Both the writings of alchemists and religious and political authorities hold that, prior to Newton's time, alchemy was an art fraught with charlatans and snake oil salesmen, but later depictions would lose, to a varying degree, the belief that there existed a second group—those for whom alchemy was a legitimate field of study, not rooted in greed but in a mystic pursuit to understand the inner-workings of God's creation.

For another example of the popular derision of alchemy, we can look across the channel to the Académie. In his article on the decline of alchemy, historian Lawrence Principe notes that “when Louis XIV's minister, Jean-Baptiste Colbert, founded the Académie in 1666, he forbade only two topics of study: astrological prognostication and the Philosophers' Stone.”²⁷ This reflects the view

²⁶ Paracelsus, and Robert Turner. *Of the supreme mysteries of nature. Of the spirits of the planets. Of occult philosophy. The magical, sympathetical, and antipathetical cure of wounds and diseases. The mysteries of the twelve signs of the zodiack*. London, Printed by J.C. for N. Brook and J. Harison, 1656. Pdf. <https://www.loc.gov/item/35031040/>.

²⁷ Principe, Lawrence M. "The End of Alchemy?: The Repudiation and Persistence of Chrysopoeia at the Académie Royale Des Sciences in the Eighteenth Century." *Osiris* 29, no. 1 (2014): 96-116. Accessed April 20, 2021. doi:10.1086/678099.

of other institutions at the time who imposed similar bans; this one, however, points to the views of other scholars. While some viewed alchemy as a respectable field of study, there was a not insignificant portion of the scholarly world—especially those in power or with close ties to politics—who viewed the subject with much disdain, enough to ban its study altogether. Whether this reflects a disregard for its beliefs, a fear of what a successful alchemist might achieve, an attempt to squash con-artists and charlatans, or a genuine worry that the upper classes would squander their wealth on a fruitless endeavor is a complicated question in itself.

THE VIEWS OF NEWTON'S CONTEMPORARIES

Looking into Newton's correspondences grants us a glimpse of the views of his contemporaries regarding his alchemy. In a letter addressed to Dr. John Twysden, a contemporary astronomer, Newton wrote, "destillatio haec posterior ita successit ut ne quidam ipsi Basilio melius potuisset"—a direct reference to the alchemical processes of Basilius Valentinus with a level of familiarity that reflects an ongoing discourse regarding the subject.²⁸ We know then that Newton's alchemy was, at least in late 1673, known to some of those with whom he shared correspondences, and within these correspondences it was a common topic, not something mentioned in passing or in reference to something no longer being studied by respectable academics. The general public would not have necessarily shared this

²⁸ Isaac Newton. "Keynes MS. 50". *The Chymistry of Isaac Newton*. Ed. William R. Newman 2011. Retrieved March 23, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00039>; Frost, Mike A. "John Twysden and John Palmer: 17th-century Northamptonshire astronomers." *Antiquarian Astronomer* (January 2008): 41-54. <https://doi.org/https://ui.adsabs.harvard.edu/abs/2008AntAs...4...41F/abstract>.

knowledge of Newton's alchemy; David Brewster's later biography of Newton seems to indicate that they did not; but in either case it can be said with some certainty that there was not a total lack of knowledge regarding Newton's alchemy preceding his death. The academic world knew of his research and at least some of them engaged in correspondence with him regarding it, an indication of its validity which later writers seem to disregard.

A letter from John Locke, the famed English philosopher, included "a copy of two alchemical recipes" which were left incomplete due to Newton's familiarity with the processes they outlined.²⁹ John Locke is known to have had some interest in alchemy, and his correspondence with Newton on the matter solidifies that, among scholarly circles, Newton's alchemy was not some secret vice but instead a subject of letters. Similarly, Locke and Newton were familiar enough with the subject to leave much unsaid; this was a part of a dignified discourse which later biographers and other writers would relegate to Newton's youth. This broader discourse indicates a degree of respectability—at least amongst some members of the Republic of Letters—for the discussion of alchemy. We have then a dissonance between the official stances of many political, religious, and even academic institutions regarding alchemy and the personal views of some of their constituents.

