

Thomas Vaughan and the Iatrochemical Revolution

Thomas Vaughan has often been called a ‘mystical’ or ‘spiritual’ alchemist by his readers, especially since the nineteenth-century edition of A. E. Waite, whose works helped fuel the late Victorian mania for theosophy, hermeticism, and secret societies. While Waite acknowledged that Vaughan had experimented with metals, he believed Vaughan’s true subject was the union between God and the soul; thus he regarded Vaughan as one in a long line of ‘spiritual’ alchemists.¹ The conception of alchemy as primarily a form of spirituality was further popularized in this century by Carl Jung, who was interested in alchemy to the extent that it seemed to mirror his own theories of psychological transformation. The writings of Thomas Vaughan, indeed, continue to enjoy a certain celebrity among those interested in esoteric philosophy. Waite’s edition of *The Works of Thomas Vaughan: Mystic and Alchemist* has been frequently reprinted (whereas Alan Rudrum’s scholarly edition had only a meagre print run and is virtually unavailable). Contemporary evidence suggests that Vaughan was recognized in his time as an experimental chemist; his activities with Thomas Henshaw in the *Christian Learned Society* (ca. 1650) and later association with Sir Robert Moray and the chemical circle surrounding Charles II also point to a role in active research. Since the unpublished notebook of Thomas and Rebecca Vaughan, *Aqua Vitæ, Non Vitis* (British Library MS, Sloane 1741), has largely been ignored, the precise nature of his own research consequently has remained obscure. In this essay I would like to shed some light on that research and its part in the iatrochemical or Paracelsian revolution then underway in medicine.

Vaughan began his public career, brief though it was, during the turbulent 1650s, and his writings ought to be seen as a part of the firestorm sparked by the fear that Descartes had depicted an atheistic, mechanistic universe. In his first two treatises, Vaughan devoted considerable efforts to refuting the notion of a lifeless universe and aimed his vitriolic barbs at the ‘*Whymzies of des Chartes*’.² As a youth Vaughan had been fascinated with the hidden forces

of the natural world – which ‘(I know not how) surpris’d my first youth, long before I saw the University’.³ With his first works, *Anthroposophia Theomagica* and *Anima Magica Abscondita* published together in 1650 under the pseudonym of Eugenius Philalethes, he established himself as an anti-Aristotelian and a defender of divine immanence in the universe. He also declared his allegiance to the new science by using the well-known epigraph from the title page of Bacon’s *Novum Organum* for *Anthroposophia Theomagica*: ‘Many shall run to and fro, and knowledge shall be increased’ (Daniel 12:4).⁴ Like Bacon he was committed to the idea that the way to break open the sealed fountain of truth was empirical investigation:

But it will be question’d perhaps, how shall we approach to the Lord, and by what means may we finde him out? Truely not with words, but with workes, not in studying ignorant, *Heathenish Authours*, but in perusing, and trying his *Creatures*: For in them Lies his secret path, which though it be shut up with thornes and Briars, with outward worldly Corruptions, yet if we would take the pains to remove this luggage, we might *Enter the Terrestriall Paradise*, that *Hortus Conclusus* of *Solomon*, where God descends to walk, and drink of the sealed Fountain.⁵

At the same time as he declared his commitment to the new empirical methodology, Vaughan dedicated the work to the most notorious of the mystical brotherhoods in early modern Europe, *Illustrissimis, et vere Renatis Fratibus R. C.* (‘to the most illustrious and truly reborn brothers of the rosy cross’). These positions are not as cross-purposed as they might at first appear to modern readers, because the Rosicrucian manifestos were written as part of a campaign to foster a similar renewal in the early years of the seventeenth century.⁶ Comparable historical exigencies, Vaughan maintained, compelled *him* to write, for as he observed in the preface to his first work, ‘It is an Age wherein *Trueth* is neere a *Miscarriage*, and it is enough for me that I have appeared *thus far for it*, in a *Day of Necessity*’.⁷

When Vaughan brought out two years later the first print edition in English of the Rosicrucian manifestos and wrote an introduction defending their ideals, however, he became infamous as England’s leading Rosicrucian, despite his repeated avowals that he had no personal acquaintance with the Rosicrucians.⁸ While the *Athenæ Oxonienses* would identify him as a ‘great chymist, a noted son of the fire, an experimental philosopher’, it also would characterize him as a ‘zealous brother of the Rosie-Crucian fraternity’. This public perception would later be made indelible through the satire of Samuel Butler and others.⁹ During his pamphlet war with Henry More in the early 1650s, Vaughan was further tarred with the brush of *enthusiasm*.¹⁰ As a result, his writings have been removed altogether from their context in the intellectual debate of the time, and Vaughan himself turned into a caricature.

