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**“A Thing Ridiculous”? Chemical Medicines  
and the Prolongation of Human Life  
in Seventeenth-Century England**

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## **‘A Thing Ridiculous’? Chemical Medicines and the Prolongation of Human Life in Seventeenth-Century England**

*David Boyd Haycock*

### **Abstract**

Sir Francis Bacon explored as a medical question the issue of how human life spans might be returned to the near-thousand years enjoyed by Adam and the Patriarchs. Extended old age seemed feasible: reports told of people living well into their centenary. Meanwhile, New World natives were said to live for several hundred years. The boundaries of old age in the seventeenth century were inconclusive, and the hope that life could be prolonged for decades beyond the allotted eighty years was a serious question. In 1633, one doctor observed that to “attaine to 100 is no wonder, having my selfe knowne some of both sexes”, but responding to the claims of Paracelsians asked, “is it not a thing ridiculous, now in these later times, to extend the life of man-kinde to 1000, 900, or at the least to 600 yeeres?” Comparing the reception of information extrapolated from Biblical sources, stories from distant lands, and the growing divide between philosophical and medico-scientific approaches, this paper looks at how “facts” about human longevity were received and employed by scholars and doctors during the course of the seventeenth century, and the emergence of a more “respectable” empirical chemistry from under the shade of alchemy.

In his masterly survey, *The Great Instauration: Science, Medicine and Reform 1626—1660*, Charles Webster explored the significance of the prolongation of human life to radical thinkers in seventeenth-century England, and how this formed a part of their ideas on the dominion of man over nature. The founding philosopher for many mid-century reformers and visionaries in England was, of course, Sir Francis Bacon. In *Historia Vita et Morbis* (1623, translated in 1638 as the *History Naturall and Experimentall, of Life and Death*), Bacon explored how human life spans might be returned to the near thousand years enjoyed by Adam

and the Patriarchs. There, he went so far as suggesting that “That which may bee repaired by Degrees, without a Totall waste of the first Stocke, is potentially eternall.”<sup>1</sup> This reflection supported his earlier (unpublished) proposal that the “true ends” of human knowledge and thus the whole purpose of his programme for the advancement of learning was, “to speak plainly and clearly ... a discovery of all operations and possibilities of operations from immortality (if it were possible) to the meanest mechanical practice.”<sup>2</sup> Indeed, Graham Rees has written that the “aim of prolonging life represented the aims of Bacon’s programme as a whole,” and that he “marked out the prolongation of life as the first and highest objective of the new philosophy.”<sup>3</sup>

Bacon was by no means the first to explore this medical question. In the second chapter of his late sixteenth-century best-seller, *Erreurs Populaires au Fait de la Médecine et Régime de Santé*, the French physician Laurent Joubert, Chancellor of the University of Montpellier, asked whether it was possible for medicine to considerably prolong the life of men, observing that such speculation “has always been intense and has excited the greatest minds.” Objectively reviewing both sides of the

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<sup>1</sup> *History Naturall and Experimentall, of Life and Death. Or of the Prolongation of Life*, translated from the Latin by W[illiam] R[awley] (London: printed by John Haviland for William Lee, and Humphrey Mosley, 1638), “The Preface,” unpaginated. Rawley (who had been Bacon’s last secretary) brought out his translation following an ‘unofficial’ version had appeared earlier in the same year under the title *The Historie of Life and Death*. The book was first published as *Historia vitae & mortis, sive, titulus secundus in Historiâ naturali & experimentalî ad condendam philosophiam: quae est Instaurationis magnae pars tertia* (London: printed by John Haviland for Matthew Lownes, 1623). See Charles Webster, *The Great Instauration: Science, Medicine and Reform, 1626—1660* (London: Gerald Duckworth & Co., 1975), esp. chapter 4, ‘The prolongation of life’.

<sup>2</sup> *The Works of Francis Bacon*, edited by James Spedding, Robert Ellis and Douglas Heath (London: Longmans and Co., 1876), Volume III, Part I, 222.

<sup>3</sup> Graham Rees (ed.), *The Oxford Francis Bacon, VI: Philosophical Studies, c. 1611—c. 1619* (Oxford: Clarendon Press, 1996), lxxv. See also Guido Giglioni, “The hidden life of matter: Techniques for prolonging life in the writings of Francis Bacon,” in Julie Robin Solomon and Catherine Gimelli Martin (eds), *Francis Bacon and the Refiguring of Early Modern Thought* (Ashgate, 2005), 129—44, and Gerald J. Gruman, “A history of ideas about the prolongation of life: The evolution of longevity hypotheses to 1800,” *Transactions of the American Philosophical Society* (1966) 56/9: 3—102.

argument, Joubert had concluded that it was possible to “elongate the terms of all ages, and thus of all life, by medicine, even further than is ordered by Nature.”<sup>4</sup> But Joubert had not proposed a clear way it was to be done. Bacon’s *Historia Vita et Morbis*, in the depth of its exploration into the causes of ageing and the range of its applications and speculations for overcoming it, was a work unprecedented. In this essay, I shall look in greater detail at the historical context of Bacon’s work on the prolongation of life, the role played by chemical/alchemical medicines in this debate,<sup>5</sup> and its place in medical thought in England in the second half of the seventeenth century.

The Bible clearly placed postdiluvian human life span at three score year and ten, but this had been a process of decay from the 930 years of Adam and Methuselah’s unrivalled 969 years.<sup>6</sup> Josephus in *Jewish Antiquities* and St Augustine in *The City of God* had defended the literal interpretation of these figures, and they were taken as hard facts in early modern thought.<sup>7</sup> Thus as Edward Maynwaring explained in 1670 at the beginning of his book on “The preservation of health, and prolongation of life,” “In the *Primitive Age* of the *World*, mans life was accounted to be about 1000 *Years*: but after the *Flood*, the Life of Man was *abbreviated* half.” Over time it had continued to fall, so that by the time of Moses:

the *Age* of Man was yet shorter, commonly not exceeding 120 *Years*; which also was *his Age* when he died ... Now the *Age* of Man is reduced to half that: 60 or 70 years we count upon. But although in general we find this gradual declension and

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<sup>4</sup> Frederick M. Gale, “Whether it is possible to prolong man’s life through the use of medicine,” *Journal of the History of Medicine* 26 (1971), 391—9.

<sup>5</sup> On the absence of a distinction between alchemy and chemistry in this period, see William R. Newman and Lawrence M. Principe, “Alchemy vs. chemistry: The etymological origins of a historiographic mistake,” *Early Science and Medicine* 3 (1998): 32—65.

<sup>6</sup> Pslam 90: 10; Genesis, 5: 5, 5: 27 and 8: 29.

<sup>7</sup> See Gruman (1966), 21.

abbreviation of man *Life*, in the several Ages of the *World*; yet must understand it was not *equally* so in all parts of the *World* together; but *places* and *climates*, and manner of *living* of a people, cause much *difference* in the *protraction* of their *lives*, that at the same time, some people of *peculiar places*, were longer lived, by a *third* or *fourth* part, then [sic] others of another *Climate* or *Region* ...<sup>8</sup>

That some humans, like some animals, lived much longer than others seemed obvious, and Bacon filled many pages of his *Historia Vita et Morbis* with records of people, in both ancient and modern times, who had lived well beyond eighty years. In fact, he reckoned there was “scarce a *Village*” in England “but it affords some Man or Woman of Fourescore yeares of Age,” and he noted that he had himself once met “an *old Man*, above an hundred yeares of Age.”<sup>9</sup> He also recorded that it was “reported” that a contemporary, the Irish Countess of Desmond, had “lived to an hundred and forty yeares,” whilst the inhabitants of the Barbary mountains “even at this day, they live, many times, to an Hundred and fifty yeares.”<sup>10</sup> Other accounts indicate Bacon was not alone in believing men and women in England could likewise live beyond a century. The Northampton doctor, James Hart, for example, observed in 1633 that to “attaine to 100 is no wonder, having my selfe knowne some of both sexes.”<sup>11</sup> The Oxford antiquary Anthony Wood recorded the

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<sup>8</sup> Edward Maynwaringe, *Vita Sana & Longa. The Preservation of Health, and Prolongation of Life. Proposed and Proved. In the due observance of Remarkable Precautions. And daily practicable Rules, Relating to Body and Mind, compendiously abstracted from the Institutions and Law of Nature*. London: Printed by J.D., 1670, 1—2.