In a 1669 letter, Newton wrote to Francis Aston—a scholar out of Trinity College, Cambridge—seeking to "lay down some general rules" regarding Aston's upcoming travels. Most importantly for our purposes though is what

²⁹ John Locke to Isaac Newton, n.d., in "Keynes Ms. 98," <http://www.newtonproject.ox.ac.uk/catalogue/record/ALCH00059>.

Newton recommended should Aston encounter “any transmutations out of one species into another,” transmutation being one of alchemy’s core concepts. Newton thought that transmutations “out of iron into copper, out of any metal into quicksilver, out of one salt into another, or into an insipid body” would be worth noting by Aston for the insight they might give. Newton believed such transmutations to be “the most luciferous and many times lucriferous experiments too in philosophy.” All this together, we can come to understand that Newton would openly advise a fellow scholar to be on the watch during his travels for others who might be engaging in alchemical studies and attaining to the transmutation of metals—then considered a prominent and profitable endeavor. At this time, Newton’s alchemy was obviously not something he hid away; we see again that he spoke openly about it in serious discourse.³⁰

During his own time, Newton’s alchemy was openly shared with other scientists and philosophers, but after his death biographers and newspaper editors wrote of his alchemy as if it was a vice that had been ‘discovered’ among his personal papers. This indicates a shift in the general attitude that took place over the course of his life; before him, we’ve shown that public opinion regarding alchemy was on the decline, though among academic circles it was still entertained, if not with the same vigour; after his death though, a general distaste transformed into active dismissal. This was driven by the growing importance of the sciences as well as the view that alchemy belonged to the Medieval world—a world increasingly seen as scientifically stagnant. This distinction between the old

³⁰ 1940 Biographical Notes - Francis Ashton, 1645-1715, *Notes Rec. R. Soc. Lond.* 3, 88–92
<http://doi.org/10.1098/rsnr.1940.0009>; Isaac Newton to Francis Aston, May 18, 1669, in “MS Add. 9597/2/18/4,”
<http://www.newtonproject.ox.ac.uk/view/texts/normalized/NATP00227>

and the new left alchemy firmly in the past; any modern practitioner must then have been ignorant or dim, two traits no one wanted to ascribe to the great Isaac Newton. His alchemy—in a similar manner to that of Robert Boyle, John Locke, and Gottfried Leibniz—became a point of shame, having to be justified as part of his eventual embracing of scientific principles.³¹

LOOKING BACK ON NEWTON

In 1831, David Brewster, a renowned scientist and inventor in his own right, composed *The Life of Sir Isaac Newton*—a work which represents one of the earliest attempt to chronicle the life and works of Sir Isaac Newton in such a form; it serves as a good test for determining public opinion regarding Newton’s alchemy, as it details a number of his other experiments and interests as well. The seventeenth chapter features a section describing Newton’s “supposed attachment to alchymy,” in which the author claims that “there is no reason to suppose that Sir Isaac Newton was a believer in the doctrines of alchymy” despite a testimonial from a local reverend who stated that Newton “had been a diligent student of Jacob Behmen’s writings”—Behmen, or Böhme, being a German theologian and philosopher whose works incorporated alchemical language. Brewster also allows us to be sure that Newton’s writings on alchemy were available, if not taken seriously, by this time; he states that “there were found among his papers copious abstracts... in his own handwriting.”³²

³¹ *The Atlas* (London), July 28, 1860. The British Newspaper Archive.
<https://www.britishnewspaperarchive.co.uk/viewer/BL/0002115/18600728/027/0012>

³² Brewster, David. *The Life of Sir Isaac Newton*. Harper’s Stereotype ed. New York: Printed & Published by J. & J. Harper, 1833. 270 - 271.

