NEW LIGHT ON STEPHEN GRAY, FRS (1666-1736), CANTERBURY FREEMAN DYER

STEPHEN WILLIAMSON

Stephen Gray, an early English scientist, had an intriguing career. For the first 40 years of his life he plied his trade as a dyer in Canterbury. He subsequently achieved fame for his pioneering experiments on the conduction of electricity for which he was awarded the first Royal Society's Copley Medal in 1731: 'as an encouragement to him for the readiness he has always shown in obliging the Society with his discoveries and improvements in this part of Natural Knowledge', and in 1733 he was elected a Fellow. However, long before this he had involved himself in a broad area of science that included the study of fossils, geology, optics and astronomy. His first known scientific correspondence (about water microscopes) is with the Royal Society in 1696. By 1707 his reputation as an astronomer was sufficiently strong for Roger Cotes FRS (1682-1716) to invite him to be his assistant at the newly established observatory at Trinity College, Cambridge.

This article builds on the work of others[1] trying to uncover how someone from his background succeeded in making his mark. It seeks to answer in particular how he established contact with the Royal Society and first became interested in Science and in particular in Astronomy.

Stephen Gray was baptised on the 26 December 1666 at All Saints, Canterbury. His parents were Matthias Gray, a dyer, and Ann Tilman who had married in 1658 at Canterbury Cathedral. Their four surviving sons became Canterbury Freemen by paternity: Thomas, Freeman dyer 1681, Matthias, Freeman grocer 1682, John, Freeman carpenter 1691, and Stephen, Freeman dyer 1692.

There is no record of Stephen being one of the fifty free scholars at the Kings School in the Cathedral Precincts, so it may be that as he knew some Latin [LM, p. 86] he went to the nearby school at the Eastbridge Hospital.

His father's house in Best Lane was recorded with five hearths in the 1664 hearth tax returns (All Saints parish), which suggests he was reasonably prosperous. After his father's death the lease of the house transferred to his mother until 1694, and then to his brother John until 1706 when it is transferred to Jacob Janeway.[2] Janeway happens to be the key figure linking Stephen to the Royal Society (see below).

The Contacts: Henry Hunt and Jacob Janeway

Stephen Gray's first extant letter[3] was sent on 3 February 1695/6 to Henry Hunt, the then Demonstrator at the Royal Society (an example of his work is at **Fig. 1**):

Fig. 1 Drawings of 'A giant Swiss Hussar' and 'Kidney and Bladder Stones' by Henry Hunt both ref. MS/131, reproduced by permission of @The Royal Society.

> Sir, I heer return you the account of these Optic physiological Experiments which the time I could spare from my necessitous Avocations for a livelihood have this winter Permitted me to make … Have since my Brother was with you chanced to light upon an other Experiment which I have incerted.

Further correspondence with Hunt followed. This extract from a 1701 letter[4] concerning 'drawing the Meridian Line by the Pole Star, and finding the hour by the same', advises about his telescope:

> My own observations assure me, that the Pole-Star may be seen in the day time with a Telescope of 16 foot, for with one of this length I saw that Star on the 26th of April, this present year 1701, from 4 a Clock in the morning till 7, and cou'd have seen it longer had not Clouds interposed.

It is interesting that the 1695/6 letter mentions that Henry Hunt knows one of Stephen Gray's brothers (see below).

Henry (Harry) Hunt had been employed by Robert Hooke FRS (1635-1703), Professor of Geometry at Gresham College. In Hooke's time the Royal Society met at Gresham College, and Hooke oversaw the Royal Society Library and

Repository. There is a letter from Hooke to John Aubrey FRS (1626-1697) dated 24 August 1675:[5]

> I have preferred Harry to Mr Montacue[6] who will imploy him in painting pictures these two or 3 years, and is so pleased with him that he hath promised to bear his charges to Italy that he may see and improve himself. And I doubt not but he will with ease get his £150 or £200 per annum. He hath lately done some peices extraordinary well, & will be paid for them accordingly.

Hunt remained close to Hooke till his death.[7] On 2 November 1676 Hunt succeeded Richard Shortgrave as Operator to the Royal Society at a salary of £20/yr. Several ground plans of London Church sites were drawn by him. He was paid £6 10*s*. on 7 July 1677 for 13 plans.[8] He engraved plates for the Royal Society's journal 'Philosophical Transactions', and some of his excellent drawings survive.

Hunt was appointed Keeper of the Royal Society Library and Repository on 25 October 1696 at a salary of £40/yr. He also developed a sideline in selling Scientific Instruments:[9]

> Hooke's Marine Barometer which could be obtained from Mr Henry Hunt, Operator to the Royal Society.

These sales must have been lucrative. When the Royal Society moved from Gresham College to Crane Court in 1710 he was able to lend the Treasurer £464 to help repay the Crane Court mortgage.