The problem of appreciating Vaughan’s intellectual activities has since been compounded by the marginalization of alchemy itself within the academy, which viewed alchemy as either a metaphor for ‘spiritual’ processes or,

more typically, as intellectual fraud. Scholars now recognize that not all of those who pursued alchemical secrets in early modern Europe were the sort satirized in Chaucer's figure of the Canon or Jonson's Face and Subtle. By the late sixteenth and early seventeenth centuries, alchemy had become an intellectually respectable, if controversial, branch of natural philosophy that had little to do with gold-making. To its adherents, alchemy offered insights into and a method of exploring the fundamental processes and relationships of the physical universe, especially in the new field of chemical medicine. From alchemical laboratories came knowledge of such basic compounds as alcohol, ammonia, nitric acid, and hydrochloric acid. For many respectable 'scientists' and fellows of the Royal Society, such as Sir Isaac Newton and Sir Robert Boyle, alchemy was a life-long passion.¹¹ If a typology of alchemists were established, it would include in its broad spectrum the charlatans, the vulgar who sought gold for personal enrichment, those who delved into nature's secrets using chemical principles, and the mystics who pursued an esoteric philosophy. The comparatively rigorous programme of research recorded in Sloane 1741 reveals that Vaughan, as an alchemical practitioner, sought scientific advances in a manner consistent with the other researchers of his age.

Certainly, some of Vaughan's contemporaries would agree with Patrick Scot's assertion in *The Tillage of Light* (1623) that alchemy was nothing more than an allegory for perfecting wisdom. However, many would strenuously disagree, notably Robert Fludd, who countered with *Truth's Golden Harrow*, breaking Scot's points down into twelve 'furrows' that were in turn 'har-rowed' to find their 'truth'. Fludd also considered transmuting base metals into gold *chymia vulgaris*, but while he believed (with Scot) that the true philosopher was concerned with the transmutation of the soul, he also maintained that the sought-after elixirs were materially real and not metaphorical.¹² Had Vaughan drafted a response to counter such views, it would have been essentially the same as Fludd's, though Vaughan's stand on the issue of experimental alchemy is complicated by comments made in his published works, which castigated certain alchemists as *vulgar* precisely because they had lost sight of the higher dimensions of the work. He tagged them 'broylers', faulting their preoccupation with transmuting metals, which, in his view, revealed an unsophisticated grasp of the mysteries of nature.

The *common Chimist* dreams of *Gold* and *Transmutations*, most noble and *Heavenly Effects*, but the *Means* whereby hee would *compassse* them, are worme-eaten, dustie, mustie *papers*. His *Study* and his *Noddle* are stuff'd with *old Receipts*, he can tell us a hundred *Stories* of *Brimstone* and *Quick-silver*, with many miraculous *Legends* of *Arsenic* and *Antimonie*, *Sal gemmæ*, *Sal prunæ*, *Sal Petræ*, and other stupendious *Alkalies*, as he loves to call them; with such strange *Notions* and *Charms* doth he *amaze*, and *silence* his *Auditors*, as *Bats* are *kill'd* with *Thunder* at the *Eare*. Indeed if this *Noyse* will carry it, let him alone, he can want no *Artillery*. But if you bring him to the *field*, and force him to his *Polemics*, if you *demand* his *Reason*,

and *reject* his *Recipe*, you have laid him as *flat* as a *Flounder*. A rationally, methodically *Dispute* will undoe him, for he studies not the whole *Body* of *Philosophie*: a *Receit* he would find in an old *Box*, or an old *Book*, as if the *knowledge* of *God* and *Nature* were a *thing* of *Chance*, not of *Reason*.¹³

The key to this puzzle lies in recognizing that alchemical research meant more than turning base metals to gold. There was considerable interest in chemistry in England at the time, centred on producing medicaments in the wake of the revolution brought about by Paracelsus. To Vaughan and his circle, the true philosopher sought to discover the mysteries of the prime matter and the formation of the elements by experimentation in order to use these secrets for the benefit of mankind (the Creation too they regarded as essentially a divine chemical separation). He conceded that 'in *metalls* there were great *secrets*, provided they be first reduc'd by a proper *Dissolvent*; but to seek that *Dissolvent*, or the *matter* whereof it is *made*, in *Metalls*, is not onely *Error* but *Madness*'.¹⁴ Without the evidence of Vaughan's practical applications and experiments, this statement appears to renounce experimental in favour of spiritual alchemy. To understand it properly, we need to place his theory in the context of his practice, i.e., Sloane 1741.

A further glimpse into his research activities is provided by the meagre evidence of his association with the chemical circle at the court of Charles II. We know that Vaughan's patron Sir Robert Moray, one of the principal architects of the Royal Society (F.R.S., president 1661–62), played a role in setting up a royal laboratory at Whitehall and served as an intermediary for the king with the Royal Society. As a result, Vaughan may very well have been part of these experiments. We know that Vaughan was in the entourage when the king left London for Oxford to escape the plague in 1665; according to his brother, Thomas was 'vpon an employment for his majesty'.¹⁵ He and Moray took lodging at the rectory in nearby Albury (perhaps at the laboratory William Oughtred had set up when he was rector) where they conducted experiments, during which 'as it were suddenly, when he was operating strong mercury, some of which by chance getting up into his nose killed him'.¹⁶ He was buried in the village churchyard in Albury at Moray's expense, and all his remaining manuscripts were left in Moray's hands (along with his library); only his notebook of experiments, *Aqua Vitæ: Non Vitis: Or, The radical Humiditie of Nature: Mechanically, and Magically dissected By the Conduct of Fire, and Ferment*, is extant.

