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'The deplorable frenzy': the slow legitimisation of chemical practice at Cambridge University

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On a mild autumnal evening in 1780, Cambridge's distinguished physician Robert Glynn rose from his chair in Somerset House to address the Royal Society. He announced that he wished to communicate a comical narrative concerning Cambridge's former professor of chemistry and the current Regius Professor of Divinity, Richard Watson. Dr Glynn reported how he had been enjoying a quiet evening reading in his rooms when a distraught messenger stormed in exclaiming, 'Dr. W[a]ts[o]n is absolutely ungovernable.' Immediately, Glynn speculated that his distemper could be attributed to 'chemical vertigo'. Upon arriving at Watson's college rooms, his 'auditories' were assaulted by 'tremendous growls'. Glynn soon came to realise that Watson had been immersed in chemical experiment and fiendishly penning 'two bulky volumes in quarto on chemistry'. His diagnosis was swift: Glynn supposed that Watson's 'kindly liking to the crucible' had resulted in 'a little too much of the phlogiston in his composition'. In response, Glynn's nurse declared, 'You perceive the natural easy transition from chemistry to divinity; you would almost think they were dependent on each other'. Glynn resolved upon an exorcism as the expedient remedy: 'Mr A[twood], almost the only *conjuror* in the Un-v-rs-ty', was summoned and in due course the malevolent spirits were coaxed from the body of the 'Philosophical Scriblerus'.[1]

This incident was recorded as *The Late Strange and Deplorable Frenzy of the Reverend Richard Watson*. No doubt this droll tale from the waggish Glynn amused the scholars, physicians and divines of the prestigious Royal Society. Yet this tale of Watson's 'distemper' is also representative of the problematic status of chemistry in Cambridge during the long-eighteenth century. Hitherto, because it has seemed self-evident that chemistry *is* one of the natural sciences,

The 1702 Chair of Chemistry at Cambridge: Transformation and Change, ed. Mary D. Archer and Christopher D. Haley. Published by Cambridge University Press.

Figure 1.1. The cultivation, preparation and philosophical discussion of medicinal plants and herbs was a major part of eighteenth-century chemistry at Cambridge. Professors and students alike would be extremely familiar with all the steps required to dose patients, as is depicted in this French 1676 vignette from Denis Dodart's *Mémoires pour servir à l'histoire des plantes*.

historians have generally treated the foundation of chemical professorships as an inevitable component of the progression of universities. Two explanandæ stem from this assumption: why enlightened scholars such as Isaac Newton 'dabbled' in alchemy, and why dons who opposed the study of chemistry were misguided or 'irrational'.[2] (Lethargy, indifference, antiquarianism, dullness and Anglicanism have all been used as explanations for the 'lack-lustre' careers of Cambridge chemists.[3]) Some recent studies have challenged these assumptions; yet most historians still fail to elucidate the deep tensions embedded within chemical discourse and the convoluted topography of its practice and pedagogy during the *siècle de lumières*.[4] As late as 1800, Cantabrigian dons were uncertain if the 'chemical revolution' added or subtracted from the discipline's credibility. Meanwhile, to other detractors, chemistry was not a philosophical discipline but a 'sooty' and 'dingy' craft. Before it could pass muster in Cambridge, chemistry needed to be tamed and sanitised.

This domestication of chemistry has a protracted and complex history (Figure 1.1). With their exploration of the experimental techniques, local audiences and the global network in which the eighteenth-century chemists of the varsity were linked, Simon Schaffer and Larry Stewart skilfully describe several elements of this triumphant domestication in Chapter 2. Nevertheless, it is vital also to show the persistence of chemistry's awkwardness and the intense social negotiations that helped make chemistry a discipline fit for the university undergraduate. These negotiations also illuminate larger cultural and intellectual issues. At the turn of the eighteenth century, for example, chemistry found many proponents in forums such as coffee-houses, metropolitan waterworks,

Gresham College and provincial breweries. This 'rise of public science' contrasted with Cambridge, where the proponents of chemistry struggled to show that it was an appropriate activity for gentleman-scholars and future divines. In the eighteenth century, 'chemistry' was undoubtedly many different things to different people in different locales, but to many Cambridge scholars it remained an 'art', at best a non-essential accessory for future physicians. Even amongst the university's chemical professors, the uncertainty whether their lecture material was a branch of natural philosophy or a discrete enterprise persisted throughout the century. Nor were philosophers certain whether theoretical work such as Robert Greene's anti-Newtonian contractive forces or William Whiston's fluid dynamics of Creation fell within the category of chemistry.[5]