<sup>9</sup> Bacon (1638), 134—5, 159.

<sup>10</sup> Bacon (1638), 244, 241.

<sup>11</sup> James Hart, *KAINIKH, or Diet of the Diseased* (London: printed by John Beale, for Robert Allot, 1633), 7—8. Hart (d.1639) had probably been educated at Edinburgh University before studying at Basel University, where Paracelsus had briefly been Professor of Medicine. Hart travelled extensively in Europe, receiving his MD from Basel in 1609; he eventually set up practice in Northampton.

deaths of two old women in the city, both aged 104, in 1679 and 1680,<sup>12</sup> whilst Sir William Temple wrote of meeting a beggar at a Staffordshire inn who professed to be 124.<sup>13</sup> The papers of Robert Boyle include a receipt for a “Medicine for clearing of the eye-sight found out by Dr. Purlow Sometime Bishop of Hull and Suffragan of York who at the age of 125 years was able to read any Print without Spectacles which att the age of 50 he could no.”<sup>14</sup>

Of course, it is doubtful many (or any) of these people were so old as was claimed. What is important is the *belief* that healthy old age beyond a hundred years was a real possibility. Indeed, the most famous seventeenth-century example was Thomas Parr, who died at Westminster in November 1635, allegedly aged 152 years and nine months old. The Earl of Arundel discovered “Old” Parr, blind but living a healthy, humble married life in Shropshire.<sup>15</sup> Arundel took him as a curiosity to Westminster, but Parr soon took ill and died.<sup>16</sup> On the King’s command, the famed anatomist William Harvey undertook Parr’s autopsy. Harvey found no great signs of ageing in the old man’s organs, and having examined Parr’s stomach and intestines, he deduced that by “living frugally and roughly, and without cares, in humble circumstances, he in this way prolonged his life.” Indeed, Harvey found that “all the internal organs seemed so sound that had he changed nothing of the routine of his former way of living, in all probability [Parr] would have delayed his death a little longer.” Harvey blamed what actually appeared

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<sup>12</sup> *The Life and Times of Anthony Wood, Antiquary, of Oxford, 1632—1695, described by Himself. Collected from his Diaries and Other Papers by Andrew Clark, MA.*, Oxford: printed for the Oxford Historical Society, Volume 2 (1892), 461 and 476.

<sup>13</sup> William Temple, *Miscellanea. The Third Part* (London: 1701), 112.

<sup>14</sup> The Boyle Papers, Royal Society of London, MS RB/1/17/2. If Boyle’s Dr Purlow is Robert Pursglove (1503/4—1580), suffragen bishop of Hull and prebendry of York, then we can see how the age of an old man of about 75 is increased in popular memory to one of 125.

<sup>15</sup> Geoffrey Keynes, *The Life of William Harvey* (Oxford: Clarendon Press, 1966), 223.

<sup>16</sup> Keynes (1966), 221; Thomas Fuller, *The Worthies of England*, ed. John Freeman (London: George Allen & Unwin, 1952), 480.

to be Parr's *premature* death on the smoky atmosphere of London compared to the fresh air of Shropshire, compounded by his sudden change to a more rich and varied diet.<sup>17</sup>

No contemporary appears to have questioned Parr's great age, and no requests made for documentary proof of his birth date. Harvey's autopsy report, which appeared in the pages of the Royal Society's *Philosophical Transactions*,<sup>18</sup> gave Parr's longevity an official stamp that even sceptically minded Victorians found hard to shift,<sup>19</sup> and his name would recur down the next two centuries as an example of what could be achieved by a simple life of manual labour and a sparse, temperate diet. Indeed, in 1661 John Evelyn happily used Parr's seemingly untimely death as clear evidence of the harmfulness of London's polluted, smoky air.<sup>20</sup>

Yet Parr was not the oldest man on record in the seventeenth century. James Hart noted that the natives of Florida lived for up to three hundred years,<sup>21</sup> whilst in his *Essay Upon Health and Long Life* (1701), Sir William Temple observed that the native Brazilians were said "to have lived two hundred, some three hundred Years." The supposed longevity of the inhabitants of the New World was held as an uncontested fact

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<sup>17</sup> Keynes (1966), 224. On the role of diet in health and the prolongation of life, see Steven Shapin Steven, "How to eat like a gentleman: Dietetics and ethics in early modern England," in Charles E. Rosenberg (ed.), *Right Living: An Anglo-American Tradition of Self-Help Medicine and Hygiene* (Baltimore and London: Johns Hopkins University Press, 2003).

<sup>18</sup> The autopsy report was printed in John Betts's *De ortu et natura sanguinis* (1669), 319—25; an abstract of the report appeared in the *Philosophical Transactions* (1668), iii. 886—8.

<sup>19</sup> See William J. Thom, *Human Longevity: Its Facts and Fictions* (1873).

<sup>20</sup> John Evelyn, *Fumifugium: Or the Inconvenience of the Aer and Smoake of London Dissipated* (London: printed by W. Godbid for Gabriel Bedel and Thomas Collins, 1661), 21.

<sup>21</sup> Hart (1633), 5, 7—8.

through the seventeenth century and is repeated, for example, by the Flemish physician Jean Baptiste van Helmont.<sup>22</sup>

These were all impressive, almost wondrous, records. They illustrate how the boundaries of old age in the seventeenth century were inconclusive, how the hope that life *might* — indeed *could* — be prolonged for decades beyond eighty years was not without factual foundation. But they were still much, much less than the near thousand year lives of the Patriarchs. What exactly explained this considerable diminution? There were numerous suggestions, and Bacon addressed some of them in the *Historia Vita et Morbis*.<sup>23</sup> A common explanation, and one used by Bacon, was that the cumulative action of the Great Deluge, as well as other smaller floods, long droughts and earthquakes, had made the land less fertile, or the air less pure.<sup>24</sup> As William Vaughan, author of the remarkably popular *Directions for Health, Naturall and Artificiall*, explained, the “principall reason” men lived longer before the Flood was because the World had then been in a better state: “the earth in those dayes was of greater efficacie to bring forth necessaries for mans use, then it is in this crooked and out-worne age. The soyle was then gay, trim, and fresh: whereas now by reason of the inundation ... it is barren, saltish and unsavorie.”<sup>25</sup>

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<sup>22</sup> William Temple, *Miscellanea. The Third Part* (London: printed for Benjamin Tooke, : 1701), 112. See also Hart (1633), 7—8, and Jean Baptiste van Helmont, *Oriatrike, or Physick Refined. The Common Errors therein Refuted, and the whole Art Reformed & Rectified: Being a New Rise and Progress of Phylosophy and Medicine, for the Destruction of Diseases and Prolongation of Life* (London: printed for Lodowick Loyd, 1662), 810.

<sup>23</sup> See also Bacon’s earlier, unpublished work on this subject, reproduced by Graham Rees, with Christopher Upton, in *Francis Bacon’s Natural Philosophy: A New Source. A Transcription of Manuscript Hardwick 72A with Translation and Commentary* (Chalfont St Giles: The British Society for the History of Science, Monograph 5, 1984). See also ‘Medicine and medical imagery in Bacon’s “Great Instauration”’, *Historical Reflections* [Canada] 1989 16(2-3): 351—65.

<sup>24</sup> Bacon (1638), 137—9.

<sup>25</sup> William Vaughan, *Directions for Health, Naturall and Artificiall: Derived from the Best Physicians, as well Moderne as Antient* (7th edition, London: printed by Thomas Harper for John Harison, 1633), 121.