A careful examination of this Sloane manuscript reveals that Thomas and Rebecca Vaughan were part of the most important development in medicine in a millennium, the advent of chemical medicaments. Medical theory until this time was dominated by the Galenic notion that disease was a general imbalance in the body's humoral system that could be remedied by its contrary – e.g., an excess of the 'hot' quality could be tempered with something 'cold'. Paracelsus started a revolution when he insisted that all disease was

localized in a part of the body. ‘Seeds’ of disease grew in the body in the same way that metals were propagated from ‘seeds’ and nurtured within an alment in the earth. The basic treatment was homeopathic: like cures like, or *similia cum similibus* as it was usually put.¹⁷ That is, it was assumed that the poison that caused a disease would also cure it if administered properly (as twentieth-century immunization theory upholds). The task of the chemist was to remove the toxic quality of the drug, which Paracelsus accomplished, for example, by using mercury compounds instead of the metal itself.¹⁸ Within thirty years of the death of Paracelsus in 1548, a school of ‘Paracelsian’ physicians existed which advocated the use of chemically prepared remedies from mercury, arsenic, and, most controversially, antimony. These principles, usually called *iatrochemistry*, were championed in England by the chief physician to the court, Turquet de Mayerne.¹⁹ At the heart of Paracelsus’s philosophy was a belief in an empirically observable chemistry as the foundation of Nature, rather than in the mathematical abstractions or the study of motion taught in the schools. While he referred to the four Aristotelian elements in his writings, he believed a second set of elementary substances to be more significant, the *tria prima* of mercury, sulphur, and salt. Paracelsus’s ideas, therefore, presented a multifaceted challenge to the medical establishment and universities of Europe, which were predicated on traditional Aristotelian elemental theory.

The stock of the apothecary in earlier times had been nearly all herbal in origin. After the flowering of *iatrochemistry* in the late sixteenth century, apothecaries, using the principles of Paracelsus, began a search in their laboratories for chemically prepared medicaments. Even the Royal College of Physicians included a section on chemical medicines in its first *Pharmacopœia Londinensis* (1618) – and had intended such a section for its earlier (unpublished) pharmacopœia of 1585. By mid century the Royal College of Physicians had established a chemical laboratory at its Physic Garden in Chelsea in the charge of William Johnson (‘chymicus noster’),²⁰ and Sir Thomas Browne would include the writings of Jean Beguin, Daniel Sennert, and Heinrich Crollius in his list of essential writings for the medical student.²¹ Thus chemistry was gradually accepted in the seventeenth century for its practical pharmaceutical value.

With their experience in the laboratory and their familiarity with Paracelsian principles, the potential allies of apothecaries and the so-called chemical physicians, as one might suspect, were the alchemists who had honed the technical aspects of what has been called the ‘most flourishing laboratory tradition’ before the scientific revolution.²² With the publication of the first student’s manual on the *techne* of chemistry, Beguin’s *Tyrocinium Chymicum* (1610), terminology and procedures became more standardized and (somewhat) demystified. This work became a standard text and appeared in more than forty editions during the seventeenth century.²³ The stereotypes of gold-making charlatans persisted, however, prompting Beguin’s caution:

how egregiously they are deceived, who, hearing the name of an Alchymist, presently conclude that Man employs himself in nothing else, than the transmutation or Metamorphosing of Metals, and meditates on no other thing than the wonderful Mystery of the Philosophick Stone; Whereas the intention of this Artist, is to prepare most sweet, most wholesome, and most safe Medicaments.²⁴

Medicine was, in the opinion of Vaughan's brother the poet, who had declared, in response to queries from his kinsman Aubrey, with whom he had begun to correspond when Aubrey was collecting biographical data for Anthony Wood's *Athenæ Oxonienses*: 'My brothers employm^t was in physic & Chymistrie My profession allso is physic'.²⁵ Like his twin brother, a practising country doctor who translated two iatrochemical works, namely Heinrich Nolle's *Hermetical Physick* (1655) and *The Chymist's Key* (1657), Thomas Vaughan utilized the principles of chemical medicine throughout his notebook.

Though Vaughan was accused by More and others of uttering only wild and whirling words, his fundamental positions on natural philosophy were internally consistent, based on authoritative sources, and reasonably simple (even if they seem difficult for modern readers). About the influences on his thinking and the direction of his chemical research there is little doubt, for he proudly announced in print that Cornelius Agrippa, whose picture adorned his first work, Johannes Trithemius, Johannes Reuchlin, and Michael Sendivogius were his masters, calling himself 'an *Usher* to the *Traine*, and one borne out of due time'.²⁶ From his frequent invocation in his notebook of the authority of the pseudo-Lullian *Testamentum* (ca. 14th c.) and the Polish alchemist Sendivogius, we can also locate his research within the framework of contemporary theory. Most natural philosophers believed that metals were propagated from 'seeds' and nurtured (in the same fashion as the human foetus) in the earth in an aliment known as *sophic mercury* that was considered the mother of all metals. Just as in natural generation, where seed was multiplied into corn by the husbandman, so in minerals was there a sperm for multiplying; most chemists failed because the earth or vessel in which the seed was buried was too cold or the heat used to nurture the seed was too hot.²⁷ The *Testamentum* considered philosophic salt a substance necessary to every stage of the alchemical opus, because it was the medium through which nature produced metals from the *sophic mercury*.²⁸ To the common belief that the great work of transformation meant uniting the fixed with the volatile principles (i.e., *sophic sulphur* with *sophic mercury*), Sendivogius emphasized especially the role of 'centric salt' (*sal nitrum*) within the earth in nurturing these metallic 'seeds'.²⁹ In fact many chemical philosophers, such as Bernard Palissy, Joseph Duchesne, Robert Fludd, Johann Glauber, and Nicolas Le Fèvre, believed the life force or *spiritus mundi* was actually an aerial saltpeter within the grosser air that turned into arterial blood. For example, recognizing that air was essential for both fire and life, Le Fèvre believed saltpeter to be the 'universal salt', possessing