Though eminent philosopher-dons (such as Richard Watson) could march into its domains, chemistry remained tainted. What Glynn's nurse inferred from Watson's activities – that chemistry and divinity had become dependent on each other – was a common fear in the Hanoverian university. In his book on enlightenment Cambridge, John Gascoigne concedes that 'geology and biology' were subjects 'subject to particular scrutiny' because of their bearing on biblical exegesis. Yet he pronounces that 'a subject like chemistry . . . had no relevance to such religious issues', and 'was not viewed with quite the concern'.[6] If this is true, then it is difficult to explain why, for example, Glynn wrote his parody or why Watson felt himself compelled to torch his chemical manuscripts upon receiving his bishopric.

Throughout the eighteenth century, Cambridge dons realised that chemistry could have tremendous resonance in politico-theology. Although the dons exploited other scientific disciplines to comment on the nation's political and religious practices, particularly what Sir David Brewster dubbed the 'Holy Alliance' between Newtonianism and low Anglicanism, the chemical professors, wary of the subject's volatility, made little effort to forge such marriages.[7] They understood that chemistry threatened the status quo at Oxbridge. The anxiety of late-seventeenth century sceptics – especially their fear that chemistry was secretive, occult and inflammatory – persisted through the entire century.

This chapter focuses on the tactics that the champions of chemistry – from John Francis Vigani onwards – deployed to win over sceptics, especially the arguments that they used to convince their peers that chemistry had transformed from a craft to a philosophical discipline. As such, they made chemistry more gentlemanly and therefore suitable for a prominent place in the university curriculum. To show how extended and problematic this process was, I consider the context in which the professorship was founded, delving into the career of the foundation professor, John Francis Vigani, in relation to the political interests of Richard Bentley. The second section recounts some of the professors'

minor triumphs of mid-century, as well as their enduring struggles to make the discipline a worthy subject for the varsity. In doing so I discuss the professors' departure from *materia medica*, their endeavours to import elements of Scottish 'philosophical chemistry' and their attempts to balance the discipline between a recondite activity and superficial entertainment. The final section examines the repercussions of the 'chemical revolution', as the professors tried to navigate through the minefield of French 'atheistic' nomenclature and nagging phlogistic vapours. Thanks to their sophisticated navigation, the new breed of chemical scholars were finally capable of purging the lingering doubts from even the most suspicious of dons, enabling chemical practice to flourish in Cambridge.

Diverting amusements

During the sixteenth and seventeenth centuries there was little reason why a scholar would come to Cambridge specifically to study chemistry. High Churchmen offered little encouragement to those who were interested in establishing a *laboratorium* within college cloisters. Nonetheless, the university was never an intellectual wasteland in terms of chemical investigations. Before the eighteenth century, undergraduate disputations often touched upon matter theory, usually in reference to Aristotelian forms, essences, affectations and qualities, as well as animal economies such as digestion and nourishment.[8] Such disputations could be very provocative. Richard Drake reminisced about his thesis on '*Pura Elementa non sunt Alimenta*' (Pure elements cannot provide sustenance), delivered in the Old Schools on Ash Wednesday, 1630: 'the speech . . . roused the hornets about my ears and so exited the anger of the Prochancellor, the Doctors, and I don't know whom else, that I was called to account before them.'[9]

Despite little support from college masters, late-Elizabethan Cambridge produced several scholars who practiced the chemical art. The exploits of John Dee are renowned; less celebrated is the work of gownsmen such as Samuel Norton, great-grandson of Thomas Norton, and Peterhouse's William Parys. Norton, for example, penned a *Key to Alchemie* and a treatise on mercurial preparations, while Parys published a *Booke of Secrets* which revealed 'diuers waies to make & prepare all sortes of Inke & Colours'.[10] William Harvey studied at Gonville and Caius College in the final decade of the sixteenth century, although the work for which he is remembered was completed in London and Oxford. While it is the 'Oxford physiologists' who are commemorated for their chemico-pneumatic researches, Cambridge's Regius Professor of Physic, Francis Glisson, also promoted a 'Harveian research tradition'.[11]