Among the beneficiaries of Henry Hunt's will was his uncle Mr Jacob Janeway of Canterbury.[10] Jacob Janeway (*c*.1648-1719) was a son of William Janeway (1600-1654). William was Rector of Kelshall in Hertfordshire as was his son William (1631-1668). Henry seems to have married the latter's daughter Elizabeth.[11] Benjamin Janeway, the youngest brother, was baptised 7 June 1654 at Kelshall. Benjamin is referred to in Robert Hooke's Diary.[12] He died young (17 Jun. 1674, RH p. 108). He also worked with Henry Hunt.

Professor Kusukawa, in an article in Notes and Records of the Royal Society,[13] has:

> Mr Nun executor to Mr Hunt lately deceased having sent a Box with several copper plates the Box was opened in which was found the following wrot by Mr Hunts own hand. These Copper Plates were graved by Ben: Janeway and Hen: Hunt, anno 1671 for the Right Reverend John Wilkins Bishop of Chester, in order to his Universal Character, and after his Decease were committed to my care by the Reverend John Tillotson Dean of Canterbury, which I commit to the Royal Society as liklyest to perfect what my Bishop had not time to performe. Hen: Hunt.

As well as 'Benjamin Janeway' a Mr Janeway is referenced in Hooke's diary, tendering money from Dr Tillotson (20 Nov 1673, RH p. 70). The reference to Tillotson makes it clear that Mr Janeway was Jacob Janeway. In his time Dr John Tillotson FRS (1630-1694) was regarded as one of the best preachers in England, known for his anti-Papist views. He often preached at St Lawrence Jewry, as 'Tuesday lecturer' between 1664 and 1694, where John Wilkins FRS (1614-1672) (one of founders of the Royal Society – he had studied astronomy at university) was Vicar from 1662-

1666. Tillotson became Dean of Canterbury in 1672 and Archbishop of Canterbury in 1691. Tillotson's interest in science is demonstrated by his election to the Royal Society in 1672. Jacob Janeway seems to have been his amanuensis, and Janeway was 'looked after' when Tillotson was appointed Dean at Canterbury.

There is a document dated 10 Dec 1673 in Canterbury Cathedral Archives[14] showing that John Somner, mercer, of Canterbury and Jacob Janeway, gent, of London were appointed as the keepers of Short wood in Throwley. Lambeth Palace Archives[15] have the appointments of the woodreeves or keepers of the Archbishop's woods in Kent, including Jacob Janeway of Canterbury Kent, gent., 30 March 1682.

Jacob Janeway married Frances Bathon[16] in 1679 also at St Lawrence Jewry, and they lived the rest of their lives in Canterbury. As well as his woodreeve duties he seems to have been a clerk of works[17] for the Dean and Chapter of Canterbury. It seems that Jacob Janeway remained a valued aide until Tillotson's death. In the 1690s Jacob Janeway is known to have become a Customs Officer.

The Gray Family's links to Jacob Janeway

The Grays were an upwardly mobile family. Stephen's brother Matthias (*c*.1661-1706) particularly so. He became a Canterbury Councillor in 1688, an Alderman in 1691, and was Mayor in 1692 and 1700 [LM, p. 29]. Matthias Gray's civic responsibilities, particularly as Mayor, would have brought him into contact with men like Jacob Janeway on relatively equal social terms. Jacob's predecessor as woodreeve was John Somner,[18] and in 1693 Matthias married the widow of his son, another John Somner. At any rate the connection to the Somners provides a further link to the Royal Society. A fossil discovery on John Somner's property at Chartham had attracted considerable attention at the Royal Society (**Fig. 2**). First thought to be hippopotamus teeth, they were catalogued correctly as those of a rhinoceros in 1681 by Nehemiah Grew FRS (1641-1712) in his 'Natural and Artificial Rarities belonging to the Royal Society'.

In a letter in 1701 Stephen Gray writes to Hans Sloane FRS (1660-1753), Secretary to the Royal Society, about his inquiry concerning the bones:[19]

> What bones and drawings of them that were dugg up at Chartham are in the hands of Mr Alderman Gray whom you must suppose I needs know which was a little pleasing to me he being my own Elder Brother. His present wife was the wife of Mr John Somner's son for whom he built the house where the bones were dug up. She says she was there when her father Somner was let down into the well by a Basket and saw the bones soe soon as brought up and that not longe after they were all except one tooth put into an oval wooden Box and sent to Oxford haveing first caused a limner to draw some of the Most Remarkable one.

So, it seems certain that Matthias Gray is the brother in the 1695/6 letter, and it seems probable that before Hooke's 1697 lecture, Hunt had asked his uncle Jacob Janeway about the Chartham fossils on Hooke's behalf. This would explain why Hunt, on a visit to his uncle, might have been introduced to Matthias, and subsequently to his brother, amateur scientist, Stephen.

