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THOMAS HENSHAW AND SIR ROBERT PASTON'S PURSUIT OF THE RED ELIXIR: AN EARLY COLLABORATION BETWEEN FELLOWS OF THE ROYAL SOCIETY

by

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The problems involved in using Baconian categories to understand the great instauration Bacon hoped to foster are now well known. Natural philosophers were, for Bacon, empiricists, who tested their observations of nature openly, and their foes were superstitious dogmatists, who speculated by conjuring hypotheses in secret. As Joseph Agassi has wryly remarked, 'once a person, historian or not, accepts a division of mankind into open-minded and closed-minded, he almost invariably finds himself on the right side'.[1] We now appreciate how broad even the Royal Society's conception of natural philosophy was, given the hermetic interests of many of its early members.[2] By examining an early collaborative effort of Thomas Henshaw and Sir Robert Paston, who were both respected Fellows of the Royal Society as well as 'chemical alchemists' or 'chemical philosophers' following a rigorous, quantitative programme of experimentation, this essay will confirm that the actual practice of natural philosophy was broad indeed, and hardly revolutionary.[3] Our view of these shadowy figures is usually obscured by the backdrop against which they are set, a backdrop that was created as the category of 'natural magic' disappeared, with part becoming science and the rest being discarded as superstition. The evidence to be examined includes an alchemical treatise in the British Library (Sloane 2222) and Henshaw's correspondence discussing it. Although the status of alchemy certainly changed during the course of the seventeenth century, it did so because more rigorous experimentation proved the alchemist's claims to be unverifiable, not because any underlying theories had been altered. The letters, especially, illustrate this process and also shed light on the differences between the closed world of alchemy and the more open culture of science then emerging.

Thomas Henshaw (1618–1700), one of the founding Fellows of the Royal Society, was born in London and lived most of his life in Kensington. He studied at University College, Oxford, from 1634–38, without taking a degree, then entered the Middle Temple; he broke off his legal career at the outbreak of the civil war.[4] In his account for the *Athenæ Oxonienses*, Henshaw indicated that he joined the King at York (January–September 1642), returned to London to outfit himself with money and arms,

and was taken prisoner. Given the gentleman's option of pledging not to fight again or confinement, he spent the duration on the continent. He sailed first to Holland, travelled to Spain, then to Italy where he joined John Evelyn in Venice, spending the winter with him at the University of Padua (where he matriculated on 22 November 1645). Upon his return Henshaw was called to the bar, but he confessed that 'my long absence and y^{e} sowre complexion of y^{e} times quite discouraged me from y^{e} practice of that profession'.[5] Instead he devoted himself to experimental chemistry, supported by a small patrimony.[6] In 1657 he married Anne Kipping of Twedley, Kent, who helped him enjoy 'a serious priuate and studious life, sweetned by y^{e} Conversation of a good woman who always bid me welcom, and neuer interrupted my contentment by a minutes ill humour'.[7] She bore him eight children, all but one of whom died in infancy; she herself succumbed during a particularly difficult delivery in 1671. As a staunch Royalist and astute observer of the London scene, he was well qualified for the diplomatic posts he later held.[8]

During his travels Henshaw acquired manuscripts and artefacts for his cabinet of curiosities—especially optical instruments—and made important friends, including the Jesuit polymath Athanasius Kircher. Elias Ashmole praised him as 'extraordinary *Learned*, and a great *Ornament* of our *Nation*'.[9] In time he would become a very active member of the Royal Society; he read papers on various topics, was a member of its first council, served as secretary for six years and was Vice-president in 1677.[10] When the American physician Dr Robert Child introduced Henshaw to one of London's most important intellectual circles in December 1649, Samuel Hartlib noted this 'universal Schollar' in his daybook:

> One Hinshaw about Kensington a Gentl[man] of 2. or 300. a y[ear] a universal Schollar and pretty communicativ. Hee pretends to have the Alchahest or a true dissolvent. Is skilled in the Coptical Language. Exercises hims[elf] in Chymistry. Brought over an Excellent Historie of China in Ital[ian] wherin are the Annual Letters of the Jesuits. w^{ch} is worthy to bee translated. Hee is to bee ranked in the number of Experimental Philosophers. Hee hath a good Optical Glasse and kn[ows] one that hath one wherin you use both your eyes. Hee hath a number of MS.[11]

Henshaw's claim to have J. B. van Helmont's formula for the alkahest, or universal solvent of prepared mercury (given to Sir Hugh Platt when van Helmont was in England and from whose manuscripts Henshaw acquired it), makes it quite clear that he was a practising alchemist, though we should also note how easily this rests among his other intellectual interests.

The engaging Henshaw, not surprisingly, made quite a mark during the Commonwealth period. In 1650, together with Thomas Vaughan (1621–1666), who was widely known in his time as an apologist for the Rosicrucian Brotherhood and an alchemist, Henshaw formed a research collegium of chemists known as the Christian Learned Society or the Chymical Club. A handful of people lived or worked at his manor house in Kensington, called Pondhouse or Moathouse because close by were some large fish ponds 'intersected with grand walks' and the islands in the middle of the ponds were connected by wooden bridges.[12] Prominent among them were

FIGURE 1. Thomas Henshaw (1618–1700), one of the founding Fellows of the Royal Society. Reproduced by permission of the Ashmolean Museum, Oxford (Sutherland collection).

Obadiah Walker and Abraham Woodhead, two Oxford dons, both recently ejected from their Fellowships, who had tutored and befriended Henshaw at University College. What they all had in common was an interest in experimental science and mathematics that had been cultivated by the leading mathematician of the age, William Oughtred (1575–1660), whose *Clavis Mathematicæ* (1631) was hailed for introducing Hindu-Arabic notation, algebraic symbols, decimal fractions and algorithms, and for teaching the mathematical operations fundamental to scientific research. As the universities did not provide instruction in higher mathematics, Oughtred had long tutored students, including Henshaw, gratis at his rectory in Albury just outside Oxford.[13]

Henshaw met his future patron and collaborator, Sir Robert Paston (1631–1683), the son of the antiquary Sir William Paston, about this same time. Paston was educated at Westminster School and Trinity College, Cambridge (1646). After service in the Civil War, he too took refuge in France. He was knighted in 1660 and succeeded his father as baronet in 1663. For having devoted his fortune and energies to the King's cause, especially during the second Dutch war, he gained the affection of Charles II and a place at court as a gentleman of the privy chamber. Eventually he was elevated to the peerage as Baron Paston of Norfolk and Viscount Yarmouth (1673).[14] Paston was already at work with Henshaw on various research projects by 1656, as was Paston's brother-in-law, Sir John Clayton of Parson's Green (*ca.* 1630–*ca.* 1710).[15] Descended from a prominent family in the law, Clayton matriculated at King's College, Cambridge, in 1648, was admitted to the Inner Temple in 1649 (becoming a barrister in 1656) and made a Fellow of the Royal Society in 1661. Like Paston, who married Clayton's sister Rebecca about 1651, Clayton was knighted in 1664 and made a gentleman of the privy chamber under William III.[16] Aside from their interests in alchemy, Paston and Clayton also jointly undertook the construction of lighthouses and channel buoys along the coast.