During the Interregnum and early years of the Restoration there is evidence that a 'Philosophical Club of Chymists', including Joseph Nidd, Isaac Barrow and John Beale, conducted chemical experiments.[12] Moreover, in their speculations about natural history and the Creation, John Ray and Tancred Robinson often investigated chemical subjects.[13]

Speculation about the Creation and the concealed processes of nature were regarded with suspicion by many Cambridge gownsmen. They fretted that such conjectures would evoke the nefarious contagion of the Civil War and Interregnum: Sectarianism. In general, this fear led them to agree with apologists for the Royal Society such as Thomas Sprat, who contended that the gentlemanly and semi-public space of Gresham College could alleviate the ravings of 'inspired' Britons.[14] However, while Robert Boyle assumed that Gresham College was a space that did not impinge upon theology, Henry More and the Cambridge neo-Platonists mobilised Boyle's experimental philosophy to comment on religious doctrines. Where Boyle claimed that his pneumatic engine produced value-free 'matters of fact' upon which everyone could agree, More and his Emmanuel College associates appropriated Boyle's pneumatic trials in order to comment upon the role of immaterial spirit and the existence of an hylarchic principle that governed the universe. Like Boyle, More was determined to evince that matter was 'brute and stupid' in order to demonstrate that an intelligent spirit 'umpired' inanimate and 'preposterous' matter. Yet, going further than Boyle, More reckoned that demonstrating the role of vital spirits must be the goal of a natural philosopher since this was a key 'antidote to atheism' and an efficacious remedy for sectarian distemper.[15]

Although Isaac Newton grumbled at 'the want of persons willing to try experiments', he undoubtedly inherited many of his (al)chemical interests from scholars such as More, Cudworth, Ray, Beale and Barrow. His own willingness to sully his hands in experiment and the protracted periods he sat in front of his furnace in Trinity College are well documented. As Newton's amanuensis remembered, 'y^{e} fire in y^{e} Elaboratory scarcely went out' during his indefatigable quest to regain the alchemical wisdom of the ancients.[16] It is from these experiments, and readings of Basil Valentine, George Ripley, Michael Maier and Sendivogius, that Newton came to envision the earth as a living entity: 'this Earth resembles a great animall or rather inanimate vegetable, draws in ætherial breath for its dayly refreshment & vitall ferment & transpires again wth grosse exhalations.'[17] For Newton, chemical analysis became crucial for comprehending the present state of the universe, man's place within the cosmos, as well as cosmogony and the millennium.

