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Instruments and Relics:

The History and Use of the Royal Society's Object Collections c. 1850–1950

Rebekah Higgitt

Abstract

Despite the age and prestige of the Royal Society of London, the history of its collections of scientific instruments and apparatus has largely been one of accidental accumulation and neglect. This article tracks their movements and the processes by which objects came to be recognised as possessing value beyond reuse or sale. From at least mid-century, the few surviving objects with links to the Society's early history and its most illustrious Fellows came to be termed 'relics', were treated with suitable reverence, put on display and made part of the Society's public self-presentation. If the more quotidian objects survived into the later 19th century, when their potential as objects for collection, research, display, reproduction and loan began to be appreciated, they are likely to have survived to the present day.

Introduction

Most research on the history of the object collections of the Royal Society (RS) has focused on its early years – when the Repository played a significant part in its activities and reputation – and particularly on natural history.¹ Indeed, it is often assumed that the Society had no scientific collections after its move from Crane Court to Somerset House in 1780, when its natural history and geology specimens were given to the British Museum. However, as well as keeping and adding to its library and collections of portraits, busts and medals, it retained overlapping and changing holdings referred to as scientific instruments, apparatus and relics. It is perhaps more accurately understood as an assemblage of objects than a collection; arriving by different routes, they were things neither deliberately collected nor disposed of.² As Allen Simpson has shown in his exploration of the collection and its star object, Newton's reflecting telescope, up to the early 19th century, attention was sporadic at best. Indeed, the 1671 telescope was broken, lost and later replaced by another, gifted in 1766 (see Fig. 1).³ Despite the significance of the institution, this was a story of inadequate storage, uncatalogued, unnumbered and broken objects, and items borrowed and not returned. Tracking the collection into the mid-nineteenth century and beyond likewise shows a history largely of neglect and accidental accumulation, punctuated by moments of attention. Those moments and their causes are, however, revealing and over time have helped turn the 'historical accumulation' into something more obviously resembling a collection.⁴

Attempts within the Society to inspect, catalogue and dispose of its accumulation of instruments and apparatus tended to be prompted by issues around storage, although over time they increasingly reflected an interest in their investigation, use and display. This was very significantly prompted by the arrival of public exhibitions and museums that included instruments and apparatus, most pertinently here the South Kensington Museum, created after the 1851 Great Exhibition, and the 1876 Loan Collection of Scientific Apparatus, part of which joined the science collections at South Kensington around which the Science Museum coalesced (the title was used informally from 1885 and officially from 1909).⁵ Also significant from the end of the nineteenth century was the interest and knowledge of collectors of historic scientific instruments.⁶ As will be shown, therefore, many of the prompts – important moments whereby value was created and at least some of the objects began to be considered as exceptional – were external.⁷ However, the mere existence of the objects

as RS property has also had its own impact, urging investigations, stimulating opportunities for display and encouraging a particular sense and presentation of the institution's identity.⁸

In order to understand the fate of this complex collection, this article will firstly give an overview of its composition and whereabouts over time. It will then look at how understandings of its role and value changed, considering some of those who were responsible for it and some of the ways in which it was put to use. It is worth highlighting that, unlike collections assembled by universities and museums, those of the RS served neither teaching nor public exhibition, although some aspects are similar to university collections arising from research. Unlike the Royal Geographical Society and Royal Astronomical Society, it did not develop a collection that might be put at the service of its members, although a few objects were borrowed and used repeatedly.⁹ Public presentation of the Society, its buildings and their contents were, however, to become important, particularly as a result of its annual *conversazione* and the illustrated press. The 'historical accumulation', their cohesion as a collection and significance, or otherwise, to the institution are, therefore, distinct.

As a corporation, gifts and bequests to the RS have been important, deliberately linking individuals and their reputations to that of the institution.¹⁰ So, too, are identifications of use, user or maker that cast good light the institution's history and generate a sense of connection between past and current Fellows.¹¹ Here the distinction between some of the instruments and other objects at the RS – including portraits, medals, manuscripts, relics and institutional regalia – are muddled, each potentially used 'to keep predecessors alive in the minds and memories of those who feel themselves connected to them' and 'further reinforce such affinities'.¹² However, while relic instruments might be considered to be distinct from other scientific instruments, the fact that they were instruments was not incidental. They were also to play a role in defining and changing the perceived value of more quotidian objects within the same institution.

Object biography has played, and continues to play, an important role in uncovering changing attitudes to science and its material culture over time and in different spatial or geographical contexts.¹³ It would be possible to discuss the active 'afterlife' of several key items from the RS collection – especially Newton's telescope and the three long-focus objective lenses made by Christian and Constantine Huygens – in order to show the variety

and complexity of possible object histories in this context. Such stories demonstrate the importance of illustrious provenance but also that the physical and visual properties of the objects have affected the people encountering them and shaped their trajectories. However, it is impossible to do this for every object: considering the collection as a whole brings additional challenges but also a range of benefits. This group of objects has always been in flux and is exceptionally hard to pin down, yet it is *as a collection* that the majority of its contents has had prolonged life. Gaining value through the prestige of associations – with the RS, its Fellows and with other objects (their stable mates, as it were) – has saved them from resale or the scrapheap, extracting them from their initial sphere of exchange, as new and second-hand instruments, and placing them next to the 'priceless' objects of major national institutions.¹⁴ Today what remains of this collection largely sits between the Royal Society and the Science Museum, to which much of the collection has been or is currently on long-term loan (see the supplementary online lists).

Tracking the Royal Society's object collections

When a committee was sent to examine and report on the contents of the Royal Society's Repository, kept in 'a common passage or thoroughfair', in the years 1729-34, they expressed concern about the damage to natural history specimens, the loss and theft of valuable rarities and the fact that 'The Instruments and Models of Engines are generally so broke to pieces that few of them are worth preserving'.¹⁵ Despite some serious efforts to update Nehemiah Grew's 1681 catalogue, which included instruments and models among the list 'Of Artificial Matters', it was found that poor conditions and loss of institutional memory meant that many objects could no longer be identified.¹⁶ The physical conditions were improved but other items were missed off the lists because they were kept elsewhere, for example the historic Huygens lenses and microscopes by Antonie van Leeuwenhoek, which were intended for use but kept locked in the closet of the Council Room from 1728.¹⁷ The latter nevertheless went missing at some point before the 1830s, probably after an unrecorded loan.¹⁸ Another inspection, in 1763, produced inventories, the disposal of broken objects and greater care in arrangement, while disposals to the British Museum in 1780 left the Society with a collection of instruments and apparatus that was understood to be of continuing use, whether as historic reference or for new investigations.¹⁹

This collection included a few items that had been kept since the earliest years, typically gifts intended for use or examination at meetings, as well as instruments acquired in the

following centuries. These had usually been supplied by the Society to support scientific surveys and expeditions, such those to observe the eighteenth-century transits of Venus, funded by George III, or government-prompted investigations into weights and measures or geodesy.²⁰ From 1850 the Society administered an annual Government Grant of £1,000, given out in smaller sums to individuals, often for purchase of instruments. Such equipment was, in theory at least, returned to the Society after use.²¹ Objects were also gifted or bequeathed or, occasionally, arrived and remained after having been brought for exhibition or, at least in one case, submitted for a prize.²² It is a difficult collection to pin down fully, not least because there is no complete catalogue of the current object holdings at the RS and no easy means of accessing information about the objects loaned to the Science Museum. What has survived today often appears to be an accident of timing as well as objects considered useful or significant. If items entered, or survived within, the Society's apartments after the date that museums with a collecting remit that included instruments were established – that is, the late nineteenth century – they are more likely to have found a permanent home.²³

The existence of and attention to the instrument and object collections has depended on the physical space in which they have been kept. The change or lack of storage space has, over time, required objects to be inventoried and/or disposed of in a process that was central to understanding the assortment of objects as a collection. From 1782 the Society had a warehouse in which to keep books and papers, a space and cost that had been shared with the Board of Longitude for storage of its publications and instruments.²⁴ Not surprisingly, the Society also began to store instruments there, for both institutions supplied equipment to the same expeditions.²⁵ When a Committee appointed to consider RS property in the warehouse met on 22 March 1821, they found instruments alongside printed books and manuscripts. It was decided then 'That all the Instruments now in the Warehouse with the exception of the Magnetic Terrella and M^r Knight's Magnets be disposed of', along with additional copies of *Philosophical Transactions* and a number of picture frames. The instrument makers Edward Troughton and George Dollond were to give their opinion as to the value.²⁶ At the same time, however, additional instruments were being acquired and it was again noted a few years later that they still lacked an accurate catalogue.²⁷ A new committee was appointed, and another inventory made, and this time the instrument maker William Simms commented on their condition and utility.²⁸ However, his was not the only

opinion considered, as his list is not identical to the one solidified in a printed list of 1834, by the Vice President, Henry Kater, and Treasurer, John Lubbock.

