

The Gresham Professors of Astronomy 1597-2013

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Themes

- Sir Thomas Gresham (1519-79) and his vision
- Gresham College and its professors
- The Professors of Astronomy
 - Brerewood, Gunter, Gellibrand and the early years
 - Late 17th century: Wren, Hooke and the Royal Society
 - 18th century setbacks and developments
 - The Victorian age
 - Into the 20th century
- The 21st century and Global Gresham
- Access, Mass, open, online, life-long learning

Sir Thomas Gresham (1519-79)

- Father Lord Mayor of London; studied at Cambridge
- Employed as royal agent for Henry VIII, Edward VI, Mary Tudor, Elizabeth I – financial
- In London but also overseas, especially Antwerp, Germany, France, Spain. Copied the Antwerp Bourse in London
- Saved the Tudors from bankruptcy through 'Gresham's Law' on the dangers of false/debased coinage – 'bad money drives out good' (also known to Copernicus)



Sir Thomas Gresham,
1544 (aged 26)

Gresham: Elizabethan financier



- Huge estates in Norfolk, London; owned Royal Exchange
- Married with one son (plus illegitimate daughter)
- Son died in 1564
- 1575 – drew up will - left estate to be entrusted to the Corporation of the City of London and the Mercers Livery Company for the benefit of the City of London

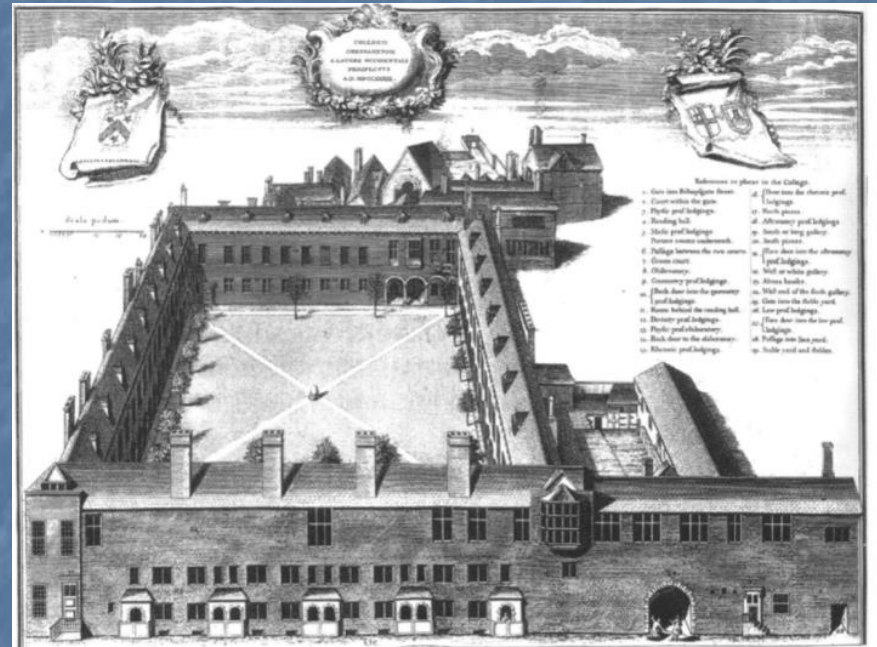
Sir Thomas Gresham, Antonis Van Doshorst, 1565-70 (aged 46-50)

The Will: 20 May 1575

*I Will and Dispose .. unto the Mayor and Commonalty
and Citizens of London ... that they and their successors,
shall give and distribute, to and for the sustenation,
maintenance and Finding Four persons, from Tyme to
Tyme to be chosen, nominated and appointed And
their successors to read the Lectures of Divinity,
Astronomy, Musick and Geometry. . . also Law,
Physick and Rhetorick., within myne now dwelling House
in Bishopsgate Street*

The Terms of the Will

- Use of Sir Thomas's House, Gardens, Stables and other Appurtenances ...
- Funded by income from properties (£50 each pa)
- *'None to be chosen if married'* (wives would hinder)
- Charges of a 'Feast or Dynner' for the Company (£100)
- *Shall have and enjoy the said Royal Exchange, Shops, Vaults, Houses and all other Premisses **for ever** ... as they will answer the same before Almighty God*



Engraving by George Vertue of Gresham College, looking east, showing the entrance in Old Broad Street, from John Ward's Lives of the Professors of Gresham College (1740)

