The New London and the Heavenly Jerusalem: Scientists and Craftsmen in Sir Christopher Wren's London

Dr Allan Chapman

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Seventeenth-century European civilisation experienced a sea-change in how it perceived reality. At the heart of this change were a series of discoveries in the sciences which fundamentally challenged classical ideas about the cosmos, about how living bodies worked, and about the very nature of the surface of the planet upon which we live. The great voyages of discovery, anatomists and physiologists such as Vesalius and Harvey, the impact of the Copernican Revolution, and the application of the telescope to astronomy after 1609, had all compelled a fundamental re-thinking about how nature was put together. But hand-in-hand with this went a new, visionary understanding of mankind. Were these new discoveries, which were abounding by 1660, the fulfilment of Biblical prophecies which said that humanity would be allowed to glimpse hitherto unseen wonders before God brought about Judgement and the end of the world? Or were they the beginning of a new and wonderful era of Divinely-sanctioned advancement of the human condition: a sort of partial release from sin in the very world itself, in fact?

No Biblical passage spoke more eloquently on this point - as Sir Francis Bacon made clear in its citation, in Latin, on the title page of Novum Organon in 1620 - than Daniel 12:4: "Many shall run too and fro, and knowledge shall be increased." For men were certainly running too and fro by 1620, as Bacon's depiction of a three-masted ship sailing out beyond the ancient Pillars of Hercules made plain, and new discoveries were daily abounding.

And for Protestants in particular, these changes and discoveries carried with them an especially potent visionary dimension. Was God using the Protestant reformers to bring this Church back to the true path after what seventeenth-century Protestants saw as the perversion of the Catholic centuries? And as Saints Peter and Paul and other followers of Christ in the Early Church brought about miracles and wonders that testified to God's power, so were not the scientific wonders of this new age signifiers of a new wave of natural revelations...

At this time, however, England was coming to see itself as a nation of destiny: the deliverance from the Spanish Armada, Foxe's Acts and Monuments of the English [Protestant] Martyrs (1563), the populist forces unleashed in the Civil Wars of the 1640s, a restored monarchy that was all too aware of the execution of King Charles I in 1649, and the abdication of James II in 1688 after a disastrous attempt to re-Catholicise the country. England's self-image as loyal, libertarian, independently prosperous and endlessly ingenious was taking shape at this period, and it had a profound impact upon the nature of English science. Largely because the restored monarchy of 1660 was impoverished, by the standards of the great European rulers, and was unable to offer much in the way of patronage beyond the granting of titles and graces, English ingenuity looked elsewhere for its tangible support. The Royal Society required a subscription from its Fellows to cover running costs, while it was by independently wealthy gentlemen that much of the real cost of research was borne, and apparatus paid for. The Hon. Robert Boyle, Bishop John Wilkins, and Sir Robert Moray all helped in their various ways, while it had come to be an accepted fact of British scientific life that researchers often paid their own way, from William Gilbert's De Magnete(1600) onwards.

Science, private initiative, Protestantism, and independent commercially-derived wealth were all fundamental assumptions which underpinned "The New London and the Heavenly Jerusalem," especially after the Great Fire of London of 1666. For if London were to rise, Phoenix-like, from its ashes, it could only expect to look to itself for support, and what seemed truly miraculous to outsiders was the speed with which this civic resurrection took place. And what lay at the heart of it was the sheer civic and economic vigour of the City itself, for while most of its merchants had suffered terrible financial losses during the Fire, its springing back to life thereafter speaks volumes about the confidence and wealth-generating capacity of the great mercantile metropolis.

And when commercial London was up and prospering, and was substantially re-built within eight or ten years of the devastation, the remaining challenge lay in finishing the hundred City churches, and most spectacularly of all, St. Paul's Cathedral.