This list, containing 82 items has remained a long-term reference point. The objects were marked with these numbers and the accompanying descriptions relied on well into the twentieth century.²⁹ It was made use of as the collection was moved out of Somerset House in 1857, stored at Kew Observatory and then placed in new accommodation at the Society's apartments in 1874, when 47 of the 82 were marked as arriving at Burlington House and four as remaining at Kew. Fourteen additional items were listed at this date, including instruments, models and a 'Cocked-hat <in> Case'.³⁰ About 30 of the original 82 objects were included in the Special Loan Collection of Scientific Apparatus in 1876, plus one of the additional items and two more previously on display in the Society's apartments: Davy's safety lamp and Priestley's electrical machine. A handful of other objects clearly remained somewhere in the Society's possession, and others arrived subsequently, for we find them loaned to the South Kensington, later Science, Museum and/or listed in the various editions of *The Record of the Royal Society* (London, 1897, 1901, 1912, 1940). The 1897 edition listed 33 items, 'And other instruments of less interest', as well as 9 'Relics of Sir Isaac Newton', which included instruments (Fig. 1).³¹ By the 1912 edition, following substantial loans in 1900, there were only 14 items in the main list, including two subsequent additions. By 1940 the number of Newtonian Relics had increased to 12, while the 'Other Relics and Instruments' was no longer a numbered list but picked out some of the most interesting items, whether on loan or still with the Society. Between 1893 and the 1970s over 30 items from the 1834 list, at least 27 items mentioned in subsequent 19th-century lists and about 30 additional objects were loaned. A few items were never loaned, some made their way to the Museum via other institutions and a few have been loaned to elsewhere. There are about 25 objects extant in 1874 for which I know of no current whereabouts.

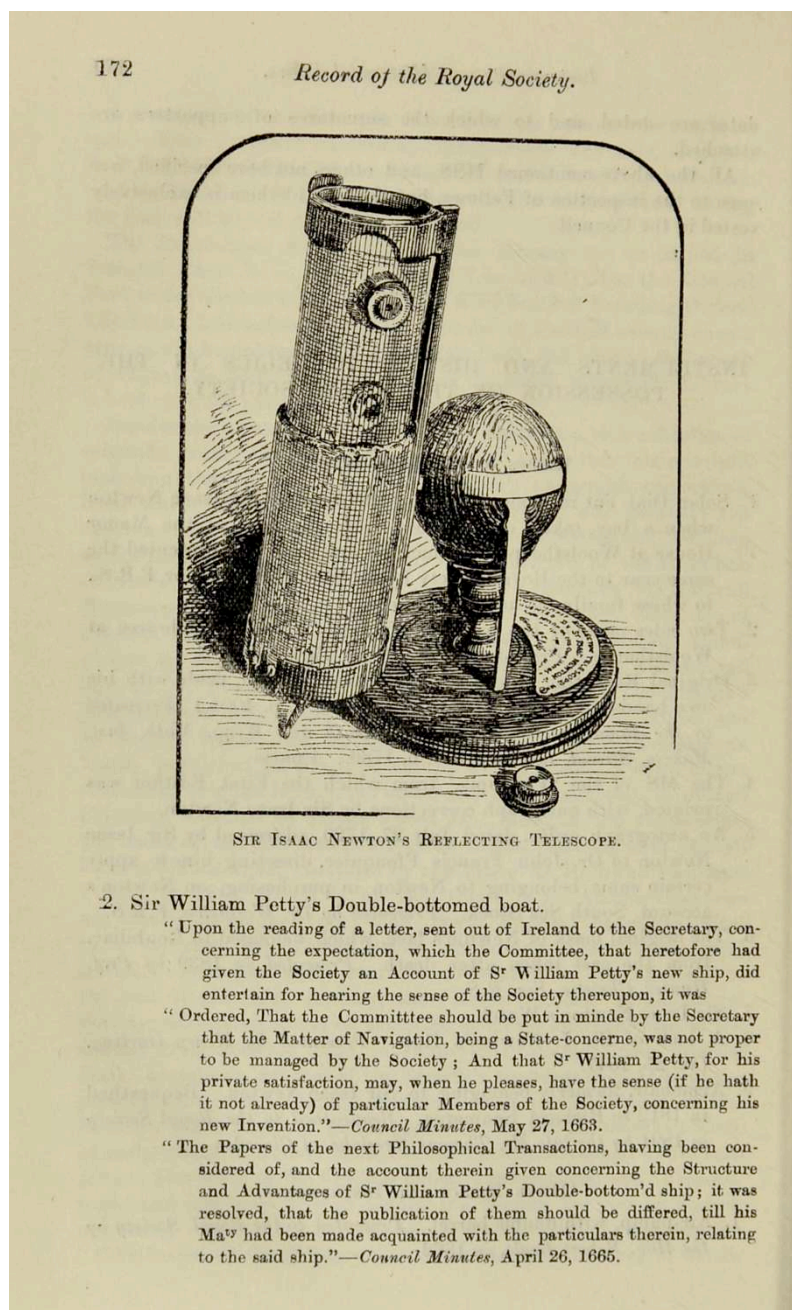


Figure 1: Illustration of 'Isaac Newton's Reflecting Telescope' in the list of 'Instruments and Historical Relics in the Possession of the Royal Society' in the 1897 edition of *The Record of the Royal Society* (1897). The telescope is listed among the 'Relics of Sir Isaac Newton' on the previous page. Credit: Wellcome CC BY.

After 1834, the collection of instruments was solidified enough as part of RS property for its storage to be a consideration as new space was planned for the Society in Burlington House in the 1850s. The first concern was nevertheless for an adequate meeting room and library – book collections were clearly the largest and most significant, requiring greater wall space

than initial proposals allowed – and the next priority was ‘the Society’s valuable collection of Portraits <which now open to the inspection of the Public>’. Less public, but nevertheless important to the Society’s functions were Council and Committee Rooms, ‘Room for the Archives and Manuscripts about 20 feet by 14’ and ‘A Room for Philosophical and Mathematical Instruments about 20 feet square’.³² An 1866 description of requirements emphasised the need for ‘A Room to hold the Society’s Instruments & apparatus ... say 30^{ft} x 20^{ft}. Here, it was suggested, there ‘might also be placed the Safe containing the National Standards of length & weight placed by Parliament in the R. Society’s custody.’³³ The creation and fitting up of the rooms was, however, a lengthy process and ‘The Instrument Room’ was still ‘quite empty’ in March 1873 but finally, by the Council Meeting of 29 October 1874, the instruments had been placed in their new accommodation.³⁴ Nevertheless, a few were always on display elsewhere. In John Timbs’s *Curiosities of London* (1868), there was an entry for the ‘Royal Society’s Museum’ in Burlington House. It was barely worthy of the name, but included Isaac Newton’s sundial, watch and telescope, and ‘the original model of the Safety-lamp’ by Humphry Davy.³⁵

Twenty years after the instruments arrived at Burlington House, however, the decision was to repurpose the Instrument Room and dispose of most of the contents. From this time, the policy was that the Society did not have an instrument collection: offers would be redirected to suitable locations and exiting objects put on loan.³⁶ The first small tranche of loans to South Kensington was made in 1893, with an offer of any other meteorological instruments that they might want.³⁷ Also passed on were instruments acquired by the Government Grant, 15 of which were made permanent acquisitions of the Museum between 1888 and 1896. Among them was Lord Kelvin’s Harmonic Analyser for tidal observations, now ‘no longer useful for the purposes for which it was originally constructed’.³⁸ The Instruments Committee supposed to oversee this process annotated a copy of the 1834 list to note loans, relocations, missing items and a further and rather eclectic list of the additions, as well querying the identification of their air pump.³⁹ However, a letter from 1900 suggests that Silvanus P. Thompson was the ‘only active member’ of this Committee, which had still not reported to Council.⁴⁰ This prompt presumably led to the 48 loans made that year, while a set of radiometers and otheoscopes presented in 1911 were moved to the Science Museum in 1920.⁴¹ Subsequent loans seem to have resulted from accidental finds or enquiries from the Museum as it solidified its presence.⁴² For example, the 1927 loan of spectroscopes ‘recently returned from Dehra Dun by the Survey Department of India’ was made ‘in

response to an application to that effect from the Director of the Museum.⁴³ What remained, in theory, were a few 'relics of Sir Isaac Newton and other departed worthies', displayed in a glass case dressed with cloth and surrounded by rope.⁴⁴ Yet, once again, the collection was added to even as objects were removed and, by making loans rather than donations, the RS retained control and have been able to call back or loan objects elsewhere as policy or need have changed.⁴⁵

Valuing the Collections

Anthony Turner has suggested that instruments were not collected 'for their own sake' before the late nineteenth century, although they might be valued for their age and provenance.⁴⁶ Robert Anderson adds that before this date 'there was no natural audience for scientific instruments *per se*, unless they be regarded as antiquities or works of art.'⁴⁷ Some items in the RS collection, like standard weights and measures or instruments used to produce significant published observations, were important for reference and maintenance of national standards. Several were borrowed for comparison by the Treasury or Ordnance Survey and were of interest as Parliament debated new weights and measures in the 1860s, or feared destruction of their own standards in the Second World War.⁴⁸ High quality equipment supplied for expeditions had frequent use.⁴⁹ Fellows of the RS were, however, typical in first valuing unused or unusable instruments if they were considered to be personal relics of great lives, bolstered by the story of institutional significance and longevity that they implied. Nevertheless, although interest in relics, which might include instruments, developed there was little concern for retaining instruments that might prove to be similarly noteworthy in the future. The value of collecting contemporary portraits and manuscripts, as a record of the Society's activities and fellowship, was readily understood but the same has never been the case for instruments. However, developing external and internal interest helped them to find value in what they did have.