Henry Hunt clearly encouraged Stephen Gray. Stephen borrowed Galileo's works

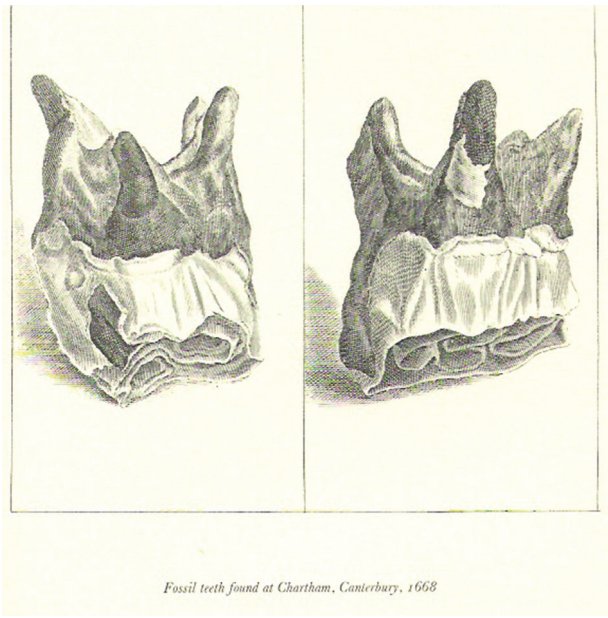


Fig. 2 Illustrations of teeth from 1703 edition of William Somner's *The Antiquities of Canterbury*.

and Scheiner's book on Sunspots[20] [LM, p. 86] from the Royal Society. Stephen was also given access to copies of 'Philosophical Transactions'. Moreover, Hunt probably gave him introductions not just to Sloane, but also to the Astronomer Royal, John Flamsteed FRS (1646-1719), to whom by 1699 Stephen was writing the first of many letters (see below).

The probable inspiration: Thomas Hill

It remains to explain who inspired Stephen Gray's initial interest in Science, particularly in Astronomy. The likeliest person is a Thomas Hill. These letters concerning the sighting of a comet in 1680/1 shed light on this conclusion:

Letter (part) from Flamsteed to Isaac Newton FRS (1642-1727) dated 7 March 1680/1.[21]

> ... to these may be added an observation of the comet made at Canterbury by one Hill an artificer with an instrument of 4 foot Radius on Friday morning Nov 11 whereby hee gives me its place then in Virgo 12 with two degrees North latitude.

Letter from Hill to Flamsteed:[22]

> Canterbury Dec 29. 1681
>
> Mr Flamsteed,
> I am very sory yt it happened so I could not write before this to yr Request about the Comet, about my observations taken from the fixed starrs. I have here under writen three. The first was the 12 Nov. 80: 5 hours A:M: (as was before wch I gave) 12 degr in Virgo 2d north latitude, for the distance I found it by Instrument it made an Angle upon the arch of a great circle, from the Lyons heart 17 deg to the east-ward and the

distance it likwise made from the Lyons Tail was an Angle of somthing more than 11 degr: south towards the west
January the 3d, 8 hours P:M: the Comet appeared almost in a right line betweene Pegasus wing, and Andromeda's head, the distances found of each upon the Limbe was 14 degr: ½ the one, and 7 degr: the other,
Feb : the 3d, 8 hours P:M : the distance I then tooke was from the Goate Star, 27 degr:, and likwis from the neeres of the Triang was 12 degr, its place very neer Medusa's head, wch was my Last observation that I could take, and by those distances I found his latitude as I write before to you. I desire a line from you, whether you find it by this as I have, and if you please also to send me the observation from Roome as you promis me, I shall be much ingauged to you for it.

Letter (part) from Newton to Flamsteed dated 19 September 1685:[23]

Trinity College, Cambridge
SIR, I have been for a great while indebted to you many thanks for your communications particularly for your last about Saturn; but imagining I should have occasion to trouble you again, I deferred, in order that I might not cumber you with more letters than were necessary. I have not yet computed the orbit of a comet, but am now going about it, and taking that of 1680 into consideration, it seems very probable that those of November and December were the same comet. But I am at a loss in the observations you sent me of a Canterbury artificer made on Friday morning, November 11, the comet being then in Virgo 12, with 2 degrees north latitude (**Fig. 3**). But November 11 fell on Thursday, and in Cassini's treatise of this comet the day of the month is November 13. If you have the day noted down, I beg the favour you would assure me which it is.

Letter (part) from Flamsteed to Newton dated 26 September 1685:[24]

Yours of the 19th instant came to hand on Tuesday last, I am very glad to find by it, that you have the motions of comets under consideration. Hitherto, we have only groped out the lines of their motion. If they may be reduced to a theory, it will be very welcome news to us. As for the Canterbury observation, it is a very coarse one; I discoursed with the person that made it, but found him a very ignorant well willer; yet, I believe his observations as good as those of Cellio, made at Rome, which, if I forget not, I sent you, I have here, included, given you part of a letter, I received from him concerning it, whereby you will find the time, November 12th, at 5 hours mane, which is the 11th, 17 hours p.m. which clears the business.