The Life of Sir Isaac Newton provides for us a foundation: by the early nineteenth century, the nature and extent of Newton's interest in alchemy was not certain, and even his biographers relegated the subject to a quick paragraph or two. It is in this work that we learn that "Sir Isaac, together... with his relation, had, in the earlier part of his life, set up furnaces, and were for several months at work in quest of the philosopher's tincture." Not only is Newton's alchemy treated disparagingly, it is further dismissed as the whimsical interest of an adolescent, abandoned in favor of the true sciences once he came of age. This same testimony is said to have been "weakened" when Mr. Law, the reverend making these claims, "assert[ed] that Newton borrowed the doctrine of attraction from Behmen's first three propositions of eternal nature."³³ The idea that Newton inherited any of his later ideas from the alchemists whose work he read is taken as evidence of the weakness of the testimony. We are assured that neither Newton nor the sciences he shaped borrowed anything of note from those mystics and madmen who toiled with their tinctures and vials in an ultimately fruitless endeavor.

Two decades after Brewster's biography, we can find more evidence of the public's misunderstanding of Newton's alchemy in an article by *The Cornish Telegraph*, entitled "Alchemy and Mesmerism," in which the writer states that "the ordinary mass of superficially-educated and semi-scientific people, who have been trained to look on a belief in Alchemy as the pre-eminent symptom of mediæval superstition and ignorance" would be "utterly surprise[d]" to learn that "Sir Isaac Newton did not reject it." This reaffirms the idea that Newton's

³³ Brewster, *The Life of Sir Isaac Newton*, 271.

alchemy was not common knowledge, and for those who were familiar, it “by no means, impl[ied] a belief in all the legends which Paracelsus and other adventurers of the middle ages coined respecting their ‘modos operandi.’” The writer goes on to clarify that Newton’s practices did not have “any necessary connection with a belief in the ‘Elixir of Life,’ which the pretenders to Alchemy have usually professed their power to compound.”³⁴ This claim that Newton did not necessarily show interest in the works of Paracelsus and the Elixir of Life runs contrary to Brewster’s account of his early alchemy, as well as Newton’s own writings which reference Paracelsus explicitly, in addition to a number of other alchemists whose works deal with such fantastic concepts as the Elixir of Life and the Philosopher’s Stone.³⁵

A consistent image of Newton’s alchemy eluded the public and scholars alike, well after Newton’s death; in an issue of *The Liverpool Standard*, a review of David Brewster’s *The Life of Sir Isaac Newton* describes “Newton’s great attainments as a chemist” as having been “chiefly obtained by diligent study of the fruitless science of alchemy”—a quite different approach to the relationship between Newton’s interests, when compared with earlier accounts—though the author is quick to clarify that Newton’s alchemy should not be considered a “diminution” of his qualifications, nor a justification for any “unprincipled attempt to denude him of the office” of the Master of the Mint.³⁶ For the general

³⁴ “Alchemy and Mesmerism.” *The Cornish Telegraph* (Penzance), July 25, 1851. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/BL/0001617/18510725/004/0001>

³⁵ Isaac Newton. “Keynes MS. 43”. *The Chymistry of Isaac Newton*. Ed. William R. Newman 2011. Retrieved February 1, 2021 from: <http://purl.dlib.indiana.edu/iudl/newton/ALCH00032>.

³⁶ “Firmness and Honesty of Newton.” *Liverpool Standard and General Commercial Advertiser* (Liverpool), August 7, 1855. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/BL/0002090/18550807/140/0009>

public in the century and a half following his death, Newton was seen as the great mind who brought forth modern science, and it was with some embarrassment that his interest in alchemy was brought up, always quickly swept under the rug for fear that it might diminish his achievements in more respectable fields.