It would be inconceivable today, if a great capital City should be devastated, that the two men appointed to supervise its resurrection should be, respectively, a Professor of Astronomy and a Professor of Geometry, neither of whom had had any formal training in practical building. Yet this is precisely what happened over 1666-1667. For Dr Christopher Wren (knighted 1672) was Savilian Professor of Astronomy at Oxford, and had previously been Gresham Astronomy Professor, while his co-worker Robert Hooke had been Gresham Geometry Professor since 1665. The men were old friends, and had not only met at Oxford a decade previously, but were also distantly related by marriage. Wren became Surveyor to King Charles II, while Hooke was Surveyor to the City of London. One was responsible for the rebuilding of Churches and Royal buildings, while the other was responsible for street widening, new fire regulations, houses, shops, Livery Halls, hospitals and civic administrative buildings.

Both men were eminent figures in the "New Jerusalem" culture of England, while their lives and works did much to further confirm the same. Both were sons of clergy: Wren, the son of a Dean of Windsor of the Caroline, pre-Civil War age; Hooke, the son of an Isle of Wight clergyman of Royalist, Protestant persuasion, who had served as a tutor to the Island's powerful Oglander family, and had probably been a member of the delegation presented to the embattled King Charles I at Carisbrooke Castle. Wren was probably educated by private tutors (the references to him having been educated at Westminster School are ambiguous), though Hooke did go to Westminster. Both went up to Oxford - Wren to Wadham, and Hooke to Christ Church - where both seem to have been "talent-spotted" by the Revd. Dr John Wilkins, Warden of Wadham, and head of the Oxford Philosophical (Scientific) Club.

Yet what lay at the heart of Wren's and Hooke's way of thinking, and which made them eminently suitable for re-building post-Fire London, can be summed up thus: geometry, proportion, good taste, a fascination with how structures held together, and classical literacy. For geometry and proportion underpinned the mathematical astronomy of the age, in which instruments and physical analogies were used to explain the movements of the planets through the void of space. A fascination with natural structures - of insects, crystals, plants, flames and fossils - had taught both men how to see architecture in everything. Wren and Hooke had been bedazzled by the microscopic unity of nature, and Hooke'sMicrographia (1665) never let its readers forget that on every level, from the lightweight geometrical strength of a fly's wing to the layered structure of plates of mica, mathematical propositions and counterbalanced forces lay at the heart of everything. And furthermore, Hooke and Wren were artists, with eyes sensitive to aesthetic shapes and compositions, and as accomplished Latinists they were fully familiar with Vitruvius's De Architectura (c. AD 10). And so one begins to see the wisdom underlying their respective appointments.

Yet not only did elegance and geometry underpin Wren's and Hooke's architecture: they also underpinned their science. And added to geometry and elegance were carefully-devised and meticulously-executed experiments. St. Paul's Cathedral was the most daring architectural experiment to be made in England since the middle ages, as Wren had to first design a classical interior of unparalleled vastness, by English standards, and then to crown it with the first great dome ever built in these Islands. Having won success with his first dazzling architectural creation, the Sheldonian Theatre, Oxford, in the late 1660s, Wren felt, calculated, and experimented his way towards the devising of his domed masterpiece in the City of London.

The Sheldonian, however, had been his first challenge in applied mathematical ingenuity, for in it Wren had not only to take the basic format of a classical amphitheatre and adapt it to the harsh demands of a north-European climate; he also had to make it serve a secondary, concealed, function: namely, that of a printing factory for Oxford University Press. His theatre had to have a large internal space, capable of seating several hundred people, yet without any internal columns to support the roof. And the high walls had to be strong enough, through concealed buttresses, to allow penetration by large glazed windows, so that, even in winter, the academical ceremonies held therein would have plenty of natural illumination, with yet more windows to illuminate the enormous attic space where the compositors and printers worked, thirty feet above the heads of the academics seated below. And if that wasn't a baptism of fire for scientifically devised, high art, elegant architectural engineering, it would be hard to know what was.