The scientific instruments were, however, in many ways the least significant of the Society's collections. The Library, portraits, busts and medals were more proactively collected, more valuable and more frequently discussed. Many more pages of the *Record of the Royal Society* were devoted to these collections, which were also insured for higher sums. The Society's 1875 insurance policy was worth £18,000 for the Library and £3,000 for the pictures, while the 'Philosophical Instruments' were insured for the rather less significant figure of £500.⁵⁰ Money and use were the obvious approaches to appreciating the value of

the Society's instruments. Unsurprisingly, this was the instinct of instrument makers; the fact that Dollond, Troughton and Simms were asked to comment suggests this was also true for the Society's officers. Simms had concluded that 'the most important & useful instruments are those that I find are in the best condition', noting too that a repaired and re-divided 12-inch quadrant by Bird 'would be an acquisition to a young Astronomer'. However, he acknowledged a different kind of significance for the chronometers by Arnold: they were 'highly curious' because of 'having accompanied Capt. Cook' and because they could illustrate 'the progress to the Modern compensating balance.'⁵¹ Others on the committee may have felt similar kinds of interest even in items Simms judged 'apparently useless', for not all were disposed of, although a range of old and foreign equipment was.⁵²

Some objects had long been considered, and referred to, as relics, while others became so due to age and developing interest in the Society's, and science's, history. It appears that the possession of some acknowledged relics encouraged the reframing of other, hitherto less reified, objects. The arrival of the Newtoniana gifted to the Society by Charles Turnor in 1843, which included wood from the famous apple tree and a sundial taken from the wall at Woolsthorpe Manor, undoubtedly helped shift some 'instruments' to 'relics'.⁵³ It was in this year that the Society clarified their view that certain objects were too historically important to be taken out of their apartments, including Newton's telescope, which had also had a glass case made for it in 1827.⁵⁴ This view was also taken of objects symbolic of the Society's corporate status and history, such as the mace given by Charles II and the inkstand donated by Joseph Banks. As far as insurance values were concerned, the Newton Collection was worth £400, and the mace and charter book £190.⁵⁵ Such objects were, however, increasingly described as 'irreplaceable' and 'invaluable', possessing instead 'value as historical records'.⁵⁶

The Relics were a different category from the objects in the Instrument Room, and were often displayed in the Society's apartments. Typically, they emphasised the personal and the bodily. Newton's hair, death mask, autograph and portraits were displayed alongside the sundial and telescope, instruments that gained value by having been made as well as used by him. The associations of 'Cook's chronometers' were valued but it was always better to be able to state that, for example, the safety lamp was 'made by Sir Humphry Davy's own hands'.⁵⁷ Likewise, a brass plaque attached to Newton's telescope records, in suitably if fictionally antiquated language, that it was 'invented by S^r Isaac Newton and made with his

own hands'.⁵⁸ On the few occasions that the Society made proactive acquisitions it was always as relics. While gifts of portraits, manuscripts and, less often, objects might be accepted, they rarely bought items offered for sale. The exceptions included a chair marked 'R.S. 1691', believed to have belonged to the Society's former president, Robert Southwell, which was purchased from a sale at Christies' in 1935, and a Darwin-associated item when Down House was being emptied in 1899.⁵⁹ George Darwin was informed that the RS 'would much like to take custody of any article which it might be desirable to preserve as a memorial of Mr. Charles Darwin', and he was persuaded to present the barometer used during the *Beagle* voyage.⁶⁰

By the mid-nineteenth century, the most significant of the Society's relics generated reverence, pilgrimage and even ritual. Newton's death mask was to be 'hallowed and preserved with religious care'.⁶¹ His telescope attracted visitors and was included in the ritual surrounding the inauguration of a statue of Newton in Grantham in 1858.⁶² The Assistant Secretary, Walter White, was instructed not let the relic out of his sight during its travels.⁶³ He, the visiting dignitaries and Grantham crowds watched the 'telescope carried in the procession by some of the Grammar School boys' on a red velvet cushion (Fig. 2).⁶⁴ The telescope was frequently illustrated and readily recognised: much modified, it was a deliberately iconic reconstruction of the Royal Society's 1672 drawing.⁶⁵

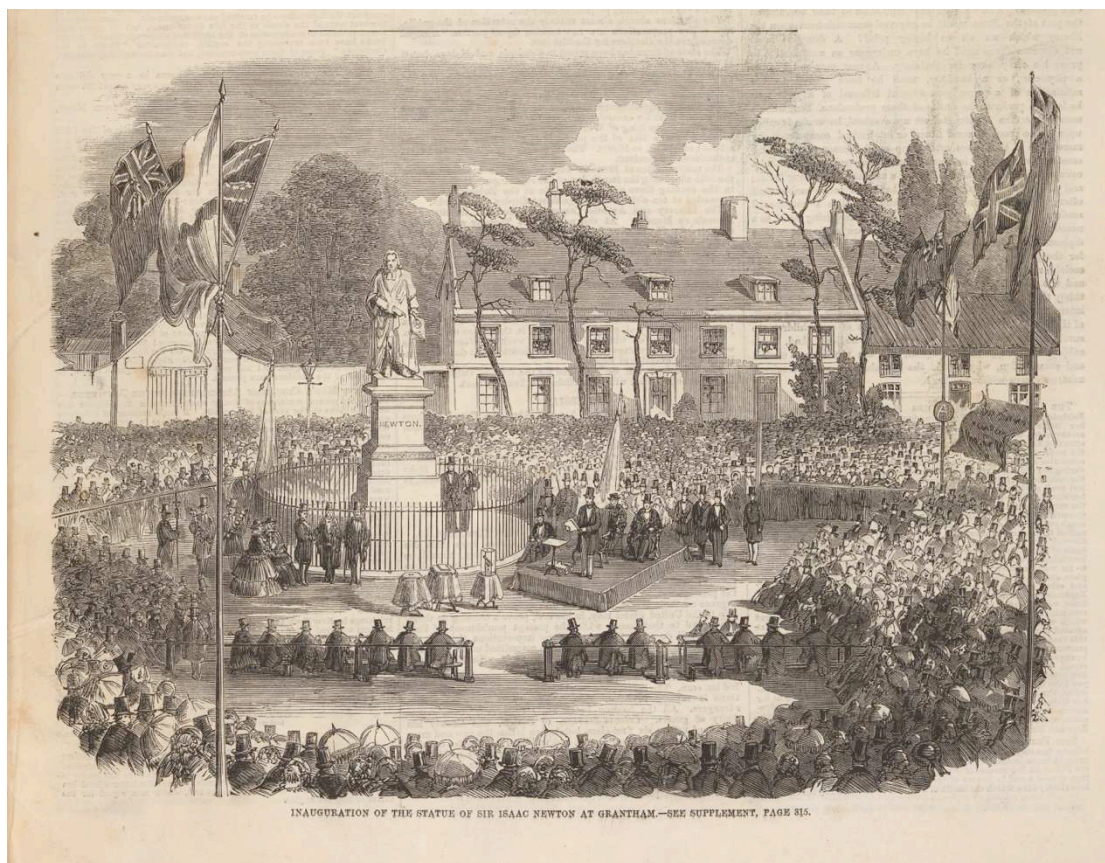


Figure 2: 'Inauguration of the Statue of Sir Isaac Newton', *Illustrated London News* 33 (1858), p. 299. The telescope, in its glass case, is displayed in front of the statue alongside a copy of Newton's *Principia* and a prism. Credit: Wellcome CC BY.

Far less visually appealing, but continually secured and accounted for, were the Huygens lenses (Fig. 3). Their significance in the history of optical science has prompted a succession of individuals from the eighteenth to the twenty-first centuries to explore and make use of them.⁶⁶ While the personal associations are there – the lenses bear original signatures and later inscriptions record that they were 'made by the celebrated Huygens' – they required an active and technical engagement of their devotees.⁶⁷ Attempts were made to explore their optical qualities and, until the late nineteenth century, to use the lenses for new observations. This was also a means of treading in the footsteps of celebrated forebears. It was 'desirable to form a just estimate of the tools with which our ancestors worked' or to understand 'how they contrived to get the eye and object-glasses of these unweildly [sic] machines married, or brought parallel to each other for perfect vision'.⁶⁸ Among the encounters that were inscribed on the lenses themselves was that of William Derham, who

added on the aerial telescope object glass, '*Vitrum praestantissimum*' (Most excellent glass).⁶⁹

Figure 3: 122-foot focal length object glass, by Constantine Huygens (Royal Society, MO/2), c. 1691, within its 19th-century mount. Credit: ©The Royal Society.