From their surviving correspondence, it is clear that Henshaw acted as Paston's mentor or adviser in matters of science.[17] The earliest letter, dated 5 November 1663, is typical: Henshaw explained the alchemical procedures in a newly acquired manuscript poem by Edward Noell, which he had transcribed for Paston. Judging from Henshaw's speculations on the causes of their problems, they were clearly at work in the laboratory:

> I suppose the reason why wee missed both y^{e} sulphur & fixed salt was that excessiue Ghehennall fire at the D$^{rs.}$ for uppon my fayth [when] I wrote [i.e., wrought] it in my furnace at home I had always some fixed salt and haue had it by mee 4 [ounces] of it at a time, and it was a sandy gritty salt iust as the authour describes it. y^{u} need not bee curious of great quantities of it for hee says com[mon] [mercury] it will multiply in infinitum, and that there is a sulphur in it I [all] the more confirmed since Jacke Clayton told mee last night at the Colledge that our D^{r} tells him that bye grinding Sall Armoniacke wth the Cap[ut] mort[uum] of y^{e} subiect hee can sublime a sulphure as red as rubies.[18]

The 'Colledge' where the experiments were discussed was the Royal Society, which did in fact meet on 4 November 1663. Henshaw, as noted above, was a Founding

Fellow; Clayton and Paston were both admitted as Fellows in 1661.[19] In addition to their common chemical interests, Henshaw kept Paston informed about foreign news and court gossip. His social position not withstanding, Henshaw was respectful but frank in his dealings with Paston. Though he usually addressed him as 'Deare Patrone', Henshaw had a sufficient income of his own and moved easily within the highest social circles. Inequalities in social rank were counterbalanced by Henshaw's status as an intellectual, which far exceeded that of Paston, the gentleman *amateur*. Nevertheless, association was attractive for Henshaw because of Paston's vast resources: he maintained a fully equipped laboratory and a full-time operator or assistant.[20] Henshaw must have viewed this collaboration as a rare opportunity for success in the great work.

A rift between these research associates did, however, develop, brought on by Paston's frustrations over his failure to produce the so-called 'red elixir'. We know that on 6 June 1668 Henshaw made available a secret recipe given to him by his own mentor, the mathematician Oughtred, who had once boasted to Evelyn, 'not above a yeare before he dyed, that if he were but five yeares (or three yeares) younger, he doubted not to find out the Philosopher's stone'.[21] Paston himself had copied this valuable treatise into a manuscript notebook, now designated British Library Manuscript, Sloane 2222, which he had acquired following the death (in 1655) of its former owner, Theodore Turquet de Mayerne. The bulk of this folio volume (fols. 2–127^{r}) contains one of Mayerne's fully indexed Latin notebooks, entitled *Αμφημεριναι ακροασεις. Sive, Miscellanea ex variâ auditione, visione, & diversorum Experimentis, hinc inde—Collecta & annotata in Gallia, præsertim Lutetiæ Annis [Christi] 1605, 1606, 1607, 1608, 1909, 1610, 1611 per The. Mayerne.*[22] Following Mayerne's notes is *A Diarie and Practike giuen by M^{r} Oughtred to M^{r} Thomas Henshaw from whose manuscript I coppied itt. June y^{e} 6: 1668* (fols. 136^{v}–41^{v}). The first five leaves, the *Practike*, offer a detailed recipe for the red elixir; the next six leaves report a specific (though not successful) operation to produce it in the laboratory, complete with the days of the month (without the year), the days of the week, and sometimes the astrological moment. It is unclear who performed the experiment recorded in the *Diarie*. As the day of the week was given along with the date, we can speculate on when the experiment could have taken place. During the period of Henshaw's association with Oughtred, the first recorded date, 12 August, fell on a Saturday in the years 1637, 1643, 1648 and 1654.[23] The most attractive possibilities are 1637, when Henshaw may very well have been under Oughtred's tutelage at Albury (being then in the middle of his years at Oxford); 1648, when he was abroad; and 1654, when the Chymical Club was still flourishing in Kensington. (In 1643 Henshaw was embroiled in politics; Oughtred could have tried the procedure alone in either of these years, as he could have in 1609, 1615, 1620 or 1626; or Henshaw could have worked alone in 1665.) The ambiguity in the title, *A Diarie and Practike giuen by M^{r} Oughtred to M^{r} Thomas Henshaw from whose manuscript I coppied itt*, leaves the question open. It seems clear, however, that Paston had nothing to do with the original experiment and that 6 June 1668 was simply the date he copied the manuscript. (Paston similarly dated and reproduced the first person

narration of the other alchemical treatise he copied into Mayerne's old notebooks, 'Manna', which had been taken from the notebooks of Sir Hugh Platt who died in 1611.[24])

Sloane 2222 records an alchemical operation for producing the red elixir from the prime ingredient for the great work, sophic mercury, which was considered the mother of all metals. Whenever a solid metal (even ordinary quicksilver) was melted, it revealed the fundamental liquidity or volatility common to all metals. Alchemists—indeed most natural philosophers—believed that metals were propagated from 'seeds' and nurtured in an aliment in the earth just as a human foetus grew. What distinguished one metal from another was its degree of maturity or perfection. Alchemists sought to replicate in an alembic what nature accomplished gradually through the sophic mercury generated naturally within the bowels of the earth. The various stages of the great work were detected through colour changes, from black, to white, citrine, and finally red.[25] It is worth noting that neither Henshaw nor his early partner Vaughan, had much interest in vulgar alchemy. Vaughan stated emphatically that since it was commonly only a '*torture* of *Metalls*, I did never believe; much less did I study it'. 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*'.[26] What such chemists sought was the universal dissolvent or alkahest that would yield the prime ingredient for the work and thus the secrets of nature. Such an alkahest, we recall, Henshaw boasted of possessing in 1650.

Oughtred's formula required a matrix of sophic mercury or 'spiritt' into which a fixed 'bodie' was incorporated—perhaps a 'sublimate' of mercury with lead acetate—to generate '41 [ounces] of o^{r} red Elixer w^{ch} thou mayst multiply to thy lives end'.[27] It was, therefore, of considerable value, and its secrets had been kept from Paston for a number of years. The procedure itself was fully described in a numbered sequence that included the quantities of materials and type of apparatus needed, the grade of heat to be applied at each stage of the operation, and the colour changes to be noted. Its refusal to identify the two chief ingredients, referred to only as 'our Spiritt' or 'our pure bodie', makes evident the manuscript's affiliation with the secret tradition of alchemy. Otherwise, this experiment was as carefully controlled and as scientifically rigorous as most others in its time, e.g. those of Isaac Newton.[28] The text of this manuscript is included below as an appendix.