Brewster's brief description of Newton's alchemy as an adolescent phase with little connection to his later works contrasts with later writers' views that Newton maintained his interest in alchemy throughout his life, though they drew a solid line between Newton's alchemy and the mystic writings of Paracelsus and Valentinus—a line we've shown to have been largely illusory.

Newton maintained an interest in alchemy, and he dealt in arts far less scientific than his biographers liked to admit. John Maynard Keynes had perhaps the most accurate understanding of Newton, the alchemist, as just another in a long line of knowledge seekers stretching back to the roots of civilization and forward into the modern sciences.

An 1877 issue of *The Grantham Journal* has a more charitable portrait of alchemy and Newton's research into it. The writer explains that alchemy was then "known to be a delusive science, but it used to be very highly thought of, so much so that many of the wisest men made unceasing efforts, spent their lives and their property in hope of discovering" the Philosopher's Stone. The language here is undeniably more favorable than previous writers; it reflects an understanding of the development of knowledge, in which "no man... can be blamed for not being in advance of his age," a more generous view compared to the writers of the

Liverpool Standard and *The Cornish Telegraph*, though Newton's alchemy is still ultimately considered a "folly."³⁷

Similarly, a death knell is rung for alchemy; it is written that "the seekers after the philosopher's stone are all extinct, and their philosophy exploded, dead, and buried." The writer has now a different perspective on the origins of alchemy, in which it was "first made... known to the world" by "the Arabians" who, unlike later alchemists whose pursuits were aimed towards the easy acquisition of gold, instead "loved science and scholarship for its own sake, and in their nation were the best if not the only mathematicians, astronomers, and chemists that the world possessed a thousand years ago."³⁸ This view of alchemy as having arrived ultimately from Arab writers who contributed greatly to European knowledge reflects an understanding of the history of alchemy which is much more nuanced than many of the alchemists' own views. That a writer from the late nineteenth century would have this broader perspective is not necessarily surprising, but it speaks to the continued interest in the histories of alchemy and science, of which Newton played an important role, not only in making but in imbuing with importance and legitimacy in the eyes of the public.

An 1856 column by the *Caledonian Mercury* out of Edinburgh represents a different perspective when compared to its contemporary, *The Liverpool Standard*. In it, the writer explains that "in the first edition of the best biography of him, Newton's devotion to alchemy was not sufficiently known, and, therefore, not conceded. 'There is no reason to suppose,' said the gifted expounder and

³⁷ "Sir Isaac Newton and Colterworth Church," *Grantham Journal* (Grantham), March 25, 1877. The British Newspaper Archive.

³⁸ "Sir Isaac Newton," *Grantham Journal*, 1877.

eulogist, ‘that Sir Isaac Newton was a believer in the doctrines of alchemy.’” This is in reference to David Brewster’s biography which had been released a few decades prior, but we have seen that this description in the *Caledonian Mercury* does not entirely represent the testimonial laid out in that work. Brewster reported that “there exist[ed] among the Portsmouth papers”—a set of papers donated to Cambridge by the Earl of Portsmouth which included a number of Newton’s writings—“many sheets, in Sir Isaac’s own writing, of Flammel’s Explication of Hieroglyphic Figures, and... William Yworth’s *Processus Mysterii Magni Philosophicus*, and” an inquiry into “one Borry in Holland... who was said to possess valuable secrets.”³⁹ Brewster’s description of Newton’s alchemy, as it was laid out in the *Caledonian Mercury*, contained little of Brewster’s nuance, a sign of the uncertainty surrounding the legitimacy of the claims that Newton practiced alchemy which Brewster, in his first edition, had done little to clear up.⁴⁰

However, the *Caledonian Mercury* goes on to explain that in Brewster’s most recent “greatly expanded edition” the reader was “now told [that] ‘Newton, at one period of his life, was a believer in alchemy, and even devoted much time to the study and practice of its processes.’” This revelation, or clarification, is followed shortly thereafter by the claim that “no evidence appears that he ever absolutely renounced his long allegiance to Hermes Trismegistus.” As the decades passed, more of Newton’s work in alchemy came to light, and the narrative that he had flirted with alchemy in his youth became increasingly untenable; further

³⁹ Brewster, *The Life of Sir Isaac Newton*, 270; Iliffe, Rob, and Scott Mandelbrote. "The Portsmouth Papers." The Newton Project. <http://www.newtonproject.ox.ac.uk/history-of-newtons-papers/portsmouth-papers>.