Importance of Astronomy: the first Professorship in England

- 1597 - Gresham College
- 1620 - Savilian Professor of Astronomy, Oxford (Henry Briggs)
- 1675 - Astronomer Royal (from John Flamsteed and Edmond Halley - to Lord Rees)
- 1707 - Plumian Chair of Astronomy & Experimental Philosophy, Cambridge
- 1760 - Regius Chair of Practical Astronomy, Glasgow
- 1785 - Regius Professor of Astronomy, Edinburgh

Teaching of astronomy predates this (ancient times, Bologna 1088, Sacrobosco, Oresme, Cusanus etc) but first professorial appointment when no other in Britain

Access and widening participation

- 'The Cambridge doctors could not conceive that the tree of learning could grow and flourish in the atmosphere of London' (letter cited by Ward 1740, Charles 1845), but:
- Citizens of London all to have free access to the lectures – in *English and Latin* (to 1811)
- 'He instituted a lectureship upon astronomy at a time when the science was not taught in any school or university in this country, when its rudiments were almost unknown and when many of the foremost men of the age believed in astrology'
- Aimed to be popular, practical and clear, not obscure
- Free mass open courses? (Internet, Apps and MOOCs)

Approach to Astronomy

- ‘...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’
- Emphasis on practical applications of astronomy (as with other subjects, eg mathematics, geometry)

Inspired by Astronomy?

- Dangerous times
- New learning of the age
- Influence of contemporaries - Copernicus? John Dee? (likely to have known Dee through patronage of William Cecil, Mercers Company etc)
- Above all, practicalities including navigation

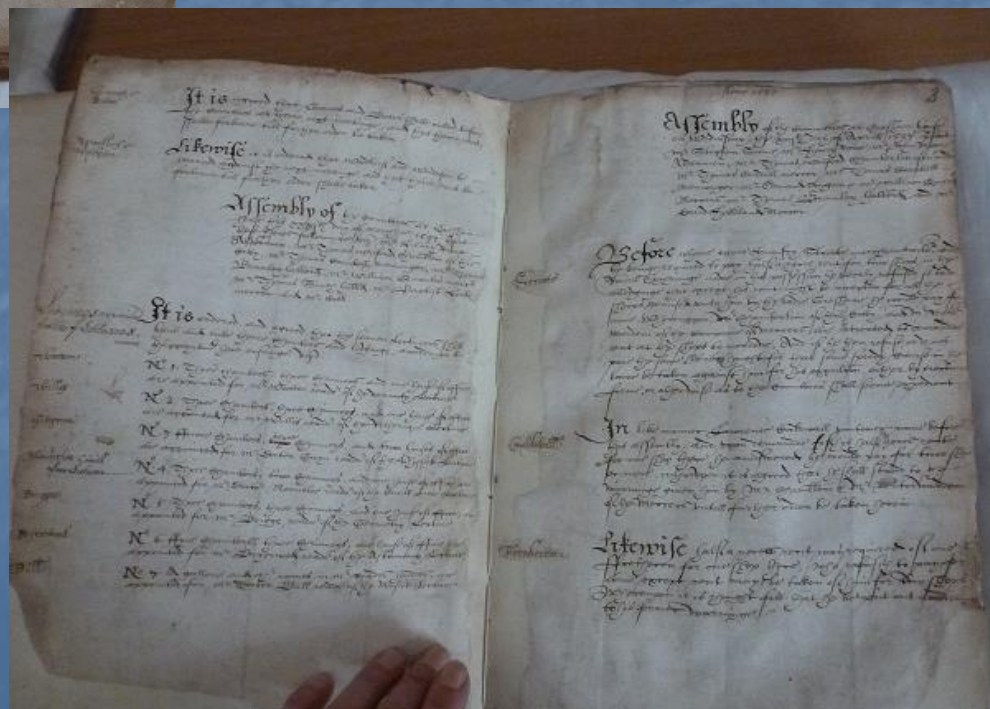
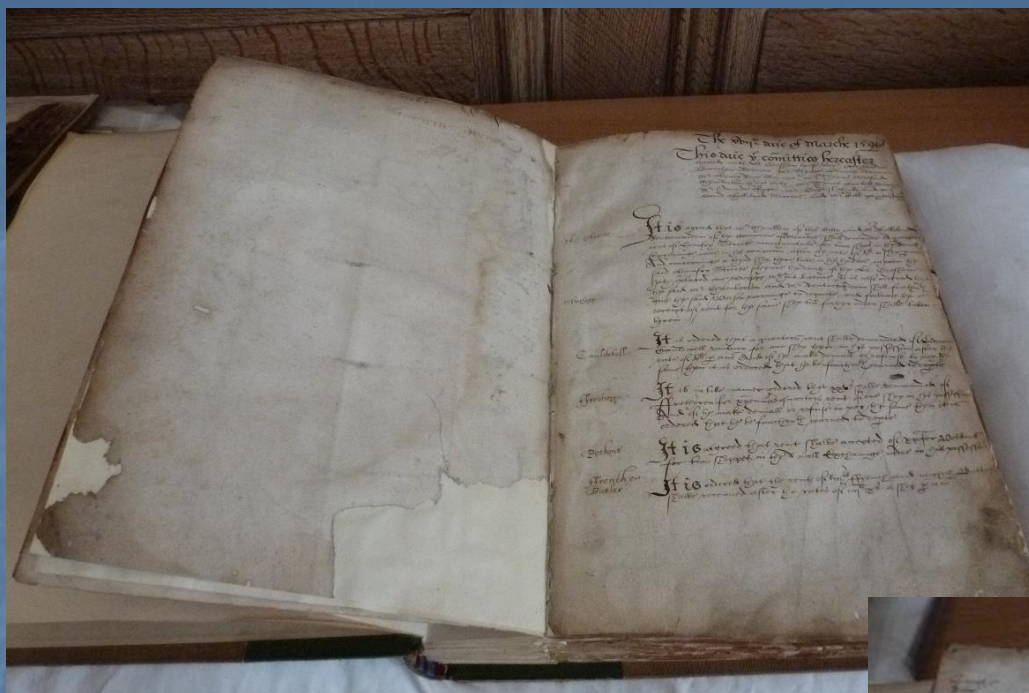