within itself the *spiritus mundi*.³⁰ (Since Le Fèvre was the royal chemist of Charles II, Vaughan, through the offices of his patron Sir Robert Moray, may even have worked with him at the king's laboratory.) All in all, there was significant interest in the mid-seventeenth century in the role of salts in the procreation and sustenance of life, for example, in dissolved salt from dung as a fertilizing agent (one of Hartlib's pet projects). Thomas Henshaw, Vaughan's quondam research partner, we know, signed at least one letter to Sir Robert Paston as 'Halophilus', i.e., 'salt-lover', and was involved in such research and spoke before the Royal Society on the history and manufacture of saltpeter.³¹

So too were Thomas and his wife and research partner Rebecca Vaughan within the chemical mainstream in their use of various salts in their laboratory experiments.³² These included sodium chloride, borax, saltpeter, a salt they called *scarabæus*, and, very frequently, *sal ammoniac* for washing or purifying processes.³³ (Any solid that was soluble in water was considered a salt; hence there were neutral salts as well as acids and alkalis.) Roughly half of their experiments involved work of this kind; nearly all of the research involved substances that were used as medicaments. The notebook also catalogues a wide variety of recipes from favourite authors, such as Ramon Lull, Paracelsus, Sendivogius, and Basil Valentine, as well as their own discoveries, notably an 'aqua vitæ, which I found, when I lived with my deare Wife, att y^e pinner of wakefield', and several versions of an 'Aqua Rebecca'.³⁴

More than fifty of the experiments (about half) involved the preparation of specific medicines – either involving herbal preparations for scammony, rhubarb, larch fungus, senna, cassia, jalap root, the sap of panax, narcotics, such as opium, or mineral compounds used as medicaments, such as *crocus metallorum*. The Vaughans used alcohol to separate the essences of *mercury* and *sulphur* from the plant *salts* by extraction (as opposed to fermentation). The Paracelsian term *arcantum* was also used (on thirty-seven separate occasions) to denote a medicine whose secret 'virtue' allowed it to act directly (as opposed to Galenic medicines that balanced or tempered the elements). Paracelsus believed that each of the four elements contained a fifth, the quintessence, an ethereal substance that constituted its 'virtue' and was the vehicle for the special powers in herbs or iatrochemical medicines.

While Vaughan may very well have supported himself by preparing such medicaments, he was further driven by altruistic motives, judging from the private thanksgiving he recorded for a dream in which God revealed 'A Notable Medicine to Reduce Fever':

I dreamed that I had intended to fashion a certain medicine mixed from nitric salt and crystals of tartar I hope that God has shown and shared this to me, a most unworthy sinner, in solace of those suffering fever. For which gift of His mercy, eternal praise be to Him.³⁵

Such sentiments in a work not intended for the public eye help us see that his interests lay in medicine, just as his experiments had nothing to do with gold-making.

As befits one who placed himself in the Baconian vanguard, Vaughan carefully recorded the details of his experiments. The text gives evidence of having been amended with new material also being added at a later time, which shows the care he took in recording procedures and correcting mistakes. He specified the proper operation, the necessary apparatus, the quantities of materials, and, to a lesser extent, the grade of heat and the duration of each operation. He differentiated between *assation*, roasting or incinerating a substance in a glass vessel to desiccate it; *calcination*, heating a solid substance at a high temperature to reduce it to a fine powder; *cohobation*, repeated distillation; *decoction*, separation of pure from impure substances through a gentle heat; *distillation*, heating a substance to convert it into a vapour, then cooling it to extract its essence by condensation; and *putrefaction*, decomposing or disintegrating a substance, usually by chemical means. He frequently specified the apparatus required: alembic, athanor, crucible, glass spheres, matrass, retort, *sextum barbatum*, or even a common iron pot. As the subtitle to Vaughan's notebook – *The Radical Humiditie of Nature: Mechanically, and Magically dissected, By the Conduct of Fire, and Ferment* – indicates, the key to success in most operations lay in controlling the heat, which was accomplished by using various sources (the thermometer being not yet available). The lowest grade was produced by a warm water bath, the *balneum Mariæ*, named for its inventor, the legendary Maria the Jewess or Maria Prophetissa. The next grade was produced by a fire kindled under a pan of ashes or cinders. The third grade was compared to boiling sand or iron filings. The fourth grade, the fiercest, was produced from coals and a bellows.³⁶ While Vaughan sometimes specified a *balneum Mariæ* or *balneum roris* (a steam bath) or instructed that something be heated *in cineribus* or *in arenâ*, more often than not he indicated only that it be done *igne modo*, *igne moderato*, *igne fortissimo*, or *igne violento*. He took less pains to indicate the duration of experiments, which were indicated in hours or days.