Paston may very well have begun his attempt to produce the red elixir soon after acquiring the manuscript in June 1668; a flurry of Henshaw's letters to Paston from 1669 and 1670 survive (nearly a score), which enable us to sketch the history of their collaboration. The earliest letters advising Paston about his efforts—those of 25 March 1669, 5 May 1669, 19 June 1669, 31 July 1669, 21 August 1669 and 28 August 1669, and those of 16 July 1670 and 13 October 1670—were quite hopeful, at times extremely so. For example, Henshaw wrote:

> I doe hope these revelations may be y^{e} vantcurriers of some extraordinary fortune will betide y^{u}.[29]

> I thanke y^{u} for y^{e} accounts y^{u} giue me of y^{r} late Experiments in w^{ch} y^{u} have taken a great deale of care and pains, and though things doe not succeed yet according to Expectation I hope wee cannot long misse on so good a Subiect.[30]
>
> I am very well pleased that y^{u} find such incouragements by y^{r} practice, that you hope well of our sujects and processes.[31]
>
> While I was in Worcester shire I receiued a second letter from y^{u}, giuen 7^{br} y^{e} 14, wherin I receiued y^{e} pleasant news of y^{r} hauing accomplished our long looked for Sublimate.[32]

These letters are filled with advice about chemicals, equipment, techniques and authors to consult for help. Henshaw also recommended that Paston maintain 'a paper booke to set down what trialls y^{u} make in y^{r} Ergasterrium, adding y^{e} dayes and months of y^{e} yeare, w^{ch} will be very usefull & delightfull to y^{u} in y^{e} review, for memorie is fraile and subject to mistakes'.[33] This advice accords well with the practice followed by the 'diarist' of Sloane 2222.

From these letters we can also learn something about the unnamed chemicals used to try to produce the red elixir. Henshaw was without question a devotee of Michael Sendivogius, who was frequently cited as an authority in the Paston correspondence. As the process in Sloane 2222 bears a striking resemblance to Nicolas Flamel's *Exposition of the Hieroglyphicall Figures* (1612), the direction of Henshaw's thinking is clear. Both Flamel and Sendivogius held that the great work began by uniting the fixed with the volatile principles (i.e. sophic sulphur with sophic mercury), though the latter emphasized the role of the 'centric salt' within the earth (sal nitrum) in nurturing the 'seeds' of metals.[34] Many chemical philosophers, such as Joseph Duchesne, Robert Fludd, Johann Glauber and Nicolas Le Fèvre, believed the life force or *spiritus mundi* was an aerial saltpeter within the grosser air that turned into arterial blood. Charles II's royal chemist Le Fèvre, for example, considered saltpeter to be the universal salt, which in itself possessed the soul of the world.[35] Henshaw, we know, signed at least one letter to Paston as 'Halophilus', i.e. 'salt lover', and was very interested in such research.[36]

About a year after the manuscript was copied, Henshaw made his first clear references to this important experiment:

> When y^{u} haue the happinesse to see y^{r} Sendivogius, y^{u} will easily find by my annotations and references to y^{e} parallel places that wee haue been hitherto under a great mistake, not distinguishing between his Magnet and his Aqua Pontica, w^{ch} is drawn out of his Mare Nostrum, that is y^{e} great expansion of Ayre and Ether w^{ch} is y^{e} Sea of y^{e} Sol Cælestis, by vertue of his Chalybs of Magnesia; what y^{e} meaning of his Chalybs w^{ch} is beyond all others, that is found in ventre Aristis will be very plainly discoured to y^{u} by y^{e} reference to y^{e} 16^{t} page. I doe not much wonder y^{u} find Adrop or Peter so hard to run p[er] deliquint after a strong fire giuen them ... Any salt that will draw Ayre I suppose is well enough, but y^{u} did not take y^{e} right course wth Adrop, for if y^{u} had only drawn of[f] y^{e} water he had attracted, and not forced him to an Aqua forti, he would haue been Attractiue againe, w^{ch} is worth y^{r} trying.[37]

Sendivogius referred to 'aqua pontica' as if it were sophic mercury, but perhaps not in a finished state as its salty nature may indicate ('pontic' meant briny); from this water metals were extracted by 'magnets' or attractive forces. 'Adrop' referred to the

matter out of which the sophic mercury was to be extracted. This letter shows that the two were searching for a salt to act as a basis from which to produce such a magnet. Later remarks to Paston make it clear that the salt in question was a white crystalline compound known as Salt of Saturn or lead acetate ($Pb[C_2H_3O_2]_2 \cdot 3H_2O$):

> y^r fixed Salt though but [ounces] in quantitie, I like very well y^e quality of, though y^r first indeauour must bee to get greater quantities of all y^e Principles. my fixed salt of Saturne that I made 20 years since, was very gritty and earthy but not so quite deprived of his saline ponticity as y^{rs} seems to bee, but y^e reason was it had neuer been so well calcined as y^{rs} has. and will no doubt wth out any further purification bee a very good basis to fixe all sort of spirits on whether Armoniack or Acid.[38]

Though sometimes called 'sugar of lead' because of its taste, lead acetate was classed as a fixed 'salt' or extract of lead. As Henshaw later explained, he hoped the salt would serve as the basis or 'bones' for the conjunction: 'y^e Salt of Adrop may supply y^e place of y^e red lions bones if they should bee deficient either in quantitie or purity'.[39] We also know they later experimented on other kinds of 'salt' to make the 'magnet', including saltpeter (KNO_3) and *sal alkali* or potash (K_2CO_3).[40]

If the principle of volatility was supplied by 'sublimate', i.e. the sublimate of mercury or mercurous chloride (Hg_2Cl_2), as indicated in their letters,[41] then the experimental 'recipe' given in Sloane 2222 can be described in modern terms as follows. Three ounces of mercurous chloride ('spiritt') are combined with a like quantity of lead acetate ('bodie') and heated in an enclosed vessel for 40 days, then repeatedly distilled. This process would produce elemental mercury with lead chloride in acetic acid:

$$Pb(C_2H_3O_2)_2 \cdot 3H_2O + Hg_2Cl_2 \rightarrow Hg + PbCl_2 + CH_3COOH$$

As lead chloride occurs as insoluble white crystals, it could be taken for the white elixir, or 'white greasy Earth', mentioned in both the *Practike* and the *Diarie*. In the final stage of the process, we are instructed to use the white elixir already produced to 'make new milk to feed y^e Child'. *Lac virginis*, ordinarily, was basic carbonate of lead, but if the 'sublimed' form of lead carbonate ($PbSO_4$) were used, sulphur would be present in the solution that could combine with mercury to form red cinnabar (HgS). While this common ore of mercury was not the fabled elixir, it would impart traces of the necessary colour.

From their correspondence it is thus quite clear that Henshaw and Paston were privately pursuing a line of inquiry that originated in the alchemy of Paracelsus, Flamel and Sendivogius that did not involve the 'torture' of metals. At the same time, records show that Henshaw publicly pursued similar lines of inquiry at meetings of the Royal Society. On 18 May 1664, Henshaw offered 'Some Additional Experiments to be made on May Dew' to the Society, then meeting at Gresham College.[42] (He was still mulling over the prospect of recovering nitre from May-dew with Paston as late as 2 September 1671.) May dew was thought to contain wonderful properties because it, like aerial nitre, was endued with the spirit of life or *anima mundi*.