All this, moreover, had been preceded by Wren's researches into the shapes, curves, and interconnected geometry of planetary motion. And while Robert Hooke's great City buildings, such as Bethlehem (Bedlam) Hospital and the College of Physicians' amphitheatre, were not so daring in engineering terms as those of Wren, it was Hooke who was the greater experimental scientist of the two. It is sad that in spite of all the many buildings that he devised and oversaw, only the Fire Monument in the City of London and the beautiful little Church of St. Mary Magdalene, Willen (now part of Milton Keynes) still survive. But the closeness with which Wren and Hooke worked together is made manifest by the diary which Robert Hooke kept between 1672 and 1680. For the two friends saw each other almost daily, to drink coffee, to dine, to discuss plans, to visit building sites, or to attend meetings of the Royal Society and discuss experimental researches. For what is amazing about Hooke in particular is the sheer diversity of the projects in which he was engaged at any one time. As if supervising the re-building of London were not a full time job in itself, the late 1660s and 1670s saw him fully in harness as an experimental scientist, conducting fundamental researches into optics, mechanical physics, physiology, and planetary dynamics, not to mention re-designing watches and astronomical telescopes.

At the heart of Hooke's science was vibration. Though the word "energy" had not yet come into use in the late seventeenth century, Hooke talked of "force", "power" and "recoil" as equivalents. Guided in part by Sir Francis Bacon's ideas, Hooke interpreted a whole body of experimental data along vibrative, mechanical lines, for wherever one looked in nature, one encountered motion, and that motion seemed to act by means of shocks, impulses, or beats. Sound was the obvious example, and so, he argued on the strength of several experiments, was light. Suspended pendulous bodies vibrated in perfectly even beats when they moved, and he even speculated that gravity itself acted by means of pulses. And did not the gravitating force of the sun - just like light, sound, or magnetism in laboratory experiments - become weaker the further it extended into space, thereby explaining why Mercury completed its orbit in 88 days, and remote Saturn in 29½ years. What is more, Kepler's widely-known laws of planetary motion demonstrated a clear mathematical relationship between the distance and velocity of a planet as it moved around the Sun in elliptical orbit.

But if the weight of terrestrial objects depended upon their relationship to the centre or the surface of the Earth - as Bacon himself had mused in the "Centuries," or hundred of things to be tested - how could one devise an experiment to demonstrate the same? Indeed, it was in pursuit of this end that Robert Hooke had his first scientific connexion with St. Paul's Cathedral: Old St. Paul's, in fact, which would be destroyed by the Great Fire in 1666.

From the high Gothic vaulting of the medieval Cathedral, Robert Hooke suspended a 16-ounce weight on a fine cord. One end of the cord was tied to the arm of a precision laboratory balance, hanging free over a ledge, so that the 16-ounce ball was suspended 91 feet below, just above the Cathedral floor. In the opposite balance pair were weights that corresponded precisely to the 16-ounce ball and suspension cord.

What Hooke was trying to do was see if a 16-ounce weight weighed differently when close to the Earth's surface than it did 91 feet above it. It was a brilliant piece of experimental physics thinking, and while he did find that the suspended weight registered slightly heavier than did the 16-ounce in the balance pan 91 feet above it, he was cautious about his results. Could the string have become heavier by absorbing moisture? And could slight air currents have affected the string?

Hooke tried this experiment several times, at Old St. Paul's, at Westminster Abbey, and down a deep well near Epsom. And while the lower, suspended, weight always seemed heavier, he was nonetheless aware of the potential disturbances caused by local conditions.

Robert Hooke's fascination with the pull of the Earth also led him to develop experiments first tried by Jeremiah Horrocks in Lancashire in the late 1630s. Why, for instance, if one suspended a heavy object on the end of a long piece of string, and gave it the gentlest of pushes, did its orbit gradually assume an elliptical path around its point of suspension, and why did the long axis of the ellipse gradually precess, or creep backwards from its starting point? Was it something to do with the Earth's pull upon the object, and perhaps the Earth's axial rotation? And not only did Hooke demonstrate these pendulum experiments indoors, on a relatively short string, to the Royal Society in the mid-1660s; he also tried them from the top of St. Paul's tower! Old St. Paul's Cathedral as a physics laboratory, in fact - and a wonderful demonstration of the unity in which science and the Christian Faith were seen as acting, as the ingenuity of the men of the New Jerusalem probed forever deeper into the wonder of God's creation.