Edmond Halley FRS (1656-1742) had observed this comet on 8 December 1680 in the early morning with Giovanni Cassini in Paris. Two days later it appeared as a spectacular comet in the evening. The comet was the first ever to be initially found with a telescope.[25] Apparently the weather in Northern Europe made observation in November difficult, so Hill's 'early' November observations were special. They were communicated to Halley by Dean Tillotson in a letter from London dated 7 March 1680/1:[26]

I put you some charge by the enclosure, wch yet I hope will be acceptable to you. It is the observations of our Canterbury Astronomer, Mr Hill of the late Comet, wch he told me within this last fortnight appear'd still but was very little. He is not a learned man but very industrious. I submit it to Mr Haley's better judgem't …

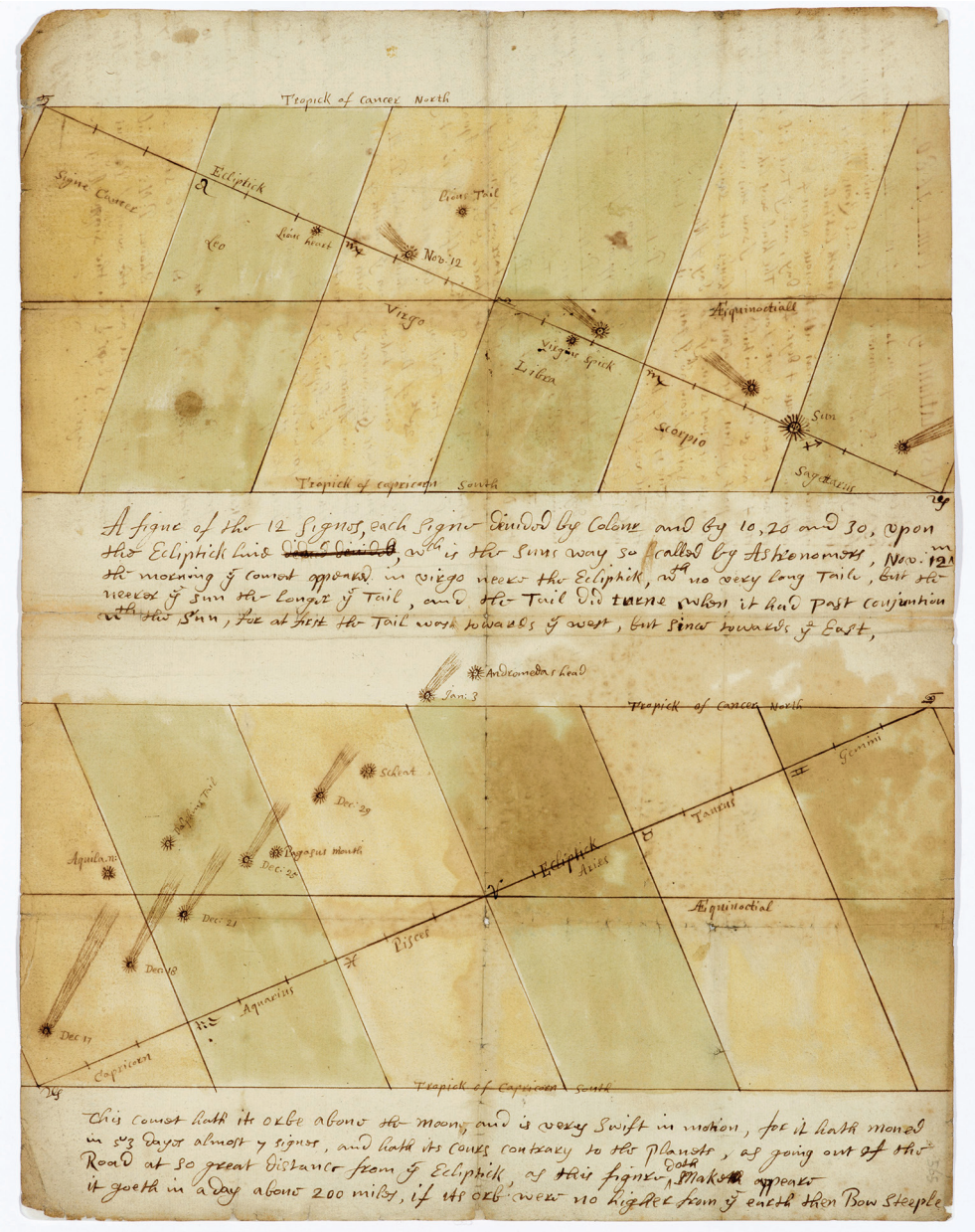


Fig. 3 Thomas Hill's observations of 1680/1 comet sent to Newton. Reproduced by kind permission of the Syndics of Cambridge University Library. Classmark MS-ADD-03965-014-00034.jpg (MS Add.3965, f.565r).

In fact a paper from Hill had already been read on the 19 January 1680/1 at the Royal Society Council Meeting presided over by Sir Christopher Wren FRS (1632-1723). The minutes have:

> Mr Thomas Hill's paper concerning comets sent by Dr Tillotson was perused, and ordered to be copied.