Typically Vaughan gave the quantities of the ingredients using a ratio of parts, as for example in his recipe for the spirits of common mercury:

Place [equal] parts vitriol and mercury in a retort; pour in aqua fortis in an equal weight of mercury. Decoct with the heat of the ashes for two days. Then distill, and if the fumes do not wish to be resolved into a vapour, pour in a little distilled water, and immediately it will succeed. Dissolve new mercury often in this rectified spirit, and proceed until you have enough.³⁷

Occasionally he used weights as in a recipe for a calcinated water, attributed to Ramon Lull.³⁸ These examples from Sloane 1741 show that the Vaughans' chemical experiments in the 1650s were empirically rigorous, even in comparison to many of those performed before the Royal Society in the following decade.

To modern readers the language of the notebook may seem encoded in exotic and unfamiliar ways. Because of its origins in Greco-Roman Egypt as a metaphysical as well as physical inquiry into the innermost secrets of God's creation, alchemists relied on symbolic language to protect their mysteries from the unworthy. This symbolic tradition also has epistemological roots, as Lyndy Abraham has observed:

Alchemical symbols expressed the philosophical properties residing in matter as well as the outer form of that chemical matter. Such a philosophical experience of matter existed beyond the scope of the rational mind, and could only be adequately expressed in symbol, emblem, paradox and allegory.³⁹

Broadly speaking, alchemical writing had much in common with the Renaissance emblem tradition. Both arts were predicated on the underlying unity in the created universe; like the alchemist, the emblematist delighted in simultaneously discovering and concealing these correspondences through symbols.⁴⁰

As was customary for his day, Vaughan always used alchemical symbols for metals based on the celestial analogues of the seven prime metals – gold, silver, iron, mercury, tin, copper and lead (e.g., ☉ for gold); he sometimes used standard notations for chemical operations, such as $\frac{\text{fl}}{\text{fl}}$ for firing in a crucible; and he frequently used coded names or alchemical *Decknamen* to refer to certain substances postulated by alchemists, such as *aquila* for the volatile principle, or *lac virginis* for the *prima materia*. Especially typical was the use of the adjective 'philosophical' – for example, *plumbo philosophico* (fol. 5v), *stybii philosophici* (fol. 7r), or *flores philosophicos* (fol. 10v) – attached to certain substances. While the use of such exotic language in part served the same function as symbolic notation or abbreviations do for scientists today – convenience – it also enabled adepts to control access to secret knowledge, to protect trade secrets, and to enhance the mystery of their art. While I do not credit the notion that all alchemical language is intrinsically paradoxical and hence unfathomable, we should still recognize the language of alchemy is often steeped in mystery for a reason.⁴¹

Vaughan's notebook shows that he was a master of these secret vocabularies, just as his printed work demonstrates his skill in the interpretation of difficult allegories. He had remarked in *Anthroposophia Theomagica* that since most people were accustomed only to seeing the 'Barke of Allegories', his own explanations of nature's hidden mysteries would seem strange. He observed further that many texts could only be understood allegorically:

I will now digresse a while; but not much from the purpose, whereby it may appear unto the Reader that the *letter* is no sufficient *Expositor* of *Scripture*, and that there is a great deal of difference between the *sound* and sense of the *Text*. *Dionysius* the *Areopagit* in his Epistle to *Titus* gives him this Caveat. *Et hoc præterea Operæ prætium est cognoscere: Duplicem esse Theologorum Traditionem, Arcanum Alteram, ac mysticam: Alteram vero manifestam, et notioorem.*

And in his Book of the *Eclesiastical Hierarchie* written to *Timotheus*, he affirms, that in the *primitive, Apostolical times*, wherein he also lived, the mysteries of Divinity were delivered *partim scriptis, partim non scriptis Institutionibus*.⁴²

Oral traditions have long been associated with sacred texts: for example, accompanying the Torah were the oral commentaries known as the *Mishnah*, which according to Jewish tradition Moses had received on Mount Sinai and transmitted to Joshua (and were not written down until 200 C.E.). Implicit in these traditions, especially in what came to be known as *prisca theologia*, was the necessity to conceal esoteric wisdom from the vulgar.⁴³ The belief that some knowledge ought to be reserved only for an elite was in earlier times far more widespread than now. In every guild or craft in the Middle Ages, masters safeguarded the ‘mysteries’ for the economic good of all.

Secrecy was certainly used to conceal the sharp practices of the charlatan, but so too was it common for persons to form partnerships for commercial ventures, licensed in the Patent Rolls, which bound the principals to confidentiality. For example, among the papers of Dr Robert Plot, the first professor of chemistry in the University of Oxford, is a draft agreement, dated 1677, concerning a partnership to prepare and sell chemical medicines. In return for the secrets of preparing the *elixir, alkahest, and grand arcanum* to be supplied by Plot, the agreement bound his partner to secrecy and held him responsible for production and sales.⁴⁴ And such confidences were taken seriously. Henshaw would later quarrel with his patron who had betrayed a confidence by revealing certain secrets entrusted to him.⁴⁵