Of course, it was also vibration that lay at the heart of Hooke's work on clocks and watches. Galileo had first discovered the evenness of swing, or isochronalism, of a suspended body in 1583, and Christiaan Huygens the physicist and Solomon Coster the clockmaker had first employed this discovery to make the first pendulum clocks, in Holland, after 1658. The pendulum, indeed, was to revolutionize the accuracy of time-keeping overnight, by exploiting the physical relationship that exists between the energy present in a swinging weight (the pendulum bob) and the pull of gravity which will make the oscillations cease if the energy fails. The perfect beats of a pendulum suddenly meant that after 1658, clocks went from being, at best, accurate to ten minutes per day to being scientifically reliable to five to ten seconds per day.

And if this is what happened when energy was put into a pendulum and released, by means of clockwork, Hooke asked whether there was a similarly equal input and output of energy when one tensed and released a spring. Could one use a fine "hairspring" to control the oscillations of the balance wheel of a watch? Hooke was later to claim that it had been when he was still a student at Oxford in the late 1650s that Professor Seth Ward (later Bishop of Exeter and then Salisbury) had encouraged him to undertake experiments with pendulums and springs. He was certainly experimenting with spring watch balances by1664, though it was not until 1675 that he entered into a priority dispute with Huygens for the invention of a practicable watch spring balance. But it had also been at Oxford that this lifelong fascination with spring action had been stimulated in other ways as well: most notably in his study of bird and insect wings, and in assisting the Revd. Dr John Wilkins, Warden of Wadham College, to devise a flying machine that was to be supported by a vibrating wing action. Of course, the machine never got off the ground, though Hooke's involvement in the project gives a sense of the intellectual apprenticeship that he had passed through before he, and his friend Christopher Wren, found themselves designing the New London and its spectacular new Cathedral.

Another area of study which the two friends shared was the geometry of arches. Ever since the twelfth century, when French Master Masons had begun to experiment with the load-bearing properties of Gothic arches, the geometry of the arch had fascinated European, and Arabic, applied mathematicians. Soaring arches were not only used to enclose great public spaces: they also lay at the heart of the dome as an architectural structure, for in some respects one could think of a dome as nothing less then an arch rotated through 360 degrees. Arches and domes involved all manner of complex thrusts and loads, and both had a tendency to burst and explode outwards if their thrusts were not met, and countered, in exactly the right places.

And this, one might argue, is one reason why a pair of astronomers were so singularly well-qualified for such matters of advanced, even experimental, architectural engineering. For both Wren and Hooke had a masterly knowledge of planetary geometry, and through Kepler's laws of planetary motion, experiments with the shapes described around a suspension point by moving pendulums of various kinds, and a knowledge of how machines, such as clocks, functioned, both had come to a remarkable understanding of how forces moved within complex structures. And a great building, such as St. Paul's Cathedral, is, in many respects, a static machine. It remains static because all of its thrusts and forces are channelled through an elaborate array of mathematically-determined curves, and finally stabilised in deeply-dug foundations. And should the machine move in any way, and the house-of-cards-like offsetting forces become displaced, then all would come crashing down.

In his Diary (5June and 26September 1675), and in a list of inventions appended to his book Helioscopes (1676), Robert Hooke produced an early mathematical analysis of curves and arches, and in particular, he discussed catenary arches. Such an arch is formed when a chain, or rope, is suspended between a pair of supports. Depending on the length of the chain, and its tension, it will produce a curve of a given amplitude, like a section of a planetary orbit, each part of which will have mathematical properties. It was Hooke's belief that a proper mathematical understanding of the properties of these curves - when turned upside down to produce arches - would be of inestimable importance to architecture, and it is not for nothing that catenary propositions were used in Hooke and Wren buildings, most notably in St. Paul's Cathedral. For the great (and concealed) brick cone that supported the timber structure of the dome was a catenary arch.

So astronomy, geometry, aesthetics, experimental physics and even a sort of concrete theology all coalesce in St. Paul's: for did not Wren's great Cathedral encapsulate the greater mathematics which ran through the entire Creation: from the perfect shapes of crystals and the vibrative mechanism of a fly's wing at one end of the scale, to the perfect curves along which the orbiting planets moved at the other...