The various inventories of the RS instrument collections are revealing of changing attitudes. The 1834 catalogue of 'Instruments and Apparatus Belonging to the Royal Society' listed the objects with names of makers, owners, occasionally donors and references to *Philosophical Transactions*. Dates of manufacture were rarely of interest, and chronology was subservient to the original organisation of the list by scientific field and instrument type.⁷⁰ Newton's telescope appeared at 28, among other telescopes, and the supposed Boyle 1662 air pump at 49, originally under the heading 'Philosophical'. By the end of the century there had been a significant shift. In the first edition of *The Record of the Royal Society*, Newton's telescope – identified as the most significant item by being illustrated – appeared within the separate list of the 'Relics of Sir Isaac Newton', along with items from Woolsthorpe, Newton's death mask, hair and (purported) chair. In the following list of 'Other Relics and Instruments', dates had become more significant, with the air pump coming first, and the model of a ship designed by William Petty, donated in 1685, second (see Fig. 1).⁷¹

Compiling inventories and investigating the collections had usually been a matter for ad hoc committees, aided by instrument makers and the Society's secretaries or librarians, who dug up records of donation and use. These individuals mediated the objects in day-to-day dealings, in person and via correspondence. They were often required to show or talk about the collections with journalists or visitors and, as a result, might explore and research them for their own interest or on behalf of the Society. Charles Weld, Assistant Secretary and then Librarian for 16 years from 1843, did a great deal of work on the historic collections to produce his *History of the Royal Society* (1848), a catalogue of the portraits (1860) and a number of other works. Walter White, sub-Librarian and then Assistant Secretary in 1844-1885, was likewise required to take an interest in the Society's history, manuscripts, paintings and artefacts. As well as having maintained custody of Newton's telescope in Grantham he was, for example, asked to show Thomas Babington Macaulay 'our relics of Newton' in 1849 and to 'plan [the] Newton collection for [the] glass-case' in 1874.⁷² Herbert

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Rix, Assistant Secretary 1885-96, wrote on three articles on the Society and its history for the illustrated magazine *Leisure Hour*, which included a new engraving of Newton's sundial, as well as of the Royal Society's mace, charter book and chest.⁷³

Treasurers also had an impact on object collections. Sir John Evans, in that role 1878-98 and previously on Council, was an archaeologist and numismatist, as well as a paper manufacturer and President of the Society of Antiquaries (1885-92).⁷⁴ He displayed objects of historic and archaeological interest at several of the Society's conversazione and undoubtedly helped develop a sense of antiquarian interest in at least some of the Society's instruments, adding a perspective associated with the slowly developing appreciation of historic instruments at this period that was lacking in the more education-focused context of the South Kensington Museum with which the RS more frequently engaged.⁷⁵ Evans was the father of Lewis Evans, later famous as owner of the founding collection of the Museum of the History of Science in Oxford. Probably through his father's influence he exhibited some ancient astrolabes and other fifteenth- to eighteenth-century instruments at an 1896 Royal Society conversazione and lent others to the 1876 Special Loan Collection Exhibition.⁷⁶ As discussed in the following section, the rising interest in display of scientific objects and collecting historic instruments was important for the reframing of the RS collections.

The most significant individual in this story was Colonel Sir Henry Lyons, who was Director of the Science Museum between 1920-33 and, from 1935-40, Chair of its Advisory Council. Lyons was also very closely involved with the Society, rising to Foreign Secretary (1928-9), Treasurer (1929-39) and Vice President (1928-1939). He developed a clear view on the function of historic science objects as he expanded the Museum's displays and collections, and played a role in researching the RS collection. In 1933 Lyons wrote that the 'key-note' of the technical and scientific museum 'is development' and displays should illustrate man's progress over time, showing 'the earliest tools and processes which he employed ... in relation to the later and more advanced types which he produced as his knowledge and skill increased'.⁷⁷ The Museum's historical collections developed significantly under his watch, including with loans from the RS. A 1932 resolution stated that the Society's 'historic scientific instruments ... [should] be dealt with at the discretion of the Assistant Secretary subject to the approval of the Treasurer', and correspondence between the two chased up objects and organised the c.46 loans of the 1920-30s.⁷⁸ It was Lyons, too, who was behind the effort to list, trace and research the Society's collections for the 1940 *Record*. Here is

displayed a real sense of interest in the development of the collection, echoing the Science Museum's shift towards history under Lyons and discussions of the history and significance of collections in its series of *Handbooks*.⁷⁹ Although, by this date, few items beyond the acknowledged Relics remained recorded as in the Society's possession, we finally see an interest in the history of the objects as a collection.

Displaying the collections

The activities of the Society's officers, and their interactions with other institutions and individuals, point to ways in which the collections were put to use, reflecting and influencing the shifting perceptions of their value. These developed over time and out of particular requirements of the Society and external developments, as well as in response to the interests of individuals. They included the public presentation of the Society, whether to visitors to the apartments – privately arranged or at the annual *conversazione* – and via the press. A particularly significant event was the 1876 Special Loan Collection of Scientific Apparatus exhibition at South Kensington and the subsequent development of instrument collections in national museums.⁸⁰ The Royal Society loaned more than 30 items to this enormous exhibition, which drew attention to the existence of other collections, nationally and internationally, and emphasised a story of historical development as well as recent achievement. It also led ultimately to the foundation of the Science Museum and the Society's policy of making loans. These moves, in their different contexts, raised the significance of both the retained objects and the loaned collection.

The chief occasion on which the Royal Society's rooms and their content were put on show was during its *conversazione* (Fig. 4).⁸¹ On these occasions an eclectic mix of objects, experiments, specimens and images, brought in by Fellows and others for the occasion, were displayed. Most were removed after the event, although a few remained with the Society. At least one or two have done so permanently enough to have been absorbed into the collections. For example, some corn grown under electric light by Charles William Siemens was displayed at a *conversazione* in the 1880s, was found 'In the long glass <topped> case' in the 1890s and was loaned to the Science Museum from 1900.⁸² A series of X-ray photographs taken at the *conversazione* held in 1896 have also been kept.⁸³ The radiometers and otheoscopes used by William Crookes to illustrate papers read to the Society between 1875-78, and probably featured in at least one *conversazione*, were given to the RS in 1911.⁸⁴ While emphasis was typically on the new and recent, as we have seen

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the exhibits also included antiquities and objects of historic interest. In 1887 the lawyer and microscopist Frank Crisp 'exhibited a curious collection of early microscopes' including one said to be by Giuseppe Campani and 'probably the earliest microscope extant'.⁸⁵ In the twentieth century, scientific instrument and manuscript collector George H. Gabb was a ubiquitous presence: in 1947 it was reported that he had 'exhibited at every Royal Society conversazione for the last forty years.'⁸⁶

Figure 4: 'Conversazione of the Royal Society at Burlington House', *The Graphic* 968 (16 June 1888), p. 629. Credit: British Library Newspapers.

The Society's existing 'large and interesting collection of portraits' and, to a lesser extent, its relics, were inevitably part of the display too.⁸⁷ Newspapers typically described the novel exhibits and listed many of the attendees but might also comment on the surroundings and history of the institution. The Society's own material tended to be treated more as a museum exhibit, placed in showcases, unlike the objects actively shown and demonstrated by exhibitors. In 1934, for example, Lyons was in charge of planning the content of six newly glazed showcases, including one for the charter book, one for the Newton relics, and four for manuscripts.⁸⁸ RS collections were also featured in relation to appropriate anniversaries or as recent arrivals. Thus the Society could tie its story to that of famous people and events, and to the generosity of donors. A report of the 1842 conversazione noted the recent gift of Charles Blacker Vignoles, a railway engineer and remote descendant of Newton, of 'one of the finest original portraits known of Sir Isaac Newton, one of the early presidents of the society'.⁸⁹ Anniversaries linked to Cook brought out the Arnold timekeepers, while bicentenaries of Priestley and Faraday likewise prompted display of appropriate objects.⁹⁰

Occasionally, the press, especially illustrated periodicals, carried longer articles about the Society that featured the objects that were readily on view. In 1843 the *Illustrated London News (ILN)* featured the RS, depicting and describing its rooms and their contents. The portraits and busts in the print were identified in the text, and a (false) story about the mace recounted.⁹¹ In similar fashion, a 1863 report took the occasion of the Society's 200th anniversary to describe treasures such as the manuscript of Newton's *Principia*, the portrait collection and the room, 'which, by its size and decorations, may be said to be truly worthy of a society which, for nearly 200 years, had taken the lead in fostering a spirit of

investigation into the laws of Nature, and thus promoting the best interests of its country and mankind.' It left it to the very end to add 'a few words on the relics and memorials preserved by the society', although their age and associations might likewise be interpreted as reflecting its significance. These were firstly, of course, those of Newton ('autograph, solar dials, watch, first reflecting telescope, lock of his hair, and mask of his face from the cast taken after death') but also noted was 'Davy's safety-lamp, made by Sir Humphry's own hands' and 'the delicate "balance" left by Sir Joseph Banks'.⁹²

As the author of a three-page article in *The Graphic* in 1893 noted, the Newton collection had become totemic for the Society:

Once the president, he is now the patron said of the Royal Society, his relics – his death-mask, his dial, his telescope, his watch, a piece of his apple-tree, and a lock of his hair – being religiously preserved, and worship being (scientifically speaking) paid continually at his shrine.

The illustrations accompanying this article depicted the Burlington House apartments, the current officers, some of the collection of busts, and key objects: the Society's mace and seal, Newton's dial and telescope, 'Captain Cook's chronometer', Davy's Safety Lamp and W.H. Wollaston's thimble-battery (Fig. 5). These last few were described as 'sundry other curiosities', although Wollaston's battery, which had been presented to the Society by his godson in 1879, led to a short discussion of and anecdote about Wollaston and the simplicity of his apparatus.⁹³ These items, along with the account of the Society's history and the historic works noted in the Library, were part of the 'quaint and picturesque' details that added colour to the periodical's account of the Society in 'its modern aspect'.⁹⁴ They attested its age but also how much things had changed – perhaps, it might be asserted, as a result of scientific work such as that promoted by the RS.