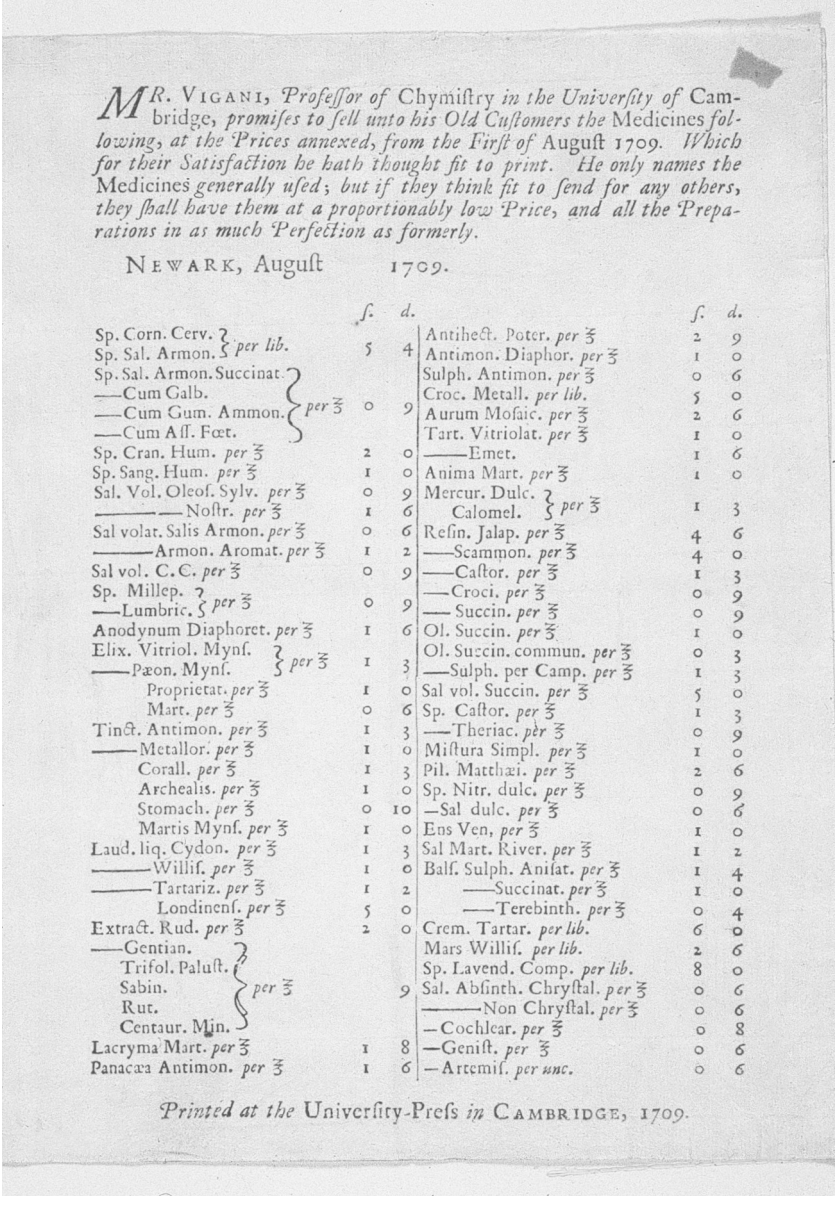
It remains uncertain to what extent John Francis Vigani acquiesced in Newton's conception of the earth as a breathing vegetable, but it has been

recorded that the 'Great Man' enjoyed conversations with the Veronese apothecary. Humphrey Newton reminisced that 'M^{r} Vigani, a Chymist', was a regular guest of Newton, 'in whose Company he took much Delight and Pleasure at an Evening'.[18] This 'pleasure' ceased abruptly after the unfortunate Vigani recounted 'a loose story about a Nun', but before the unforgiving Newton broke with Vigani he wrote to Boyle that the Italian had 'been performing a course of Chymistry to several of o^{r} University much to their satisfaction'.[19] Vigani's first course probably took place in 1682, in an outdoor laboratory located in the cloisters of Queens' College. Almost certainly, students paid Vigani directly for his services, as they did for medical consultations, for it was Vigani's career as *practising* apothecary that proved the most enduring feature of his presence in the university town. Indeed, as late as 1709 Vigani was still peddling his medical wares, as the flyer shown in Figure 1.2 indicates.[20] Soon after his arrival in Cambridge Vigani's medicines became indispensable for Cambridge's student body:

> *Meus viridis Mercurius præcipitatus brevi momento conficitur, & Gonorrhæm infallibiliter, & radicalitur curat; non intelligo illum, de quo alii Authores mentionem fecerunt, sed tantum de eo, quem tanquam maxinuum arcanum conservo.*[21]

In effect, Vigani's trade secret perpetuated Cambridge's secret trade. Vigani's green precipitate of mercury, which he claimed was an infallible cure for venereal disease, undoubtedly was deployed frequently in an environment plentiful with 'women of doubtful virtue'.[22] It is perhaps ironic that an apothecary who often saw students in a state of distressed undress would later don sumptuous professorial robes. It is likely also that it was their mutual interest in medicines upon which the Vigani–Newton friendship was founded. Notwithstanding Newton's seeming indifference to his own body, he slaved over medicinal preparations, including his Lucatello Balsam, used 'ffor y^{e} Measell Plague . . . & y^{e} biting of a mad dog'. Among other preparations, he worked hard to perfect a '*primum ens*' of Balm, a restorative agent that was, among other things, capable of starting menstruation in seventy-year-old women.[23]