In addition to these wider intellectual concerns, the streets and alleyways around St. Paul's Cathedral housed another form of novel ingenuity: publishing and scientific instrument making. St. Paul's churchyard, only a few yards to the north of both old and new St. Paul's, had become the centre of the London - and national - printing trade. One of the tragedies of the Great Fire of 1666 followed from the fact that many of the printers, publishers, and booksellers whose premises were huddled around the Cathedral had moved in their stock, by permission of the Dean and Chapter, on the assumption that it would be safer there, not imagining that the great Gothic edifice would itself fall prey to the conflagration. A bundle of the manuscripts of the 1630s Lancashire astronomer, Jeremiah Horrocks, for instance, deposited with the printer, were lost, "in Mr Brook's hands, by the Fire". What survived of Horrocks's papers, in the possession of people outside London, was published by the Royal Society in 1672. Yet when London was rebuilt after 1666, St. Paul's churchyard had sprung back to life with vigour, and was printing and publishing books and pamphlets long before Wren's great Cathedral itself began to rise from the ashes.

Brooks, however, did not print or publish the Royal Society's Philosophical Transactions. That was in the hands of John Martyn, who worked at the sign of The Bell. Between March 1665, when the Transactions were first published, and 1669, however, he had given the location of his premises on the title page as beyond Temple Bar, which would have been just outside the square mile of the City of London. By 1670, however, Martyn had re-located the firm operating at the sign of The Bell to St. Paul's churchyard. Temple Bar, of course, had been beyond the westerly limits of the Great Fire, though one wonders what details of business history his move may have concealed. With the big City printers of St. Paul's churchyard burnt out and no doubt facing financial crisis, did Martyn thank his lucky stars and make a bid to move up-market, re-locating his already thriving suburban business into the very heart of the City, in brand-new premises? As the Royal Society's own printer, seizing such a commercial opportunity would be quite understandable. It would be interesting to know more about John Martyn, his fellow-printers and publishers, and other businessmen who survived the Fire, due to fortunate suburban locations, and who had the spare cash, contacts, and commercial acumen to re-locate in more prestigious locations.

And while not actually connected with the great Cathedral itself, Wren, Hooke, and their friends in Gresham College and the Royal Society knew many prosperous businessmen who made new lines of commodities that were of direct interest to the scientists. One such individual who springs to mind is Thomas Tompion, the celebrated clock and watch maker. The man, indeed, who turned Robert Hooke's drawings into clocks and watches of revolutionary design, and who, under Hooke's guidance, made all the clocks and precision measuring instruments that went into the Royal Observatory, Greenwich, after 1675. (Indeed, Sir Christopher Wren had designed the Observatory as a building, and Hooke had designed the astronomical instruments that went into it, and while the King had paid for the Royal Fabric - £520-9s-1d - it had been a private individual, Sir Jonas Moore, who had paid for the Hooke-Tompion instruments from his own pocket.)

Thomas Tompion's premises were in Water Lane, off Fleet Street, a short walk from the Cathedral, and were a favourite haunt of Hooke, as well as of other early Fellows of the Royal Society. Yet Tompion was only, perhaps, the most famous of a succession of clock, instrument, and precision engineers who thrived within a stone's throw from old and new St. Paul's. Elias Allen of Fleet Street, who died in 1654, had been one of the leading pre-Fire instrument makers. And a couple of generations later, when Wren's new Cathedral was still shining pristine white at the beginning of the eighteenth century, Tompion's business was taken over by his apprentice and business partner, George Graham. Like Tompion, Graham was, and remains, one of the legendary clock and watchmakers of all time, who, like his old master, made a brand new set of major astronomical instruments for the Royal Observatory, Greenwich, after 1721. Graham's genius as an experimental scientist even led to his being elected a Fellow of the Royal Society in 1720. He made his post-1721 Greenwich instruments for Edmond Halley, following Halley's appointment as Astronomer Royal in 1720, upon the death of the first incumbent of that Office, the Revd John Flamsteed. But we shall encounter Halley again in another St. Paul's connexion.

Clockmakers, instrument makers, opticians who made Hooke's telescopes and microscopes, such as Richard Reeves and Christopher Cock of Long Acre, printers, publishers, Gresham College Professors, and Fellows of the Royal Society would all have lived under the shadow of St. Paul's, both old and new, for both churches were, quite simply, the biggest, grandest, and most conspicuous edifices in the pre- and post-Fire City.