> When you have vapoured away your Dew for the obteining a Saltish Earth, as I proposed in my former paper, take [half a pound] of this Earth (if you can spare no more) and grinde it well with a pound of Bole on a marble, put all this into a large coated glass-retort, or else of Waldenburg earth, and in a naked fire beginning first with a gentle heat, drive it strongly for 6 houres; when it is cold, take off the receiver, which must have beene carefully luted to the Retort: and observe well, whether you have not received an Acide spirit, and an *oily substance* swimming on the top of it; Rectify Each of these apart, in a small retort, and then observe what mettals they will dissolve. The *fixed salt* may be taken out of the Caput mortuum remaining after the first distillation.[43]

He spoke likewise on the history and manufacture of saltpeter.[44]

About 2 years after Paston acquired the manuscript, tensions began to mount. As the experiment itself required 13 months, the timing seems about right. Their quarrel is worth examining because it illuminates key differences, not only between their personalities but also between the closed world of the alchemist and the more open culture of science then emerging. Their rupture seems to have involved mutual antagonisms. For his part, Henshaw was perturbed that Paston had betrayed a confidence by revealing certain secrets entrusted to him. On 16 July 1670, Henshaw wrote somewhat testily:

> I am not a little pleased, that y^{u} find y^{r} experiment of fixing y^{e} Spirit on y^{e} Salt of Adrop to succeed so constantly, and doubt not now but if y^{u} proceed as y^{u} determine Som great Magnate of Nature will shew it self to y^{u}; if y^{e} divine Nemesis doe not by som strange Accident withdraw it from y^{u} as a iust punishment for y^{r} revealing this great Arcanum to so many after y^{e} taking so solemne a sacrament of secrecy.[45]

The barb at the end, while softened by its rhetorical position in the sentence, none the less suggests the bone of contention between them. As nearly every letter referred to the experiments Paston had been conducting, we can reasonably assume Paston's violation of 'so solemne a sacrament of secrecy' entailed revealing the secrets Oughtred had first entrusted to him. While Henshaw was in many ways the typical Baconian who empirically tested all hypotheses, he none the less remained faithful to the esoteric tradition in alchemy in which adepts controlled access to secret knowledge. Paston's apparent betrayal of confidence caused him considerable distress. Though this inconsistency strikes modern readers as bizarre, Henshaw was untroubled by the secret vocabularies or *Decknamen* that dominated alchemical texts and practices. As he once explained to Paston, who was puzzled by a passage in an authoritative text, 'who knows but Sendiuog, myght safely enough conceale his meaning in a litteral sence, where all y^{e} world expected an Enigmaticall'.[46]

Paston's own frustrations over his failure to produce the red elixir doubtlessly contributed to the rift as well. Judging from Henshaw's prickly response, we can deduce that Paston had maligned him openly in his letters. Henshaw's candid apologia reveals, furthermore, that the two men differed significantly in their motivation for science, for Paston was lambasted as a dilettante always building a 'castle in y^{e} ayre'.

> Deare S^{r} I hope y^{u} will doe me y^{e} iustice to remember that 20 years since or neare uppon (S^{r} J Clayton is my witnesse) I earnestly dehorted y^{u} both from entring on so hopeless a study ... That since y^{r} fate has cast y^{u} on this attempt not withstanding all y^{e} caution I gaue, (though

> y^{u} haue always pretended to haue made choyce of Chymistry only as y^{r} diuertisement for want of other recreations) I haue not only in obedience to y^{r} genrall commands but uppon y^{r} frequent and constant sollicitation, spent many howres (which else I should haue otherwise employed) in y^{e} reuew and considerations of those Authours, and faythfully acquainted y^{u} wth all y^{e} reall or seeming truths I could discouer in so obscure and winding a laberinth, y^{u} y^{r} self know this is all y^{u} could expect from my seruice and that I did neuer pretend to Reuelations, secret Demonstrations, or Recipes found in Abbey walls; If I had had ten Elixirs you had bin Master of them all long ere this time; therfore in iustice and equity y^{u} ought not to impute to me y^{e} ill successe of y^{r} triall nor y^{e} losse of y^{r} time and expence; I haue often exhorted y^{u} to desist but you could not liue wth out a castle in y^{e} Ayre. and at this time I should not only bee well pleased but exceeding glad y^{u} would abandon this sooty imployment unsuitable to y^{e} calling of a gentleman; y^{u} may wth much lesse change and anxiety spend y^{r} afternoons wth a Chesse bord or a pair of Tables. To tell y^{u} y^{e} same truth I haue often told y^{u} before, I haue no hopes from Chymistry but to obteine an Extraordinary Medicine w^{ch} will cure most diseases and maintain a vigorous health to y^{e} time appointed. this would gratify my greatest Ambition nor should I much doubt of compassing it, had I A laboratory, operator and Minera to my mind; but yowr ayms are so vast and generous that such a thing would giue y^{u} no more satisfaction, than a cure for y^{e} Itch or a gold horsebacke.[47]

Henshaw was not a little stung by Paston's suspicions about his withholding secrets from him, as evidenced by the claim that 'even If I had had ten Elixirs you had bin Master of them all long ere this time'. His disdain for 'Recipes found in Abbey walls' reminds us of the sharp practices of Chaucer's Canon or Jonson's Face and Subtle. Henshaw obviously held himself above this *demi-monde*, though his collaborators had been lured into its shadows. We know that Clayton once boasted to Paston that he had purchased secrets in Florence reputed to 'have been found in a book hidden in the bottom of a well, inclosed in soldered lead, and after that a marble cover'.[48] Paston's interest in alchemy may have been motivated by his desire to restore the family's fortunes, which had been badly depleted on behalf of royalist causes.[49] In light of credulity of Paston and Clayton, Henshaw appears far more sophisticated, even altruistic, in his commitment to dispassionate inquiry in 'so obscure and winding a laberinth'.

Even after this confrontation, Henshaw continued to advise Paston, with whom he must have enjoyed an easy familiarity, for in his next letter Henshaw playfully deflated Paston's soaring aspirations: 'Deare S^{r} I am sorry that after y^{u} haue lookt so high y^{u} should now fall in a Surreuerence [i.e. excrement], and that hauing soard to y^{t} pitch, y^{u} should at last light uppon pidgeon shite'.[50] In the letters that followed, they continued to discuss such topics as 'y^{e} Spirit of May dew', the universal spirit, ways of drawing saltpeter from the earth, and the 'Sendiuogius MS processe', in short, they continued their private research.[51]

As Steven Shapin has pointed out, the private house remained an important site for experimental work at this time, despite the Baconian methodology that required disciplined witnessing as the all important epistemological criterion of truth.[52] At the weekly meetings of the Royal Society, the Fellows were typically entertained with public re-enactments of successful experiments using instruments and materials transported from a private to a public site. Henshaw and Paston's collaborative pursuit

of the red elixir offers a glimpse inside Henshaw's private research activities with Paston and Clayton. Although both his private and his more public Royal Society papers were focused toward the same end, experiments on various salts and dissolvents, he clearly observed different codes regarding secrecy in each arena. So too does *A Diarie and Practike* stand Janus-like in this transitional age: with its telling omissions and use of *Decknamen*, it hearkens backwards to traditions of esoteric secrecy; with its precise procedures and controls, it looks forward to modern laboratory practice. Sloane 2222 and the Henshaw–Paston letters, therefore, illuminate the intellectual life of a respected Fellow of the Royal Society who was also a 'chemical alchemist'.

Appendix

British Library Manuscript, Sloane 2222, fols. 136^{v}-41^{v}.[53]

A Diarie and Practike giuen by
M^{r} Oughtred to M^{r}
Thomas Henshaw
from whose manuscript I coppied itt:
June the 6: 1668.

