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## The Gresham Professors of Astronomy 1597–2013

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Abstract. Gresham College is named after Sir Thomas Gresham (1519–1579), an English merchant and financier who worked for the four key Tudor monarchs, Henry VIII, Edward VI, Mary I, and Elizabeth I. He studied at Cambridge before going to Antwerp where he was a merchant as well as the financial agent of the crown—negotiating loans, and procuring funds and goods. Gresham also acted as ambassador and was well rewarded with a salary, lands, and a knighthood in 1559, becoming one of the richest men in England. Sadly, Sir Thomas's only son and legitimate heir died in 1564. As a result he left his vast fortune to the Corporation of London and the Mercers' Company for the purpose of founding a College in London. Seven professors were to be appointed to read lectures daily—in various subjects including astronomy. The first Gresham professor of astronomy (predating chairs in astronomy at Oxford and Cambridge) was appointed in 1597 and a continuous line of professors—and their lectures—has taken place ever since, up to the present day when lectures are both free and open to the public in London as well as being recorded and available globally via the internet.

The first person to be appointed as a professor of astronomy in England was Thomas Brerewood, Gresham Professor of Astronomy from 1597 to 1598. Brerewood's appointment predated the founding of professorial chairs in astronomy at Oxford (1620) and Cambridge (1707) by more than 20 years and was the first of a continuous line of thirty-six Gresham professors of astronomy up to and including the present day. Over the centuries, the appointment of Gresham professor of astronomy has been held by such notable astronomers as Edmund Gunter, Henry Gellibrand, and Sir Christopher Wren, and (in the twentieth century) Sir Martin Ryle, Roger Tayler, Sir Martin Rees, Michael Rowan-Robinson, John Barrow and, at time of writing, Carolin Crawford. The collective contribution of "Greshamite" men and women to the study of astronomy is immense and many Gresham professors have been foremost leaders in astronomy-Wren, Steavenson, Ryle, Tayler, Rees to name but a few. Some, it is true, made lesser contributions to astronomy or science more generally—the reasons for their appointments remaining obscure. The vision of Sir Thomas Gresham (1519-79) in founding the College formed the basis for a long tradition of astronomy and astronomical research, leading directly to the foundation of the Royal Society by a group of Gresham professors in 1660. Setbacks in the 18th century were superseded by successes in the Victorian age, and in the 20th and 21st centuries, the College has been highly successful in its new global approach to open, online, life-long learning.

Sir Thomas Gresham (1519–79) was a leading sixteenth-century financier, serving as agent for four major Tudor monarchs. He negotiated loans with foreign merchants

<sup>&</sup>lt;sup>1</sup>Bryn Jones, *Some Historical Astronomical Posts in Britain and Ireland*, http://www.jonesbryn.plus.com/histastron/posts\_gbi/posts\_gbi.html



Figure 1. Portrait of Thomas Gresham 1544, attributed to Holbein, (courtesy of the Worshipful Company of Mercers).

for Henry VIII and was appointed as Royal Agent in Antwerp for Edward VI, Mary Tudor, and Queen Elizabeth I. Son of the Lord Mayor of London, he was educated at Cambridge and then spent the rest of his life in London and on the Continent (mainly Antwerp, but also Italy and Spain). He swiftly became a very successful merchant banker, managing the Crown's finances, borrowing money to finance wars against the French, Scots, and Spanish to ensure England's survival in those precarious times. He founded the Royal Exchange (MacFarlane 1845), owned immense tracts of land and property in what is now the City of London, and was a brilliant economist with an intense understanding of currency and coinage in particular. He became known for "Gresham's Law"—that bad or debased currency drives out good, although others, including the astronomer Nicolaus Copernicus, had also recognized this concept (Balch 1908).