Vaughan's description reflects the common contemporary belief that the Earth, like all living things, was growing old and would itself eventually die. As the vitality of the Earth waned, so the things living upon it became less vibrant: like men, who had been made perfect but had then degenerated, so the Earth had decayed from its physical perfection on the first day of Creation. In 1632 the poet Henry Reynolds reflected, "I have thought upon the times wee live in, and am forced to affirme the world is decrepit, and, out of its age & doating estate, subject to all the imperfections that are inseparable from that wracke and maim of Nature."<sup>26</sup>

According to such a view, there was little that could be done to recover the long lives of our ancestors. The world was drawing inevitably, inexorably, to a close. Time was coming to an end, human flesh crumbling. The troubled political events of the seventeenth century — together with the apparent increasing incidence of diseases such as syphilis, smallpox, scurvy, plague and rickets — seemed to indicate as much. As Dr Richard Browne wrote in 1683 in his footnotes to Roger Bacon's *The Cure of Old Age, and Preservation of Youth*, "we must conclude the World is in its testy old Age," and the Second Coming was nigh.<sup>27</sup>

Although Bacon called his times "this autumn of the world," and he appears to have held millenarian beliefs, he rejected such a pessimistic view of natural history and the irreversibility of human mortality.<sup>28</sup> If this was the Earth's dotage, for Bacon it was to be a ripe old age of profound wisdom and great learning, in which European scholars would pluck the

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<sup>26</sup> Henry Reynolds, *Mythomystes* (1632), quoted in Guibbory (1986), 6.

<sup>27</sup> Roger Bacon, *The Cure of Old Age, and Preservation of Youth*, translated out of the Latin by Richard Browne (London: printed for Tho. Fisher at the Angel and Crown, and Edward Evets at the Green Dragon, in St Pauls Church-yard, 1683), 6—7.

<sup>28</sup> See Guibbory (1986), 50.

final fruits of God's benevolent creation.<sup>29</sup> Hence Bacon frequently cited Daniel's Old Testament prophecy touching upon the end of days: "Many shall go to and fro, and knowledge shall be increased."<sup>30</sup> This was the "special prophecy" Bacon believed God had directed to his age. For Bacon, therefore, the quest for immortality was an inherent feature of "The Great Instauration," his radical plan to overthrow Scholastic learning and re-found scholarship on new, experimental, empirical, and essentially Modern foundations. For Bacon, long life was not simply a projected *end* of the restitution of all wisdom — it would also prove to be one of its *means*. For, given what a single gifted human being can achieve in one seemingly foreshortened and increasingly debilitated life span of seventy or eighty years, imagine what could be achieved in an almost perpetually youthful life of a *thousand* years. The wish for a long life, he emphasized in his preface to the *Historia Vita et Morbis*, was not impious: it would allow more time to do good and charitable Christian work.<sup>31</sup>

Although Bacon practised many of his own rules for prolonging life,<sup>32</sup> substantial human longevity was not something he expected to be achieved quickly or by a single person's efforts. One of his major ambitions for perfecting his project, therefore, was the establishment of permanent, well-funded learned societies. In his posthumously published *New Atlantis*, Bacon wrote of Salomon's House, an institution devoted to the collective, long-term advancement of learning. The great enterprises pursued there included "the prolongation of life, the restitution of youth in

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<sup>29</sup> See Guibbory (1986), 45.

<sup>30</sup> Daniel 12:4; see Guibbory (1986), 50—51; see also Bacon, *Novum Organum*, in *Works*, 8.130

<sup>31</sup> Bacon (1638), "The Preface," unpaginated.

<sup>32</sup> See William Rawley, "The life of the Honourable Author," unpaginated, in his *Resuscitatio, or, Bringing into Publick Light Several Pieces of the Works, Civil, Historical, Philosophical, and Theological, Hitherto Sleeping, of the Right Honourable Francis Bacon, Baron of Verulam, Viscount Saint Albans* (2nd edn, London, 1661).

some degree, [and] the retardation of age.”<sup>33</sup> In the decades after Bacon’s death Salomon’s House became the model for numerous scientific societies, culminating in 1660 with the foundation of the Royal Society of London – whose importance we shall come to shortly.

In the “Dedication” to *Historia Vita et Morbis*, Bacon had stated his hope that it would prompt “the Nobler sort of *Physicians*” to “advance their Thoughts” on this subject, and encourage them to become “Coadjutours ... in *Prolonging and Renewing the Life of Man*; Especially seeing we prescribe it to be done by Safe, and Convenient, and Civill wayes, though hitherto un-assayed.”<sup>34</sup> As Webster has shown, in the 1650s Samuel Hartlib and his circle – some of whom would be involved in establishing the Society — advanced the Baconian project for the prolongation of life, in particular through the search for new, chemical medicines, the philosopher’s stone, the elixir of life and even, perhaps, a universal medicine. The possibility that chemical medicines could be used to cure diseases had been given a powerful new lease of life in the sixteenth century by the radical German physician and alchemist Philippus Aureolus Theophrastus Bombastus von Hohenheim (1493—1541), better known as Paracelsus. In the introduction to his essay *A Book Concerning Long Life*, Paracelsus asserted that “no physician ought to wonder that life can be prolonged,” observing that if a dead body could be long preserved by means of embalming, “by how much more can a living one be kept from decay?”<sup>35</sup> Using a metaphor dating back at least to ancient Greece, he likened life to “a burning and living fire” within us, its heat

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<sup>33</sup> See Francis Bacon, *New Atlantis. A Work Unfinished* (London, 1658), 27—8, and Richard Serjeantson, “Natural knowledge in the *New Atlantis*,” in Bronwen Price (ed.), *Francis Bacon’s New Atlantis* (Manchester: Manchester University Press, 2002), 82—105.

<sup>34</sup> Bacon (1638), dedication “To the present Age, and Posteritie,” unpaginated.

<sup>35</sup> Arthur E. Waite (ed.), *The Hermetic and Alchemical Writings of Aureolus Philippus Theophrastus Bombast, of Hohenheim, Called Paracelsus the Great* (2 vols, London: James Elliott and Co, 1894), 2.108—9. I have used Waite’s translation, though he does not give sources for his edition. Also of interest is Paracelsus’s *Concerning the Nature of Things*, also in Waite, 1.120—94.

consuming the body's fuel, drying out its "radical moisture" until death occurs. But as it is possible, when a fire burns down, to "supply something stronger and stronger" to restore its vigour, so Paracelsus considered it possible to do the same with the body, "substituting something else in its place exactly as the fire is renovated with fresh wood." According to Paracelsus, our "only defect" in prolonging our lives "is that we do not know the special kinds of wood by which we can kindle our life. It is not against Nature that we should live until the renovation of the world: it only passes our comprehension."<sup>36</sup>

Like ancient physicians, Paracelsus fully acknowledged the importance of regimen in prolonging life. Indeed, he wrote that the "practical method" for the "conservation" of health was three fold: diet, disposition of the body, and medicine. But of these three, and unlike other early modern physicians, Paracelsus placed his chief trust in medicines. Every herb, metal or stone possessed its quintessence, the "Nature, Power, Virtue and Medicine, shut up and imprisoned" within it; it was "the Colour, Life, and propertie of things; tis a Spirit like the Spirit of life, with this difference, that the spirit of the Life of a thing is permanent, but of a man [it is] mortal." As Paracelsus directed in numerous books, chemical processes such as reduction and distillation could release the quintessence of things. And Adam, he explained, had "attained to such an Age" not because of some condition in his original make-up, but "because he was so learned and wise a Physitian, and knew all things that were in Nature her self."<sup>37</sup> For Paracelsus, there was no predetermined length of human life, so long as the right medicine – be it a quintessence, elixir or

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<sup>36</sup> Waite (1894), 2.112—3.

<sup>37</sup> *Paracelsus his Archidoxes: Comprised in Ten Books, Disclosing the Genuine Way of Making Quintessences, Arcanums, Magisteries, Elixirs, &c, faithfully and plainly Englished, and Published by J.H. Oxon.* (London: printed for W.S., 1661). (1661), 35, 114.

the philosophers' stone – could be found to cure disease and maintain health.

As Alan Debus has shown, Paracelsian chemical theory made significant inroads into medical thought and practice in seventeenth-century England. When in the 1630s Dr James Hart explored the possibilities of prolonging human life through careful regimen, he observed:

one may aske what is the ordinary period whereunto the life of man by meanes of art may be prolonged? Our ordinary Authours, as wee have said, assigne 100 or 120 [years]: but wee have a certaine sort of people, who in shew, would seeme to transcend vulgar understanding, and tell us strange things of the prolongation of mans life for many yeeres, farre beyond this above-mentioned period; and that by meanes of certaine medicines made of metals, of gold especially; and these be *Paracelsus* and his followers ...<sup>38</sup>

Hart, however, utterly dismissed such claims, pointing out that, notwithstanding the great merits of his supposed medicines, Paracelsus had died before he was even sixty years old, and asked rhetorically, 'is it not a thing ridiculous, now in these later times, to extend the life of mankinde to 1000, 900, or at the least to 600 yeeres?'<sup>39</sup>

As Graham Rees has shown, Paracelsus had some influence on Bacon's thought, and on his ideas on the prolongation of life.<sup>40</sup> But Bacon had had no time for what he called "impostors" in philosophy.<sup>41</sup> Though

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<sup>38</sup> Hart (1633), 5—6.