Figure 5: Detail showing some of the illustrations accompanying 'The Royal Society', *The Graphic* 1228 (10 Jun 1893), p. 25. Credit: British Library Newspapers.

The 1876 Special Loan Collection exhibition, on much larger scale, linked instruments and their historical development to the success and future of the nation. It was an outcome of

concerns that Britain had lost its lead not only in original scientific work but also in the manufacture of instruments.⁹⁵ As its catalogue suggested, however, it displayed 'not only apparatus for teaching and for investigation, but also such as possessed historic interest on account of the persons by whom, or the researches in which, it had been employed.' It was to include 'objects of historic interest from museums and private cabinets, where they are treasured as sacred relics, as well as apparatus in present use in the laboratories of professors.'⁹⁶ When the Committee of Council on Education made the official request for loans from the Society, they asked for 'any objects it may possess which are suitable for the Exhibition', and 'the original apparatus used by Newton, and Leewenhoek's microscope, were especially mentioned'.⁹⁷ The mention of the latter does not suggest good acquaintance with the current state of the Society's collections, despite the fact that more than half of the exhibition committee were Fellows of the Royal Society, including its chief officers.⁹⁸ However, they were keen to demonstrate support for this assertion of the cultural and economic significance of science and its support by government.

The event was, perhaps, more significant for the Society in terms of how it and others might think about the instruments in its collection than the Society's objects were significant for the event's success. Of the 5,000 exhibits, from 1,400 lenders, just over 30 were directly from the Society, although many more were associated with the Society's Kew and Meteorological Committees. A number attracted wider attention, particularly the historic ones. In the opening address at the Physics conference accompanying the exhibition, the section President, William Spottiswoode, picked out, among loans 'especially worth notice', Newton's telescope and the Huygens lenses and there was some discussion of the latter by Professor Pieter Rijke, as he introduced the Huygens instruments loaned from Leiden.⁹⁹ This opportunity to compare objects across collections, including from overseas, was unprecedented and had a significant impact in assessing the worth or authenticity of objects, both to their benefit and detriment. Thus Newton's telescope was given little attention in the catalogue, placed as it was after older Galileo-linked instruments from Florence. It was, however, among the 'Historical Treasures' depicted and discussed by the *ILN* on 16 September 1876.¹⁰⁰ To the layman, it seemed, the minority of historic objects, with august associations and quaint looks trumped novelty and complexity.¹⁰¹ These were understood to be the 'treasures' among the 'very bewildering' mass display.¹⁰² Objects with famous associations were, as usual, of the greatest interest. The *ILN* noted that Galileo's telescopes were, like Newton's, 'Constructed by himself' and 'made by himself'.¹⁰³

The opportunity for mass and comparative display gave the Society's relic of Davy's Safety Lamp lesser billing compared with the many examples lent by the North of England Institute of Mining and Mechanical Engineers. In this case, the oddly-shaped and humble-looking object was not included in the *ILN* illustrated spread of historic objects, which used instead more iconic versions by Stephenson and Davy's later, improved, lamp. A second illustration of further 'Historical Treasures' in the following issue included Otto von Guericke's air pump and Magdeburg Hemispheres, while the RS's air pump was overlooked.¹⁰⁴ This followed the exhibition catalogue, which gave much greater space to these earlier examples. It may have been from this point that suspicions about the attribution and dating of the Society's one were raised. Whilst it was a premier object, and often displayed in the Library, we find that at some point its entry in the object list was marked 'Always a doubt about it' and 'Probably by Hauksbee', although it continued to be listed as Boyle's in the 1897 and 1912 editions of the *Record* and a part of it, lent to the Museum of the History of Science in 1932, was and still is identified with Boyle.¹⁰⁵ In his investigations into the Loan Collection, Peter de Clerq has found that, despite some dubious dating and attributions, there was 'a real concern for what was original, a desire to present the genuine *objet témoin*'.¹⁰⁶

John Dalton Hooker, President of the RS, had been chief among those suggesting that the Loan Exhibition should lead to a permanent display. The assumption was that many lenders would be happy to leave their objects in situ to create a science museum.¹⁰⁷ However, although over a thousand items remained, and were added to the South Kensington Museum's science collections in 1877, the Society's objects were returned.¹⁰⁸ Many were subsequently transferred back but control was maintained, particularly of the more historic items. The Society decided, for example, not to lend their 'astronomical relics' to the Franco-British Exhibition in 1908, considering them to be of 'great historical interest' and 'irreplaceable were any accident to befall them.'¹⁰⁹ However, loans for display were allowed on occasion, usually to institutions rather than individuals, and were an important signifier of the RS's cultural significance. Portraits were regularly loaned and in 1896 what was then considered 'Newton's chair', the President's chair and 'Boyle's' air pump were loaned for an exhibition of furniture organised by the Science and Art Loan Department at the Bethnal Green Museum.¹¹⁰ The Society's officers also agreed to loan the air pump to the Physical and Optical Societies 'for one day only, provided that great care be taken of it and that it be returned undamaged.'¹¹¹ However, in 1913, it was, unsurprisingly, thought unlikely that the

Council would agree to its loan, or that of any other historical relics, 'to serve as a property in the Masque of Learning' organised by Patrick Geddes in Chelsea.¹¹²

Conclusion

Bringing together some of the scattered evidence regarding the nature and movements of the instrument and object collections of the Royal Society has revealed the changing attitudes to these objects, from stored apparatus – that was either considered useful and reusable or obsolete and ready for disposal – to collections of instruments and relics that should be retained for their historic interest. While the care of most of these objects was ultimately delegated to museums, the Society has retained ownership of the collection. A relatively few items have, since the early-to-mid 19th century, been recognized as scientific relics, of value as talismans and for public representation. Individual items, such as the Huygens lenses, have slid between categories, while others have simply 'ended up' in the collection and more have slipped the net when attitudes to loans or grants were lax. The Newton telescope has retained a central function of institutional display. It has never been on loan to the Science Museum (although it may be temporarily loaned to a gallery on science in London, 1550-1800, opening in 2019) and continues to play its traditional role, displayed to dignitaries and visitors to the Society's building. The 350th anniversary of the Society, marked in 2010, included the telescope in the Summer Science Exhibition, where it was duly shown to the politely interested monarch.¹¹³ This anniversary was the most recent occasion on which the RS made significant use of its object collections, including recalling loan items from the Science Museum. Key corporate signifiers like the mace, ink stand and founders' portraits were brought onto the stage of the Royal Festival Hall for the anniversary Convocation, while a significant number of objects were exhibited in their Carlton House Terrace building and featured by the press.¹¹⁴ In an image gallery accompanying a BBC Radio 4 'Today' feature on the Society's anniversary on 24 June 2010, Newton's telescope and death mask, wood from the Woolsthorpe tree (part of which was sent to space on a NASA shuttle mission in May that year) and Davy's Safety Lamp are all present and correct.¹¹⁵

The opportunities for use and display of instruments as relics within the Society's buildings and in the press helped solidify their role as part of its identity. The shape of the RS collection and attitudes toward it have thus been influenced by internal affairs and individual interests. Matters of space and storage prompted attempts to get to grip with an ever-changing set of objects, but interest in the history and contemporary role of the Society

have also had their impact on decisions about the representation and future of the collection. External events and enquiries, however, often made a more significant impact; the sense that the Society had a collection worthy of care and consideration was developed by requests from Fellows, journalists, curators and others to see, borrow or illustrate their objects, papers and paintings. Increasingly, as individuals like Lewis Evans and George Gabb developed their instrument collections and expertise, and as the Science Museum took shape, the Royal Society's collection took on significance within a wider field. Their loan and display alongside other collections brought them clearly into the sphere of museum objects, while Society developed a role as a cultural institution, loaning to others and allowing objects and manuscripts to be copied, drawn or photographed in its apartments. The collections have, therefore, been shaped by their history and location, and by their custodians and users. They have also, by their individual 'biographies' and collective physical presence, shaped internal and external understandings of the Society's role, both past and present.

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Notes and references

¹ See for example J. Thomas, 'Compiling "God's great book [of] universal nature": The Royal Society's collecting strategies', *Journal of the History of Collections* 23 (2011), pp. 1--13; M. Hunter, 'The

² R.L. Kremer, 'A time to keep, and a time to cast away: thoughts on acquisitions for university instrument collections', *Rittenhouse* 22 (2008), pp. 188--210 discusses unused objects as in a liminal state, 'precariously poised between active life in the laboratory and death in landfills or scrap metal recyclers.' (p. 188). As Marples, op. cit. (note 1) shows, however, the early 18th-century Repository was, although passively collected, actively used and exchanged.

³ A.D.C. Simpson, 'Newton's telescope and the cataloguing of the Royal Society's Repository', *Notes and Records of the Royal Society of London*, 38 (1984), pp. 187--214; A.R. Hall and A.D.C. Simpson, 'An Account of the Royal Society's Newton telescope', *Notes and Records of the Royal Society of London* 50 (1996), pp. 1--11.

⁴ Although focused on universities, Lourenço's category of 'second generation collections', typified by a collecting process of 'historical accumulation', is pertinent here: M.C. Lourenço, 'Between Two Worlds: The Distinct Nature and Contemporary Significance of University Museums and Collections in Europe' (PhD Thesis, Conservatoire national des arts et métiers, 2005), pp. 39--40, see also 76--80.