With vast estates in Norfolk as well as large amounts of land in the City of London, it has been estimated that in modern terms Sir Thomas Gresham was worth over £100 billion (\$150 billion) but, sadly, his only son and legitimate heir predeceased him in 1564. When he made his will in 1575, he, therefore, left most of his assets to be entrusted to the Corporation of the City of London and the Mercers' Livery Company, to be used to fund a College based on seven professorships in the key areas of Divinity, astronomy, music, geometry, law, physic and rhetoric—based on the ancient *Quadrivium* and *Trivium* (an eighth chair, of commerce, was added in 1985). At a time when

Oxford and Cambridge were undergoing great expansion, with new colleges and various foundations, Sir Thomas preferred, rather, to do something for London, so he left his money and property to found a College in the City of London (Ames-Lewis 1999). The terms were set down in his will, dated 20 May 1575 which led, after the death of his wife in 1596, to the founding of Gresham College, the first institution of higher learning in London, established in 1597 (Hackett 1833). The College is unique (Chartres & Vermont 1997). Gresham professors have given free public lectures in the City of London for over 400 years and the College still offers about 130 free public lectures, seminars, and other events every year, now recorded and made available on the Internet.<sup>2</sup>



Figure 2. Later portrait (1575) of Thomas Gresham.

Sir Thomas was way ahead of his time in wanting to found a Higher Education Institution with free lectures that were open to all. Open access, widening participation, and lifelong learning are terms that are much bandied around in current discussion on education, but Thomas Gresham was there first. He saw the advantages in having a well-educated workforce—not only for altruistic reasons, but because of the financial success it would bring to the city and companies, including his own. He could see little point in the academics at Oxford and Cambridge pontificating in Latin about the

<sup>&</sup>lt;sup>2</sup>http://www.gresham.ac.uk

theoretical and abstract. Rather, he aimed to make the new learning available so that it could have practical application—such as the use of astronomy for navigation—by those who steered his ships to the New World, enabling goods to be transported as efficiently as possible. The College was originally intended by Sir Thomas Gresham to widen access to the new learning of the sixteenth century, and one of the ways he ensured such access was to stipulate that the Gresham professors delivered their lectures in both English and Latin, benefiting those who lived or worked in the City of London, and not just the wealthy and highly educated. Sir Thomas's mansion in Bishopsgate was Gresham College's first home, where professors gave their lectures until 1768. Their salaries were financed by rental income from Sir Thomas's estates in the City (Burgon 1839). The early period for the College also saw the formation and early development of the Royal Society in 1660 with such distinguished professors as Sir Christopher Wren, famous as an astronomer as well as the architect of St Paul's (Bennett 1982), and Robert Hooke, well known as a natural scientist and philosopher (Bryson 2010; Hill 1965). In later years, lectures were given in various places in the City until the construction of a purpose built College in 1842. The College has been based at the fifteenth-century Barnard's Inn Hall, Holborn (mentioned by Charles Dickens in Great Expectations) since 1991.



Figure 3. Sir Thomas Gresham's Coat of arms, as on his funerary monument.

Astronomy was always a leading subject at the College and Sir Thomas Gresham's establishment of the very first professorship of astronomy seems to have been based on his aim to ensure a practical approach to academic study, emphasizing the functional rather than theoretical use of subjects like astronomy, which was fundamental to successful navigation. This clearly also related to his personal interests in astronomy, evidenced by the significant inclusion of stars or comets on his coat of arms and also his funerary monument (see Figure 3).

The Gresham professor of astronomy has always been formally appointed by the City of London Corporation, and the minutes of the Joint Grand Gresham Committee (which has met continuously since 1596) clearly show the process of appointment of the first Professor, Edward Brerewood, at its first meeting, on 17 March 1596. This appointment was significantly earlier than the Savilian professor of astronomy, Oxford (1620); Astronomer Royal (1675); Plumian chair of astronomy & experimental philosophy, Cambridge (1707); Regius chair of practical astronomy, Glasgow (1760); and Regius professor of astronomy, Edinburgh (1785). Undoubtedly, the teaching of astronomy, from ancient times, predates such appointments. In the seventh century, the English monk Bede of Jarrow published an influential text, On the Reckoning of Time, providing churchmen with the practical astronomical knowledge needed to compute the proper date of Easter, which remained an important element of the education of Clergy until well after the rise of the Universities in the twelfth century. Other key works were produced by the astronomer-Pope Gerbert (tenth century) and, reflecting the introduction of astronomy into the universities, writings of John of Sacrobosco, Nicholas Oresme, and Nicholas Cusanus in the fifteenth century were also crucial for astronomical developments, although they did not deem to have held formal university "chairs" as astronomers.