<sup>39</sup> Hart (1633), 7.

<sup>40</sup> Graham Rees, "Francis Bacon's semi-Paracelsian cosmology," *Ambix* (1975), 22(2): 81—101, and "Francis Bacon's semi-Paracelsian cosmology and the *Great Instauration*," *Ambix* (1975), 22(3): 161—73.

<sup>41</sup> Francis Bacon, *Novum Organum* (1620), part 2, Aphorisms, no. 87. On the influence of chemistry on Bacon's thought, see Rees (1975), 81—101, and (1975) 161—73; see also Stephen Gaukroger, *Francis Bacon and the Transformation of Early-Modern Philosophy* (Cambridge: Cambridge University Press, 2001), 175—9, and Joshua C. Gregory, "Chemistry and alchemy in the natural philosophy of Sir Francis Bacon, 1561—1626," *Ambix* 2 (1938), 93—111. See also C.W. Lemmi, "Mythology and

he conceded in *Novum Organum* that chemists had “made several discoveries,” and (albeit accidentally) “presented mankind with useful inventions,”<sup>42</sup> it was undoubtedly (al)chemists Bacon was attacking when he noted the “many silly and fantastical fellows who, from credulity or imposture” had “loaded mankind with promises, announcing and boasting of the prolongation of life, the retarding of old age, the alleviation of pains, the remedying of natural defects, the deception of the senses, the restraint and excitement of the passions, the illumination and exaltation of the intellectual faculties, the transmutation of substances,” etc.<sup>43</sup> Potable gold and the other “*Chymicall Medicines*” of the Paracelsians thus received short shrift in his *Historia Vita et Morbis*, for they “first puffe up with vaine hopes, and then faile their Admirers.”<sup>44</sup>

For Bacon, the prolongation of life was a laborious task, not to be quickly won. As he explained in *The Advancement of Learning*, only someone who had studied “perfectly” the processes of the human body, and who had investigated thoroughly the effects of diets, baths, ointments and “proper Medicines,” would be able to prolong their life — or at the least “renew some degrees of youth, or vivacity.” In both the *Advancement* and (at greater length) *Historia Vita et Morbis*, Bacon expounded a complex scheme involving careful regimen, exercise, dress, climate, and “seasonable sleep.” These along with regular purging, phlebotomy, and “attenuating Diets, which restore the Flower of the Body,” supplements of opiates and nitre, and (literally) blood baths, were all means that could reduce the effects of ageing and restore bodily

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alchemy in *The Wisdom of the Ancients*,” in Brian Vickers (ed.), *Essential Articles for the Study of Francis Bacon* (London: Sidgwick & Jackson, 1972), 51—92.

<sup>42</sup> Bacon (1620), part 2, Aphorisms, no. 85.

<sup>43</sup> Bacon (1620), part 2, Aphorisms, no. 87.

<sup>44</sup> Bacon, (1638), Preface, unpaginated.

juices.<sup>45</sup> For Bacon, the prolongation of life could not “be effected, by a few drops of *some precious Liquor*, or Quintessence.”<sup>46</sup>

Notwithstanding his reservations about chemists, however, it is notable that whilst in the *Advancement of Learning* Bacon ridiculed the idea silver could be turned quickly into gold by “a few graines of *Elixir*,” he did not dismiss the idea “that Gold by an industrious and curious wit, may, at last, be produced.”<sup>47</sup> Nor did he deny in the *Historia Vita et Morbis* that, if only the right way could be found to “open” it for human use, gold “would bee no unprofitable Medicine.”<sup>48</sup> Furthermore, in the posthumously published miscellaneous collections, *Sylva Sylvarum*, he observed that though “The World hath been much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible,” and he presented an “Experiment Solitary,” suggesting how it might be done. Indeed, Bacon’s interest in medicines was such that in 1679 a number of his supposed recipes were posthumously published, including “A Medical Paper” to which Bacon “gave the Title of *Grains of Youth*.” It included a ‘preserving oyntment’ made from ‘Deers-suet’, saffron and myrrh, and a “*Methusalem Water*” made from crayfish boiled in claret that acted “against the Driness of Age.”<sup>49</sup>

Clearly interested in chemical medicines, Bacon’s real objection to the chemists was not their advocacy of transmutation or the medical potential of gold, but the fact that their “practice” was “full of Errour and Imposture,” and their theory “full of unsound Imaginations” — including

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<sup>45</sup> Bacon (1640), 201—3; Bacon (1638), 110—113.

<sup>46</sup> Bacon, (1640), 170.

<sup>47</sup> Bacon (1640), 170.

<sup>48</sup> Bacon (1638) 165—368.

<sup>49</sup> T[homas] T[enison], *Baconiana. Or Certain Genuine Remains of Sr. Francis Bacon, Baron of Verulam, and Viscount of St. Albans: In Arguments Civil and Moral, Natural, Medical, Theological, and Bibliographical* (London: printed by J.D. for Richard Chiswell, 1679), 155—61.

their beliefs in astrology, natural magic and superstition: beliefs that did not stand up to the rigours of Bacon's legalistic, empirical method.<sup>50</sup>

Bacon's position indicates the ambivalence in which chemistry was held in the early seventeenth century. That it had something of a stronger reputation in England by the middle of the century was largely down to the work of the Flemish physician Dr Jan Baptiste van Helmont (1579—1644), who rejected the scholastic method and advanced upon the work of Paracelsus. In 1648, four years after his death, his collected works, *Ortus medicinae*, were published in Amsterdam through the efforts of his son Franciscus Mercurius van Helmont. An English translation by John Chandler (a graduate of Magdalen Hall, Oxford) was published in 1662 as *Oriatrike, or Physick Refined*. The subtitle to this immense, 1,161 page octavo tome made Helmont's intentions clear: in it the "whole Art" of medicine was to be "Reformed & Rectified," providing "a New Rise and Progress of Phylosophy and Medicine, for the Destruction of Diseases and Prolongation of Life."<sup>51</sup>

Though Helmont was a supporter of Paracelsus from whose writings he had "profited much," he was not uncritical, and considered Paracelsus "no less ignorant of a Medicine for Long Life, and the use thereof, than of the very Essence and Properties of Long Life." Whilst Helmont held Paracelsus's "Arcanums" to be good medicines for a "healthy or sound Life, or unto a removal of Impurities; yet they do not any thing directly and primarily tend to long Life."<sup>52</sup> Like Hart, Helmont took Paracelsus's early death as a clear indication of his ignorance in this matter. Helmont, therefore, looked elsewhere for the true methods of prolonging life. Like the ancient physicians, he first advised care of diet

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<sup>50</sup> Francis Bacon, *Sylva Sylvarum, or a Naturall Historie in Ten Centuries* (London, 1627), Century IV. Bacon's method involved heating silver (or alternatively copper) with mercury, nitre and "some Oyled Substance" in a sealed container perpetually for six months.

<sup>51</sup> Helmont (1662), title page.

<sup>52</sup> Helmont (1662), 753, 802.

and climate, noting that “there are also places at this day, whereunto a Life of three hundred years is ordinary.”<sup>53</sup> Those who lived cheerfully “far from the cares, usuries, busie affaires, and stormes of their age” were likely to live longest. Helmont also advised his readers to avoid “carnal Lust,” gluttony, drunkenness, tobacco, frequent baths, bloodlettings, “loosening medicines,” and to live away from bad climates and contagious air.<sup>54</sup>

In these respects, Helmont’s practical guidelines were little different from those advocated by the sixteenth-century Italian nonagenarian Luigi Cornaro in his *Discorsi della vita sobria*.<sup>55</sup> But Helmont believed that medicines also had a role to play in advancing human life spans. The Tree of Life that grew in the Garden of Eden, and which had promised by its fruits eternal life to Adam and Eve, was his medicine of choice for indefinitely prolonging life, and his arbiter of what could be achieved through Nature’s bounty. Whilst the Paracelsian *Arcana* could cure diseases, Helmont wrote that the Tree of Life “chiefly concerns the preservation and renewing, or making young again of the vital Faculties.”<sup>56</sup> Helmont believed that the closest equivalent to this medicine “was to be fetched out of a most wholesom, odoriferous, balsamical, and almost immortal Shrub.”<sup>57</sup> The most likely candidate for such a “shrub,” was the “Cedar in *Libanus*” from which Noah had made the Ark. It was not enough, however, simply to use the fruit, bark, leaves or sap from this “Cedar of the Shoar of *Palæstina*.”<sup>58</sup> Helmont’s method depended upon

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<sup>53</sup> Helmont (1662), 810.

