

Early Science in New College I: Robert Plot on New College (1677)

New College is not usually mentioned in discussions of the sixteenth- and seventeenth-century scientific revolution, especially as that movement found its feet in mid-seventeenth century Oxford. And it is true that the college did not have as vibrant an internal experimental community as did Trinity or Wadham or perhaps Merton in the period; nor did it ever construct a laboratory and an anatomy theatre, as did Christ Church a little later on. Nevertheless, several New College fellows – unsurprising in a society of 70 statutory fellows – played major roles in early Oxford science, and some of these figures are still underappreciated. The first FRS of the college, to be sure, was utterly useless from a scientific point of view, even if appraised under the eclectic definition of the seventeenth-century ‘virtuoso’. This was the poet and miniaturist **Thomas Flatman** (1635-88), whose rather death-obsessed poetry is still read by the diligent, but whose ‘limning’ is now better appreciated; he was a fine miniaturist, and the college displays one of his pieces in the SCR. More significant in scientific terms was **Ralph Bohun** (1639-1716), tutor to the Evelyn family, and a man whose meteorological treatise on winds (1671), published in Oxford on his return to New College, got him into trouble with the Oxford authorities for being too enthusiastic about the recently founded Royal Society of London. The natural historian and theologian **Robert Sharrock** (1630-84) was closely associated with Robert Boyle in 1660s Oxford, and saw several of Boyle’s works through the Oxford press. He donated six Boyle imprints to the library in 1672, to which he also served as librarian in the Restoration. Sharrock was a significant scientific author in his own right, and his treatise on vegetables went through two editions, of which the college has recently purchased the second. A third figure of interest is **Walter Harris** (1647-1732), a convert to and then apostate from Catholicism, who became a prominent paediatrician and FRCP, publishing many chemical works, both originals and translations from the French, notably of Nicolas Lémery’s popular *Cours de chymie*. The most institutionally significant of the early New College scientists, however, was **William Musgrave** (1655-1721), a physician who vivisected dogs in Oxford, obtaining different results from the classic experiments of Richard Lower, and communicating these to the Royal Society of London in 1684. He also delivered the English speech on behalf of the college upon the visit of the Duke of York in 1683. Musgrave, the college’s second FRS, acted as secretary to the society in 1684, managing the society’s *Philosophical Transactions* in that period, and it is true to say therefore that the first and oldest of British scientific journals was therefore edited for a time from New College. Musgrave was also an FRCP, a founder of the 1680s Oxford Philosophical Society, and a prominent antiquary, publishing his later works on Roman Britain from Exeter, where he settled as a physician.

These men, and several significant others, shall find their *New College Note* in time. But for now it seems appropriate to commence a series of notes on early science in New College by looking at not the people but the college itself. I was struck by this way of thinking by a stray entry in the manuscript diaries of the physician John Ward, who recalled ‘botanising’ for ‘Ruta muraria’, a kind of wall-rue, on the top of New College walls around the years of the Restoration.¹ I then recalled that the first proper county history of Oxfordshire, Robert Plot’s *A Natural History of Oxford-Shire* (1677), also mentioned New College as a place of interest in its own right several times. Plot’s book was a classic of its time, and it won for him the keepership of the new Ashmolean Museum (1683), held jointly with the professorship in Chemistry, also the first such appointment. Plot’s book broke new

¹ Quoted in Robert G. Frank, Jr., *Harvey and the Oxford Physiologists* (Berkeley and Los Angeles, 1980), p. 49.

ground because he included within his remit many scientific matters, and correspondingly played down the interests traditional to that genre, especially matters genealogical and heraldic. What interested Plot were rather springs, earths, fossils, fauna and flora, and indeed Oxford men who had made an effort to understand their environment or who had otherwise contributed towards natural philosophy. In the course of his book he mentions New College several times, and his anecdotes prove surprisingly interesting. I excerpt them below, organised into three groups. The first concerns the fabric of the college itself, namely the echo in the cloisters caused by their design; the erosion visible in 1677 in the stone used to build the chapel; and the original engineering feat that is the Long Room cistern. The second group concerns natural and artificial rarities in the gardens: a spring, some intertwined trees, and the elegance of the garden design itself. Finally, I include two tangential mentions, one of Sharrock's own experiments with grafting plants, probably conducted in the Botanic Gardens but possibly in the college too; and secondly an unusual use of the college archives to speculate about the original name of the Oxfordshire town Adderbury, against John Ray's belief that the town was named for the adder-shaped fossils, that is to say ammonites, commonly found there.