As Gresham's will was implemented, at first "The Cambridge doctors could not conceive that the tree of learning could grow and flourish in the atmosphere of London" (Ward 1740), but Gresham had ensured that the citizens of London should have free access to the lectures. He established lectures on astronomy at a time when the science was not taught in any school or university in England, its rudiments were almost unknown and many of the foremost men of the age believed in astrology. Aiming to be popular, practical, and clear, rather than overly technical and obscure, Gresham professors of astronomy were tasked to "read the principles of the sphere and the theories of the planets... to explain the use of common instruments for the capacity of mariners... to use by reading geography and the art of navigation." It should be remembered that these were dangerous times, with new learning provoking considerable controversy. It was likely that Gresham would have personally known the astronomer John Dee. They were both members of the Mercers' Company and both under the patronage of William Cecil (first minister to Queen Elizabeth I). Through John Dee, Gresham may well have heard of the work of Nicholas Copernicus for example.

The first group of Gresham professors comprised **Edward Brerewood** (Gresham Professor 1596–1613) a scholar and antiquarian who was noticed by Elizabeth I at a public debate on philosophy in Oxford in 1592; **Thomas Williams** (1613–20) of whom little is known, and **Edmund Gunter** (1620–26) famous for his work on mathematics and the real world, and development of the quadrant and sextant for calculations of positions of stars and navigation for sailors. He worked with the mathematician Henry Brigges on logarithms and was the first "Savilian" professor. **Henry Gellibrand** (1627–36) also worked on the Earth's magnetic field, logarithms, and longitude calculated



Figure 4. Sir Christopher Wren, Gresham Professor of Astronomy, 1657-60.

whose records have become the main sources for Wren's scientific achievements—ranging from astronomy, optics, the problem of finding longitude at sea, cosmology, mechanics, mathematics, microscopy, surveying, medicine, and meteorology. He became Savilian professor of astronomy at Oxford in 1661 but his attention soon turned to architecture. When Wren was a student at Oxford, he became familiar with Vitruvius's *De Architectura* and intuitively absorbed the fundamentals of architectural design. Among many of his remarkable designs, the monument (1671–76) commemorating the Great Fire also involved Robert Hooke, but Wren was in control of the final design (the ashes from the fire in a container at the top were eventually replaced by a telescope). He also designed the Royal Observatory (1675–76). The crater "Wren" on Mercury was named in his honor.

Following on from Wren, **Walter Pope** held the professorship from 1660–87 and was very active in publishing the Philosophical Transactions of the Royal Society. Little is known about the successors **Daniel Man** (1687–91) and **Alexander Torriano** (1691–1713) and the best part of the eighteenth century (not a good time for the College) was then covered by the appointments in astronomy of **John Machin** (1713–1751) who devised a formula to compute the irrational number pi to 100 decimal places and assisted in the calculus priority dispute between Leibniz and Newton. **William Cockayne** (1752–95) was a merchant and Lord Mayor whose astronomical work seems unclear, and **William Romaine**, a curate, was appointed for about one year (1751–52) for reasons which seem unclear. Decline was evidenced when the College buildings were sold off in 1768.

by lunar eclipse observations, whilst **Samuel Foster** (appointed 1541 and re-elected 1552) became well known for his observations (especially eclipses) and planetary instruments. **Mungo Murray** was appointed 1637, but had to resign on his marriage (professors were required to be single), to be succeeded by **Lawrence Rooke**, one of the founders of the Royal Society but also known for his work on longitude, the moons of Jupiter, and astronomical navigation for sailors. These works were not aimed at cloistered university academics but for sailors and surveyors in the real world, contributing to mathematically controlled navigation. These were difficult times as Galileo was meeting with persecution in Rome; the Civil War was enveloping England as academics struggled to keep going, and Gresham College itself was encountering some financial difficulties (with a public pamphlet of 1647 indicating discontent at the way it was being managed).