Vigani's expertise in *materia medica* also interested both members of the university and local practitioners of medicine. In 1704 the President of Queens' College agreed to the purchase of a handsome oak cabinet for Vigani, equipped with over 600 ingredients, ranging from *Sanguis Draconis* to opium (Figure 2.4 in the following chapter).[24] Vigani, however, did not lecture exclusively on pharmacopoeia. The year before he was awarded his professorship (1702/3), Vigani's lectures covered an array of subjects. Course notes from one attendee record that Vigani concentrated on processes related to the furnace, particularly



MR. VIGANI, *Profeſſor of* Chymiſtry *in the Univerſity of* Cambridge, *promiſes to ſell unto his Old Cuſtomers the* Medicines *following, at the Prices annexed, from the Firſt of* Auguſt 1709. *Which for their Satisfaction he hath thought fit to print. He only names the* Medicines *generally uſed; but if they think fit to ſend for any others, they ſhall have them at a proportionably low Price, and all the Preparations in as much Perfection as formerly.*

NEWARK, Auguſt 1709.

	ſ.	d.		ſ.	d.
Sp. Corn. Cerv. Sp. Sal. Armon. *per lib.*	5	4	Antihect. Poter. *per* ℥	2	9
Sp. Sal. Armon. Succinat. —Cum Galb. —Cum Gum. Ammon. —Cum Aſſ. Fœt. *per* ℥	0	9	Antimon. Diaphor. *per* ℥	1	0
			Sulph. Antimon. *per* ℥	0	6
			Croc. Metall. *per lib.*	5	0
			Aurum Moſaic. *per* ℥	2	6
			Tart. Vitriolat. *per* ℥	1	0
Sp. Cran. Hum. *per* ℥	2	0	——Emet.	1	6
Sp. Sang. Hum. *per* ℥	1	0	Anima Mart. *per* ℥	1	0
Sal. Vol. Oleoſ. Sylv. *per* ℥	0	9	Mercur. Dulc. Calomel. *per* ℥	1	3
——Noſtr. *per* ℥	1	6			
Sal volat. Salis Armon. *per* ℥	0	6	Reſin. Jalap. *per* ℥	4	6
——Armon. Aromat. *per* ℥	1	2	—Scammon. *per* ℥	4	0
Sal vol. C. C. *per* ℥	0	9	—Caſtor. *per* ℥	1	3
Sp. Millep. —Lumbric. *per* ℥	0	9	—Croci. *per* ℥	0	9
			— Succin. *per* ℥	0	9
Anodynum Diaphoret. *per* ℥	1	6	Ol. Succin. *per* ℥	1	0
Elix. Vitriol. Mynſ. ——Pæon. Mynſ. *per* ℥	1	3	Ol. Succin. commun. *per* ℥	0	3
			—Sulph. per Camp. *per* ℥	1	3
Proprietat. *per* ℥	1	0	Sal vol. Succin. *per* ℥	5	0
Mart. *per* ℥	0	6	Sp. Caſtor. *per* ℥	1	3
Tinct. Antimon. *per* ℥	1	3	—Theriac. *per* ℥	0	9
——Metallor. *per* ℥	1	0	Miſtura Simpl. *per* ℥	1	0
Corall. *per* ℥	1	3	Pil. Matthæi. *per* ℥	2	6
Archealis. *per* ℥	1	0	Sp. Nitr. dulc. *per* ℥	0	9
Stomach. *per* ℥	0	10	—Sal dulc. *per* ℥	0	6
Martis Mynſ. *per* ℥	1	0	Ens Ven. *per* ℥	1	0
Laud. liq. Cydon. *per* ℥	1	3	Sal Mart. River. *per* ℥	1	2
——Willif. *per* ℥	1	0	Balſ. Sulph. Aniſat. *per* ℥	1	4
——Tartariz. *per* ℥	1	2	——Succinat. *per* ℥	1	0
Londinenſ. *per* ℥	5	0	——Terebinth. *per* ℥	0	4
Extract. Rud. *per* ℥	2	0	Crem. Tartar. *per lib.*	6	0
—Gentian. Trifol. Paluſt. Sabin. Rut. Centaur. Min. *per* ℥		9	Mars Willif. *per lib.*	2	6
			Sp. Lavend. Comp. *per lib.*	8	0
			Sal. Abſinth. Chryſtal. *per* ℥	0	6
			——Non Chryſtal. *per* ℥	0	6
			—Cochlear. *per* ℥	0	8
Lacryma Mart. *per* ℥	1	8	—Geniſt. *per* ℥	0	6
Panacea Antimon. *per* ℥	1	6	—Artemiſ. *per unc.*	0	6

Printed at the Univerſity-Preſs *in* CAMBRIDGE, 1709.