℞ 3 [ounces] of our Spiritt washed as itt should be till itt be cleane, & of a Cælestiall color, then straine itt then take $^{1}/_{4}$ [ounce] of our pure bodie unmixed with any thing, & simul amalgamentur & laventur usque dum ad puritatem pernoverint;

[℞] 3 [ounces] of our Spiritt washed & strayned & $^{1}/_{4}$ [ounce] of pure soule and wash them lickewise till they can be noe cleaner then putt alltogether into our ovall artificially closed (ut Philosophorum mores est) whose neck shall be soe long as will serve to open & nip 3 times more: which ovall shall be soe great that 3 parts be empty:

Putt itt into our threefold furnace in a compassing heat primi gradus, beeing soe easy that itt may be æquivalent to the naturall heat of the body; then lett itt stand 40 dayes or 6 weekes in which time our matter will have a superficiall blackness, our soule animating the Spiritt & the Spiritt peircing the body for dissolution. This don draw the fountaine soe drie with thy buckett that you leave butt i [ounce] in the ovall which proportion is one to one: nip itt artificially, and keep the animated Spiritt in calore simplici primi ignis nutritivi in an other glass nipped:

Then sett the other ovall (as itts sayd) closed in our threefold furnace for now doth our worke begin and beeing soe sett continew itt in the furnace keeping itt allwaies warme, cum igne primi gradus ad extirpationem primæ formæ: /fol. 136^{v}/

The tokens whereof is the growing and increasing of blackness, ad periodum usque, which will be don in 90 dayes or neere, and in 20 dayes after or thereabouts, he will putt of his mourning weedes and as right is, (exiling moysture) challenge to himself the second color of the world, the day appearing in the East all which must be don igne continuato.

Then increase thy heat usque ad secundum gradum usque ad congelationem &

dealbationem att which time take our waters, which till this time thou hast nourished igne primo, & quas per artificium nostrum hausisti ex terrâ which will be in all $5^{1}/_{2}$ [ounces] or 44 [drams] and thereof take 7 [drams] for thy semen imbibitionis in the first rotation, & there will be one [dram] for every imbibition, keeping the rest I meane 37 [drams] of our water, in igne primo nutritivo, & soe diet the thyrsty bodie, with this sayd proportion warme & then congeale him; & tunc iterum bibat, & congeletur & dealbetur; septies solis calore vel igne secundi gradus, adeo ut non comedat res ullas festinanter and thus having imbibed & congealed 7 times, there is one rotation ended; & the matter is 15 [drams]:

Then for the second rotation[.] To those 15: [drams] adde other 15 [drams] of our warme water, and itt maketh 30 [drams] having now spent just halfe the water and left onely 22 [drams] for thy imbibition for this second rotation, shutt thy Ovall philosophically /fol. 137^{r}/ and begin in the west, passe to the North, igne primo continuato; untill Eclipse be past, and soe dawning and growing white thou mayst then anon increase the fire till itt be as hott as in thy bare hand thou mayst endure itt; with which heate he will be white, then increase thy heat ad 3^{tium} gradum, the better to whiten & congeale him; then itt beeing cold take out 8 [drams] or one [ounce], for the making of new Sperme, and then thou leavest 22 [drams] in thy wombe; which 8 [drams] or 1 [ounce] thou shalt amalgam with 24 [drams] of our pure sp[irit]: as att the first streyned & washed, & then as before nourish cum igne primo nutritivo, that itt may be fitt water to imbibe our thyrsty bodie withall[.]

In the meane time, till you have made thy drink fitt thou mayest imbibe, the thyrsty body beeing 22 [drams] with the 22 [drams] of water remaining, having for every of the first 6 imbibitions 3 [drams] and for the 7^{th} 4 [drams]: which thou mayst boldly, because through his maniefold imbibing & dessication, he hath gotten a strong stomach, of better digestion, in imbibing listen to Rasis, saying quoties corpus imbibitur; toties desiccetur, and thus having shewed thy charitable devotion in imbibing the hungry and thirsty body untill thou hast att 7 draughts given him all thy drink; increase thy heat ad 3^{tium} gradum the better to congeale & fix itt up, and there is an end of the second rotation;

For the third Rotation:

Adde unto the 44 [drams] or $5^{1}/_{2}$ [ounces] other 5 & $^{1}/_{2}$ of our last made waters, which was in quantity 25 [drams] /fol. 137^{v}/ and our matter is then 11 [ounces] just, then having first philosophically shutt up thy vessell, nourish him as att the first cum igne nutritivo primo: taking thy journey by the west againe, & soe to the north by obscure Eclipsation igne primo semper continuato, untill the Rivers be dried att which time by little & little growing whitish he will by little & little strip himself to his shirt. Then increase thy heat till his chamber be as hotte as in thy bare hand thou mayst suffer to hold itt; and soe forward ad ignem 3^{ij} gradus which augmentation of heat will fix him well.

Then imbibe him 7 times with 11 [ounces] of our water and you shall have for every of the first 6 imbibitions $1^{1}/_{2}$ [ounces] and for the 7^{th} 2 [ounces] which draught he will easily drink, without glutting he is become soe strong. Imbibe allwaies with warme

water as Norton teacheth. All liquors should be refused which frost infecteth, and should not be used: the cause why as telleth authors old is because their activity is dulled with cold: allwaies congealing after every imbibition the better to provoke appetite; and att the last congealation, augment the heat ad periodum ignis tertij gradus, that thou mayst fix him perfectly; And then thou hast the white Elixer of the 3^{d} order fluxible as wax exceeding snow in whiteness; in weight 22 [ounces]: frigescat ac dividatur.

And Continew the other half I meane 11 [ounces] in our third fire in his Chamber Philosophically shutt till he be red; then augment the fire ad 4^{tum} gradum (if thou darest for feare of vitrification) the better to confirme color & fixation, for the more he is in the fire the better & perfecter will his /fol. 138^{r}/ tincture bee, therefore lett him rest a while butt vitrifie nott, Et frigescat vas gradatim; then take out our red Elixer red as bloud; which thou mayst multiply thus:

Take from these 11 [ounces]: 2$^{1}/_{2}$ [ounces] whereof keep 2 [ounces] for thy use in transmutation, att thy pleasure and with the half ounce make new milk to feed the Child.

Amalgum itt with 24 [ounces] of our Spiritt washed & streyned as att the first, and now resting itt 40 dayes or longer, till having added 8$^{1}/_{2}$ [ounces] which remained of our medicine to the 8$^{1}/_{2}$ [ounces] which remained of our water part of the 25 [ounces] made att the second Rotation thou hast in a fitt wombe Philosophically shutt turned the wheele from the west to the South; where hee must rest till that he bee att the period of Redness and fixation: The retrograde by degrees thy heat ad 3^{tium} gradum; and feed our Child beeing in weight 17 [ounces], seven times, with the 24 [ounces] of our milke provoking appetite after every draught; and thou shalt have for every of the 4 first 3 [ounces]: and for every of the 3 last draught 4 [ounces] and after thy last draught direct thy heat as before, ad 4^{tium} gradum or as much as thou canst for vitrification and lett our Child rest the better to confirm tincture & fixation.