It turned out Hill's observations were important in the debate about the 1680 comet's orbit. Newton initially thought there were two comets. Subsequently his analysis of the comet data showed that it was a single comet with a nearly parabolic orbit: a necessary consequence if its attraction to the sun followed an inverse square law. Firstly, as the 1685 letters quoted above show, Newton had to clarify Hill's dates. Having done so he included Hill's data in *Principia* (first published in 1687):[27]

> Nov. 11, the tail just begun to shew itself, but did not appear above ½ deg long, through a 10ft telescope.

Thomas Hill of Canterbury thus appears to have possessed a 10ft telescope. He was also known to Robert Hooke.[28]

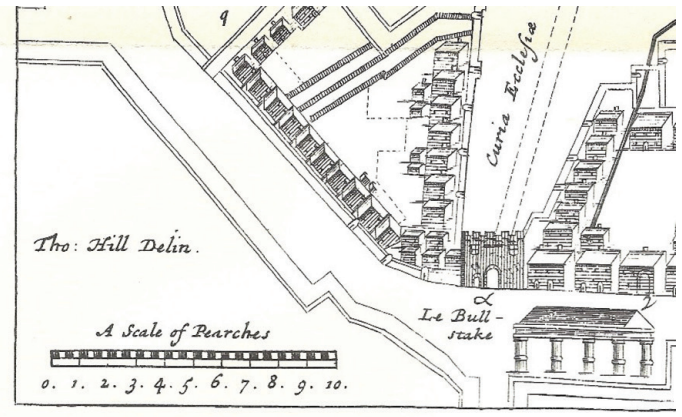
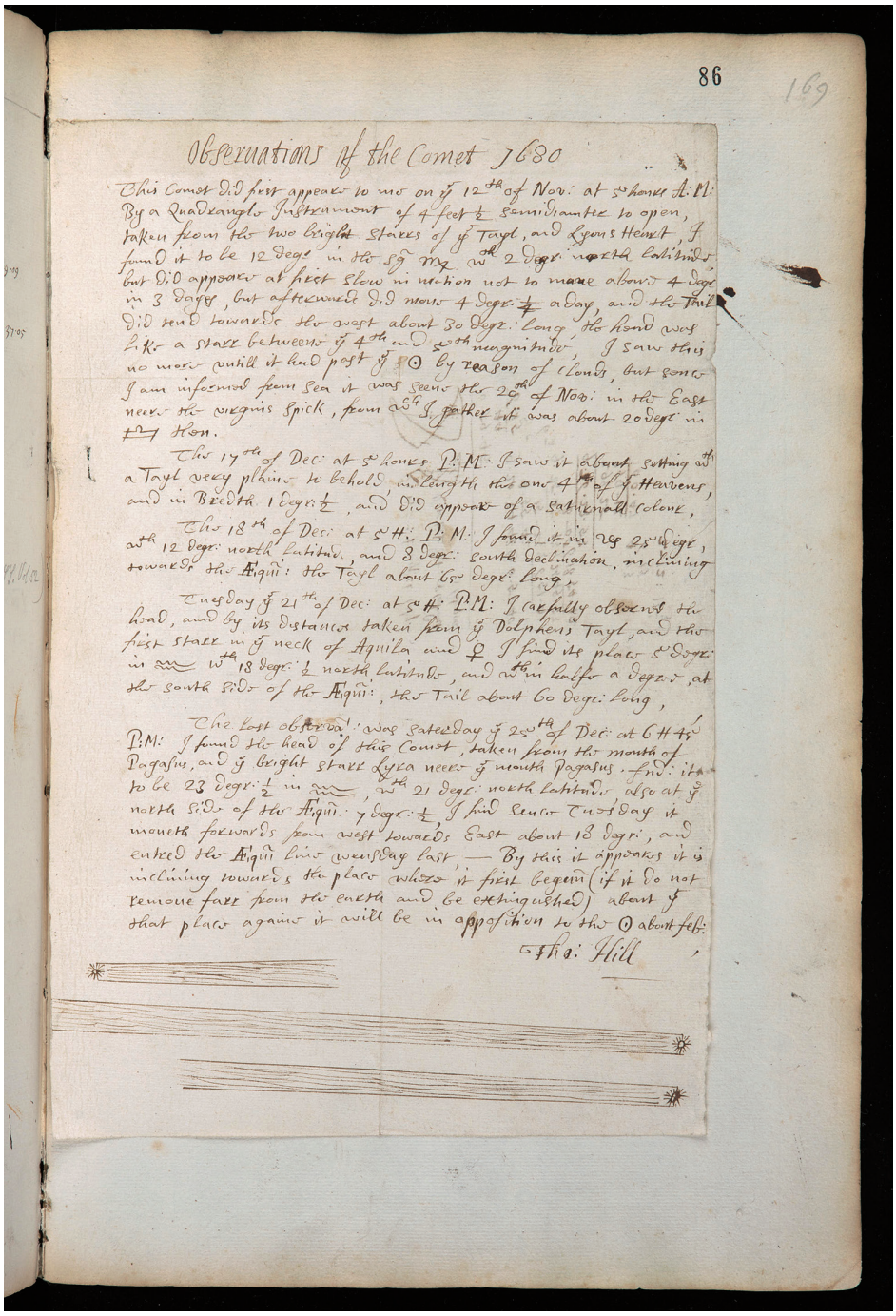


Fig. 4 Part of Thomas Hill's map of Canterbury Precincts from 1703 edition of William Somner's, *The Antiquities of Canterbury*.