The penchant for secrecy was especially pronounced in the *demi-monde* of alchemy. So strong had the habit of reading texts allegorically become, that Henshaw once explained a puzzling passage in an authoritative text by quipping, ‘who knows but Sendiuog [Sendivogius], myght safely enough conceale his meaning in a litteral sence, where all y^e world expected an Enigmaticall’.⁴⁶ To ensure the continued succession of the art, some would entrust their secrets orally to a worthy ‘*Heire unto this Science*’, as Elias Ashmole explained in *Theatrum Chemicum Britannicum*.⁴⁷ When Ashmole himself was selected for tutelage by an adept in 1651, he wrote an ode, titled ‘To my worthily honour’d William Backhouse Esq^f Upon his adopting me to be his Son’, celebrating his initiation into the alchemical mysteries by a man he called ‘father’ thereafter.⁴⁸ A single statement placed near the new beginning of *Aqua Vitæ* suggests that Vaughan may have intended his manuscript notebook as a book of secrets or *testamentum* to be handed down at such a time when God saw fit: ‘I shall lay them downe heere in their order, protesting earnestly, and with a good Conscience, that they are the very trueth, and heere I leave them for his Use, and Benefit, to whome god in his providence shall direct them’.⁴⁹ It should be noted that only here on the title page of this notebook would Vaughan use his own name, whereas for all his printed works he employed the pseudonym Eugenius Philalethes, the well-born (i.e. noble) lover of truth.

While Vaughan was in many ways the typical Baconian who empirically tested all hypotheses, his notebook *Aqua Vitæ* stands Janus-like in this transitional age: with its codes and exotic language, it hearkens backwards to traditions of esoteric secrecy; with its attempts at precision, it looks forward to modern laboratory practice. As an historical document it shows that Vaughan quite clearly was involved in experimental philosophy and with the iatrochemical revolution in medicine; any sketch of his life and work, therefore, ought to take this into account.

Texas A&M University

DONALD R. DICKSON

Notes

This essay will appear also in the introduction to: Thomas and Rebecca Vaughan, *Aqua Vitæ: Non Vitis: Or, The radical Humiditie of Nature: Mechanically, and Magically dissected By the Conduct of Fire, and Ferment* (British Library MS, Sloane 1741), edited and translated with an Introduction by Donald R. Dickson, *Medieval & Renaissance Texts & Studies 217* (Tempe, AZ: Arizona Center for Medieval and Renaissance Studies, 2000), ISBN: 0-86698-259-0.

- 1 Thus in his edition of *The Magical Writings of Thomas Vaughan* (London, 1888), p. 9, Waite stated: 'Vaughan was a mystic, and though he seems to have had some practice in alchemical work, his proclivities were mainly in the direction of mystical rather than of physical Alchemy.' See also his introduction to *The Works of Thomas Vaughan: Mystic and Alchemist*, pp. xxv–xlviii, and Stanton J. Linden, *Darke Hieroglyphicks: Alchemy in English Literature from Chaucer to the Restoration* (Lexington, University Press of Kentucky, 1996), especially pp. 224–46.
- 2 *Anima Magica Abscondita* in *The Works of Thomas Vaughan*, ed. Alan Rudrum (Oxford, Clarendon Press, 1984), p. 137.
- 3 *Works*, p. 521.
- 4 Rudrum, *Works*, p. 597, citing Charles Webster's *The Great Instauration* (London, Duckworth, 1975).
- 5 *Anima Magica Abscondita* in *Works*, p. 115. As he indicated in the subtitle of his research notebook, he believed Nature must be 'Mechanically, and Magically dissected, By the Conduct of Fire, and Ferment' (Sloane 1741, fol. 1r).
- 6 For a fuller account see Donald R. Dickson, *The Tessera of Antilia: Secret Societies and Utopian Brotherhoods in Early Modern Europe* (Leiden, E. J. Brill, 1998), chapters 2–3.
- 7 *Anthroposophia Theomagica* in *Works*, p. 53.
- 8 Vaughan published *The Fame and Confession of the Fraternity of R.C., Commonly, of the Rosie Cross. With a Præface annexed thereto, and a short Declaration of their Physicall Work* (London, 1652), under his pseudonym Eugenius Philalethes, though he was not the translator. See the Preface to the *Fame and Confession*, in *Works*, pp. 483, 498, for his avowals. See also Linden, *Darke Hieroglyphicks*, pp. 266, 268, 278–9.
- 9 Anthony Wood, *Athenæ Oxonienses*, ed. P. Bliss, 3rd ed., 4 vols (facsimile rpt. of London, 1817; New York and London: Johnson, 1967), III, 723. Samuel Butler's