There thou hast 4i [ounces] of our red Elixer which thou mayst multiply to thy lives end. Thank God for itt. /fol. 138^{v}/

The Diary

1 August the 12^{o}: [Saturday] I putt my matter into my Ovall beeing of a Cælestiall color, and soe continuing him in his chamber hermetically sealed and warmed with our first degree of heat: on August the 16 [Wednesday] it was swollen on higher about $^{1}/_{3}$ of an inch having a pellicula lick that which is about an Embrio, of a pale colour mixed a little with yellowe and red, licke the corona about the [moon] against west. within that membrana were 17 little Ampullæ simpering licke butter on a small fire, and the Membrane head had bright azure veines, here and there licke those of a bladder; this membrane seemed to enclose the matter round.

2 August the 29 the Ampullæ continued becomming of a Bright shining Saturnine color, and soe was the membrane & toward the circumference quite round[;] itt was of a subcitrine color and the whole matter seemed to swim in a little black water round about the membrane between itt and the Glass O[val].

3 September 8^{o} [Friday] the matter did magis in superficie nigrescere vel membrana circuente[;] the membrano on the one side did pucker licke a purse mouth: butt still with a shining blackness, swelling, simpering & bubling more & more, the Subcitrine color att ye circumference, growing now to Saturnine and seemed to make inwardly to his center or bottome of the matter.

4 Att 40 dayes and my matter swelling bubling & blustering, there appeared veines of marvailous diaphanity that might easily be seen in the dark. Att the making my Separation my water was /fol. 139^{r}/ much thinner then [mercury] common; and of as bright shining as the brightest fountaine, when the Sun Gloriously shineth upon itt, notwithstanding the thinness of my water itt did stick to my Glass bason, and there came upon his face heere and there an unctuous blackness, so that by his Unctuosity, his quickness & his sticking to my Glass O[val]; thinner & brighter beyond measure then that which is on a lookinglass O[val]. I am right sure he is animated, and hath subtiled the body and hath gotten som part thereof; butt before I seperated my matter, itt had an unctuous black superficies in the middle, and toward the circumference itt was a brownish black. and the water seemed verily to be of a pale Saturnine color butt beeing Seperated itt was most glorious bright, & shining mairvailously and the body & soule both spiritualized, which were after Seperation a white greasy Earth, with mairvelous diaphanity i [ounce] i [dram] which I putt into the Chamber Philosophically sealed up Septemb^{r} the 21:

5 October: 5to [Thursday] my white greasy Earth had bubled & swelled, soe that itt was nott terra cum superficies planâ, butt montibus vallibusque plena changing his white diaphane color into ~~blackish~~ grayish: nothing ascending butt working marvailously in himself, att which time I made my heat to bee of the middle of the first degree & soe continued; Saturne prædominating in nostro cælo:

6 Att October the 20 untill October the 23 my matter had more & more swollen beeing of a bright Saturnine color very spongious /fol. 139^{v}/ palish, sending a bright Chrystalline dew to the top of the glass O[val] which did guttatim descendere licke a bright thin swelling water;

7 December the 3^{d} I see two or three little round sparkling starrs licke the eyes of fishes, which sight I had seene many times 3 weekes before, butt still they turned to a blackish color deeper then Saturne, and amongst the rest of the Starrs there was one exceding bright licke an Orientall Pearle; my matter still bubling & swelling licke melted pitch; and increasing his blackness far deeper then Saturne's coat[;] note that all the bubling & swelling is imperceptible att the p[re]sent untill itt have stirred a good deale soe that though I could never perceive any motion in my matter yett I could easily perceive itt had mooved & altered

8 Jan i^{o} [Monday] my matter seemed to dessiccate and whiten; and from December the 20^{o} beeing the 90 day itt continued att itts period licke the Crowes bill: blew as lead, or as I may say black albedine quadam obfuscatâ till the sayd Januar i^{um}: soe that itt was apparent the waters began to drie and my matter whitened by little & little:

9Jan: 11^{o} [Wednesday] my matter shewed more & more drying plainely and white licke a faire Winters night with Starrs heere and there whereof one was as big as a good seed pearle, shining as bright as the Sun beames or polished silver, beeing whitish yellowish and azure and twincling with marvailous diaphanity noe moysture ascending as before, when itt sent up the Christillin dew, /fol. 140^{r}/

10 Jan the 24 [Wednesday] there appeared a Floud of water comming out of my matter side marvelous bright with a shining white Yellowishness bigger then a beane, and dried the next day att night soe drie as if itt never had beene moyst, and pale licke all the other earth, nor moysture att all ascending the licke was on Jan the 27 [Saturday] which appeared in the morning and continewed liquid all the day butt by little & little itt dryed and by [Monday] morning itt was a solid substance of a bright Citrin Color butt on [Wednesday] itt was dryed as dry as the other was, and of a gray color mixed with Azurine licke the other with many bright sparks heere & there in itt.

11 February: 7^{o} [Wednesday] there came forth a Floud of water greater than the former out of my matter which was marveylous bright in color licke the other butt att the sides itt was more citrine or inclined toward reddish: next day itt was much dryed beeing of a bright citrine color on [Friday] next it was more & more dryed on [Monday] itt was quite dryed;

Feb the 13 [Tuesday] there was another Floud bright & citrine & whitish & the next morning itt was dryed up

Feb the 26 [Sunday] there was another little Floud butt very thick, by reason of much dryness for itt would hardly shake, and in the middle of my matter was a red spark licke deep red bloud[;] next morne the floud was dry butt the red spark continewed with as deep a color as before butt more Splendent. /fol. 140^{v}/

Feb the 28 of [Tuesday] there came out a Floud thicker then before[;] itt was of the licke color with the other and att night itt was dryed. on [Wednesday] there came a thicker then that att which I tooke up my Glass and turned itt aside a little, soe that the River ran upon the Earth and was presently drunck up, the red spark which was seene still remaining.

March the 6 there was a little coagulate as big as a good Pearle in color of [gold] bright & shining.

March the 22 [Thursday] I tooke up my glass and turned itt and my matter appeared in a manner mettalline bright; shining betwixt gray & white and the Clouds have left rising & the rivers dryed up.

April the 21: [Friday] my matter was turned into a round Earth as big as a Nuttmeg & very white which had soe continewed a forthnight butt now itt beginns to chinke and gape by reason of his dryness

May the 2nd itt did more and more chink and growe rugged licke a great stone continewing his whiteness still;

May the 24 I tooke out my inward pott for adding heat; I altered my heat 2 hours before att which my matter was still nott without som clouds that were nott dryed up for lack of heat because for 20 dayes together I used the 1st degree of heat: /fol. 141r/

May the 25 I increased my heat more to my proposed purpose

May the 30 I increased my heat to the period of 3tius gradus and my matter fused licke wax

Junii the 14 itt was againe within the same degree coagulate very well[;] note that in fusion & his coagulation, he was fixed & white

August the 10 [Tuesday] I ground my matter and itt fell to a gray ~~powder~~ greasy Earth subtill & soft[;] this I did att this howre and then putt itt into the 1st degree of heat.

Laus Deo.

/fol. 141v/

Acknowledgements

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Notes

1 Joseph Agassi, 'Towards an historiography of science', *History and Theory* **2**, 1 (1963). See also his remarks on p. 16.

2 See, for example, K. Theodore Hoppen, 'The nature of the early Royal Society', *British Journal for the History of Science* **9**, 1–24, 243–273 (1976); or the recent essays in *Robert Boyle Reconsidered*, ed. Michael Hunter (Cambridge University Press, 1994).