Yet there was another set of social relations and personal friendships that bound St. Paul's to the world of science, learning and the spread of ideas. Take John Tillotson, for example. He was a young Cambridge graduate from Yorkshire who seems to have formed part of the sphere of influence of the abovementioned Dr. John Wilkins of Wadham. Now in 1656, Wilkins, in a diplomatic move that was to retard his subsequent ecclesiastical career after the Restoration in 1660, married one Robina French, relict of the late Canon French of Christ Church, Oxford, and a lady a good bit older than himself. But Mrs French was Oliver Cromwell's youngest sister, and obviously not a family connexion to boast of after 1660. Robina, however, had a daughter with Canon French, a young lady named Elizabeth, who became Dr. Wilkins's step-daughter.

Because Wilkins was one of the most famous and undoubtedly charismatic intellectuals around Protector Cromwell's "court" (along with John Milton) and had a formidable reputation as a promoter of experimental science, he was a person to attach oneself to if one were a Protestant theologian. Thus the young Mr Tillotson seems to have encountered Miss Elizabeth French, and subsequently to have married her. Tillotson also met and formed a lifelong friendship with Robert Hooke, who in the late 1650s was also part of the Wilkins circle. When the Restoration of the Monarchy came in 1660, both Wilkins and Tillotson slid into the Church of England, not being Puritans, though both were staunchly anti-Catholic. Wilkins' charm and learning soon won him a Deanery, and in 1667 the Bishopric of Chester. Tillotson likewise thrived, being a brilliant preacher and lecturer, with sufficient scientific interests to become an early Fellow of the Royal Society.

John Tillotson rose quite rapidly within the Anglican hierarchy, becoming a Prebend, then a Canon of St.

Paul's, before becoming Dean in 1677. This close association with the Cathedral during the crucial years of the 1670s and 1680s would have meant that he would have been a leading member of that Chapter which decided to adopt Wren's classical design for the new Church. And on his way up the ecclesiastical ladder, Tillotson also served as Dean of Canterbury.

Hooke's diary for the 1670s makes clear his on-going friendship not only with John, but also with Mrs Elizabeth Tillotson. It appears that Mrs Tillotson, like many ladies of the day, was skilled at brewing medicinal preparations, and seems to have produced a particular concoction which the hypochondriac Hooke believed did his troublesome stomach much good. Hooke dined with the Tillotsons, he consumed Elizabeth's potions and often, and rather confusingly from our point of view, referred to John by whichever title in the Church he currently occupied, such as the Dean of Canterbury or the Dean of St. Paul's. Then in 1691 John Tillotson F.R.S. became Archbishop of Canterbury, and no doubt signifying his warm regard for his old friend, he promptly conferred a Lambeth Doctorate of Medicine upon Robert Hooke.

Yet in addition to Tillotson, as Canon and Dean of St. Paul's, one should not forget the part that people attached to St. Paul's School played in the New Jerusalem and the new scientific movement. There was, for instance, the Revd Dr Thomas Gale, High Master of the School and a Fellow of the Royal Society, and later Dean of York Minster. He was also a friend of Hooke, Wren, and Tillotson. Hooke mentions several conversations with Gale in his Diary, such as in September 1678, when the group of friends discussed a new French translation of the Bible, and the "Alexandrian Bible of Tecla", which seems to have been an ancient Biblical manuscript that had only recently come to light in Egypt. Sir Christopher's interconnected interests in science, architecture and Biblical scholarship were such that, as Hooke recorded, "Sir Chr. Wren would have it printed from copper plates," for in this way it would have become more accessible to scholars.

St. Paul's School also produced two pupils who were to play prominent roles in the early Royal Society. The first was Samuel Pepys, the Diarist. On a cold January day in 1649, Pepys had slipped out of school and made his way to Whitehall, where he had witnessed the public execution of King Charles I on a scaffold outside the Banqueting House. Sixteen years later, as a rising Civil Servant with money in his pocket, Pepys had purchased, read, and been transfixed by Hooke's Micrographia. He had come to meet Hooke, whom he admired profoundly, and while himself a scientific dilettante first became a Fellow of the Royal Society, then, as a public figure, served it as President in 1684. Samuel Pepys, indeed, was characteristic of many men of the New London: intellectually curious, artistic, philosophical, and bedazzled by the power of the new science as embodied in men such as Hooke, Wren, the Hon. Robert Boyle and others, and who became Fellows of the Royal Society as friends of science rather than as active researchers in their own right.