⁵ See P.J.T. Morris (ed.), *Science for the Nation: Perspectives on the History of the Science Museum* (London, 2010) and Alison Boyle's paper in this special issue.

⁶ See P. de Clercq and A. Turner (eds.), 'Origins and evolution of collecting scientific instruments', *Journal of the History of Collections* 7 (1995), pp. 133--268, including Turner's 'From mathematical practice to the history of science: the pattern of collecting scientific instruments', pp. 135--50.

⁷ On changing value of objects, see I. Kopytoff, 'The cultural biography of things: commoditization as process', in A. Appadurai (ed.), *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge and New York: 1986), pp. 64--91.

⁸ Museums are by no means the only location in which instruments are or have been displayed: see S. Ackermann, R.L. Kremer and M. Miniati (eds.), *Scientific Instruments on Display* (Leiden and Boston, 2014).

⁹ See A. Filippopoliti, '"A small but choice collection of instruments": the early days of the Royal Astronomical Society of London collection', *Museum History Journal* 5 (2012), pp. 105--126 and Jane Wess, *The Role of Instruments in Exploration: A Study of the Royal Geographical Society 1830-1930* (PhD Thesis, University of Edinburgh, 2018).

¹⁰ On the gifting of objects to another kind of corporation, a Livery Company, see J. Kilburn-Toppin, 'Gifting cultures and artisanal guilds in sixteenth- and early seventeenth-century London', *The Historical Journal* 60 (2017), pp. 865--87. The Society's recording of gifts, a habit that, like the use of eponyms for lectures or medals paid for by bequests, might encourage others to follow suit, has always been more thorough than its records of objects. See forthcoming essays by M. Berretta, on eponyms, and R. Higgitt, on the RS Copley Medal, in *Nuncius* (December 2019).

¹¹ See also Karin Tybjerg's article in this special issue.

¹² L. Jordanova, 'Science, memory and relics in Britain', in M. Beretta, M. Conforti, and P. Mazzarello (eds.), *Savant Relics: Brains and Remains of Scientists* (Sagamore Beach, 2016), pp. 157--81, p. 160. On Newton's relics, many of which were held by the RS, see also R. Iliffe, 'Newtonian hagiography and the creation of genius' in the same volume, pp. 93--132.

¹³ See Kopytoff, op. cit. (note 7); S.J.M.M. Alberti, 'Objects and the museum', *Isis* 96 (2005), pp. 559--71; D. Pantalony, 'Collectors, displays and replicas in context: what we can learn from provenance research in science museums', in J. Buchwald and L. Stewart (eds.), *The Romance of Science: Essays in Honour of Trevor H. Levere*, *Archimedes* 52 (2017), pp. 255--75. On re-use, repair and the second-hand instrument market see S. Werrett, 'Recycling in early modern science', *British Journal for the History of Science* 46 (2013), pp. 627--46.

¹⁴ Kopytoff, op. cit. (note 7).

¹⁵ 'Report of the Committee for Examining the State of the Repository of the Royal Society', 2 Nov 1731, quoted in Simpson, op. cit. (note 3), p. 195.

¹⁶ Simpson, op. cit. (note 3), p. 197; Marples, op. cit. (note 1); N. Grew, *Musæum Regalis Societatis. Or a Catalogue & Description of the Natural and Artificial Rarities Belonging to the Royal Society and Preserved at Gresham Colledge* (London, 1684), pp. 351--86.

¹⁷ Simpson, op. cit. (note 3), pp. 196, 198. Werrett, op. cit. (note 13), p. 636 notes that when the microscopes were acquired, instructions were published in *Philosophical Transactions*, to ensure they were 'of Use'.

¹⁸ See B.J. Ford, 'What were the missing Leeuwenhoek microscopes really like?', *Proceedings of the Royal Microscopical Society* 182 (1983), pp. 118--24, p. 123.

¹⁹ Simpson, op. cit. (note 3), pp. 201--2.

²⁰ Simpson, op. cit. (note 3), p. 203. On the relationship between government, science and the RS, see J. Gascoigne, 'The Royal Society and the emergence of science as an instrument of state policy', *British Journal for the History of Science* 32 (1999), pp. 171--84.

²¹ R.M. Macleod, 'The Royal Society and the Government Grant: notes on the administration of scientific research, 1849--1911', *The Historical Journal* 14 (1971), pp. 323--58. The return policy was spelled out in 1853 but was clearly not well communicated or policed as it was reiterated in 1869 and 1876: Council Minutes 1863-1874, 18 Mar 1869, CMO/14; Council Minutes, 1874-1877, 17 Feb 1876, CMO/15 (Royal Society).

²² A handful of items displayed or created at soirées have been subsumed into the object collection or archive (see below). One object has been identified as probably the winner of an 1843 prize, the entrants to which were to be delivered to Somerset House: Powell & Lealand microscope, 1843, RS Picture Library <<https://pictures.royalsociety.org/image-rs-8460>>.

²³ See the supplementary online data appended to this article for an overview of the changing collections and relevant inventories, with cross-referred ID numbers indicated where possible. My

thanks to Keith Moore, Librarian at the Royal Society, and Alison Boyle, Keeper of Science Collections at the Science Museum, for access to relevant database lists.

²⁴ Meetings of 13 Jul and 7 Dec 1782, Confirmed Minutes of the Board of Longitude, 1780-1801, Papers of the Board of Longitude, Cambridge Digital Library <<https://cudl.lib.cam.ac.uk/view/MS-RGO-00014-00006/181>> and <<https://cudl.lib.cam.ac.uk/view/MS-RGO-00014-00006/185>>.

²⁵ See R. Higgitt, 'Equipping expeditionary astronomers: Nevil Maskelyne and the development of "precision exploration"' in F. MacDonald and C.W.J. Withers (eds.), *Geography, Technology and Instruments of Exploration* (Farnham, 2015), pp. 15--36.

²⁶ Minutes of meeting of the Committee appointed to take into consideration the state of the property belonging to the Society in their Warehouse, 22 Mar 1821, CMB/1/2, p. 22 (Royal Society).

²⁷ The Committee for examining into the state of the Meteorological Instruments belonging to the Royal Society ordered a number of meteorological and magnetic instruments, for example 25 Apr 1822 and 13 May 1824, CMB/1/4, pp. 36, 95--6 (Royal Society). Simpson, op. cit. (note 3), p. 204.

²⁸ 'Account of Instruments, Apparatus and Coins belonging to the Royal Society', Mar 1827, DM/2/124 and 'List of Instruments belonging to the Royal Society, 1831', DM/2/127. The list of instruments, DM/2/123, is annotated 'Simm's [sic] catalogue', there are 'Remarks by M^r Simms' at DM/2/133, while the 1831 list (DM/2/127), by Henry Kater, includes Simms's notes (Royal Society).

²⁹ 'Instruments and Apparatus Belonging to the Royal Society', November 1834, MM/13/45 (Royal Society). Simpson, op. cit. (note 3), p. 206 suggests that the physical numbering probably took place in early 1832. It was overseen by George Dollond, *ibid*, p. 217, endnote 107.

³⁰ 'List of Instruments and Apparatus belonging to the Royal Society, returned from Kew Observatory', MM/1351 (Royal Society).

³¹ *The Record of the Royal Society* (London, 1897), pp. 171--4.

³² Draft statement about required room for Royal Society, MM/13/65 (Royal Society).

³³ Description and plan of rooms required, c. 1866, MM/13/68 (Royal Society).

³⁴ Statement of unfinished Joinery and Fittings and Imperfections at the Royal Society, received from Mr Spottiswoode, MM/13/79; Council Minutes, 29 Oct 1874, CMO/14; List of Instruments and Apparatus belonging to the Royal Society, returned from Kew Observatory, MM/1351 (Royal Society). This list includes most of the items displayed at South Kensington as well as most of the others cross-referenced to the 1834 list, to be installed in the new Burlington House Instrument Room.

³⁵ J. Timbs, *Curiosities of London: Exhibiting the Most Rare and Remarkable Objects of Interest in the Metropolis*, new edition (London, 1868), p. 600.

³⁶ For example, B.A. Joule was informed in a letter 13 Nov 1896 that this policy would not be varied, in spite of his offering J.P. Joule's apparatus: copy letter from Robert William Frederick Harrison to B.A. Joule, 13 Nov 1896, NLB/13/742 (Royal Society). This apparatus eventually came to the Science Museum in 1969, via the University of Manchester Institute of Science & Technology.

³⁷ Copy letter from Michael Foster to Arthur James Richens Trendell, Science & Art Department, South Kensington Museum, 25 Jan 1893, NLB/7/338 (Royal Society).

³⁸ Copy letter from Herbert Rix to the Director of the South Kensington Museum (probably Major-General Edward Robert Festing, director of the science collections), 9 Dec 1895, NLB/12/112 (Royal Society). This is Science Museum Inv. No. 1896-60.

³⁹ Copy letter from Rix to Lockyer 20 May 1894, NLB/9/507. The committee were Norman Lockyer, Silvanus Thompson and Lord Rayleigh. List of Instruments &c in Instrument Room, MM/13/56 (Royal Society). This is undated but lists photographic slides, a spectroscope and 'An umbrella' and presumably relates to this period of activity.