3 The former term is that of Betty Jo Teeter Dobbs, *The Foundations of Newton's Alchemy: or 'The Hunting of the Greene Lyon'* (Cambridge University Press, 1975), pp. 83–87; the latter, Allen G. Debus, *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries*, 2 vols (New York: Science History Publications, 1977).

4 *Alumni Oxonienses: The Members of the University of Oxford, 1500-1714*, ed. Joseph Foster, 4 vols (Oxford, 1891–92), vol. I, p. 694. He matriculated at the Middle Temple on 21 April 1638, *Register of Admissions to the Honourable Society of the Middle Temple*, 3 vols (London, Middle Temple, 1949), vol. I, p. 135.

5 Letter, Henshaw to Anthony Wood, 21 June 1693, Bodleian Library MS, Ashmole Wood S.C. 25216, fol. 181; ed. by Stephen Pasmore, 'Thomas Henshaw, F.R.S. (1618–1700)', *Notes and Records of the Royal Society* **36**,177–180 (1982). In this letter to Wood, Henshaw stated that his brother, Major Nathaniel Henshaw, and a cousin named Thomas Henshaw were both soldiers; this cousin with the same name, who later served in the French army, was the cause of misinformation regarding Henshaw in the *DNB*.

6 In a letter to Sir John Clayton at Oxnead, 29 August 1671, Norfolk Record Office MS, Bradfer-Lawrence, 1c/1, Henshaw revealed that he had about £200 a year from his father.

7 Letter, [Henshaw] to Paston at Norwich, 6 January 1672, NRO Bradfer-Lawrence, 1c/1.

8 At the Restoration, Henshaw was appointed Under Secretary for the French Tongue (on 26 December 1661) and later was appointed envoy extraordinary to Denmark (1671). Some of Henshaw's diplomatic correspondence survives: that of 1672–76 to Sir Henry Coventry (BL MS, Add. 25,117), and that of 1682–83 to Sir Robert Southwell (BL MS, Add. 38015, fols. 278–285).

9 Elias Ashmole, ed., *The Way to Bliss* (London, 1658), Sig. A3^{v}.

10 Michael Hunter, *The Royal Society and Its Fellows 1660–1700: The Morphology of an Early Scientific Institution* (Chalfont St Giles: British Society for the History of Science, 1982), pp. 79, 162–163.

11 Samuel Hartlib, *Ephemerides* (1649), Sheffield University Library MS, Hartlib 28.1.37a. This entry was made some time in December, as the following one (on the visit of Dr Bates of Cambridge) was dated 15 December 1649.

12 Thomas Faulkner, *History and Antiquities of Kensington* (London, 1820), p. 176. The house appears quite clearly on the 1769 edition of the maps of John Rocque and on the 1770 Haynes Survey (in the Kensington Library). It stood north east of the present church of St Barnabas in Addison Road, probably on what is now Oakwood Court. Demolished in 1801, its remains were converted into a gardener's cottage. See *Survey of London*, vol. XXXVII, *Northern Kensington*, F.H.W. Sheppard, ed. (London: Athlone Press, 1973), p. 103; and Stephen Pasmore, 'Thomas Henshaw and the Manor of West Town, Kensington, in the Seventeenth Century', *Annual Report of the Kensington Society* (1964–65), pp. 30–35.

13 See also Donald R. Dickson, *The Tessera of Antilia: Secret Societies and Utopian Brotherhoods in Early Modern Europe* (forthcoming), chapter VI.

14 See *DNB*, **XV**, 450; John Venn and J.A. Venn, eds, *Alumni Cantabrigienses: Part I, from the Earliest Times to 1751*, 4 vols (Cambridge University Press, 1922–27), vol. III, p. 317. See also R.W. Ketton-Cremer, *Norfolk Portraits* (London: Faber and Faber, 1944), pp. 22–57. Paston first proved his mettle by moving the Vote of Supply before Parliament in November 1664 to fund the Dutch War.

15 In a letter to Paston at Oxnead, 5 August 1671, NRO MS, Bradfer-Lawrence, 1c/1, Henshaw reminded Paston that he had been offering advice '20 years since or neare uppon'. We know from a letter to Evelyn, 25 December 1656, British Library MS, Add. 948, fol. 61^{r}, that Henshaw was working on a project with Paston. In *The Diary of John Evelyn*, ed. E.S. de Beer, 6 vols (Oxford: Clarendon, 1955), vol. III, p. 186, Evelyn recorded that he dined with Paston, Henshaw, and Clayton on 30 December 1656.

16 See Venn, *op. cit.*, vol. I, p. 351; and Edmund Berkeley and Dorothy Smith Berkeley, *John Clayton: Pioneer of American Botany* (Chapel Hill: University of North Carolina Press, 1963), pp. 8–16. Clayton's grandson John was a noted botanist in Virginia.

17 Twenty letters from Henshaw to Sir Robert Paston survive, mostly from 1669–71. At the Norfolk Record Office in the Bradfer-Lawrence collection (1c/1) are letters dated: 5 November 1663, 11 June 1666, 19 June 1669, 21 August 1669, 16 July 1670, 13 October 1670, 10 February 1671, 13 May 1671, 5 August 1671, 12 August 1671, 19 August 1671, 2 September 1671, 9 September 1671, 16 December 1671, 6 January 1671/2, and 24 April 1676. There is also a single letter from Henshaw to Sir John Clayton, who was at the time visiting Paston at Oxnead, 29 August 1671. BL MS, Add. 36988 contains four letters from Henshaw to Robert Paston at Oxnead: 25 March 1669 (fols. 91^{r}–92^{v}), 5 May 1669 (fols. 93^{r}–94^{v}), 31 July 1669 (fol. 95^{r}), and 28 August 1669 (fol. 97^{r}).

18 Letter, Halophilus [Henshaw] to Paston at Oxnead, 5 November 1663, NRO MS, Bradfer-Lawrence, 1c/1. The words bracketed (except for the abbreviations for ounces and mercury)

are conjectural readings, as the letter was sewn into the volume without any guards and the text dives deeply into the centerfold.

19 Thomas Birch, *The History of the Royal Society of London*, 4 vols (London, 1756–57; reprinted New York and London: Johnson, 1968), vol. I, pp. 324–328. According to Hunter, *The Royal Society and Its Fellows*, pp. 176, 178, Clayton was admitted on 30 October 1661 and Paston on 18 December 1661.

20 In his letter to Paston at Oxnead, 16 July 1670, NRO Bradfer-Lawrence, 1c/1, Henshaw mentioned Richard Brickenden as an alchemist advising and working with Paston. Little is known of Brickenden other than that he once owned a beautiful alchemical manuscript in the British Library (Sloane 1687). Fol. 70^{v} bears his name and the date, 17 May 1680.

21 *Aubrey's Brief Lives*, ed. O.L. Dick (London: Martin Secker, 1949; Penguin, 1972), p. 291.

22 Mayerne (1573–1655), French born physician and Baron of Aubonne, studied at Heidelberg and Montpelier (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, Charles I, Charles II. Biographical articles may be found in the *DNB*, **XXXVII**, 150–152, and the *Dictionary of Scientific Biography* **13**, 507–509. 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**, 417–438 (1993).