Knighted 1559
(stars and grasshopper)



Gresham's tomb in the Church of St
Helen, Bishopsgate, City of London





Minutes of the Joint Grand
Gresham Committee
17 March 1596

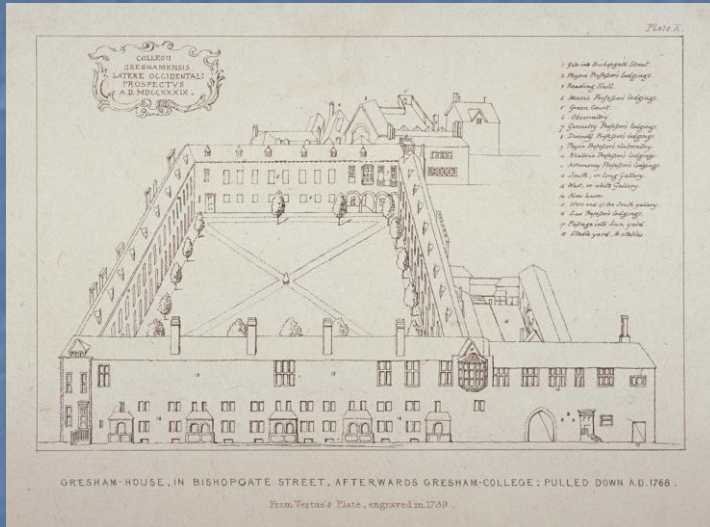
- Cotton. N^o 1. Three chambers, three chimneys, and one house of office,
 are appointed for Mr Cotton reader of the Divinity Lecture.
- Willis. N^o 2. Three chambers, three chimneys, and one house of office
 are appointed for Mr Willis reader of the Rhetorique Lecture.
- Gwynne. N^o 3. Four chambers, ~~three~~ ^{three} chimneys, and two houses of office
 are appointed for Mr Doctor Gwyn reader of the Assick Lecture.
- Mountloe Ciwill Law Lectur. N^o 4. Three chambers, two chimneys, and one house of office are
 appointed for Mr Doctor Mountloe reader of the Ciwill Law Lecture.
- Briggis. N^o 5. Three chambers, three chimneys, and one house of office, are
 appointed for Mr Briggis reader of the Geometry Lecture.
- Brerewood. N^o 6. Four chambers, three chimneys, one house of office are
 appointed for Mr Brerewood reader of the Astronomy Lecture.
- Bull. N^o 7. A gallerie and other rooms in Mr Reader's garden, are
 appointed for Mr Doctor Bull reader of the Music Lecture.