⁴⁰ Copy letter from R.W.F. Harrison to S.P. Thompson, 3 Oct 1900, NLB/21/222 (Royal Society).

⁴¹ Science Museum Inv: 1920-391 to 418. 19 of these were returned to the RS around 2010 as they marked the Society's 350th anniversary. See Radiometers and otheoscopes, RS Picture Library <<https://pictures.royalsociety.org/image-rs-8490>>.

⁴² See Morris, op. cit. (note 5).

⁴³ Minutes of Officers' Meetings, 17 Feb 1927, OM/2/1, f. 18 (Royal Society); Science Museum Inv: 1927-805 to 807.

⁴⁴ Copy letter from Rix to Dr Ephraim Cutter, 14 Mar 1894, NLB/9/29, accepting his gift of a case of Rumford ash, in which they would place their Rumford Medal and place amongst said relics; unknown to H. Lindfield, 17 July 1894, NLB/9/828, on display materials 'wanted for our Newton relics'. On the lack of a museum, see Rix to the Honorary Secretary of the Goldsmiths' Ramblers' Club, 11 Oct 1894, NLB/10/59 and to Senor D. Tomas Llorente, 14 Dec 1894, NLB/10/543 (Royal Society).

⁴⁵ For example, the Science Museum applied for permission to loan the Shuckburgh scale (R.S. 43) to the National Physical Laboratory: Minutes of Officers' Meetings, 26 Oct 1933, OM/2/3/14; H. Winter, interested in experimenting on the terella loaned to the Museum, requested permission from the Society: idem, 12 Dec 1935, OM/2/4/6. These had been loaned to the Museum after a request from its Director, Henry Lyons: they were recalled from loan to the Admiralty Compass Museum: see correspondence from 1931 in MDA/H/9 (Royal Society).

⁴⁶ Turner, op. cit. (note 6), p. 136

⁴⁷ R.G.W. Anderson, 'Connoisseurship, pedagogy or antiquarianism? What were instruments doing in the nineteenth-century national collections in Great Britain?', *Journal of the History of Collections*, 7 (1995), pp. 211--25, p. 224.

⁴⁸ See for example correspondence with James Yates and Treasury on use and loan of standards 1863-5, Council Minutes 1863-74, CMO/14; request for information from the Standards Department of the Board of Trade, 6 May 191; request for loan from the National Physical Laboratory, 4 Oct 1933; R.J. Trump, Standards Department, Board of Trade, to J.D. Griffith Davies, 12 Jul 1941, Correspondence about instrument on loan, MDA/H/9 (Royal Society).

⁴⁹ Classically, see D. Howse and B. Hutchinson, 'The saga of the Shelton clocks', *Antiquarian Horology* 6 (1969), pp. 281--98.

⁵⁰ Council Minutes 1874-1877, 18 Feb 1875, CMO/15 (Royal Society).

⁵¹ Report by Mr. Simms (May 1831), 'Instruments belonging to the Royal Society', 1831, DM/2/127, p. 8 (Royal Society). This page is annotated 'not to be printed' and the comment about the young astronomer has been struck through.

⁵² 'Instruments belonging to the Royal Society', 1831, DM/2/127, p. 4 (Royal Society).

⁵³ On Newtoniana, including from Turnor, who was owner of Newton's childhood home, Woolsthorpe, see P. Fara, 'Isaac Newton lived here: sites of memory and scientific heritage', *British Journal for the History of Science* 33 (2000), pp. 407--26 and Iliffe, *op. cit.* (note 12), pp. 125--9.

⁵⁴ Simpson, *op. cit.* (note 3), pp. 204, 206.

⁵⁵ Simpson, *op. cit.* (note 3). Insurance for 1930, reflecting enlarged collections more than increased value of objects, was £22,000 for printed and manuscript material, maps and medals, £7,500 for pictures, £400 for the Newtonian Collection and £190 for the mace, charter book and Banks inkstand: Minutes of Officers' Committee Meetings, 3 July 1930, OM/2/2/14 (Royal Society).

⁵⁶ Royal Society Council Record, quoted in Simpson, *op. cit.* (note 3), p. 206.

⁵⁷ Timbs, *op. cit.* (note 35), p. 600.

⁵⁸ Hall and Simpson, *op. cit.* (note 3), p. 1.

⁵⁹ Minutes of the Officers' Meetings, 12 Dec 1935, OM/2/4/6 (Royal Society). See Robert Southwell's Chair, RS Picture Library <<https://pictures.royalsociety.org/image-rs-12473>>.

⁶⁰ Council Minutes Printed 8, 1898-1903, p. 33, 16 Mar 1899 (Royal Society); Barometer, RS Picture Library <<https://pictures.royalsociety.org/image-rs-12491>>. This was loaned to the British Association for the Advancement of Science in 1932, when they had acquired Down House, but has since returned to the Society.

⁶¹ C.R. Weld, *A History of the Royal Society*, 2 vols (London, 1848), vol 1, p. 447.

⁶² Fara, *op. cit.* (note 53), pp. 416--20.

⁶³ Letter from Lord Wrottesley to Walter White, 19 Sep 1858, MS/769/117 (Royal Society).

⁶⁴ W. White, *The Journals of Walter White, Assistant Secretary of the Royal Society* (London, 1898), entry for 21 Sep 1858, p. 119.

⁶⁵ See Hall and Simpson, *op. cit.* (note 3).

⁶⁶ Probably made by Constantine Huygens, they were given to the Society in 1691 (by Christiaan Huygens), 1686 (by Newton) and 1724 (by Gilbert Burnett). They were 22, 23, and 24 in the 1834 list, have (with the exception of some optical parts, Science Museum, Inv: 1932-461/1-5) remained at the RS and are the only items recorded in their online catalogue as Museum Objects.

⁶⁷ Additional eyepieces and apparatus were made by Robert Hooke, James Pound and Edward Scarlett and Henry Cavendish. Other investigations are: Report of Warren De La Rue F.R.S. on the proposal to remount the Object Glass of Huyghens, 1854, MM/11/27 (Royal Society); by Norman Lockyer, see

Council Minutes, 28 Oct 1875, CMO/15 (Royal Society) and *Conferences Held in Connection with the Special Loan Collection of Scientific Apparatus* (London, 1876), pp. 188-9; R.A. Sampson and A.E. Conrady, 'On three Huygens lenses in the possession of the Royal Society of London', *Proceedings of the Royal Society of Edinburgh* 49 (1930), 289--99; A.A. Mills and M.L. Jones, 'Three lenses by Constantine Huygens in the possession of the Royal Society of London', *Annals of Science* 46 (1989), pp. 173--82; A.C. van Helden and R.H. van Gent, 'The lens production by Christian and Constantijn Huygens', *Annals of Science* 56 (1999), pp. 69--79. The most recent inspection was by Marv Bolt for his census of pre-1775 refracting telescopes: 'Telescope Quest: Days 20 and 21', Corning Museum of Glass (1 September 2016), <<https://blog.cmog.org/2016/09/01/telescope-quest-days-20-and-21/>>.

⁶⁸ C. Blagden to B. Thompson (draft), 7 July 1786, quoted in Christa Jungnickel and Russell McCormmach, *Cavendish* (Philadelphia: American Philosophical Society, 1996), p. 308. W.H. Smyth, in 1835, quoted in Weld, op. cit. (note 61), vol. 1, p. 331.

⁶⁹ Mills and Jones, op. cit. (note 67), p. 176.

⁷⁰ Instruments belonging to the Royal Society, 1831, DM/2/127 (Royal Society): the headings are scored out and were not used in the 1834 list.

⁷¹ *Record*, op. cit. (note 31) pp. 171--4.

⁷² White, op. cit. (note 64), p. 91 (7 Feb 1849) and p. 260 (6 Jan 1874).

⁷³ The Isaac Newton sundial, RS Picture Library <<https://pictures.royalsociety.org/image-rs-10262>>. See also Images RS.10260 and RS.10261. See Herbert Rix, 'The rise of the Royal Society', *Leisure Hour* (June 1896), 489-95; 'The Presidents of the Royal Society', *Leisure Hour* (July 1896), pp. 551--63; 'The Royal Society. Its Fellows and its work', *Leisure Hour* (August 1896), pp. 657--63.

⁷⁴ Y. Foote, 'Evans, Sir John (1823--1908)', *Oxford Dictionary of National Biography* (Oxford, 2004), <<https://doi-org.chain.kent.ac.uk/10.1093/ref:odnb/33040>>.

⁷⁵ Evans appears as an exhibitor in several of the RS *Conversazione* programmes. On the educational and military contexts of the South Kensington museums, see Anderson, op. cit. (note 47).

⁷⁶ Descriptive Catalogue of the Royal Society's *Conversazione*, 6 May 1896, p. 11; *Catalogue of the Special Loan Collection of Scientific Apparatus at the South Kensington Museum*, 3rd edition (London: 1877).

⁷⁷ Henry Lyons, 'Technical museums: their scope and aim' (1933), quoted in T. Schienfeldt, 'The Science Museum at war and peace', in Morris, op. cit. (note 5), pp. 41--60, quotations at pp. 51--2. See also E. Baigent, 'Lyons, Sir Henry George (1864--1944)', *Oxford Dictionary of National Biography* (Oxford, 2004), <<https://doi-org.chain.kent.ac.uk/10.1093/ref:odnb/34651>> and RS Fellowship Directory <<https://royalsociety.org/fellows/>>.