23 Using the tables of Ernest J. Fredregill, *One Thousand Years: A Julian/Gregorian Perpetual Calendar, A.D. 1100 to A.D. 2099* (New York: Exposition, 1970).

24 'Manna' (fols. 128^{r}–136^{r}), dated 19 May 1662 from Parson's Green (where Paston owned property and Clayton lived), is about producing red mercury. Another copy can be found among Platt's alchemical notebooks, BL MS, Sloane 2194, fols. 77^{v}–84^{v}.

25 For an excellent summary of the theory behind the alchemical tradition, see William R. Newman, *Gehennical Fire: The Lives of George Starkey, An American Alchemist in the Scientific Revolution* (Cambridge: Harvard University Press, 1994), pp. 92–114. On the colour changes see, John Read, *Prelude to Chemistry: An Outline of Alchemy, Its Literature and Relationships*, 2nd edn (Cambridge: Massachusetts Institute of Technology Press, 1966), pp. 145–148.

26 *Euphrates* in *The Works of Thomas Vaughan*, ed. Alan Rudrum (Oxford: Clarendon Press, 1984), p. 513.

27 BL MS, Sloane 2222, fol. 138^{v}. Producing the red 'stone' from the white was the goal of Ripley's *The Compound of Alchymy*. Likewise in the *Sceptical Chymist* (1661), Boyle discussed a red elixir that would turn lead to perfect gold. See *The Works of the Honourable Robert Boyle*, Thomas Birch, ed., 6 vols. (London, 1772), vol. I, p. 508: 'if instead of gold a tantillum of the red elixir be mingled with a saturn, their union will be so indissoluble in the perfect gold, that will be produced by it, that there is no known, nor perhaps no possible way of separating the diffused elixir from the fixed lead, but they both constitute a most permanent body'.

28 See Dobbs, *The Janus Faces of Genius: The Role of Alchemy in Newton's Thought* (Cambridge University Press, 1991).

29 Letter, Henshaw to Paston at Oxnead, 25 March 1669, from Kensington, BL MS, Add. 36988, fol. 91^{r}–92^{v}.

30 Letter, Henshaw to Paston, 5 May 1669, from Kensington, BL MS, Add. 36988, fol. 94^{r}.

31 Letter, Henshaw to Paston, 28 August 1669, BL MS, Add. 36988, fol. 97^{r}.

32 Letter, [Henshaw] to Paston at Oxnead, 13 October 1670, NRO Bradfer-Lawrence, 1c/1.

33 Letter, [Henshaw] to Paston at Oxnead, 19 June 1669, NRO Bradfer-Lawrence, 1c/1.

34 Vaughan, *Euphrates*, in *Works*, pp. 538–539, explained: '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*'. For an account of Sendivogius, see Zbigniew Szydło, *Water Which Does Not Wet Hands: The Alchemy of Michael Sendivogius* (Warsaw: Polish Academy of Sciences, 1994), pp. 67–125.

35 Debus, I, 109; II, 495.

36 Letter, Halophilus to Paston at Oxnead, 5 November 1663, NRO Bradfer-Lawrence, 1c/1.

37 Letter, Henshaw to Paston at Oxnead, 25 March 1669, BL MS, Add. 36988, fol. 91^{r}. In the 1650 edition of Sendivogius's *A New Light of Alchymie*, trans. John French, the reference is on p. 44.

38 Letter, [Henshaw] to Paston at Oxnead, 19 June 1669, NRO Bradfer-Lawrence, 1c/1.

39 Letter, [Henshaw] to Paston at Oxnead, 21 August 1669, NRO Bradfer-Lawrence, 1c/1.

40 See the 2 September 1671 and 6 January 1672 letters to Paston at Norwich, NRO Bradfer-Lawrence, 1c/1.

41 Letter, [Henshaw] to Paston at Oxnead, 13 October 1670, NRO Bradfer-Lawrence, 1c/1.

42 For an account of these experiments, see Alan B.H. Taylor, 'An episode with May-dew', *History of Science* **32**, 163–184 (1994). Henshaw 'putrefied" or heated the May-dew to try to extract nitre from it.

43 BL MS, Add. 4440, fol. 282$^{r\text{-}v}$. This manuscript is vol. IX of the *Royal Society Papers*, edited during Thomas Birch's tenure as secretary (1752–65). Henshaw's nine experiments are also in BL MS, Sloane 686, fols. 72^{v}–73^{v}. For a brief account of Henshaw's contributions to the Royal Society, see Hoppen, *op. cit.*, pp. 244–247.

44 See BL 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 M^{r}. Henshaw' (fols. 43^{v}–48^{r}); 'The Manner of making Salt Peeter' (fols. 48^{v}–51^{r}); 'To Refine Saltpeeter' (fols. 51^{v}–53^{r}); 'The History of making Gunpowder' (fols. 53^{v}–57^{r}). We know that Vaughan similarly experimented on saltpeter. In June 1651 the alchemist William Backhouse (1593–1662) remarked to Ashmole, 'Some have wrought much upon Sutt / Vaughan upon the spirit of saltpetre / and of late he added May-dew to it'; see *Elias Ashmole (1617–1692): His Autobiographical and Historical Notes, His Correspondence, and Other Contemporary Sources Relating to his Work*, ed. C. H. Josten, 5 vols. (Oxford: Clarendon Press, 1966), vol. II, p. 575.

45 Letter, [Henshaw] to Paston at Oxnead, 16 July 1670, NRO Bradfer-Lawrence, 1c/1.

46 Letter, [Henshaw] to Paston at Norwich, 9 September 1671, NRO Bradfer-Lawrence, 1c/1. Henshaw likewise counseled 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 [Henshaw] to Paston at Oxnead, 5 August 1671, NRO Bradfer-Lawrence, 1c/1.

48 Letter, John Clayton to Sir Robert Paston, 8 April 1663, in *Report of the Royal Commission on Historical Manuscripts*, ed. Arthur Horwood (London, 1877), p. 363; quoted in Berkeley and Berkeley, *op. cit.*, p. 11.

49 Ketton-Cremer, *op. cit.*, p. 27.

50 Letter, [Henshaw] to Paston at Norwich, 12 August 1671, NRO Bradfer-Lawrence, 1c/1.

51 [Henshaw] to Paston at Norwich, 2 September 1671, NRO Bradfer-Lawrence, 1c/1. Henshaw's last letter to Paston was dated on 24 April 1676.

52 Steven Shapin, 'The house of experiment in seventeenth-century England', *Isis* **77,** 373–404 (1988).

53 I have followed the general guidelines proposed by Michael Hunter, 'How to edit a seventeenth-century manuscript: principles and practice', *The seventeenth-century* **10**, 277–310 (1995), for editing early manuscripts, predicted on the practice of seventeenth-century typesetters who routinely amended texts and eliminated vestiges of scribal culture.

Original spelling and punctuation have been retained, though the use of *i*,*j*,*u*,*v*, and long *s* have been regularized to conform to modern usage. I have silently expanded most superscripted abbreviations, such as y^{e} for *the* or w^{ch} for *which*, macrons for *n* or *m*, and enclitic-*que*. Technical, alchemical and astrological symbols transliterated in brackets. The pagination of the original is indicated within soliduses, e.g. /fol. 136^{v}/.