Who was this Thomas Hill, and could he have inspired Stephen Gray's interest in Astronomical Observation? It can be shown that it is the Thomas Hill who drew the fine 1680 map of Canterbury Cathedral Precincts that appears in the 1703 edition of William Somner's *The Antiquities of Canterbury* (plate 22) (**Fig. 4**). His signature is on the drawing. This Thomas Hill was a surveyor[29] who produced estate plans of Vauxhall Manor, Southwark[30] and Walworth Manor, London[31] for the Dean and Chapter of Canterbury in 1681. He also wrote the Registers for St Paul's Parish, Canterbury.[32] Fortunately, the signature of Thomas Hill, the Astronomer, is preserved in his letters to Flamsteed as seen in **Fig. 5**. The signatures of surveyor and astronomer are identical.

Dean Tillotson in a letter dated 25 April 1681[33] wrote about visiting the estates of Walworth, Vauxhall and Newington. He asked for the relevant leases and terriers to be delivered via Mr Janeway, and adds that Mr Hill will also be needed. This verifies that Thomas Hill and Jacob Janeway knew each other.



86

169

Observations of the Comet 1680

This Comet Did first appeare to me on ye 12th of Nov: at 5 hours A: M:
By a Quadrangle Instrument of 4 feet ½ semidiamtre to open,
taken from the two bright stares of ye Tayl, and Lyons Heart, I
found it to be 12 Degs in the 5h m. or 2 Degs: north latitude
but Did appeare at first slow in motion not to make above 4 degs
in 3 Days, but afterward Did move 4 Degs: ¼ a day, and the Tail
Did tend towards the west about 30 Degs: long, the head was
like a Starr between ye 4th and 5th nebula under, I saw this
no more cuthll it had past ye ☉ by reason of clouds, but some
I am informed from Sea it was seene the 20th of Nov: in the East
neere the virgins Spick, from wch I gather it was about 20 degs in
Lyon.

The 17th of Dec: at 5 hours P: M: I saw it about setting wth
a Tayl very plaine to behold in length the one 4th of ye Heavens,
and in Breath 1 Degr: ½, and Did appear of a Saturnall colour,

The 18th of Dec: at 5 H: P: M: I found it in ♌ 25 Degr,
at 12 Degr: north latitud, and 8 degs: South declination, inclining
towards the Aquil: the Tayl about 60 Degrs long,

Tuesday ye 21th of Dec: at 5 H: P: M: I carefully observed the
head, and by its distance taken from ye Dolphens Tayl, and the
first Starr in ye neck of Aquila and ♎ I find its place 5 Degr:
in ♒ wth 18 Degr: ½ north latitude, and wth in halfe a degree, at
the south side of the Aquil:, the Tail about 60 Degr: long,

The last observa: was saterday ye 25th of Dec: at 6 H 45'
P: M: I found the head of this Comet, taken from the mouth of
Pegasus, and ye bright starr Lyra neere ye mouth Pegasus, find: it
to be 23 Degr: ½ in ♒, wth 21 Degr: north latitude, also at ye
north side of the Aquil: 7 Degr: ½ I find Sence Tuesday it
moveth forwards from west towards East about 18 Degr:, and
entred the Aquil line wednesday last. — By this it appeares it is
inclining towards the place where it first begun (if it do not
remove fast from the earth and be extinguished) about ye
that place againe it will be in apposition to the ☉ about feb:

Thos: Hill,

The parentage of Thomas Hill has not been determined, but given that the drawing in Fig. 4 references Bow Steeple, it seems likely that he was a bright young man on either Hooke's or Wren's staff when St Mary Le Bow Church was being rebuilt in 1671-3 following the Great Fire of London. It is known from his Diary that Hooke was very friendly with both Tillotson and his wife (e.g. RH p. 8), and Tillotson probably approached Hooke when he needed a surveyor. Amateur astronomer Hill seems an excellent fit for the science-loving Tillotson. Thomas Hill incidentally fathered a second generation of surveyors based in Canterbury who made a living from estate drawings.[34]

Gray's career after 1707

Stephen Gray stayed in Canterbury, working as a dyer, until 1707 when he was persuaded to go to Trinity College, Cambridge. There Roger Cotes, Plumerian Professor of Astronomy and Experimental Philosophy and Editor of the 2nd edition of Newton's *Principia*, was setting up an observatory above Trinity Great Gate.