'No. 6 Four chambers, three chimneys, one house of office are
 appointed for Mr Brerewood reader of the Astronomy lectures (no.5
 is Henry Briggis)'

Gresham's
house
(demolished
1768)

Gresham College

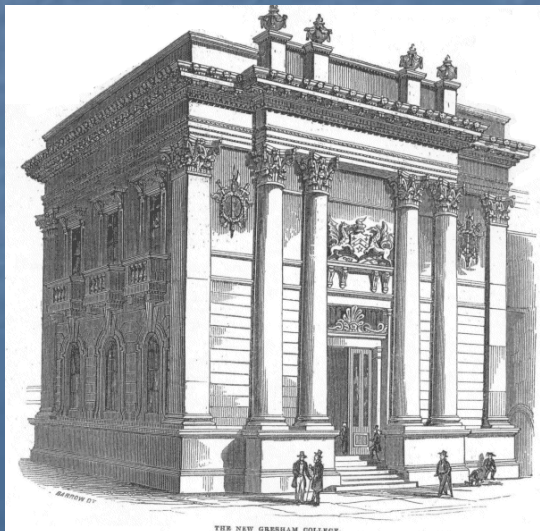
Royal
Exchange



5. Gresham's Exchange, late 1560s. This detail from the huge woodcut map of London, ascribed to Ralph Agas, is probably the earliest representation of the Exchange and almost certainly ante-dates Queen Elizabeth's conferring the epithet 'Royal' upon it. Note the grasshopper atop the tower

Guildhall Library, Corporation of London

Gresham
College,
1842



Barnard's
Inn Hall
14th cent



Gresham Professors of Astronomy 1597 - 2013

1. Edward Brerewood,1596-1613
2. Thomas Williams,1613-1620
3. Edmund Gunter,1620-1626
4. Henry Gellibrand,1627-1636
5. Samuel Foster,1636-1636
6. Mungo Murray,1637-1641
7. Samuel Foster,1641-1652
8. Laurence Rooke,1652-1657
9. Sir Christopher Wren,1657-1660
10. Walter Pope,1660-1687
11. Daniel Man,1687-1691
12. Alexander Torriano,1691-1713
13. John Machin,1713-1751
14. William Romaine,1751-1752
15. William Cockayne,1752-1795
16. Peter Sandiford,1795-1833
17. Joseph Pullen,1833-1875
18. Edmund Ledger,1875-1908
19. Samuel Arthur Saunder,1908-1912
20. Arthur Robert Hinks,1913-1941
21. William Herbert Steavenson,1946-64
22. Sir John Carroll,1964-1968
23. Sir Martin Ryle,1968-1969
24. Roger John Tayler,1969-1975
25. Martin Rees,1975-1976
26. David W. Dewhirst,1976-1980
27. Michael Rowan-Robinson,1981-1982
28. Andrew C. Fabian,1982-1984
29. Raymond Hide,1984-1990*
30. Lord Porter of Luddenham,1990-93*
31. Heather Couper,1993-1996*
32. Colin Pillinger,1996-2000*
33. Frank Close,2000-2003*
34. John D. Barrow,2003-2007*
35. Ian Morison,2007-2011*
36. Carolin Crawford,2011- *