One of the most famous early Gresham professors of astronomy was **Sir Christopher Wren** (1632–1723) who is often better known nowadays as the architect of St Paul's Cathedral, London (completed 1710) and 52 other city churches rebuilt after the Great Fire in 1666. The minutes of the Joint Grand Gresham Committee record "Mr" Wren's appointment and resignation and we know that he lectured (on Wednesdays) particularly on telescopes, the Moon, Saturn, Satellites of Jupiter, and the prediction of solar eclipses. As others before him, the emphasis was often on astronomy as furnishing practical aids to navigation. Wren was also famed as an astronomer for influencing Newton's *Mathematica Principia* by challenging Hooke's explanation of motion around the sun. Astronomy also influenced Wren's architectural designs—the dome of St Paul's is 365 feet high and incorporates features designed to be struck by the sun's rays at particular times (Jardine 2002; Soo 1998).

It was out of weekly meetings organized by Wren that the Royal Society, England's foremost scientific body, was to develop, following a memorandum of 28 November 1660:

These persons following according to the usual custom of most of them, met together at Gresham College to hear Mr Wren's lecture, viz. The Lord Brouncker, Mr Boyle, Mr Bruce, Sir Robert Moray, Sir Paule Neile, Dr Wilkins, Dr Goddard, Dr Petty, Mr Ball, Mr Rooke, Mr Wren, Mr Hill. And after the lecture was ended they did according to the usual manner, withdraw for mutual converse.

The Royal Society was "The focus of scientific life in the capital" at the time (Hoskin 1999)<sup>3</sup> and Wren undoubtedly played a major role in the early life of what would become the Royal Society, since his wide-ranging expertise in many different subjects helped the exchange of ideas between various scientists. In 1662, the group proposed a society "for the promotion of Physico-Mathematical Experimental Learning" which received its Royal Charter from Charles Π and "The Royal Society of London for Improving Natural Knowledge" was formed. In addition to being a founding member of the Society, Wren was president of the Royal Society from 1680 to 1682,

<sup>&</sup>lt;sup>3</sup>It became the Royal Society in 1662 after obtaining its charter from Charles II. Since then, members of the Royal Society have created new branches of science; split the atom; discovered hydrogen and the electron; invented the World Wide Web; developed profound theories on evolution, gravity, and motion; and furthered understanding in areas from stockmarkets to astrophysics, and electricity to biodiversity. It began at Gresham College, as part of the 17th century intellectual revolution.

As in the eighteenth century, very few individuals held the position during the nineteenth century when periods of tenure sometimes lasted decades. Lectures were held in various places until a new College was built in 1842. **Peter Sandiford** (1795–1833) held an MA in astronomy, as well as being a doctor of Divinity; **Joseph Pullen** (1833–1875) was especially significant because some of his Gresham lectures actually survive, for example his "Lecture on Astronomy: Delivered Before the Grand Gresham Committee, November 28, 1833;" and **Edmund Ledger** (1875–1908) was known for his work on a supposed new planet, Eros, as well as early work on nebulae.