1. Echoes:

'At *New College* in the Cloysters, there are others of this kind [of echoes], to be heard indeed on all sides, but best on the *South* and *West*, because on those there are no doors either to interrupt or wast the sound: These return a stamp or voice, seven, eight, or nine times, which so plainly is occasion'd by the *Peers* between the windows, that on the *West* and shorter side (being but 38 yards long) the returns are more quick and thicker by much than on the *South*, where the primary object being above fifty yards removed from the *corpus sonorum* ['sounding body'], and the secondary ones proportionably further; the returns are much slower and more distinct, in so much that on that side the *Echo* will return a *dissyllable*, whereas on the *West* side you can have but a *monosyllable* only. If it be objected, that according to the rule, 38 yards are not enough for the return of a *monosyllable*; I answer, that though it may be likely enough that the return of the primary object on that side is not heard, yet that there is none of the secondary ones, or *Peers* between the windows, but what are distant from the speaker above 40 yards, and therefore may well return a *monosyllable*. And if again it be objected, that the *interval* of an *Echo* must be *liberum* and *patens*, and it be further demanded how it comes about that we have such *Echo's* in Cloysters, when we can have none in wells that are cover'd with houses, because the *interval* is closed at both ends, as this Cloyster is: It must be answered, that that rule holds only in narrow *intervals* closed up on all sides, and not in such Cloysters that are open and arched to the top; Which may also be the reason why at *Magdalen College*, where the Cloysters are covered with a flat roof, they have but an inconsiderable *Echo*, and at *Corpus Christi* none at all; notwithstanding they have all other conditions requisite.' (p. 16)

Echoes in buildings were of considerable interest to the early experimentalists, as easily-measurable buildings provided a ready-made laboratory for the study of the properties of sound, particularly its speed. For instance, in 1661 the statesman and future FRS Robert Southwell wrote a letter to the Royal Society's secretary, Henry Oldenburg, detailing the experiments undertaken by the Duke of Tuscany, whose scientists had estimated that sound travelled one Tuscan mile in five seconds. Southwell then recorded various echoes he had encountered on his European travels, the most remarkable being that in a palace near Milan,

where he claimed to have heard 56 reiterations after firing a pistol for the purpose.² Oxonian anecdotes about echoes often preferred to measure an echo in terms of how many feet of Latin verse it could repeat back clearly to the speaker.

2. Building stone:

‘Beside the fire, it endures the weather, for of this mixed with another sort dug near *Whately*, on the *Worcester* road side, as it passes betwixt *Holton* and Sir *Timothy Tyrrells*, are all the oldest *Colleges* in *Oxford* built; as *Baliol*, *Merton*, *Exeter*, *Queens*, *Canterbury* (now part of *Ch. Ch.*) *College*, *Durham* (now *Trinity*) *College*, *New College*, *Lincoln*, *All Souls*, *Magdalen*, *Brasen-nose*, and the outermost Quadrangle of *St. John Bapt. Coll.* yet it endures not the *weather* so well as *Heddington*, by reason, I suppose, of a salt it has in it, which the weather in time plainly dissolves, as may be seen by the Pinnacles of *New College* Chappel, made of this stone, and thus melted away.’ (p. 76)

It is hard to tell from David Loggan’s celebrated engravings of the college in his *Oxonia Illustrata* (1675) whether he intends to represent this effect or not, but the decoration on the spires is distinctly more knobbly than in its modern form. Indeed the modern pinnacles are in sharp enough condition to suggest strongly that they were renovated or replaced in the eighteenth or nineteenth centuries, but we are not yet quite sure when.³

3. The ‘stupendious’ Long Room lavatory:

‘As for arched *roofs* of *stone*, that of the *Divinity School* is a fine piece of *Architecture*; and so is that of the stately *staircase* leading into *Christ-Church* great *hall*. The *Physick garden* gate is a curious piece of *rustick rock-work*; and the *Portch* at *St. Maries*, the *University Church*, is a well contrived thing. And were it not improper amongst these to mention a *structure* of so inferior a quality, as *New College* house of *Easement*, commonly called the *long-house*, I could not but note it as a stupendious piece of *building*, it being so large and deep, that it has never been emptied since the foundation of the *College*, which was above 300 years since, nor is it ever like to want it.’ (p. 269)

The Long Room latrines had long been celebrated: a little while before 1633, if a poem written by a fellow in that year into the back of a college book is to be believed, a colonnade had even been constructed for the Long Room latrines: ‘Porticus et lotio constructa est

² *Oldenburg Correspondence*, vol. 1, pp. 433-34; Southwell’s letter was subsequently printed in the *Philosophical Transactions*. The physician Walter Charleton presented a paper on echoes to the Royal Society in 1667; his own autograph transcript is Bodleian MS Smith 13, pp. 24-34. Further work on sound was carried out later in 1680s Oxford by Narcissus Marsh and Thomas Pigot, this time under the aegis of the new Philosophical Society, based in the new Ashmolean Museum.