⁷⁸ Minutes of Officers' Meetings, 7 July 1932, OM/2/3/2 (Royal Society).

⁷⁹ Schienfeldt, op. cit. (note 77), p. 51.

⁸⁰ See R. Bud, 'Responding to stories: the 1876 Loan Collection of Scientific Apparatus and the Science Museum', *Science Museum Group Journal*, 1 (2014) <<https://doi.org/10.15180/140104>> and Anderson, op. cit. (note 47).

⁸¹ On conversazione as a ubiquitous and experiential engagement with scientific culture for middle class Victorians, see S.J.M.M. Alberti, 'Conversaciones and the experience of science in Victorian England', *Journal of Victorian Culture* 8 (2003), 208-30. On some of the coverage of the Royal Society's events by newspapers and periodicals, see K. Moore, 'Plates from Royal Society Publications: fin-de-siècle newspaper sketches', *Notes and Records of the Royal Society*, 60.3 (2006), 311--20.

⁸² Instruments & Apparatus/ Additions, c. 1890s, MM/13/46 (Royal Society); Science Museum Inv No: 1900-127.

⁸³ See for example that of William Crookes's hand: Royal Society Picture Library <<https://pictures.royalsociety.org/image-rs-9840>>.

⁸⁴ See Note 42 above. A report of the 1889 conversazione mentions optical apparatus for showing Crookes's radiometer: *Illustrated London News (ILN)* 2615 (1 Jun 1889), p. 686.

⁸⁵ *The Morning Post* 35848 (12 May 1887), p. 2.

⁸⁶ *ILN* 5640 (24 May 1947), p. 548. That year he displayed a seventeenth-century model of a fire engine, pictured in the paper. In 1939 he had helped the Society to celebrate the 'Centenary of Photography' by exhibiting a range of Daguerreotypes and Talbotypes from his collection: *ILN* [no issue no.] (27 May 1939), p. 918.

⁸⁷ *ILN*, 969 (16 Apr 1859), p. 378.

⁸⁸ Officers' Meetings Minutes, 1 Nov 1934, OM/2/3/24 (Royal Society).

⁸⁹ *ILN* 18 (10 Sep 1842), p. 278. This was the 1725/6 portrait by John Vanderbank, RS Picture Library <<https://pictures.royalsociety.org/image-rs-9253>>.

⁹⁰ An 'At Home' marked the 1933 Tercentenary of Pepys and Bicentenary of Priestley, when it was 'agreed that exhibits relating to Pepys, Priestley, Leeuwenhoek, and Malpighi be shown', Minutes of Officers' Meetings, 5 Jan 1933, OM/2/3, f. 10 (Royal Society). At other times, if such anniversaries were not being marked by the Society itself they might loan objects, paintings or texts to other displays.

⁹¹ *ILN* 86 (23 Dec 1843), p. 412. This story was the tradition that the Society's mace was the pre-Cromwellian House of Commons one. Weld had shared this story, which he subsequently debunked in an article of 1846: 'History of the mace given to the Royal Society by King Charles the Second', *Abstracts of the Papers Communicated to the Royal Society of London* 5 (1843- 1850), pp. 611--19. He noted that 'numberless visitors' came purposely to the building to see it.

⁹² *ILN* 1235 (12 Dec 1863), pp. 597--598, p. 598. The latter object was a hydrostatic balance by Jesse Ramsden, presented to the Society by Lady Banks, presumably after her husband's death in 1820. It had been used in experiments 'on the best method of proportioning the excise upon spirituous liquors' ordered by Banks and reported on by Joseph Blagden: *Philosophical Transactions* 80 (1790),

pp. 321--345, p. 340. It was loaned as Science Museum Inv No: 1900-166, while all these other relics have remained at the RS.

⁹³ *The Graphic*, 1228 (10 Jun 1893), p. 24; *Record*, op. cit. (note 30). This object was offered for loan to the Museum of the History of Science, Oxford, in 1932, where it remains today (Inv: 82044).

⁹⁴ *The Graphic*, op. cit. (note 93).

⁹⁵ See Bud, op. cit. (note 80) and Anderson, op. cit. (note 48).

⁹⁶ *Catalogue*, op. cit. (note 76), pp. ix, xiii, quoted in Anderson, op. cit. (note 47) p. 219.

⁹⁷ Council Minutes 1874-1877, 30 Nov 1875, CMO/15 (Royal Society).

⁹⁸ Anderson, op. cit. (note 47), p. 219.

⁹⁹ *Conferences Held in Connection with the Special Loan Collection of Scientific Apparatus* (London, 1876), p. 2, pp. 185-8.

¹⁰⁰ *ILN* 1938 (16 Sep 1876), p. 269. See P. de Clerq, 'The Special Loan Collection of Scientific Apparatus, South Kensington, 1876: Part 1 The 'Historical Treasures' in the *Illustrated London News*', *Bulletin of the Scientific Instrument Society* 72 (2002), pp. 11--19. Information was drawn from the extensive catalogue and, de Clerq suggests, personal examination.

¹⁰¹ The first *ILN* report of the exhibition also picked out only historical objects: *ILN* 1925 (17 Jun 1876), p. 599. Peter de Clerq estimates that there were over 400 historic scientific instruments, and many more items of historic technology, among the 5000 objects: 'The Special Loan Collection of Scientific Apparatus, South Kensington, 1876: Part 2 The Historical Instruments', *Bulletin of the Scientific Instrument Society* 73 (2002), pp. 8--16.

¹⁰² This was the assessment of Queen Victoria, who added 'one hardly knew how to get away from each' of the 'many very curious things': RA VIC/MAIN/QVJ (W), 13 May 1876 (Princess Beatrice's copies) <www.queenvictoriasjournals.org>. She mentioned Newton's and Galileo's telescopes and several items of recent invention, concluding 'It would take days to see the Exhibition thoroughly' (p. 105).

¹⁰³ *ILN* 1938 (16 Sep 1876), p. 270, in de Clerq, op. cit. (note 101), p. 13.

¹⁰⁴ *ILN* 1938 (23 Sep 1876), p. 281.

¹⁰⁵ 'Instruments and Apparatus Belonging to the Royal Society', November 1834, MM/13/45 (Royal Society). The 1940 edition of the *Record* lists it as by Haukesbee. The MHS loan, a 'bomb-shaped' part marked with the air-pump's 1834 catalogue number, 49, is Inv No: 28837 (Acc: 1932-69). Its loan and identity was discussed in 1932 with R.T. Gunther in Correspondence about instruments on loan, MDA/H/9 (Royal Society). The air-pump itself was loaned to the Science Museum as Inv No: 1970-24 but has been returned to the RS.

¹⁰⁶ De Clerq, op. cit. (note 101), p. 18.

¹⁰⁷ Anderson, op. cit. (note 47), p. 220.

¹⁰⁸ The instruments lent to the Loan Collection, and the Huygens object glass borrowed by Lockyer, were reported as returned to the Instrument Room on 15 February 1877, Council Minutes 1874-1877,

CMO/51 (Royal Society). The Duke of Richmond, lobbying the Lord Chancellor for the new museum in 1876, said that would return objects to exhibitors 'who expressed a wish to that effect': Anderson, op. cit. (note 47), p. 220.

¹⁰⁹ Copy letter from Harrison to W.J.S. Lockyer, 16 Dec 1907, NLB/36/784. The rejection was conveyed in Harrison to Sir Alexander Pedler, 29 Jan 1908, NLB/37/123 (Royal Society).

¹¹⁰ Details of the loan are recorded in Masters Chair, RS Picture Library, <<https://pictures.royalsociety.org/image-rs-12501>>, and see copy letter from Michael Foster to A.J.R. Trendell, Science and Art Department, 12 May 1896, NLB/12/820. This is presumably the chair bequeathed to the Society by Thomas Kerslake in 1891: copy letter from Herbert Rix to Messrs Wilton & Sons, Bath, 3 June 1891, NLB/5/407 (Royal Society).

¹¹¹ Minutes of Officers' Meetings Committee, 28 Oct 1926, OM/2/1/8 (Royal Society).

¹¹² Copy letter from Harrison to P. Geddes, 6 Mar 1913, NLB/47/624 (Royal Society).

¹¹³ See Figure 5 in 'Convocation of the Fellowship of the Royal Society at the Royal Festival Hall, 23 June 2010', *Notes and Records of the Royal Society* 64 (2010), pp. 217–27, which shows Prince Philip, Martin Rees (then President of the RS), and Queen Elizabeth II 'enjoying some of the Society's treasures', including the telescope, manuscript of *Principia* and William Stukeley's memoir of Newton.

¹¹⁴ 'Convocation of the Fellowship' op. cit. (note 113) and, for example, '350th Anniversary: Royal Society Goes Back to the Future', *The Guardian* (3 Jun 2010). <<https://www.theguardian.com/science/gallery/2010/jun/02/350th-anniversary-royal-society>>.

¹¹⁵ Accompanying a segment on BBC Radio 4's *Today*, 'A Tour Through 350 Years of The Royal Society', 24 June 2010 <http://news.bbc.co.uk/today/hi/today/newsid_8758000/8758800.stm>.