Moving into the twentieth century, in spite of pauses caused by the First and Second World Wars, great developments took place at Gresham College with a large number of shorter term appointments of many who were to become and still remain leading figures in astronomical research. Samuel Arthur Saunder (1908-12) was a mathematician and selenographer (and has a crater on the moon named after him). Arthur Robert Hinks (1913-41) defined the astronomical unit (distance from Sun to Earth) using observations and parallax measurements of the asteroid "Eros." Working on radio signals as linked with astronomy, he appeared to feel out of place in the new astronomy dominated by general relativity. William Herbert Steavenson (1946-64) was an amateur astronomer who discovered a comet and was elected a Fellow of the Royal Astronomical Society while still at school. He was a skilled observer and astronomy correspondent for the *Times*, although his main career was as a surgeon. John Anthony Carroll (1964–68) of the Solar Physics Observatory, Cambridge advocated the use of computing machines to reduce labor in tables (especially for the Admiralty), whilst Sir Martin Ryle (1968-69), famed for his work in Radio Astronomy and distant galaxies, shared, with Anthony Hewish, the Nobel Prize for Physics-the first to be awarded in recognition of astronomical research. His work also led to the discovery of the first quasi-stellar object (quasar).

In the latter part of the twentieth century, the changing trend of shorter appointments continues—with a marked shift from appointees from Oxford to more recent ones from the University of Cambridge. Roger John Tayler (1969–75) made important contributions to stellar structure and evolution, plasma stability, nucleogenesis, and cosmology. He wrote a number of textbooks and collaborated with Fred Hoyle and Stephen Hawking at the University of Cambridge on problems of helium production in cosmology, and also worked at the Atomic Energy Research Establishment at Harwell and Culham. Martin John Rees, Baron Rees of Ludlow (1975-76) is a British cosmologist and astrophysicist. His positions have included Astronomer Royal, president of the Royal Society, Plumian professor at Cambridge, and director of the Institute of Astronomy. Inter alia, he has made important contributions to the origin of cosmic microwave background radiation, as well as to galaxy clustering and formation. His studies of the distribution of quasars led to the final disproof of steady state theory. He is a leading author of books on astronomy and science intended for the lay public and gives many public lectures and broadcasts, such as the 2010 Reith Lectures for the BBC, published as "From Here to Infinity: Scientific Horizons." Lord Rees believes the Search for Extraterrestrial Intelligence is worthwhile, even though the chance of success is small. As well as expanding his scientific interests, Rees has written and spoken extensively about the challenges of the 21st century and the interfaces between science. ethics, and politics. Sir Martin Rees was succeeded by David Dewhirst (1976-80) of the Cambridge Observatory who is well known for his work on the history of astronomy and for popularising astronomy.

Michael Rowan-Robinson (1981-82) is an astronomer and astrophysicist associated with the Astrophysics Group at Imperial College London and sometime president of the Royal Astronomical Society. His research interests include the Spitzer Space Telescope "SWIRE" project, the European Large Area ISO Survey, and the Herschel Space Observatory "SPIRE" instrument among others. He was awarded the 2008 Hoyle Medal by the Institute of Physics for his pioneering research in infrared and submillimeter astronomy, and observational cosmology. Andrew Christopher Fabian (1982–84) is an astrophysicist and head of the X-ray astronomy group at the Institute of Astronomy, Cambridge. President of the Royal Astronomical Society (2008–2010), his current and recent areas of research include galaxy clusters, active galactic nuclei, strong gravity, black holes, and the X-ray background. Much of his research involves X-ray astronomy and high energy astrophysics for which he has been awarded a number of international prizes including the Gold Medal of the Royal Astronomical Society (2012). Raymond Hide CBE FRS (1984-90) is a British physicist, formerly professor of physics at Oxford and Imperial College, London who studied at Cambridge and then worked in a range of institutions: Chicago, Harwell, King's College, Newcastle, MIT, Oxford, and Imperial. Hide was elected Fellow of the Royal Society (1971). George Hornidge Porter, Baron Porter of Luddenham, (1990-93) was awarded the Nobel Prize in Chemistry in 1967. President of the Royal Society 1985-1990, he was a major contributor to the public understanding of science and gave the Gresham lectures in astronomy, delivering a Royal Institution Christmas Lecture on "The Natural History of a Sunbeam."