Soon Stephen regretted moving and he returned to Canterbury in 1708. He found 'Cambridge mean, the facilities poor, and he was disdainful of Cotes's intention to repeat Flamsteed's work on the position of stars' as his letter to Flamsteed dated 6 September 1708 quoted in LM [p. 40] illustrates:[35]

> I had better have taken your advice which was more agreeable to my own inclination had I not been persuaded by the solicitations of my friends but we little thought or suspected such men could have been soe mercenary as I find they are … I saw nothing there that might deserve your notice there was indeed that which they call their Observatory for noe other Reason that I could perceive than that some time or other they intend to make it soe.

However, his short stay in Cambridge was remembered by William Stukeley FRS (1687-1765), amateur scientist, personal friend of Newton and author of *Memoirs of Sir Isaac Newton's Life* published in 1752. In his own memoirs Stukeley wrote:[36]

> Mr Stephen Gray, of Canterbury, was now in our university as an assistant to Mr Cotes Professor of Astronomy for whom they built the observatory in Trinity College, a very ingenious man, well versed in Philosophy, Astronomy, Optics, Mechanics and uncle to Mr John Gray[37] of our College, my Junior, studied Physick, a lad of very good parts and Industry with whom I was particularly acquainted, since took his Batchelor of Physick Degree, and now practises at Canterbury his Native country. We three used to smoak many a pipe together and try Various Experiments in Philosophy. Since then Mr Stephen lived with Dr Desaguliers, and assisted him in lectures, as in his experiments before the Royal Society. Now he lives in the Charterhouse as one of the gentleman pensioners there. He invented the water microscope mentiond in the Philosophic Transactions; one whereof I made myself about this time.

Despite his unhappy Cambridge experience Stephen Gray went on to exchange the physical demands of his trade for a life where he could concentrate on science. He wrote from Canterbury to Hans Sloane then Secretary and later President of the Royal Society on the 31 July 1711:[38]

> I have for many years spent the far greatest part of my time that the avocations for

> a subsistance would permitt me in the studie of astronomy and had been at noe little charge for books, instruments and other materials, being Prompted thereto chiefly by the natural tendency of my Genius, though not altogether without hopes that some greater advantage might at one time or other attend then barely the satisfection of my inclinations but finde it otherwise and now being in the 45th year of my age think it time to consider how I shall Procure a comfortable Subsistance being already soe Infirme as not to be able to follow my Imploy without much more Difficulty and Pain than in former years caused by a strain I received in my back some years agoe which brought on me the Dolor Coxendicis.

The mathematician Brook Taylor FRS (1685-1731) wrote on Gray's behalf to John Keill FRS (1671-1721) on the 3 July 1713 from *Bifrons*, near Bridge, Canterbury:[39]

> I am very much obliged to you for the great readiness you are pleased to shew to assist Stephen Gray upon my account. He is a very fit person for the service of the R.S. wherefore I thought to recommend him very heartily, but the poor man is so very bashful that I can by no means prevail upon him to think of that business, now it seems to be so near by the death of Hunt he has such dreadful apprehensions of so many virtuosos.

Eventually Stephen Gray did move, probably as a result of Keill's influence.[40] From about 1715 to 1719 he lodged near Westminster Bridge with John Theophilus Desaguliers FRS (1683-1744), who was also interested in electricity, sometimes staying with John Godfrey, landowner and amateur astronomer, at *Norton Court* near Faversham. Then in 1719 he obtained a 'grace and favour' home at the Charterhouse, London, from where he continued his electrical experiments, regularly demonstrating to visitors, right up to his death in 1736. Amongst other things he showed that he could transmit messages using electricity over distances of ½ mile. In doing so he can justifiably be said to have initiated the science of electrical communication.

Conclusions

The precise route of Stephen Gray's amazing journey to become a leading scientist is now a little clearer. It was not straightforward. It involved a chance connection with the Royal Society through the family of Jacob Janeway and almost certainly an encounter in his teens with an inspirational astronomer, Thomas Hill. It is worth recording that both were appointments made by the science-loving Dean Tillotson. Neither detract from the genius and determination of Stephen Gray himself.

ENDNOTES

1 E.g. Robert Chipman, 'The Manuscript Letters of Stephen Gray', *Isis*, vol. 49, no. 4 (Dec. 1958), pp. 414-433; L. Murdin, *Under Newton's shadow: astronomical practices in the seventeenth century* (Hilger, Bristol 1985) [quoted hereafter in text as 'LM']; David H. Clark and Stephen P.H. Clark, *Newton's Tyranny*, 2001.

2 Canterbury Cathedral Archives, CCA-DCc-BB/77/51-63.

3 Royal Society Records, ref. EL/G1/49.

4 Royal Society's *Philosophical Transactions*, 1701, vol. 22, pp. 568 ff.

5 British Library, Egerton MS 2231, fols 200-1.

6 Ralph Montagu, British Ambassador to Court of King Louis XIV from 1669-1678.

7 See also *Diary of Robert Hooke 1688-90 and 1692-3*, ed. R. Gunther, 1935.

8 Quoted on p. 73 of *City Churches of Sir Christopher Wren* by Paul Jeffery, 2007. Wren and Hooke worked together, and Hooke's 'Office' prepared many plans for Wren.