<sup>54</sup> Helmont (1662), 754.

<sup>55</sup> Bacon wrote in *Historia Vita et Morbis* that Cornaro (1467—1566), by his sparse diet, lived “to an extraordinary Long Life; Even of an Hundred years and better, without any Decay in his Senses; And with a constant Enjoying of his Health.” Bacon (1638), 133—4. Cornaro’s *Discorsi della vita sobria* was first published in 1558 and went through numerous editions.

<sup>56</sup> Helmont (1662), 753.

<sup>57</sup> Helmont (1662), 807—9.

<sup>58</sup> Helmont (1662), 810—13. Helmont thought India might also offer up similar healing woods.

distilling the wood in a sealed glass vessel for many months “with a like weight of the Liquor Alkahest.”<sup>59</sup> Yet here was the rub: for what, exactly, was the Liquor Alkahest?

As Paulo Porto helpfully explains, Helmont’s Liquor Alkahest “was an important means for preparing medicines and for unveiling some of the deepest secrets hidden in natural bodies. ... only through the alkahest would the physician be able to cure hitherto ‘incurable’ diseases, and to prepare a medicine for prolonging human life.”<sup>60</sup> It was Helmont who fully developed the idea of the Liquor Alkahest from a hint he found in Paracelsus, as well as the Dutch chemist Johann Rudolph Glauber, who saw it as the key to discovering a range of remarkable medicines. Both men would be enormously influential on the pursuit of chemistry and the search for chemical medicines in England from the 1640s until the end of the century, and the Alkahest became the elusive goal sought by numerous chemists working in England. Such was the interest in chemistry of many of these early Fellows that it could be asserted in 1703 by John Pickering — who claimed friendship with Thomas Herbert, Earl of Pembroke, a former president — that this “Royal Academy” had been “made up” by Charles II, Robert Boyle “and other Great and Ingenious Practitioners” to search for the “great Medicine” (by which he probably meant the Liquor Alkahest) though “without success.”<sup>61</sup> Whatever credit we may give to Pickering’s claim, it is certainly the case that Robert Boyle, as well as Sir Kenelm Digby, Thomas Henshaw and Charles II were all keenly interested in chemistry, and were all involved in the foundation of the Society.

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<sup>59</sup> Helmont (1662), 811.

<sup>60</sup> Paulo Porto, “Summus atque felicissimus salium”: The medical relevance of the liquor alkahest.’ *Bulletin of the History of Medicine* 76 (2002), 1—29, 3—4.

<sup>61</sup> John H. Appleby, ‘Moses Stringer (fl. 1695-1713): Iatrochemist and mineral master general’, *Ambix* 34 (1987), 31-45, 35.

Immediately upon his Restoration, Charles invited Nicaise Le Fèvre, formerly the King of France's chemist, to England.<sup>62</sup> According to Le Fèvre (who in December 1661 became a fellow of the Royal Society), in the spring of 1663 Charles commanded him to apply himself wholly to the preparation of the famous "cordial" invented earlier in the century by another chemist, Sir Walter Raleigh. A devoted Paracelsian, Le Fèvre asserted that by producing this "Great *Cordial*" he would "prove the great advantages that the modern *Pharmacie* carrieth legitimately above the ancient, by reason that it is enlightened with the glorious lights of *Chymistry*." Raleigh's cordial included everything considered good in contemporary medicine for preserving and prolonging life. Ingredients included hart's horn (because "there are but few Animals that can equal the Hart for length of life, since he lives whole Ages") and gold ("because it re-establishes and augments the radical Moisture and the natural Heat").<sup>63</sup> At the suggestion of Sir Kenelm Digby and Sir Alexander Fraiser (the king's chief physician), Le Fèvre added "the Flesh, the Heart, and the Liver of *Vipers*" to Raleigh's recipe, because this snake renews its skin annually, and so "the remedy it yields may also produce in us Renewing Principles and Faculties."<sup>64</sup> Raleigh's medicine was amongst those officially recommended during the Great Plague of 1665 and, according to John Aubrey, Boyle possessed the recipe for this "excellent cordial," "and makes it and does great cures by it."<sup>65</sup>

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<sup>62</sup> On Charles II and chemistry, see J. Andrew Mendelsohn, "Alchemy and politics in England, 1649—1665," in *Past and Present* 135 (1992), 30—78, and Harold J. Cook, "The Society of Chemical Physicians, the new philosophy, and the Restoration court," *Bulletin of the History of Medicine* 61 (1987), 61—77.

<sup>63</sup> N. Le Febvre [sic], *A Discourse upon Sir Walter Rawleigh's Great Cordial* (London: printed by J.F. for Octavian Pulleyn Junior, and are to be sold at the Sign of the Bible in S. Paul's Church-yard near the little North door, 1664), 8—10, 59.

<sup>64</sup> Le Febvre (1664), 14—16.

<sup>65</sup> See John Aubrey, "Brief Lives," *Chiefly of Contemporaries, Set Down by John Aubrey, Between the Years 1669 and 1696*, edited by Andrew Clark (2 vols., Oxford: Clarendon Press, 1898), 2.182, *sub.* Sir Walter Raleigh. For Boyle's profound interest in medicine, see Barbara Kaplan, "Divulging of Useful Truths in Physick": *The Medical Agenda of Robert Boyle* (Baltimore & London: The Johns Hopkins University Press,

Boyle's interest in chemistry had begun in the early 1650s. His first tutor in chemical methods was the Harvard-educated physician George Starkey. Starkey had arrived in England in 1651, claiming, according to Samuel Hartlib, to have already "done a number of most strange and desperate cures."<sup>66</sup> Starkey told Boyle that he was close to establishing the recipe of "an admirable medicine of a perpetual vertue ... with a most desirable quicknesse & protractive of Old age Espetially."<sup>67</sup> And he claimed to know an "Adept" in Massachusetts who possessed the secret of making the philosopher's stone, and had used it to restore the hair and teeth of an old lady and made a withered peach tree bring forth new fruit.<sup>68</sup> Together, he and Boyle produce a copper-based chemical medicine, "ens veneris," which was inspired by their reading of Helmont's *Ortus medicinae*.<sup>69</sup>

A belief in the power of such chemical medicines was well established in England by the early seventeenth century. John Thornborough, nonagenarian bishop of Bristol and Worcester, was "much commended" for his "skill in chemistry" and it was said that he "presented a precious extraction to King James, reputed a great preserver of health, and prolonger of life."<sup>70</sup> Around the same time Francis Anthony, a

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1993), and Michael Hunter, "Boyle versus the Galenists: A suppressed critique of seventeenth-century medical practice and its significance," *Medical History* 41: 322—61, and his *Robert Boyle (1627—91): Scrupulosity and Science* (Woodbridge: The Boydell Press, 2000).

<sup>66</sup> See Hartlib, "Ephemerides," March? 1650/51, D—D4; Ephemerides 1651, Part 1, 28/2/6A; on Starkey and Boyle, see William R. Newman, *Gehennical Fire: The Lives of George Starkey, an American Alchemist in the Scientific Revolution* (Cambridge, MA: Harvard University Press, 1994), 1—2, 62, 209—10, and William R. Newman and Lawrence M. Principe, *Alchemy Tried in the Fire: Starkey, Boyle and the Fate of Helmontian Medicine* (Chicago & London: University of Chicago Press, 2002). On Boyle's interest in alchemy, see Lawrence M. Principe, *The Aspiring Adept: Robert Boyle and his Alchemical Quest* (Princeton: Princeton University Press, 1998).

<sup>67</sup> George Starkey to Robert Boyle, after 19 April 1651, in Michael Hunter, Antonio Clericuzio, and Lawrence M. Principe, (eds.), *The Correspondence of Robert Boyle* (London: Pickering & Chatto, 2001), 1.100.