³ The Archivist, Jennifer Thorp, explains things for us: ‘I have come across a typed copy of the Pinnacles Report made to Governing Body by Basil Champneys via the Holywell Buildings Committee, 12 October 1898 (NCA 3208, undated but probably the 1898 report). College, according to the Stated General Meeting minutes of 22 March 1899 and the extract from the SGM Reports Book (NCA 9651, p. 64) somewhat predictably decided to do very little about it, and NCA 3208 also includes some robustly worded letters from Champneys in 1900 and 1901 that the pinnacles ‘which have been recently renewed must all come down’ because their supporting shafts were rotting, and that ‘there is not one of the spirelets that does not show signs of considerable decay, the stone being soft’, but he hopes he might be able to re-use some of it. The same bundle contains his rough estimate for repairs to the pinnacles and 23 buttresses of the chapel, west end turret, 1900 (totalling £6063 15s).’

pulchra meanti / Quod subtus terram caeca caverna capit.’ – ‘A fair portico has been constructed for the urinator, which a dark cesspit underground receives.’⁴ The antiquary Thomas Baskerville, who toured Oxford in the early 1680s and wrote extensive notes on his visit, also recalled in his description of the college:

‘In this Colledge the house of office or Bog-house is a famous Pile of [a] building, The dung of it computed by old Jacob Bobart [the famous Oxford gardener; see 7 below], to be worth a great deal of money, who said this Compost when rotton was an excellent soil to fill deep holes to plant young Vines.’⁵

4. Springs:

‘To these I must add another sort of *waters*, which though in tast they resemble *milk*, must yet I believe be reduced to this Head, for I find, notwithstanding their eminent sweetness, they all refuse to lather with *soap*, and therefore conclude them to hold some *Acid*: Of these we have several within the City of *Oxford*, one at a Pump over-against the *Cross Inn*, another near the Mount in *New College* Garden, and a third at the Pump at *Buckley Hall*, now the dwelling house of one Mr. *Bowman* a Book-seller, and several other places.’ (p. 47)

I am not sure where exactly this mineral spring was located, but a good guess is where the defunct hand-pump stands in the gardens, indeed next to the mound, on the corner of the dividing wall with St Edmund Hall, just on the east side. Springs were one of Plot’s specialities. His early lectures before the new Philosophical Society in Oxford were on the origins of springs, and they were published in a Latin translation by Christopher Wase in Oxford in 1685 dedicated to Ashmole himself. As Plot notes in his book (*De origine fontium* (Oxford, 1685), p. 172), an earlier English study of the origins of springs had been published by ‘our most learned’ Thomas Lydiat, another fellow of New College, and celebrated elsewhere in Plot’s *Natural History* for his achievements in technical chronology (*Natural History*, pp. 222-24).

5. Intertwined trees:

‘Beside the *Elms* at St. *Johns* knit together at the *root*, there are two *Beeches* in the way from *Oxford* to *Reading*, near a place called *Cain-end*, more strangely joined together a great height from the ground: for the bodies of these *Trees* come from different roots, and ascend parallel to the top, but are joined together a little before they come to bough, by a transverse piece of timber entering at each end into the bodies of the *Trees*, and growing jointly with them, for which reason ’tis commonly called the *Gallow-tree*, though the piece that intercedes them lies somewhat obliquely: How this should come to pass many have wondered, but the problem I guess may be easily solved, only by allowing the transverse piece of Timber to be one of the boughs of the *Tree* to which its lowermost end still joins, which whilst young and tender, might bear so hard against the body of the neighboring *Tree*, that with the continual motion of the wind, it might not only fret it self asunder, but gall off the *bark* too of the other *Tree*; which closing up again in calm weather at the rising of the *sap*, might well include so near a neighbor, first within its *bark*, and after some time within the

⁴ Thomas Kechener, in the end-papers of BT 1.130.9.

⁵ Bodleian, MS Rawlinson D 810, fol. 21r, being the collections of Thomas Baskerville (1630/1-1700), son of Hannibal Baskerville the antiquary.

wood it self: which I have observed to have been done but very lately in *New College Gardens*, where the boughs of two different *Sycomores* are thus grown together, only by bearing hard on one another, and interchangably fretting away each others *bark*, and then closing up again at the rising of the *sap*.' (p. 170)

6. The art of the planter and gardener:

'As to the *Arts* relating to *Trees*, the chiefest are those of the *Planter* and *Gardener* making curious *Walks*, and *Topiary works* of them; such is the *Dial* cut in *Box* in *New College Garden*, the *Kings arms*, and the *College coat of arms* there, and at *Exeter College*; beside the other *Garden knots* of *Box* in both those *Colleges*, and in *Brasen-nose College Quadrangle*; to which add the *Guards* at the *Physick garden gate* of *Gigantick* stature, and several other *Topia* in the same *Garden*, all formed of the *Yew tree*.' (p. 261)