The other St. Paul's School man was Edmond Halley. Born in October 1656, Halley would have been at the School in the immediate post-Fire period, when London was first a smoking ruin, and then a city magically rising from its ashes. Halley later recorded that he was making both astronomical and geomagnetic observations while a schoolboy, and would have been Thomas Gale's pupil during his last year at St. Paul's, 1672, which was the year in which Gale took up the High Mastership. Halley went up to the Queen's College, Oxford, in 1673, mapped the constellations of the southern skies from St. Helena between 1676 and 1677, and was elected F.R.S. at the age of 22. His subsequent career was to be one of the most brilliant in the whole of Western astronomy, in which he was in the scientific public eye from his teenage years to his death, as Astronomer Royal, in his 86th year in 1742. Indeed, in his long life, Halley the Londoner would have had childhood memories of the great Gothic St. Paul's destroyed by the Fire. He would have seen the ruins cleared, the new walls begin to rise in the mid 1670s, and Wren's magnificent dome completed in 1710, two years after the completion of the Lantern. And Halley would have lived into the same decade, the 1740s, in which the visiting artist Antonio Canaletto immortalised the early Georgian Cityscape, with all the buildings and towers of London dominated by the vast magnificence of Wren's great Cathedral.

Sir Christopher Wren's St. Paul's was a masterpiece by any standard. It was England's first cathedral built since the Reformation. Its grand, open, internal vistas, moreover, were not only our first national essay in large-scale Baroque classicism, but constituted in themselves a physical expression of Protestant Anglican theology. For in the context of the "Priesthood of believers" which lay at the heart of Protestantism, there were no holies of holies, choir screens or separating areas: just one great public space, where all people - Bishops, Priests, laity, men and women - came together to worship, witness the English liturgy, and partake in the Eucharist in accordance with the rites and ceremonies of the Book of Common Prayer. For no matter how much people were divided from each other in terms of wealth, social position or rank, they all stood equal before God, and had a right to hear His Word in their mother tongue in a consecrated public space.

Saint Paul's was also destined to become the internationally-recognised symbol of London: Resurgam - the post-Fire City risen from the ashes to new life and vigour. For throughout the eighteenth, nineteenth, and most of the twentieth centuries St. Paul's was by far the most physically dominant building in the metropolis, and is still the grandest, the top of its 365-foot lantern, finished 300 years ago in 1708, given extra height by the rising ground upon which the Cathedral stands. Its crypt provided the resting places for national heroes such as Nelson and Wellington, while its miraculous survival throughout the devastation of World War II became a focus and an inspiration for the nation's courage and determination to withstand and to win during the dark days of the Blitz.

Both Wren and Hooke were men of vision. And whether the world was on the brink of the Biblical Armageddon, or whether it was going to win a sort of redemption by means of new and wonderful discoveries, they nonetheless knew that they were living and working in stirring times. It is unlikely, however, that even they realised what science and experimentation would achieve in the centuries ahead, or what place St. Paul's Cathedral would come to occupy in our wider national story. When Sir Christopher died in 1723, at the age of 91, he would be interred in the crypt below, while the Latin inscription inside the base of the dome -Circumspice, si monumentum requiris ("Look around you if you are seeking [my] monument") - would become his public memorial.

Robert Hooke, however, had pre-deceased him by twenty years, and in March 1703 had been buried in his Parish Church, St. Helen's, Bishopsgate, which was near Gresham College. His bones, alas, were disinterred in the late nineteenth century, when the old graves were cleared out for the re-laying of the pavement of St. Helen's, and he was reburied in an unmarked mass grave at the Wanstead Cemetery. It is hoped, however, that in this tercentenary year, the Dean and Chapter will authorise the placing of a memorial plaque to Hooke in the crypt, alongside that of his friend Sir Christopher.