<sup>68</sup> Newman (1994), 82.

<sup>69</sup> See Newman (1994), 71.

<sup>70</sup> Fuller (1952), 615.

Cambridge graduate, gained considerable renown in London with his chemical medicine of potable gold.<sup>71</sup> By the mid century the London empiric Salvator Winter was claiming that “by the Blessing of God” and the power of his “*Elixir Vitae*” to have lived 98 years, “for this *Elixir* hath such force and vigour, that if it were possible it would revive the dead, were it not a Secret reserved to God only.”<sup>72</sup> Moses Stringer, who taught chemistry at Gloucester Hall, Oxford, late in the seventeenth century, produced numerous chemical medicines in London for considerable profit, including a so-called “*elixir renovans*.” Inspired by Paracelsus’s “Renovating Quintessence,” it was intended ‘to renew youth very much and help Old Age’.<sup>73</sup> Opium (in the form of laudanum), gold, mercury, tartar, antimony and arsenic were among the “medicines” popularised by Paracelsus and his followers, and their use became widespread in seventeenth-century English medicine, by both empirics and regular physicians.

Given their ingredients, the physical effects of these medicines were sometimes dramatic, and it is understandable why some physicians opposed their use. In his *Book of Renovation and Restauration*, Paracelsus wrote that his “renovating” medicines (made from the “first entity” of antimony, sulphur, gold and herbs) were to be taken daily “so long, till your nails of your fingers first fall off, and then the nails of your feet, then your hair and teeth; and then lastly, till your skin be dried up, and new bee again generated.” Only then was the medicine to be discontinued; in due course “so will there new nails be born again, new hairs, new teeth, and withal, a new skin; & the diseases both of the body

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<sup>71</sup> See Allen G. Debus, *The English Paracelsians* (Franklin Watts: New York, 1966), 142—4.

<sup>72</sup> British Library, printed pamphlet, 551a.32, fol. 30.

<sup>73</sup> See Moses Stringer, BL Harley 5931, f. 26 and BL Loan MS 16/2. f.248v; see John H. Appleby, “Moses Stringer (fl. 1695-1713): Iatrochemist and mineral master general,” *Ambix* 34 (1987) 31-45, 32, 36.

and mind will depart away.”<sup>74</sup> A London colleague of Starkey’s, the self-styled “Unlearned Alchymist” Richard Mathew, prescribed a chemical pill for about three weeks to a gentleman suffering from syphilis. Mathew was both startled and impressed when the man came “and shewed me his naked body, which I was loath he should, and [there was] not one hair upon him, but a fresh skin, as of a young child.” The gentleman told Mathew that “he was as well as ever he was in all his life,” and what made Mathew “more to wonder, was that the nails of his hands did then begin to peep out, like the little white that is at the root of our nails.”<sup>75</sup> Mathew also claimed that, “although to many it may seem incredible,” it was reported to him by another gentleman that an old lady “aged betwixt eighty and ninety” who had taken his pills “for some years ... now hath young teeth growing in her head;” her periods had also returned “as when she was but 20 years old.”<sup>76</sup> Boyle likewise records how Le Fèvre told him how a friend took a restorative medicine that made his finger nails fall out, and that “this Gentleman keeps [them] yet by him in a Box for a rarity.” Le Fèvre had also given this medicine to a seventy-year-old female servant, and claimed that her periods resumed, and also to an old hen, which moulted its feathers, grew new ones, and laid more eggs than usual.<sup>77</sup> If true, these were probably the pernicious effects of poison (and internal haemorrhages rather than menses?). Their critics claimed chemical medicines killed more often than they cured. But chemists took these

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<sup>74</sup> Paracelsus, “A Book of Renovation and Restauration,” 20, included as an appendix to Paracelsus (1661).

<sup>75</sup> Richard Mathew, *The Unlearned Alchymist His Antidote. Or, A More Full and Ample Explanation of the Use, Virtue and Benefit of my PILL ... Also, Sundry plain and easie Receipts, which the Ingenuous may prepare for their own health* (London: printed for Joseph Leigh, 1662), 12—14.

<sup>76</sup> Mathew (1662), 128—9.

<sup>77</sup> Robert Boyle, *Some Considerations Touching the Usefulness of Experimental Naturall Philosophy, Propos’d in Familiar Discourse to a Friend, by way of Invitation to the Study of it* (Oxford: printed by Hen. Hall, printer to the University, for Ric. Davis, 1663), in Michael Hunter and Edward B. David (eds.) *The Works of Robert Boyle*, Volume 3 (London: Pickering & Chatto, 1999), chapter 8.

symptoms as clear signs of rejuvenation: they were the seventeenth-century equivalent of chemotherapy.

Despite distancing himself from many low bred, unskilled empirics and eventually criticising some Helmontian ideas in *The Skeptical Chymist*, Boyle did not doubt that one day the elixir would be discovered. In a short, anonymously published essay of 1678, *Of a Degradation of Gold Made by an Anti-Elixir: A Strange Chymical Narrative*, Boyle gives an account of an “Experiment” with a tiny quantity of what he calls variously an “*Anti-Elixir*,” “*Anti-Philosophers Stone*” or “*Medicine*” obtained from a stranger who had travelled in the East. The experiment was, as Boyle states using contemporary scientific terminology, a “matter of Fact,” since it took place before “a Witness” who was an “experienced Doctor of Physick.” In the essay Boyle recounts his experiment to “an Assembly of *Philosophers and Virtuosi*,” headed by a “President” — terminology clearly suggestive of the Royal Society. A dark reddish powder, Boyle claims, was transmuted gold into a lesser, silver-like metal: given this apparent success of the “anti-elixir,” one of Boyle’s interlocutors (the essay is presented as a dialogue) asserts, “I see not why it should be thought impossible that Art may also make a *true Elixir*.”<sup>78</sup>

It did not seem improbable to Boyle, therefore, that an elixir — whose effects would include the prolongation of human life — existed somewhere in Nature. It was simply waiting to be found by the patient and (in particular) pious chemist. The chemist Benjamin Worsley had made this last point clear to Boyle in the late 1650s, telling him that any sure-grounded “Reformation ... of the Art of medicine must in some measure know what is the Roote of death in every man.” Death through the Fall of Adam and Eve was directly connected in Christian eschatology to sin,

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<sup>78</sup> Michael Hunter describes this essay as “a fragment of a significant work,” Hunter (2000), 9.xi, 9.5—17. My quotes are taken from the character Pyrophilus, who, Hunter writes, is “clearly intended to represent Boyle himself,” Hunter (2000), 9.7n.

and as Worsley argued at length, if you could overcome sin (through faith), you could overcome death. In Worsley's opinion, if "all the Gates & Avenues of death" were "rightly" known, "wee should not thincke it either Enthusiasticke or Ridiculous either to affirme or to expect a freedome <or> Liberation from the common state of mortality & corruption."<sup>79</sup> But Worsley did not confine his argument to faith alone: he made the Helmotian argument that as there were "severall simples & living creatures" that could "take away the life of man ... soe the Lord hath put a power in other simples to stregthen & quicken it." The "generality of Phisitians" had mistakenly "sought out the medicinall properties of things in a blended & confused manner": another way of searching might prove more fruitful. Worsley does not name this method, but as he reiterates throughout his letter, he was certain that death was neither "absolutely fatall" nor "necessary."

Though deeply pious, Boyle does not appear to have laid out a theological route to immortal life on Earth. But he did set real store by the efficacy of chemical medicines. In a work-diary from the last years of his life we find an intriguing record, where Boyle records how an unnamed "person" who had recently performed "some extraordinary things in Chymistrie" told him that in Italy he had known "an excellent Artist" – that is, one adept at alchemy. This Venetian claimed that though he "seemed to be at most between 40 & 50 year old yet <in> reality he was more than 173 years of age." Boyle writes that though this story seemed "scarce credible," he was "less disposd" to dismiss it because the person who told it to him appeared to be "noe Charleton but a plain honest German of good repute" amongst some of Boyle's friends. Furthermore, from Boyle's

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<sup>79</sup> That Worsley is the author and Boyle the intended recipient of this undated letter is not certain, but seems likely, and it has been included in Boyle's most recent collection of correspondence: see Hunter et al (2001), 1.301—318, quote from p. 308. See also Donald R. Dickson, "Thomas Henshaw and Sir Robert Paston's pursuit of the Red Elixir: An early collaboration between Fellows of the Royal Society," *Notes and Records of the Royal Society of London* 51 (1998): 57—76.

other conversations with him, he “seemd carefull not to affirm things that he had not tryed or did not otherwise know to be true; nor did hee at all pretend to bee acquainted with any of this Artists secrets for the prolongation of life.”<sup>80</sup> Boyle’s preparedness to accept the veracity of this account clearly depended in part upon the character of his informant. But it must also have been influenced both by his and his contemporaries’ search for the elixir, and in a wider cultural belief that human life spans *could* be thus extended.