9 *Philosophical Transactions*, 1701, vol. 22, pp. 791 ff.

10 Will of Henry Hunt of St Bridget, Fleet Street 26 June 1713, TNA PROB 11/533.

11 Hunt's will refers to his deceased nephew John Hunt Vicar of Thorpe. CCED online records have John Hunt, Vicar of Thorpe, from 1700-1713. *Alumni Cantabrigienses* advises John as son of John, surgeon of Rostherne, Cheshire. A Henry Hunt married Elizabeth Janney (Janeway?) at Rostherne 17 October 1679. Elizabeth Janeway, daughter of William, baptised Kelshall 30 August 1660. A Hannah Hunt, daughter of Henry and Elizabeth Hunt, baptised at St Stephen, Coleman Street, London 26 March 1682. Hannah married Jonathan Nunn, executor of will, on 6 February 1703 at All Hallows London.

12 *Diary of Robert Hooke 1672-1680*, transcribed from the original in the possession of the Corporation of the City of London (Guildhall library), ed. by Henry W Robinson and Walter Adams, 1935, Taylor and Francis [hereafter quoted as 'RH'].

13 S. Kusukawa, 'Picturing knowledge in the early Royal Society: the examples of Richard Waller and Henry Hunt', *Notes and Records of the Royal Society*, 65 (2011), 273-94, note 15.

14 CCA-DCc-BB/68/45.

15 LPA, AA/EDT/T/S/132-3.

16 London Marriage Allegation: Jacob Janeway, of St Martin's, Ludgate, London, Bachr, abt 28, & Frances Bathon, of St Giles in the Fields, Middx., Spr, abt 22, with consent of her parents; at St Lawrence Jewry, London. 18 December 1679. Frances Bathon, daughter of John and Grace Bathon, was baptised Canterbury Cathedral 8 October 1657.

17 CCA-DCc-Fabric/12/2 (1693/4).

18 Appointment by Archbishop Juxon of John Somner of Canterbury, Kent, gent., and Robert, his son, 31 December 1660 as woodreeve, with confirmation by the dean and chapter of Canterbury, 2 April 1661. Lambeth Palace Archives AA/EDT/T/S/135. See also note 14.

19 British Library Sloane Collection MS 4038 f274.

20 Christoph Scheiner, *Rosa Ursina sive Sol*, Bracciano, 1626-30.

21 Cambridge University Library, Portsmouth Collection Add 3979.2.

22 Cambridge University Library, Portsmouth Collection Add 3979.4.

23 Quoted in *Biographica Britannia*, vol. 5, p. 3226, 1760 in article on Newton.

24 Cambridge University Library, Portsmouth Collection Add 3979.8.

25 Gottfried Kirch at Coburg in Germany on 4 November 1680.

26 British Library, Add 4236 f227.

27 Newton, *Principia*, vol. 2, p. 358, 1729 edn.

28 Robert Hooke's, 'Posthumous Works', 1705 refers to Thomas Hill's observations: Mr Thomas Hill saw it first the 12th of November, at half an hour after Five in the Morning, and by its distances from Cor and Cauda Leonis, taken with an instrument of four foot and a half Radius, he found it then, as he says, in 12 Degrees of Virgo, and in two Degrees of North Latitude, with a slow Motion, having not passed above four Degrees in three days. Its Tail was then about 30 degrees long. Also Hooke's Diary for 9 Dec. 1689 has 'Hill of Canterbury dead'.

29 Stephen Gray in a paper on Parhelia published in *Philosophical Transactions* (No. 21, p. 126) in 1699 mentions having a theodolite – a surveyor's instrument – not necessarily something a dyer/astronomer would have.

30 British Library, Add 34790.

31 Canterbury Cathedral Archives CCA-Map/19.

32 Thomas and Mary Hill had a son Francis baptised at Canterbury Cathedral in 1678, and another Jared baptised at St Paul's, Canterbury in 1689. Both became surveyors. For more see F. Hull's article Kentish Mapmakers of the 17th Century in *Archaeologia Cantiana*, 109, 1991, 63-83.

33 Canterbury Cathedral Archives, CCA-DCc-CantLet/176.

34 See C. Williams, 2021, 'The Hales Palace estate map recovered to Canterbury', *Archaeologia Cantiana*, 142, 326-30.

35 Cambridge University Library, RGO 1/37.
36 The Family Memoirs of the Rev. William Stukeley, M.D., vol. 1, p. 41, 1882.
37 John Gray (1688-1737), son of Stephen's brother Matthias, was a Canterbury doctor.
38 British Library, Sloane MS 4042 f336.
39 Royal Society Correspondence, MS 82 fol. 5.
40 Brook Taylor and John Desaguliers were doctoral students of mathematician John Keill.