⁴⁰ "Sir Isaac Newton’s Alchemy." *Caledonian Mercury* (Edinburgh), July 26, 1856. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/BL/0000045/18560726/010/0004>

editions of Brewster's biography only exacerbated the issue. The language used by the *Caledonian Mercury* is of one certain in their conclusions; the writer claims that Newton's letters regarding a possible correspondence with a renowned alchemist from Holland use language that "obviously emanates from a mind teeming with hermetic aspirations."⁴¹

A century after his death, Newton's alchemy was a matter of little debate; his most notable biography regarded it as hearsay, or at worst a product of his youth, while contemporaries claimed that any interest he once might have shown did not reflect an actual belief in the Philosopher's Stone or any such mystical nonsense. But within a few decades of Brewster's first edition of *The Life of Sir Isaac Newton*, new pieces of evidence and testimonies regarding the depth of Newton's alchemy began to sow doubt into the minds of the public. The Portsmouth Papers, in addition to various collections of Newton's treatises and notes, served to undermine the popular narrative and laid the foundation for further destabilization of Newton's image as an unwavering adherent to the scientific tenets of reason and progress.

To further complicate a portrait of public opinion in the century following Newton's death, an 1860 column in *The Atlas*, a London newspaper, does not appear to hold the same biases against the study of alchemy as those writers mentioned before. Here, praise was given for "the great benefits to science that have resulted from the pursuit of the Philosopher's Stone and the Elixir Vitæ." The writer went on to list Newton among a series of other important figures as adherents to the doctrines of alchemy, claiming that "various great men... have

⁴¹ "Sir Isaac Newton's Alchemy," *Caledonian Mercury*, 1856.

thought the study of alchemy worth considering (such as Boyle, Newton, Locke, and Leibnits).⁴² This rather nonchalant labelling of Newton as a practitioner of alchemy is in line with those views expounded in *The Cornish Telegraph*. That column begins with a description of “a paper, by the French savant, M. Dumas, [which] was read before the Chemical Section of the [British] Association” the week before. In it, “Dumas maintained that the primary constituents of all metals were the same... and that it is possible to reduce each metal back to these constituents, and then to reconstruct them.” This process, the writer claimed, was more alchemy than chemistry, but it was a belief that was supported by Michael Faraday, the famed English scientist. The columnist believed that such a view could only mean that Faraday had “professed himself to be a believer in the possibility of Alchemy.”⁴³ To the public of mid-nineteenth-century England, the jury was still out on the respectability of alchemy, with figures like Locke and Faraday being labelled by some as proponents of the mystic science, while others, such as Brewster, scoffed at such accusations as either nonsense or oversimplifications. The latter clearly differentiated the respectable interests of Newton, Boyle, Locke, and Faraday from the fantasies of Valentinus, Paracelsus, and Flamel.

Newton’s alchemy posed a problem for the early modern public; during this period, as the writer of the 1761 *Caledonian Mercury* explains, “natural philosophy became a general study, and the new doctrine of electricity grew into fashion,” becoming so popular that, the writer claims, there had never been a time

⁴² *The Atlas* (London), July 28, 1860. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/BL/0002115/18600728/027/0012>

⁴³ “Alchemy and Mesmerism,” *The Cornish Telegraph*, 1851.