Figure 1.2. Flyer advertising Vigani's preparations, published by the University Press in 1709.

distillations, cohobations (repeated distillation with the distillate returned to the residue), fermentations and sublimations. In doing so he touched upon metallurgical processes, vegetable products and animal distillations. Besides providing his students with a variety of recipes for elixirs, Vigani used his great skill with the unmortared brick furnace to impart the prevailing continental view of chemical principles: 'The Chemical Principles are commonly reckoned Five, whereof three are called active principles viz. The Spirit of Mercury, Sulphur & Salt, the other two are called passive principles viz. The Phlegm or Water, & Earth.'[25]

These lectures echo Vigani's only monograph, his 1683 *Medulla Chymiæ*, and initially seem to evince that Vigani's focus was not theoretical philosophy but rather practical chemistry.'[26] If Vigani seemed to display 'little concern for underlying goings-on,'[27] his contemporaries nevertheless grasped the deeper import of his practice. Although Hermann Boerhaave dismissed *Medulla Chymiæ* as a 'confused medley of experiments,' influential members of the Royal Society imagined that Vigani's work complemented the over-arching millennial aims of the Society. Prefacing the *Medulla Chymiæ* was an epistolary letter, possibly written by Sir Tancred Robinson, secretary of the Royal Society, cohort of John Ray and Sir Hans Sloane, and, later, physician to George I.[28] In the Latin epistle, the author hitched Vigani's chemical work to the visionary, Edenic and corpuscular mission of Gresham College. Condemning 'cowardly, idle sheep', 'old superstitions' and the '*deleria Jesuitica*', he praised the 'worthy Italian' for deciphering the cryptic 'hieroglyphs' of the 'omnipotent Creator.' Like 'Adam in Paradise calmly surveying God's creatures,' Vigani 'followed living nature herself'.[29]

Despite little discussion of theoretical matters, Vigani's work seemed to conform to the aims of latitudinarian natural philosophers. Had his work been contradictory or even irrelevant to these aims, it is doubtful whether he would have found support from Newton or two famous Boyle lecturers, Richard Bentley and William Whiston. Whiston, perhaps the university's most active philosopher from the 1690s until his banishment in 1710, understood that the biblical exegete needed to be well-versed in the new chemistry. In his *New Theory of the Earth*, he devoted a number of sections to the equivalence of cometary atmospheres and the 'Ancient chaos' in order to salvage the Mosaic account of Creation. He argued also that 'the Constitution of the *Antediluvian* Air was Thin, Pure, Subtile and Homogeneous, without such gross Streams, Exhalations, Nitrosulphureous, or other Heterogeneous Mixtures, as occasion Coruscations, Meteors, Thunder, Lightning, with Contagious and pestilential Infections in our present Air; and have so many pernicious and fatal (tho' almost insensible) Effects in the World since the Deluge'.[30] William Stukeley, who like Whiston focused

much attention upon antiquarian subjects, offered a vivid description of the experimental regimen in the early 1700s university which evinces this desire to comprehend the state of postdiluvian animals and humans through chemical experiment:

> I went frequently a simpling, & began to steal dogs & dissect them & all sorts of animals that came our way. We saw too, many Philosophical Experiments in Pneumatic Hydrostatic Engines & Instruments performed at that time by Mr. Waller, after parson of Grantchester, where he dy'd last year beeing professor of chymistry, & the doctrine of Optics and Telescopes & Microscopes, & some Chymical Experiments, with Mr. Stephen Hales then Fellow of the College, now of the Royal Society. . . . We hunted after Butterflys, dissected frogs, usd to have sett meetings at our chambers, to confer about our studys, try Chymical experiments, cut up Dogs, Cats, & the like. I went to Chymical Lectures with Seignor Vigani at his Laboratory in Queens' College. . . . In my own Elaboratory I made large quantitys of sal volatile oleosum, Tintura Metallorum, Elixir Proprietatis, & such matters as would serve to put into our Drink. I usd to distribute it with a plentiful hand to my Tutors . . .[31]