These contemporaries included Boyle’s colleague and occasional correspondent Kenelm Digby.<sup>81</sup> As a young man at the court of King James, Digby had made a great impression by healing a nobleman’s injured hand with a “powder of sympathy” that, he later claimed, Francis Bacon had intended “to add, by way of Appendix, to his Natural History.”<sup>82</sup> When Digby’s beautiful young wife Venetia died suddenly in 1633 it was rumoured that he had accidentally killed her by making her drink “viper wine,” a chemical decoction made from the flesh of adders steeped in alcohol. This medicine, it was claimed, “strengthens the Brain, Sight, and Hearing, and preserveth from Gray-hairs, [and] reneweth Youth.”<sup>83</sup> The distraught Digby retreated to Gresham College where, as John Aubrey records, he “diverted himself with his chymistry.”<sup>84</sup> Following the lead of

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<sup>80</sup> Royal Society, Boyle Papers 21, 296—7: [Work Diaries, on-line.]

<sup>81</sup> Boyle in 1663 describes him as “that great Person, Sir *Kenelm Digby*”: Boyle (1663/1999), 230.

<sup>82</sup> Kenelm Digby, *Of Bodies, and of Man Soul ... With Two Discourses, Of the Powder of Sympathy, and Of the Vegetation of Plants* (London: 1666), ‘Second Treatise’, 148 (actually page 147: mispaginated in original). On Digby, see Betty Jo Dobbs, ‘Studies in the natural philosophy of Sir Kenelm Digby’, *Ambix* 18 (1971), 1—25, and *Ambix* 20 (1973), 146—63.

<sup>83</sup> See Aubrey (1898), 1.230; on “The Quintessence of Snakes, Adders, or Vipers” and “Viper-Wine,” see John French, *The Art of Distillation: Or, A Treatise of the Choicest Spagyricall Preparations, Experiments, and Curiosities* (London: printed by E. Cotes for T. Williams at the Bible in Little-Britain, 1664), 120—21. Bacon dismissed the “superstitious” belief “that the Flesh, of *Serpents*, and *Harts* ... are powerfull to the Renovation of Life; Because the one casteth his Skin, the other his Hornes.” Bacon, (1638), 173—4.

<sup>84</sup> Dobbs (1973), 143—63, 146—7.

Paracelsus and Jacob Duchesne, Digby attempted the revivification of plants and animals, and claimed success in re-engendering live crayfish from their calcinated ashes.<sup>85</sup>

When Digby fled England during the Civil War he met René Descartes in Paris. Digby told the French philosopher that since “life was almost too short to attain to the right knowledge” of things he, Descartes, who so well understood the working of the human “machine,” ought to be searching out means of prolonging its conservation. Descartes replied that he *had* considered exactly this matter of “la vie eternelle,” informing Digby “that to render a man immortal, was what he would not venture to promise, but that he was very sure it was possible to lengthen out his [i.e. man’s] life to the period of the Patriarchs.”<sup>86</sup>

Descartes’ principal method for prolonging life was by temperament and careful regimen. But his biographer, Adrien Baillet, also recorded late in the seventeenth century that Descartes “required great Caution in the administering [of] Chymical Remedies,” suggesting he may occasionally have used them.<sup>87</sup> In 1638, when he was forty-two, Descartes told Constantyn Huygens of his hope that he might yet live “more than a

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<sup>85</sup> See Kenelm Digby, *A Choice Collection of Rare Secrets and Experiments in Philosophy as also Rare and Unheard-of Medicines, Menstruums and Alkahests ... hitherto kept Secret since his Decease, but now Published for the Good and Benefit of the Publick*, by George Hartman (London: printed for the author, 1682), 131—2.

<sup>86</sup> See Gruman (1966), 79, who quotes from P. Des Maizeaux, ed. and transl., *The Works of St Evremond, with the Life of the Author by Des Maizeaux* (2nd edn, London, 1728) 1.xli—xlii. Descartes’ reference to “la vie eternelle” can be seen in British Library Add. MS 4470, fol. 4, catalogued as “An account of the first meeting between René Descartes and Sir Kenelm Digby.” See also Steven Shapin, “Descartes the doctor: rationalism and its therapies,” *British Journal for the History of Science* 33 (2000), 131—54.

<sup>87</sup> Adrien Baillet, *The Life of Monsieur Des Cartes, Containing the History of his Philosophy and Works: As Also the Most Remarkable Things the Befell him During the Whole Course of his Life*, translated from the French by S. R. (London: printed for R. Simpson, at the Harp in St. Paul’s Church-yard, 1693), 260. Richard B. Carter ponders the possible influence on Descartes of “doctor-chemists” such as Paracelsus and Bernardino Telesio: see Carter, *Descartes’ Medical Philosophy: The Organic Solution to the Mind-Body Problem* (Baltimore and London: Johns Hopkins University Press, 1983), 17—18, 111.

century” longer.<sup>88</sup> In fact, Descartes died in Stokholm in 1650. On hearing the news, Samuel Hartlib — who had his own ideas of how human life could be prolonged — recorded in his diary that “Cartes designe was to make a compleate Philosophy. In reference to this scope imagining that it was possible in nature to prolong ones life to a thousand years.”<sup>89</sup> It is notable that Descarte’s early death did not chasten Digby’s quest, and Hartlib records that in 1654 Digby was considering investing £700 in a plan by Hartlib’s son-in-law, the chemist Frederick Clodius, to establish a “universal laboratory” that would “redound ... to the health and wealth of all mankind.”<sup>90</sup> In 1660, the year the Royal Society was founded, Hartlib wrote that Digby “hath been up and down in Germany for the liquor alkahest the great elixir &c.”<sup>91</sup>

Henry Oldenburg, the Royal Society’s first Secretary, was also a keen supporter of chemistry, considering it, if “rightly used,” to be “the best possible key” for discovering “the admirable Treasures of nature.”<sup>92</sup> He appears, too, to have shared the Paracelsians’ hope of prolonging life with their medicines. According to a memorandum in the Royal Society recording the contents of a (now lost) letter sent to Robert Southwell in January 1659/60, Oldenburg had set out “my opinion of the universal medicine and of those who live very long, who yet stand under God’s decree, and require a naturally strong body without any lapse into drunkenness and venery.”<sup>93</sup> In his reply, Southwell — who was friends with Boyle and was keen to meet Digby — writes that he shared Bacon’s “obstinacy” over chemistry and had previously held “some incrudelity” to

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<sup>88</sup> Quoted in Gruman (1966), 78.

<sup>89</sup> The Hartlib Papers, Sheffield University, ‘Ephemerides, 1650, part 2 (February to May), 28/1/54A—B.

<sup>90</sup> Hartlib to Robert Boyle, 8 or 9 May, 1654, in Hunter et al (2001), 1.175.

<sup>91</sup> Hartlib to John Winthrop the Younger, 16 March 1660, Hartlib Papers, 7/7/4A.

<sup>92</sup> Oldenburg to Augustin Boutens, 11 November 1667, original in French, A. Rupert Hall and Marie Boas Hall (eds.), *The Correspondence of Henry Oldenburg* (13 volumes, Wisconsin: The University of Wisconsin Press, 1965—1986), 3.590.

<sup>93</sup> Oldenburg to Southwell, 29 January 1659/60, Hall and Hall (1965), 1.348.

what he calls “the great Production.” But having received Oldenburg’s “universall inspection” of the matter, it “commands me to be more then Neuter, in this beliefe.”<sup>94</sup> In the memorandum to another lost letter, sent to the obscure French chemist Mr Tollé in January 1659/60, Oldenburg records that he had expressed in it “my wish to prove the truth of the universal medicine by results and by the prolongation of life.”<sup>95</sup> Oldenburg appears to be suggesting here that these would-be effects are his arbiters of proof, rather than that they have actually been discovered. But it makes clear the nature of his expectations of iatrochemistry.