'And the *Dials* made upon a pile of *Books* on *New College Mount*, with *Time* on the top, exactly pointing out from what *Quarter* the wind blows, upon the 32 Points of the *Compass*, depicted on a *Cylinder of stone*, is an ingenious contrivance.' (pp. 269-70)

This is corroborated by Baskerville again: 'Some new building are now erecting on the Eastside of this College, and they have in their Garden 4 Curious knots of Box in severall quarters, in which are cut, the Kings Arms, ye College Arms, the Founders Arms & a Diall. There is also cast up in this garden, a fair mount & on the top on't to which you ascend by winding walks a diall resembling a bundle of Books.'⁶ Indeed, visitors routinely commented on the mound in particular, commenced in the sixteenth century, but only fully formed in the seventeenth. Travellers remarked upon it, and one, Georg Christoph Stirn, a German student on his Oxford tour in the late 1630s, provides us with the name by which the mound was also then known – 'Parnassus' ('darin in dem Garten ist der berg Parnassus').⁷ Later, in 1667, the Christ Church scholar Francis Vernon published on the Oxford press a Latin topographical poem on the sights of the university, *Oxonium poema*. It is again mainly the charms of New College's garden that caught his eye, especially what must have been a weather-cock once astride the ironwork partition:

Jamque adeò excelsas Wickhami invisere sedes
Mens jubet, & Muros, & non ignobile Templum,
Hortus ubi, & Mons est, tua jam levis AEole regna,
Qui positos postes aeterno turbine perflas,
Incertisque rotas Zephyris agitabile ferrum.⁸

New Colledge.
The Walls, The
Chappel. The
Garden and
Mount, Railes.
Aeolus for
weather-cock.

[And now are we minded to pay a visit to Wykeham's high seats, the walls, the celebrated chapel, and the garden, where there is a mound, your realms, light Aeolus, you who blow over the serried rails in a never-ending eddy, and turn the articulated iron with your unsettled winds.]

7. Experiments with grafting:

⁶ Bodleian, MS Rawlinson D 810, fol. 21r.

⁷ Bodleian, MS Adds. B 67, fol. 251r, for 15 July 1638.

⁸ Francis Vernon, *Oxonium poema* (Oxford, 1667), p. 17.

‘After the *Herbaceous Plants*, come we next to consider the *Shrubs* and *Subfrutices*, amongst which I met with one, perhaps I may say scarce heard of *curiosity*, though it have been an *Experiment* frequently performed many years since, not only by those excellent *Gardeners* and *Botanists*, the two *Bobarts*, Father and Son; but as I have heard also by the Reverend and Ingenious *Robert Sharrock* L L D, and Fellow of *New College*, who after many unsuccessful tryals of *grafting* one *Fruit* upon another, made at last a very pleasant *one*, and to good *advantage* too, upon different *Vines*, which in so great measure answer’d their hopes, that they have now signal proof in the *Physick Garden* of the *white Frontiniac* grafted upon the *Parsly Vine*, growing and bearing very well; and to this *advantage*, that they think the early ripening stock of the *Parsly Vine*, to conduce somewhat to the earlyer ripening of the *white Frontiniac*, naturally late.’ (pp. 260-1)

Sharrock wrote about his experiments with grafting at greatest length in the second edition, dedicated to Robert Boyle, of his *History of the Propagation and Improvement of Vegetables* (Oxford, 1672), pp. 113-42; and see pp. 58-63 for a general discussion on the possibility of the transmutation of species. At one point (p. 139) Sharrock cites trials by date from ‘my Diary’; it would be interesting to locate this diary of his experiments if it survives.

8. Use of the college archives to establish town names:

‘There are also Orphiomorphyt’s [i.e. ammonites] found sometimes about Adderbury, about two miles from Banbury, but so very seldom, that though I were there often, I could meet with none of them; so that I cannot inform the Reader whether they are of any peculiar kind, different from what have been already describ’d, or no: However, that the Town has not its name from these stones (as Mr. Ray thinks) I dare confidently avouch, Adderbury being only the vulgar name: for in the Court Rolls of New College, (and other Instruments) to which the Lordship of the Town belongs, it is written Eabberbury, perhaps from St. Ebba the tutelar Saint of the Church.’ (p. 110)

The college indeed holds early Court Rolls for Adderbury in the college archives, from 1386/7, with gaps in the earlier sequences.⁹

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⁹ Steer, *Archives of New College*, p. 347.