**denotes lectures available*

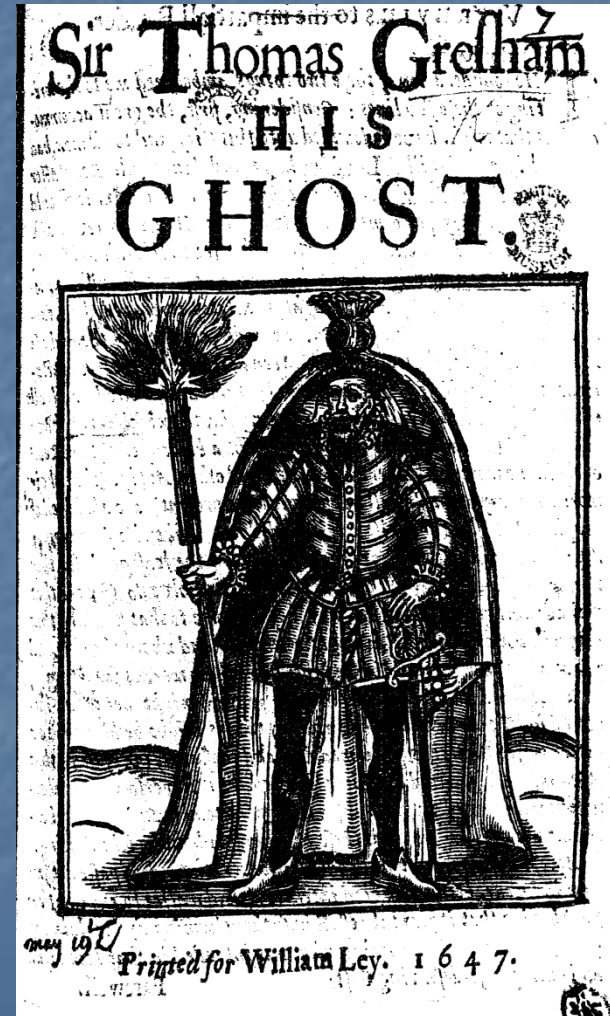
Brerewood and the early years

- ***Edward Brerewood (1596-1613)*** - Scholar, antiquary, at debate when Elizabeth I visited 1592 (***Thomas Williams***)
- ***Edmund Gunter (1620-26)*** - mathematics and the real world, first 'Savilian' Professor, sector and quadrant for calculations of positions of stars, slide rule, navigation for sailors, worked with Henry Briggs (mathematician)
- ***Henry Gellibrand (1627-36)*** - Earth's magnetic field, logarithms, longitude calculated by lunar eclipse observations
- ***Samuel Foster***: observations (eclipses) and planetary instruments. ***Mungo Murray*** was appointed 1637, but resigned due to marriage, Foster re-elected (1641-52).
- ***Lawrence Rooke***: a founder of the Royal Society; longitude; moons of Jupiter; directions for sailors

Gresham's Ghost

Pamphlet in 1647
describes discontent,
professors not fulfilling
obligations; not
meeting the City's
teaching expectations

Difficult times because
of the English Civil War
and unrest, 1642-49



The 17th century

- Important work included:
 - Gresham College 'focus of scientific life in the capital' (Hoskin, 1999)
 - Henry Briggs (logarithms – when science was hardly taught at all at Oxford or Cambridge)
 - Astronomy and navigation, comets, eclipses
 - Accounting, engineering, military matters, chemistry, magnetism (related topics)
 - Helped with competition against Dutch, Spanish, Portuguese
 - International reputation for research, as part of the 17th century intellectual revolution

Christopher
Wren,
appointed 7
August 1657
(age 25)

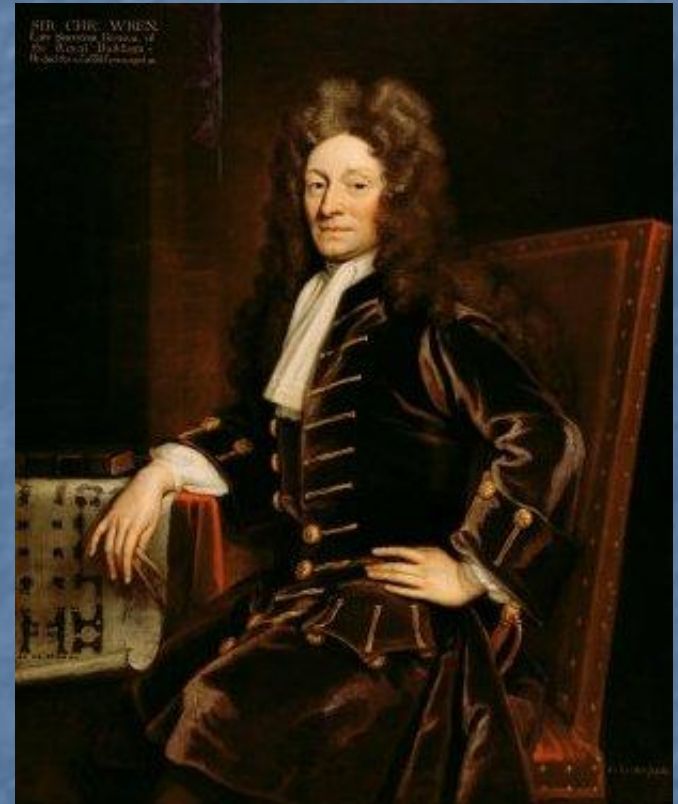
The place of Astronomy Lecturer in Exeter College
being void by the resignation of M^r Lawrence Rook
the late professor thereof there were only two suitors
for the same viz^t M^r Christopher Wren and M^r Tho:
Almon whose petitions being both read, many large
Certificates were produced and read setting forth the
most eminent and admirable abilities of the said M^r
Wren in all kind of Skill (especially Mathematicall)
Learning Whereupon the Court put the Election to vote
and the Choyce fell vpon the said M^r Wren to enjoy