- sketch in *Characters*, ed. Charles W. Daves (Cleveland and London: Press of Case Western Reserve University, 1970), pp. 144–5, of the enthusiast who adores the *Brethren of the Rosy-Cross*, those ‘*Philosophers Errant*, that wander up and down upon Adventures, and have an enchanted Castle, invisible to all but themselves’, was probably based on Vaughan. So too was Sir Hudibras’s Squire Ralph, in *Hudibras*, ed. John Wilders (Oxford: Clarendon Press, 1967), I.i.519–616; II.iii.613–40.
- 10 See Noel L. Brann, ‘The Conflict Between Reason and Magic in Seventeenth-Century England: A Case Study of the Vaughan-More Debate’, *Huntington Library Quarterly*, 43 (1980) 103–26; and Frederic B. Burnham, ‘The More-Vaughan Controversy: The Revolt Against Philosophical Enthusiasm’, *Journal of the History of Ideas*, 35 (1974), 33–49.
 - 11 See Betty Jo Teeter Dobbs, *The Foundations of Newton’s Alchemy: or ‘The Hunting of the Greene Lyon’* (Cambridge, Cambridge University Press, 1975) and *The Janus Faces of Genius: The Role of Alchemy in Newton’s Thought* (Cambridge, Cambridge University Press, 1991). On Boyle see the recent essays in Michael Hunter (ed.), *Robert Boyle Reconsidered* (Cambridge, Cambridge University Press, 1994) and Lawrence Principe, *The Aspiring Adept: Robert Boyle and His Alchemical Quest* (Princeton, Princeton University Press, 1998).
 - 12 C. H. Josten, ‘*Truth’s Golden Harrow: An Unpublished Alchemical Treatise of Robert Fludd in the Bodleian Library*’, *Ambix*, 3 (1949), 97–8.
 - 13 *Lumen de Lumine* in *Works*, pp. 345–6.
 - 14 *Euphrates* in *Works*, p. 513.
 - 15 Letter to Aubrey, in L. C. Martin (ed.), *The Works of Henry Vaughan*, 2nd ed. (Oxford, Clarendon Press, 1957), p. 687. F. E. Hutchinson, *Henry Vaughan: A Life and Interpretation* (Oxford, Clarendon Press, 1947), p. 144, also agrees that Thomas was employed by the crown.
 - 16 *Athenæ Oxonienses*, III, 725.
 - 17 Walter Pagel, *Paracelsus: An Introduction to Philosophical Medicine in the Era of the Renaissance*, 2nd ed. (Basel, Karger, 1982), pp. 129–48.
 - 18 For a full account, see Allen G. Debus, *The English Paracelsians* (New York, Franklin Watts, 1966) and *The French Paracelsians: The Chemical Challenge to Medical and Scientific Tradition in Early Modern France* (Cambridge, Cambridge University Press, 1991).
 - 19 Mayerne (1573–1655), French-born physician and Baron of Aubonne, studied at Heidelberg and Montpellier (MD in 1597) and practised at Paris. His interest in iatrochemistry earned him the censure of the French College of Physicians in 1603, so he moved to London in 1611, where he became a fellow of the College of Physicians and was appointed royal physician to James and held this influential position until his death. Biographical articles may be found in the *DNB*, XXXVII, 150–2, and the *Dictionary of Scientific Biography*, 13, 507–9. For a recent study, see Brian K. Nance, ‘Determining the Patient’s Temperament: An Excursion into Seventeenth-Century Medical Semeiology’, *Bulletin of the History of Medicine*, 67 (1993), 417–38.
 - 20 H. Charles Cameron, *A History of the Worshipful Society of Apothecaries of London, Volume I 1617–1815*, rev. ed. (London, Wellcome Historical Medical Museum, 1963), p. 93.
 - 21 Frank Livingstone Huntley, *Sir Thomas Browne: A Biographical and Critical Study* (Ann Arbor, University of Michigan Press, 1962), p. 70.

- 22 Dobbs, *Foundations of Newton's Alchemy*, p. 64. On the competition between the iatro-chemists and the Galenists, see Charles Webster, 'English Medical Reformers of the Puritan Revolution: A Background to the "Society of Chymical Physicians"', *Ambix*, 14 (1967), 16–41; and Harold J. Cook, 'The Society of Chymical Physicians, the New Philosophy, and the Restoration Court', *Bulletin of the History of Medicine*, 61 (1987), 61–77.
- 23 Debus, *The French Paracelsians*, p. 82.
- 24 Jean Beguin, *Tyrocinium Chymicum: or, Chymical Essays Acquired from the Fountain of Nature, and Manual Experience*, trans. Richard Russell (London, 1669), pp. 2–3.
- 25 Letter, Henry Vaughan to John Aubrey, 15 June 1673, from Brecon, Bodleian Library MS. Wood F 39, fol. 216, in *The Works of Henry Vaughan*, p. 688.
- 26 *Magica Adamica* in *Works*, p. 154. William R. Newman has ably traced the lineage of Vaughan's ideas from Agrippa and Sendivogius. See *Gehennical Fire: The Lives of George Starkey, An American Alchemist in the Scientific Revolution*. (Cambridge, Mass., Harvard University Press, 1994). pp. 213–21; and 'Thomas Vaughan as an Interpreter of Agrippa von Nettesheim', *Ambix*, 29 (1982), 125–40.
- 27 Preface to the *Fame & Confession* in *Works*, pp. 505–6.
- 28 See Michela Pereira, *L'oro dei filosofi: saggio sulle idee di un alchimista del Trecento* (Spoleto, Centro Italiano di Studi sull'Alto Medioevo, 1992), pp. 166–73.
- 29 'By *Earth*, I understand not this impure fæculent *body*, on which we *tread*, but a more simple pure *element*, namely the *naturall centrall salt Nitre*. This *salt* is fixed or permanent in the *Fire*, and it is the *sulphur of Nature*, by which she retains and congeales her *Mercurie*' (*Euphrates* 538–9). See Zbigniew Szydło, *Water Which Does Not Wet Hands: The Alchemy of Michael Sendivogius* (Warsaw, Polish Academy of Sciences, 1994), pp. 93–125.
- 30 Nicolas Le Fèvre, *A Compleat Body of Chymistry*, 2nd ed., 2 vols. in 1 (London, 1670), II, 251–5. See Allen G. Debus, *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries*, 2 vols (New York, Science History Publications, 1977), I, 109; II, 495.
- 31 Letter, Halophilus [Thomas Henshaw] to Sir Robert Paston at Oxnead, 5 November 1663, Norfolk Record Office, Bradfer-Lawrence MS, 1c/1. See British Library MS, Sloane 243, a copy of the first Register Book of the Royal Society. Nr. 18: 'The History of the Making of Salt Peeter. By Mr. Henshaw' (fols 43v–48r); 'The Manner of making Salt Peeter' (fols 48v–51r); 'To Refine Saltpeeter' (fols 51v–53r); 'The History of making Gunpowder' (fols 53v–57r). See Donald R. Dickson, 'Thomas Henshaw, Sir Robert Paston and the Red Elixir: An Early Collaboration Between Fellows of the Royal Society', *Notes and Records of the Royal Society*, 51 (1997), 57–76.
- 32 For an account of the Vaughans' research partnership, see Donald R. Dickson, 'The Alchemical Wife: The Identity of Thomas Vaughan's "Rebecca"', *The Seventeenth Century*, 13 (1998), 34–46.
- 33 Vaughan's experiments with saltpeter were known to his contemporaries. The alchemist William Backhouse remarked (June 1651) to Elias Ashmole that Vaughan was working 'upon the spirit of saltpetre / and of late he added May-dew to it'; see C. H. Josten (ed.), *Elias Ashmole (1617–1692): His Autobiographical and Historical Notes, His Correspondence, and Other Contemporary Sources Relating to his Work*, 5 vols (Oxford, Clarendon Press, 1966), II, 575.
- 34 Sloane 1741, fols 87v, 101v, 97v, and 93v.