when the “pursuit after knowledge [was] so universal... than at this juncture by the body of the British nation.” These scientific advancements, as well as the spread of such newspapers, made the period coinciding with King George II’s reign—which just overlapped with Newton’s life—an especially important period for the burgeoning public awareness regarding the sciences. This also served to widen the gap between the modern and the Medieval, splitting alchemy in twain.⁴⁴

Newton’s alchemy was an aberration on the resume of an otherwise brilliant mind, and this can be seen in the language that was often used to describe or justify his research. The aforementioned London newspaper, *The Atlas*, claimed that Sir David Brewster’s *The Life of Sir Isaac Newton* contained “some testimony to Sir Isaac’s belief in alchemy, and his early taste for practical chemistry.” These two are mentioned in such quick succession in order to impress upon the reader the nature of their relationship: the former gave way to the latter, matured into it, and was justified by it. It is recorded that “in Newton’s chemical studies, his mind was impressed with some belief in the doctrines of alchemy,” a diplomatic phrasing which dismisses the importance of it as a subject of his interest in its own right, though the writer does note that the “ardour of Newton in his chemical researches” kept on into his later life, never “extinguish[ing] the hope which he seem[ed] to have cherished of making philosophy luciferous by transmuting the baser metals into gold.”⁴⁵ Much attention is given to this—the

⁴⁴ Smollett, Tobias. “The state of commerce, the sciences, and arts, in the reign of George II. From Dr. Smollet’s continuation of his compleat history of England.” *The Caledonian Mercury* (Edinburgh), October 14, 1761. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/bl/0000045/17611014/002/0001>

⁴⁵ “Sir Isaac Newton.” *The Atlas* (London), July 28, 1860. The British Newspaper Archive. <https://www.britishnewspaperarchive.co.uk/viewer/BL/0002115/18600728/027/0012>.

transmutation of metals—and the aforementioned column in *The Cornish Telegraph* complements this well.

The writer of this column, a section entitled “Alchemy and Mesmerism” in *The Cornish Telegraph*, tied the potential transmutation of metals into the economic competition of his time, stating that if it were “true [that] copper, lead, or any other baser metal [could] be transmuted to gold” then England would be able to “compete with California at our own firesides.” Having been published around the time of the California Gold Rush, it is no surprise that the possibility of Michael Faraday “profess[ing] himself to be a believer in the possibility of alchemy” might excite the interest of the English public, but in an indirect way, this statement shows how the public understanding of alchemy shifted away from alchemy as the work of witless mystics and more towards the fruitless endeavors of well-minded scientists, a shift which Newton’s contributions in no small part influenced.⁴⁶

It can be said with some certainty that Newton’s research into alchemy did not in and of itself contribute to its decline; if anything the support of such an esteemed figure helped redeem it, in some sense of the word. Alchemy was spared a shallow grave in the wastepaper bin of history by Newton’s name having been attached to it. We can see as much in the great lengths contemporary writers went to justify his alchemical writings. The writer of *The Atlas* describes Newton’s fieldwork, in which he “observe[d] the products of nature, especially in mines, with the circumstances of mixing and extracting metals or minerals out of their ores, and refining them... for example, out of iron into copper, out of one

⁴⁶ “Alchemy and Mesmerism,” *The Cornish Telegraph*, 1851.

salt into another,” or some similar transmutation. The writer explains that these processes were kept secret not for the sort of mystic reasons described in the alchemical manuscripts that predate Newton—such as Valentinus’s—but “lucrative purpose” such as those which might allow, as *The Cornish Telegraph* states, competition “with California at our own firesides.”⁴⁷