The first woman to hold a Gresham Professorship, in any subject, was professor of astronomy Heather Anita Couper (1993–96). She helped popularize astronomy in the 1980s and 1990s on British television. Advised by Patrick Moore that "being a girl" was not detrimental to a career in astronomy, she has held appointments at the Department of Astrophysics at the University of Oxford, and at the Cambridge Observatory. She was a lecturer at Greenwich Planetarium and became a television presenter in 1981. Couper has written and co-written several books on astronomy and space and made many presentations for radio, television, and in public. Colin Trevor Pillinger (1996–2000) is a former planetary scientist at the Open University in the UK and has worked on a group of Martian meteorites. Pillinger's first job was for NASA, analysing the lunar samples brought back by Apollo 11; but he is best known for being the principal investigator for the problematic Beagle 2 Mars lander project, part of European Space Agency's 2003 Mars Express mission. He has continued to defend Beagle 2.

Moving into the twenty-first century (the sixth century in which Gresham College has operated), appointments continue to be made not only in accordance with the high standard of astronomical expertise and experience of the professors, but also being mindful of their abilities to convey complex facts and theories to specialists and nonspecialist members of the Gresham audience alike. **Francis Edwin Close** (2000–03) is a noted particle physicist and professor of physics at Oxford. In addition to his scientific research, he is known for his lectures and writings making science intelligible to a wider audience. He has held positions at Stanford Linear Accelerator Center, Daresbury Laboratory, CERN, and Rutherford Appleton Laboratory (head of Theoretical Physics Division) and headed the communication and public education activities at CERN from 1997 to 2000. His more general publications include *The Cosmic Onion; Lucifer's Legacy: Particle Physics: A Very Short Introduction; End: Cosmic Catastrophe and the Fate of the Universe*. (Published in the U.S. as *Apocalypse When?*); and *Nothing: A Very Short Introduction*. **John David Barrow** (2003–07) is an English cosmologist,

theoretical physicist, and mathematician who has held positions at Oxford, Berkeley, and Sussex, where he was director of the Astronomy Center. He is exceptional in being appointed to two Gresham professorships: Gresham professor of astronomy (2003–07) and also Gresham professor of geometry (2008–12)—a feat only achieved by one other person. The recipient of innumerable formal scientific awards, he has also been involved in initiatives to improve the understanding and appreciation of mathematics and its applications amongst young people and the general public. His publications explore many of the wider historical, philosophical, and cultural ramifications of new developments in cosmology, physics, and mathematics. Ian Morison (2007–11) spent much of his astronomy career at the Jodrell Bank Observatory, teaching astronomy and cosmology at the University of Manchester. He has written two books for amateur astronomers, a university textbook on astronomy, and writes regularly for the Astronomy Now magazine on telescope related topics. He has escorted groups world wide to carry out stargazing and observe solar eclipses.

Finally, bringing us up to date after a 400 year survey, the present Gresham Professor of Astronomy, Carolin Susan Crawford (2011–present) is a well known communicator of science, astrophysicist researcher, and lecturer based at the Institute of Astronomy and Emmanuel College, Cambridge—a position that she holds in conjunction with her role as outreach officer at the Institute of Astronomy. Crawford's primary research interests are in combining X-ray, optical, and near-infrared observations to study the physical processes occurring around massive galaxies at the core of galaxy clusters. She delivers public lectures, talks, broadcasts, workshops, and debates throughout the UK and beyond on wide range of topics within astronomy. She has been recognized for her outstanding abilities at science communication with a Women of Outstanding Achievement Award by the UK Resource Centre for Women in Science, Engineering and Technology.