- 35 Sloane 1741, fol. 54v: ‘Somniabam me medicam quandam mixturam ex Anatro et Crystallis Tartari intentasse Hoc mihi peccatori indignissimo, in solatium Ægrorum febricitantium, monstrasse Deum, et impartivisse spero: Pro quo Misericordiæ suæ dono, sit illi Laus Æterna’.
- 36 Vaughan discusses the various grades in *Magica Adamica*, pp. 221–3; see also Martin Ruland, *A Lexicon of Alchemy*, ed. and trans. A. E. Waite (London, privately published, 1893; rpt. Kila, MT: Kessinger, 1991), p. 180.
- 37 Sloane 1741, fol. 9r: ‘Olei vitri & Mercurii partes pone in Retortâ: affunde Aquam fortem ad pondus Mercurii. Digere in Cineribus per dies duos. Tunc distilla, & si fumi nolunt in Humorem Resolvi, affunde parum de Aquâ distillatâ, & statim succedet. Hoc spiritu sæpius rectificato solve novum [mercurium] & procede donèc satis habeas.’
- 38 Sloane 1741, fol. 55v: ‘Aluminis & vitrioli calcinatorum lib[ram] 1. nam vitriolum viride valet loco vitrioli Azoquei, in confectione Aquæ n[ostr]æ primæ. Cinnabaris, vel magnesie Cinnabarinæ lib[ram] 1. salis nitri lib[ram] 1. Distilla nudo igne, sed relicto spiraculo, et fiet.’
- 39 Lyndy Abraham, *A Dictionary of Alchemical Imagery* (Cambridge, Cambridge University Press, 1998), p. xvii.
- 40 Abraham, p. xviii. See also Don Cameron Allen’s classic study, *Mysteriously Meant: The Rediscovery of Pagan Symbolism and Allegorical Interpretation in the Renaissance* (Baltimore, Johns Hopkins University Press, 1970).
- 41 For an overview of the languages of alchemy, see Gareth Roberts, *The Mirror of Alchemy: Alchemical Ideas and Images in Manuscripts and Books from Antiquity to the Seventeenth Century* (Toronto, University of Toronto Press, 1994), pp. 65–91.
- 42 *Anthroposophia Theomagica* in *Works*, p. 74: *Et hoc ...*: ‘Furthermore, it is worth knowing that the tradition of the theologians is twofold: the one part secret and mystical, the other revealed and better-known; *partim ...*: partly in written, partly in unwritten canons’.
- 43 See D. P. Walker, *The Ancient Theology: Studies in Christian Platonism from the Fifteenth to the Eighteenth Century* (Ithaca, Cornell University Press, 1972).
- 44 British Library MS, Sloane 3646, fols 77–81. See F. Sherwood Taylor, ‘Alchemical Papers of Dr Robert Plot’, *Ambix*, 4 (1949), 67–76.
- 45 See Dickson, ‘Thomas Henshaw, Sir Robert Paston, and the Red Elixir’, pp. 65–6.
- 46 Letter, [Henshaw] to Paston at Norwich, 9 September 1671, NRO Bradfer-Lawrence, 1c/1. Henshaw likewise counselled Paston on 2 September 1671 (NRO Bradfer-Lawrence, 1c/1), to be circumspect in concealing their work from an outsider: ‘put a mist before his eyes, or else a strong obligation of Secresy on him. but aboue all conceale from him y^e use y^u mean to make of it, and take heed least hee picke any thing out of y^r discourse before him wth S^r John but use French or Latine when there is any thing of secrecy’.
- 47 *Theatrum Chemicum Britannicum* (London, 1652), pp. 440–1.
- 48 See Josten, *Elias Ashmole*, I, 77–8.
- 49 Sloane 1741, fol. 105v.

Address for Correspondence

Professor Donald R. Dickson, Department of English, Texas A&M University, College Station, Texas 77843-4227, USA. *E-mail* d-dickson@tamu.edu