and accommodations thereunto
appoynting.
M^r Christopher Wren, Astronomy professor in
Exeter College having also sent a resignation of
his said place vnto this Comitted under his hand
and seale with two Witnesses thereunto, which was
also affirmed to be a true resignation of his Kinsman
D^r Wren The Court resolved immediatly to
choose

Resignation
1660

Christopher Wren: astronomer

- Lectured (Wednesdays) on telescopes
- Moon, Saturn, Satellites of Jupiter
- Prediction of solar eclipses
- Aids to navigation
- Worked with Boyle
- Influenced Newton's *Mathematica Principia* by challenging Hooke's explanation of motion round the sun

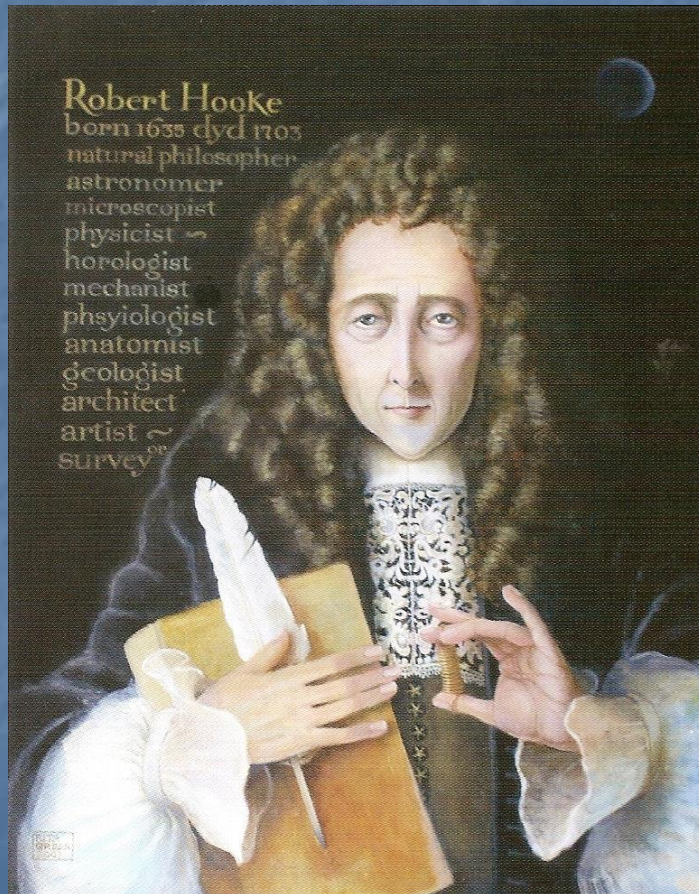


Christopher Wren: architect

- Astronomical elements of St Paul's
- 365 feet high
- Aperture used as telescope
- Also design for The Monument (Fire of London 1666 and giant scientific instrument)
- Designed Royal Observatory, Greenwich