In *Of the Supreme Mysteries of Nature*, Paracelsus wrote that if “any man desireth thoroughly and perfectly to learn this Art from its true foundation, it will be necessary that he learn the same from the Master thereof, to wit, from God, who hath created all things.” This is an explicit statement that faith is a necessary component of the study of alchemy; it cannot be pursued without faith, and it serves ultimately the same purpose as most, if not all, forms of mysticism—to understand and become closer to God. For Paracelsus, “there [was] nothing found in Heaven nor in Earth so secret,” requiring that the seeker of alchemical knowledge “imitate him [God] alone, and through him learn and attain to the knowledge of that Nature which he himself with his own finger has engraven and inscribed in the bodies of these Metals.”⁴⁸ This eminently religious language contrasts sharply with the economic interests of the English public, three and a half centuries later. It reflects the shifting realities of early modern Europe, especially the flourishing of the Scientific and Industrial Revolution, but it also reflects a change in the public’s relationship to both mysticism and science—a

⁴⁷ “Sir Isaac Newton,” *The Atlas*, 1860.

⁴⁸ Paracelsus, and Robert Turner. *Of the supreme mysteries of nature. Of the spirits of the planets. Of occult philosophy. The magical, sympathetical, and antipathetical cure of wounds and diseases. The mysteries of the twelve signs of the zodiack.* London, Printed by J.C. for N. Brook and J. Harison, 1656. Pdf. <https://www.loc.gov/item/35031040/>.

change that can be seen most clearly in how people spoke of the alchemical pursuits of Newton.

To illustrate the shift—taking place over the course of roughly one generation—away from alchemy and towards chemistry, one can look to a previous article in *The Caledonian Mercury* from 1761. The article followed the recent death of George II of Great Britain, and in it his reign, which spanned from 1727 to 1760, was described as a time in which “the powers of the human mind were freely and fully exercised,” and a period during which “the study of alchemy no longer prevailed; but the art of chemistry was perfectly understood, and assiduously applied to the purposes of sophistication.”⁴⁹ That the reign of George II saw this transition towards the sciences, so thorough that alchemy would, only thirty-four years after Newton’s death, be seen as unsophisticated is evidence of the role that political and religious institutions had on the delegitimization of alchemy.

We can find a near contemporary work, *The Scots Magazine*, which only a decade and a half later would paint a similar portrait of the decline of alchemy. In an article entitled “Rise and Progress of Chemistry,” the writer explains that there were at least some contemporary scholars who thought that one ought “instead of *alchemia*... read *chemia*.” This implies that the study of alchemy was, even in the eighteenth century, seen as a predecessor to chemistry and nigh indistinguishable, in keeping with the views of Newman and other modern historians who see alchemy as having been primarily scientific instead of mystic. The writer of *The Scots Magazine* even cites “Basile Valentine” as an alchemist whose work

⁴⁹ Smollett, “The state of commerce, the sciences, and arts,” 1761.

“contributed more than anything else to the introduction of that useful mineral [antimony] into the regular practice of most physicians in Europe.” However, there is no mention of Basilius Valentinus’s less scientific inclinations, and of the philosopher’s stone it is only said that “the nobility and gentry of England... wasted so much of their substance in search of the philosopher’s stone, as to render the interposition of government necessary to restrain their folly.” The government of England took active steps to avoid the spread of alchemy, though they were not the only ones to use their powerful institutions to do so, and this speaks again to the role of political and religious institutions in its delegitimization.⁵⁰

The Scots Magazine notes that “attempting to make gold or silver by alchemical processes had been prohibited by a constitution of Pope John XXII,” a reference to the papal decretal known as the *Spondent Pariter*, in which Pope John XXII forbid “pretend[ing] to make genuine gold and silver by a sophistic transmutation” and “stamp[ing] upon the base metal the characters of public money for believing eyes.” This move was motivated by the belief that false alchemists were lying to the public, while the motivations of the English government for their own banning of alchemy are suggested to have been either “an apprehension lest men should ruin their fortunes by endeavouring to make gold” or “a jealousy lest government should be above asking aid of the subject.”⁵¹ The former can be interpreted as an attempt to keep the aristocracy from blindly squandering their wealth on the fruitless alchemical pursuit of the philosopher’s

⁵⁰ Smollett, *The Scots Magazine*, 182; Walsh, J. J. “Pope John XXII and the Supposed Bull Forbidding Chemistry.” *Medical library and historical journal* vol. 3(4), October 1905, 248-63.