For the future, the tradition will continue by appointing leading figures in the field to deliver top quality lectures to specialists and non-specialist members of the public alike. Of course the College cannot lay claim to all the achievements of those who have been appointed as Gresham professor of astronomy over the centuries, but because of its reputation, the College can indeed boast of the way in which lectures from such notable scientists are made available to the public. Some 20,000 people attend Gresham lectures in London annually, but the intention is, more and more, for the College to go global-bringing new learning to the entire known world, as Sir Thomas would have wished. All lectures are video recorded (with an archive of more than 1,500 recordings going back to the 1980s) and views on the Internet have just reached 2 million per annum. In addition, a mobile phone and tablet app has been developed, providing access to lectures from hand-held devices. Astronomy lectures are amongst the most popular and the Gresham all time "top ten" lectures accessible via YouTube (at time of writing) features four astronomy lectures: Robbert Dijkgraaf's "The End of Space and Time?" (1st); Carolin Crawford's "The Sound of Saturn: The Winds of Titan, from the Huygens Probe" (8th); Ian Morison's "Unsolved Mysteries of the Universe" (9th); and Carolin Crawford's "Rotation in Space" (10th).

Gresham professors have always been strongly associated with a public education role. Then, as now, the aim is to continue the tradition of public lectures, but the College does not register students, nor does it make academic awards. Academics have been appointed to the title in recognition of their abilities in lecturing to a broad audience as well as their eminent standing in their field. The role today involves giving a series

of six public lectures a year in London for a period of 3–4 years, and participating in other popular educational activities. Lectures are all recorded and widely distributed, underlining the importance of the College to enable communication of the latest ideas to specialists and popular audiences alike.

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## **Appendix: List of Gresham Professors of Astronomy**

Table 1. List of Gresham Professors of Astronomy showing dates of birth, death and appointment, together with age on appointment and years in post.

\*Died in post or very soon after (appointments seem to have been open-ended).

	Name	Lived	Appointed	Age on Appointment	Years in post
1	Edward Brerewood	1565–1613	1596–1613	31	17*
2	Thomas Williams	c. 1582-?	1613-1620	c. 21	7
3	Edmund Gunter	1581-1626	1620-1626	39	6*
4	Henry Gellibrand	1597-1637	1627-1636	30	9*
5	Samuel Foster	c. 1600-1652	1636-1636	36	1
6	Mungo Murray	1599-1670	1637-1641	38	4
7	Samuel Foster	c. 1600-1652	1641-1652	41	11*
8	Laurence Rooke	c. 1619-1662	1652-1657	33	5
9	Sir Christopher Wren	1632-1723	1657-1660	25	3
10	Walter Pope	c. 1627-1714	1660-1687	33	27
11	Daniel Man	?	1687-1691		4
12	Alexander Torriano	1667-1717	1691-1713	24	22
13	John Machin	c. 1686-1751	1713-1751	27	38*
14	William Romaine	1714-1795	1751-1752	37	1
15	William Cockayne	1717-1798	1752-1795	35	43*
16	Peter Sandiford	?	1795-1833		38
17	Joseph Pullen	?	1833-1875		42
18	Edmund Ledger	1841-1913	1875-1908	34	33
19	Samuel Arthur Saunder	1852-1912	1908-1912	56	4*
20	Arthur Robert Hinks	1873-1945	1913-1941	40	28
21	William Herbert Steavenson	1894-1975	19461964	52	18
22	Sir John Carroll	1899-1974	19641968	65	4
23	Sir Martin Ryle	1918-1984	1968-1969	50	1
24	Roger John Tayler	1929-1997	1969-1975	40	6
25	Sir Martin Rees	b. 1942	1975-1976	33	1
26	David W. Dewhirst	1926-2012	1976-1980	50	4
27	Michael Rowan-Robinson	b. 1942	1981-1982	39	1
28	Andrew C. Fabian	b. 1948	1982-1984	34	2
29	Raymond Hide	b. 1929	1984-1990	55	6
30	Lord Porter of Luddenham	1920-2002	1990-1993	70	3
31	Heather Couper	b. 1949	1993-1996	44	3
32	Colin Pillinger	1943-2014	1996-2000	53	4
33	Frank Close	b. 1945	2000-2003	55	3
34	John D. Barrow	b. 1952	2003-2007	49	4
35	Ian Morison	b. 1943	2007-2011	64	4
36	Carolin Crawford	b. 1963	2011-2015	48	4

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