Oldenburg’s correspondence from his 1657—1660 continental tour is filled with references to European chemists and physicians who were searching for Helmontian medicines.<sup>96</sup> In 1670 Oldenburg even saw fit to translate and publish in *Philosophical Transactions* a letter from Jean Pierre de Martel, Professor of Anatomy at the University of Aix-en-Provence, “concerning a way for the Prolongation of Humane Life.”<sup>97</sup> Martel began by conjecturing that were we “more intelligent” in our understanding of “the causes of a meerly natural Death” (as opposed to death by disease), “we might procure for our selves an Age of continual Youth.” Having cited the “illustrious *Bacon*” and the theory of maintenance and repair posited in the *Historia Vita et Morbis*, Martel likened “The Engine of our body” to “a Chymists Furnace, which at first well retaining the heat, is very proper for the operations of Art; but at last, chinks and crevices being made therein, it ceases to be so.” Martel, however, offered no explicit theory for how life was to be prolonged, referring only to the

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<sup>94</sup> Southwell to Oldenburg, 20 February 1659/60, Hall and Hall (1965), 1.355. Southwell also makes reference to Boyle (“a person of soe much ability”) and adds that he looks forward to hearing “the happy effects of your acquaintance with Sir Kenelme Digby ... who I hope will not dye till I see him.” Ibid, 1.355—6.

<sup>95</sup> Hall and Hall (1965) 1.347.

<sup>96</sup> See for example Letter 121, Oldenburg to Johannes Michaelis, Professor of Medicine at the University of Leipzig, Paris, 6 May 1659, Hall and Hall (1965), 1.241—2.

<sup>97</sup> On Martel’s identification, see Hall and Hall (1968) 5.484n.

way “the life of many dying persons” can be “maintain’d, for some time,” by making them drink hot, spirituous liquors. Martel’s bald conclusion was that “there is no reason to despair of finding out such Medicins” as would one day fulfil Bacon’s dream of prolongevity.<sup>98</sup>

As this review has shown, the belief in the medicinal possibilities of prolonging life was firmly held amongst a number of important philosophers in the seventeenth century. It is less clear, however, how far the chemists’ search for the prolongation of life entered the public consciousness. It is certainly the case that some commercially manufactured “elixirs” (such as Anthony Daffy’s “Elixir Salutis” and Richard Stoughton’s “Great Cordial Elixir”) were very successful products.<sup>99</sup> But in 1658 the Norfolk physician Sir Thomas Browne dismissed the idea of a life-saving universal medicine, observing, “In vain do individuals hope for immortality, or any patent from oblivion, in preservations below the moon.”<sup>100</sup> When Dr John Smith, a Fellow of the College of Physicians in London, gave the subject lengthy consideration in his *Pourtract of Old Age* in 1676, he felt that “the retarding of Age, the prolonging of Life, [and] the renewing of Youth” were subjects which “have scarce entred the thoughts of Vulgar Pretenders to Physick.”<sup>101</sup> Like Bacon, Descartes and Martel, Smith believed that one day “such noble Medicines may be found out and prescribed, that may innovate the strength of all the parts of old men,” and even that humans, like insects,

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<sup>98</sup> “Of a Letter written by Monsieur *de Martel* of *Montauban* to the Publisher, concerning a way for the Prolongation of Humane Life, together with some Observations made in the Southern parts of *France*; English’d as follows,” *Philosophical Transactions* 58, 25 April 1670, 1179—83.

<sup>99</sup> See David Boyd Haycock and Patrick Wallis (eds.), *Quackedry and Commerce in Seventeenth-Century London: The Proprietary Medicine Business of Anthony Daffy* (London: The Wellcome Trust Centre for the History of Medicine, 2005).

<sup>100</sup> Sir Thomas Browne, *The Hydriotaphia, or Urn-Burial* (1658).

<sup>101</sup> John Smith *The Pourtract of Old Age. Wherein is Contained a Sacred Anatomy Both of Soul, and Body, and a Perfect Account of the Infirmities of Age Incident to them Both* (2nd edition, corrected, London: printed by J. Macock, for Walter Kettilby, and the Bishops Head in St Paul’s Church-Yard, 1676), 266.

might one day be able to shed their skins and metamorphose. But whilst “[s]ome means” may yet be found by physicians to ‘for the proroguing’ of the diseases of old age, “and keeping them off for a time; and for the mitigation of their violent assaults, but for the total preventing, or the absolute curing, let no man living hope for.”<sup>102</sup>

Though Smith dismissed the possibility of a universal medicine, this is not to say that the search for chemical medicines was thought to have been worthless. As William Wotton noted in 1694, it was the Moderns who had first made “inward Use of Antimonial, Vitriolick, and Mercurial Preparations in Physick,” and the Moderns who may be “looked upon as the first Inventors of Chymical Medicine.” Speaking more broadly of chemistry, for Wotton, “So great Things have thereby been discovered in Nature, that were unknown without it, that it may justly be esteemed as one of the chiefest Instruments whereby Real Knowledge has been advanced.”<sup>103</sup>

Yet by the close of the century it appears that a philosophical belief in the prolongation of life — like the belief in transmutation and a universal medicine — was on the wane. In 1694, when Edmond Halley, a prominent Fellow of the Royal Society, made the first advancement on John Graunt’s 1662 work on mortality statistics,<sup>104</sup> he was dismissive of any vision of prolonging human life. Using records from the Silesian town of Breslau, Halley pointed out that they showed “how unjustly we repine at the shortness of our Lives, and think ourselves wronged if we attain not Old Age; whereas it appears hereby, that the one half of those that are born are dead in Seventeen years time.” Halley advised “that instead of murmuring at what we call an untimely Death, we ought with Patience

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<sup>102</sup> Smith (1676), 262, 50.

<sup>103</sup> William Wotton, *Reflections upon Ancient and Modern Learning* (1694), chapter XVI, ‘Of Ancient and Modern Chymistry’.

<sup>104</sup> Graunt, the first medical statistician, acknowledged his debt to Bacon’s *Historie of Life and Death* in undertaking his research: see John Graunt, *Natural and Political Observations upon the Bills of Mortality* (1662), ‘Epistle Dedicatory’.

and unconcern to submit to that Dissolution which is the necessary Condition of our perishable Materials, and of our nice and frail Structure and Composition: And to account it a Blessing that we have survived, perhaps by many Years, that Period of Life, whereat the one half of the Race of Mankind does not arrive.”<sup>105</sup> In 1697 Gilbert Burnet referred contemptuously to what he called the “Projectors of Immortality, or undertakers to make Men live to the Age of *Methusalah*, if they will use their methods and medicines.” And by 1726 Jonathan Swift could famously mock the idea of immortal men in *Gulliver’s Travels*. Even by the age of eighty, Swift’s “*Struldbruggs* or *Immortals*” had “not only all the Follies and Infirmities of other old Men, but many more which arose from the dreadful Prospect of never dying.” Their lives beyond eighty years were both worthless and pointless.<sup>106</sup>

As Gerald Gruman has shown, Swift’s satire by no means marks the end of Western medicine’s search for the prolongation of life. But it does appear that by the end of the seventeenth century the belief that this might be achieved by chemical medicines had faded considerably. That it had been a real ambition of many seventeenth-century philosophers cannot, however, be dismissed by modern historians. To these men, it appeared not as “a thing ridiculous”, but simply as a thing as yet unproven.

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<sup>105</sup> Edmond Halley, “An Estimate of the Degrees of the Mortality of Mankind, drawn from curious Tables of the Births and Funerals at the City of Breslaw; with an Attempt to ascertain the Price of Annuities upon Lives,” *Philosophical Transactions*, 1694, 596—610, 654—6, citing 655; see James H. Cassedy (ed.), *Mortality in Pre-Industrial Times: The Contemporary Verdict* (Farnborough: Gregg International Publishers Ltd, 1973).

<sup>106</sup> Jonathan Swift, *Gulliver’s Travels*, edited by John Hayward (London, Nonesuch: 1934) 202, 207—8.

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