⁵¹ Smollett, *The Scots Magazine*, 182.

stone; the latter, to keep any alchemist from becoming more wealthy than the government. In either case, the English government saw fit to restrict the activities of its gentry; the Pope, some centuries before, had made a similar move to restrict the spread of the mystic arts; and across Europe, there were widespread attempts by religious and political institutions to clamp down on alchemy, contributing in their own way to its delegitimization and the characterization of its practitioners as swindlers and charlatans.

Alchemy was a guarded subject; its practitioners took great pains to ensure that the general public did not have access to alchemical knowledge, as we've seen in the works of Paracelsus and Valentinus. We can see this most obviously in Paracelsus's statement that "there is nothing found in Heaven nor in Earth so secret," or that alchemy is the "most true art" which can only be achieved through God. Paracelsus even speaks of false alchemists who "follow his own only opinion," instead of learning from God, and thus "greatly deceive [themselves]; but also all others who cleave and adhere thereunto; and shall bring them unto loss."⁵² We see this concept of the charlatan repeated in all manner of places, thus shaping the public opinion of alchemists as a whole.

While their secrecy was intended to keep those deemed unfaithful from discovering any 'truths' contained within, it ultimately resulted in the public opinion regarding alchemy being shaped largely by news and laws which pertained to it. In the case of these restrictions by political and religious institutions, the message passed down to the masses was that alchemy was the art of charlatans and liars, hence the hesitation of early writers to admit that Newton

⁵² Paracelsus, *Of the supreme mysteries of nature*, 1656

had any connection to alchemy beyond a childhood fascination. To admit that Newton was, at least in part, an alchemist would be to label him a charlatan as well, at least in the eyes of the public.

CONCLUSION

We have seen how alchemy began as the famed pursuit of scholarly minds and sank lower and lower—treated as the trade of charlatans and fools by regal and papal decrees—until, in the eyes of the public, it was little more than a laughing stock: the sort of trade ambitious minds would ply in their youth until adulthood put some sense into them and they moved on to more respectable subjects like mathematics or the sciences. This is exemplified in the popular depiction of Newton's alchemy. Various writers described it in a number of ways: first, as nothing more than a childhood project; then as a stepping stone to chemistry; and as time went on, some saw his alchemical research as a blemish on an otherwise spotless intellectual record. Without a doubt, the historical trends bore too much momentum for Newton to stand against. Alchemy had been on the decline for centuries prior, and public opinion had already shifted against it by the time he came to study the works of his predecessors. But while Newton did not act to save alchemy, it can be said that he saved its ideas. In interpreting his alchemical research as a stepping stone to chemistry, early writers indicate a view of alchemy that persists to this day: that it gave way to and served as the foundation of modern chemistry.

The current debate regarding the classification of the history of alchemy speaks to this as well; Newton straddled the line between the sciences and the magic that came before. As Keynes said, Newton was “the last of the magicians,” inheriting both from the likes of Paracelsus and Valentinus but also gifting to modernity the seeds of science which contained a kernel of this mystic tradition that preceded it.⁵³

In this way, Newton helped solidify the new intellectual inheritance from which many of the modern sciences draw, and his alchemical research contributed to this understanding of alchemy’s situation in the larger historical narrative. Instead of simply being discarded, Newton helped usher alchemy in as the grandfather of science; it was pseudo-science, yes, but the sort of pseudo-science that is born out of a lack of knowledge, not a willful ignorance to it. Isaac Newton, purposefully or otherwise, shepherded alchemy into the public consciousness and, while he could not save it from its ultimate abandonment as a serious subject of academic inquiry, contributed to its continued existence as a part of our narrative of the history of science.

⁵³ Newman. "The Problem of Alchemy," 65.