Stukeley saw great value in the work of Hales, Waller and Vigani. Likewise, the formidable master of Trinity College, Richard Bentley, envisioned Vigani as an important ally. He assumed that the Italian apothecary would help him wrest the university from the grip of High Churchmen and aid in his bid to 'Newtonianise' Cambridge. It was in the midst of his fierce controversy with Tory Churchmen in 1702/3 that Bentley helped to secure the first professorship of chemistry for Vigani. The University Senate created the chair – albeit without emoluments or duties – in recognition of Vigani's two decades of 'laudable' service. Soon afterward, at the same time that he ordered the erection of an astronomical observatory for Roger Cotes, Bentley wooed Vigani to Trinity by converting a college shed to a chemical laboratory, described by Schaffer and Stewart in the following chapter.[32]

Shortly afterwards, other buildings in Cambridge were to be converted to laboratories. Following the appointment of John Waller (*c*. 1673–1718) as Vigani's successor to the chemistry chair in June 1713, the Senate announced that along with the Professor of Anatomy, Waller could arrange and make use of a new 'Publick Elaboratory' (Figures 1.3 and 1.4).[33] The wording of the Grace is revealing. While confirming that the Chair was conferring honour upon the institution it also implied that chemistry remained the handmaid to physick (*'Cum ad honorem academiæ et medicæ artis incrementum pertineat ut lections chemicæ in loco publico habeantur'*). Revealed also in the Grace is the fact that the Elaboratory was not to be purpose-built, but converted from an 'otherwise useless printing house.' To what extent these rooms, situated off

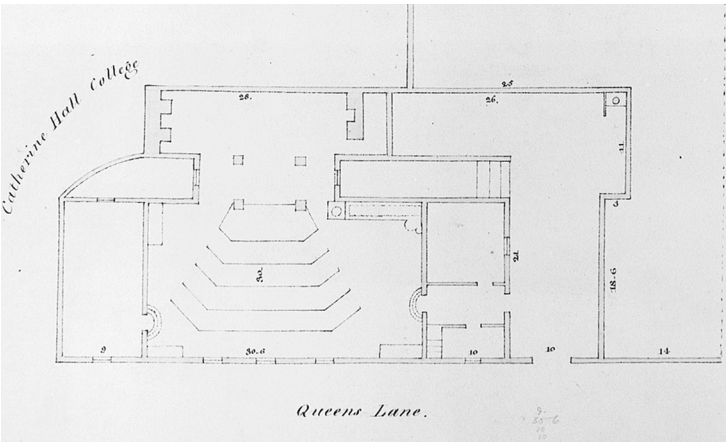


Figure 1.3. Plan of the 'Publick Elaboratory' in Queens' Lane.

Queens' Lane, were employed to promote the chemical arts is not well documented (there are no extant records of Waller's lectures), though the inventory (Figure 1.5) carried out after Waller's death in office in 1718 lists an abundance of chemical apparatus – such as furnaces, retorts and receivers – that would have been used for experiments and demonstrations. Importantly also, by acknowledging that the space was, in principle, public, the university was lending the discipline some new credibility within the town.

Yet, although the professorship and experimental spaces had been created, smuggling chemistry onto the curriculum proper as an examinable subject was no mean task, even with Bentley's fervent troop of Newtonians.[34] Bentley's detractors suggested that if Cambridge was to be a haven of right reason and safe politics, then any activity smelling of the furnace clearly had no place at the varsity. While Oxbridge humanists believed the new experimental philosophy threatened traditional learning, Sir William Temple, statesman, essayist, author of *Of Ancient and Modern Learning* (1690) and arch-enemy of Bentley, fired several volleys towards Trinity College. Temple, mastermind of the classicists' offensive on the new philosophers in the 'Battle of the Books', groused that he could not 'conceive well how [chymistry] can be brought into the number of the sciences'.[35] The danger to which Temple alluded was twofold: though he applauded the pragmatic endeavours of apothecaries and metallurgists, he argued that chemical practices should remain the domain of artisans. For Temple however, the real hazard lay in the 'wild visions' of occult alchemy in contrast to the 'diverting amusements' of artisans. Even Robert Boyle confessed that alchemy could jeopardise salvation: 'tis very dangerous to . . . procure the