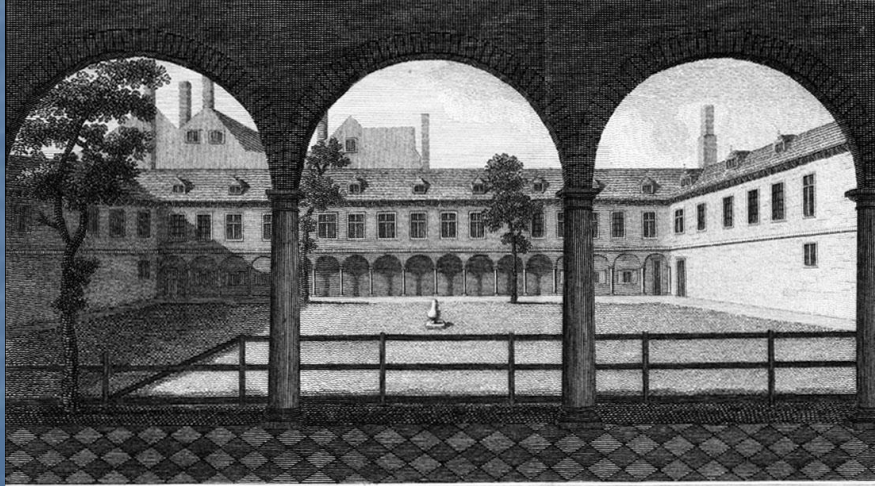
Wren, Hooke and the Royal Society



- Gresham Professor of Geometry
- Tried to measure distance of stars using parallax
- 'England's Leonardo' (Allan Chapman)
- On a damp November evening in 1660 ... a group founded a society "for the promotion of Physico-Mathematical Experimental Learning"
- The Royal Society led to whole new branches of science, profound theories on atoms, evolution, gravity and motion

Founding of the Royal Society

12 men including Sir Christopher Wren, Robert Hooke, Robert Boyle 'to assist and promote the accumulation of useful knowledge' (*Nullius in verba* – take nobody's word for it)



Gresham College, where the first Meetings of the Royal Society were held.



THE ROYAL SOCIETY'S HOUSE IN CRANE COURT (see page 104).

1660 but Royal Charter 1662
(King Charles II)

Into the 18th century

- **Walter Pope** (prof 1660-87) also Royal Society (*Philosophical Transactions*)
- **Daniel Man** (1687-91) **Alexander Torriano** (1691-13)
- **John Machin** (1713-1751) formula to compute Pi to 100 decimal places 1706; calculus priority dispute between Leibniz and Newton)
- **William Romaine** (prof 1751-52), curate?
- **William Cockayne** (1752-95), merchant, Lord Mayor
- Decline again (house sold off 1768)

The 19th century

- ***Peter Sandiford*** (1795-1833) – Rev'd, MA Astronomy, Doctor of Divinity
- ***Joseph Pullen*** (1833-1875) – Rev'd, Cambridge, lectures survive, eg 1833, Lecture on Astronomy: Delivered Before the Grand Gresham Committee, November 28, 1833
- ***Edmund Ledger*** (1875-1908) - The new planet Eros ; early work on nebulae
 - Very few individuals appointed in the nineteenth century
 - Lectures held in various places. New College building in 1842
 - Similar for other professorships
 - Changing trends from early years (Oxford) to more recently (Cambridge, Imperial, Sussex, Manchester, Open University)

20th century - I

- ***Samuel Arthur Saunder*** (1908-1912) - Mathematician and selenographer, 'Saunder' crater on the moon
- ***Arthur Robert Hinks*** (1913-1941) – The astronomical Unit (distance from Sun to Earth) using observations and parallax measurements of asteroid 'Eros', felt out of place in the new astronomy dominated by General Relativity. Rival with Eddington. Radio signals linked with astronomy
- ***William Herbert Steavenson*** (1946-64), amateur astronomer, discovered comet and FRAS while still at school; skilled observer; astronomy correspondent for the Times (day job as surgeon)
- ***John Anthony Carroll*** (1964-68) - Solar Physics Observatory, Cambridge, use of computing machines to reduce labour in tables, Admiralty Computing Service (1943)
- ***Sir Martin Ryle*** (1968-69) – Radio Astronomy, distant galaxies, Nobel Prize for Physics (first astronomy-related)
- In abeyance during World Wars

20th century – II

(2-4 year appointments)

- ***Roger John Tayler*** – stellar evolution, plasma stability (Harwell)
- ***Sir Martin Rees*** – Astronomer Royal, Director of Institute of Astronomy Cambridge, cosmic microwave background radiation, galaxy formation, quasars (public work on science, ethics etc)
- ***David W. Dewhirst*** – Cambridge Observatory, History of Astronomy, editorial work, publishing and popularising
- ***Michael Rowan-Robinson*** – extra galactic astronomy, astrophysicist, observational cosmology, planets beyond Neptune
- ***Andrew C. Fabian*** – X Ray astronomy group, Institute of Astronomy, black holes and the X-ray background
- ***Raymond Hide*** – physicist, Oxford, Imperial, Chicago, London
- ***Lord Porter of Luddenham*** – Nobel Prize in Chemistry, major contributor to public understanding of science
- ***Heather Couper*** – Oxford, Cambridge Observatory, Greenwich Planetarium, great populariser of astronomy
- ***Colin Pillinger*** – Beagle 2 Mars project (unsuccessful), NASA

21st century (the 6th century of the College)

- **Frank Close** (2000-2003) – particle Physics (Oxford, Stanford, CERN, Rutherford Appleton) – popular writings as well (eg *Cosmic Catastrophe and the Fate of the Universe/Apocalypses When?*)
- **John D. Barrow** (2003-2007) – Mathematical Sciences, Cambridge, also Oxford, Berkeley, Sussex; Also Gresham Professor of Geometry (only one precedent); Royal Institution Faraday Prize; philosophical ideas and general readers
- **Ian Morison** (2007-2011) – Jodrell Bank Observatory, Manchester, text books and communicating
- **Carolyn Crawford** (2011- present) – Institute of Astronomy, combining X-ray, optical and near-infrared observations to study physical processes of massive galaxies. Communications (talks and broadcasts)

The present

- Gresham cannot claim all these achievements, but importance as enabling communication of the latest ideas – from navigators to popular audiences and broadcasting
- Attendances at free lectures in person (c 20,000 attendances in person pa)
- Approaching two million pa on website, Youtube, FORA TV, Vimeo, Blip TV etc
- 45% UK and USA (also India, Germany, Australia and Brazil)
- 16,245 hits in one day (Astronomy most popular)
- Archive recordings - over 1,500 lectures
- Also, Facebook, Twitter

Barnard's Inn

Hall, 14th
Century



AD 1770



The Guildhall

‘The dingiest collection of shabby
buildings ever squeezed together’
Charles Dickens, *Great Expectations*



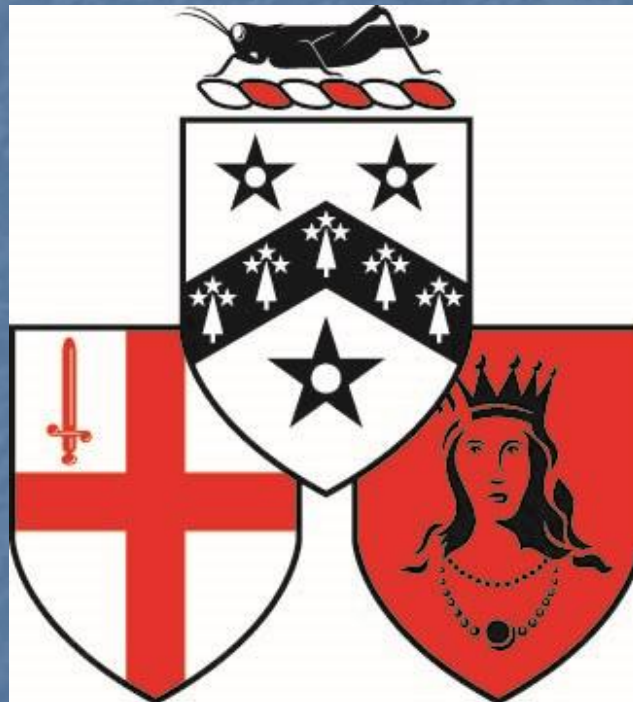
And the future ... 'going global'

- To continue the legacy of 400+ years of lectures by professors who are leaders in their fields (including and especially astronomy)
- Free lectures, seminars, conferences and papers by Gresham Professors and others
- Intellectual debate on subjects of proper concern
- Academic consideration of contemporary problems
- Engaging in intellectual debate (UK and world wide)
- International excellence

Popularity of Astronomy

- Gresham top ten on YouTube (App available now) features four Astronomy lectures
 - Robbert Dijkgraaf, *The End of Space and Time?* (top)
 - Carolin Crawford, *The Sound of Saturn: The Winds of Titan, from the Huygens Probe* (8th)
 - Ian Morison, *Unsolved Mysteries of the Universe* (9th)
 - Carolin Crawford, *Rotation in Space* (10th)

Sir Thomas Gresham's Coat of arms (with London and Mercers)



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