

The Reverend Thomas Bayes, F.R.S. (1702–61)

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ON November 10th, 1763, Dr Richard Price (1723–91) (see Thomas, 1924; Thorncroft, 1958) of the Unitarian Church, Stoke Newington, wrote a letter to Sir John Canton, F.R.S., which begins: "I now send you an essay which I have found among the papers of our deceased friend Mr. Bayes, and which, in my opinion, has great merit and well deserves to be preserved. Experimental philosophy, you will find, is nearly interested in the subject of it; and on this account there seems to be particular reason for thinking that a communication of it to the Royal Society cannot be improper."

It was in this manner that Thomas Bayes's paper, "An Essay Towards Solving a Problem in the Doctrine of Chances" (1763), was first published, and it ranks as one of the most famous, least understood, and controversial contributions in the history of science. Recently the Essay has been edited with modern notation and idiom by Barnard (1958), who says: "Bayes' mathematical work, although small in quantity, is of the very highest quality, and contains certain thoughts that did not receive as clear expression again until almost a century had elapsed."

Very little is known about the personal history of Thomas Bayes, yet he expressed ideas in science and in the humanities which will endure as long as man retains his freedom of thought and the power to express it. He was not prepared to accept established opinion on theology or on scientific subjects without the most searching scrutiny and for these reasons anything he has to say on the questions he raised is of human as well as scientific interest. Above all was his integrity in which lay the readiness to search for objective truth and the courage and ability to state it clearly.

Thomas Bayes was born in 1702 and the evidence suggests that his birthplace was in Hertfordshire. Unfortunately, the bishop's transcripts of the parish registers of Bovingdon, Hemel Hempstead, Herts., covering the period 1700–06 are missing. Urwick's (1884) comment on this is acute: "The historian's time and labour would be marvellously served if Parochial Registers, like Non-parochial, were accessible at some central office. The old register of St. Albans Abbey Church was found in a hay-loft and that of another Herts. parish was cut up by a tailor for a measure."

Thomas was the eldest son of the Rev. Joshua Bayes (1671–1746) and Ann Bayes (1676–1733). He had three brothers, John (1705–43), Nathaniel (1722–64) and Samuel (1712–89), and three sisters, Mary (1704–80), Ann (1706–58) and Rebecca (?). Joshua was ordained in 1694 (with Edward Calamy and others) at Little St. Helens Meeting House and was the minister at Box Lane, Bovingdon, Herts., until 1706, four years after the birth of his first son Thomas. (See James, 1867; Wilson, 1814; Toulmin, 1814; Jones, 1849.) He was assistant at the Presbyterian Meeting House, St. Thomas's Church, Southwark, until 1723 and finally became the Pastor at Leather Lane in Hatton Garden, London, until his death.

He was well known as an able lecturer and he helped to raise money for the assistance of county nonconformist ministers in a series of lectures, principally at

Salter's Hall. Many of these ministers were in need and suffered hardship but they had a common bond and were steadfast in times of persecution.

Joshua was the nephew of Samuel Bayes of Trinity College, Cambridge, ejected minister of Grendon in Northamptonshire, and was educated under the Rev. Richard Frankland, M.A., of Christ's College, Cambridge. (Frankland was the founder of the Academy from which Manchester College, Oxford, traces its origin.) Joshua was also a man of wealth, his portrait is in Dr Williams's Library and he lived in Milk Street in the Parish of Saint Mary Magdalene. (He was not a member of the Royal Society as stated in some references.)

No records have been traced of Thomas's boyhood days but we do know that he received a "liberal education for the ministry" and it is reasonable to suppose he received his education at a dissenting academy. These academies are to be distinguished from the dissenting schools of the time. (See McLachlan, 1931; Trevelyan, 1946.) The latter were charity foundations but the academies made good to some extent the shortcomings of the two universities. They provided a sound background of literary and scientific subjects and for those destined for the ministry, instruction was given in all branches of divinity including the oriental tongues. Their success was due to the personal exchange of ideas at close quarters. In the opinion of Dr W. A. Shaw, "The abiding claims of the dissenting academies to historical recognition rest on the high standard of academic education which they maintained during a century in which the English universities were nearly as palsy-stricken as the church."

The only academy in the London area during the period 1716 to 1730 was Coward's Academy (later known as the Hoxton Academy) in Tenter Alley, Moorfields. (See McLachlan (1931) and Minute Book of Coward Trust.) It was founded in 1701 by a Mr Coward of Walthamstow (d. 1738) and was later supported by the Congregational Fund Board. Unfortunately, the names and record of students for the period 1704 to 1738 have not been traced and, while we cannot furnish direct evidence of Thomas's attendance at this Academy, the following facts emerge.

Firstly, it was within easy reach of the Bayes's home in Milk Street, and secondly, John Eames, F.R.S. (d. June 29th, 1744), was one of Thomas's sponsors for election to the Royal Society (in Crane Court, Fleet Street) on November 4th, 1742. His other sponsors were Martin Folkes, President of the Royal Society, an antiquary; James Burrow, an antiquary; Cromwell Mortimer, physician; and the Earl of Stanhope. (For references to Eames see McLachlan (1931) and Smith (1954).) Eames was the principal tutor in languages, mathematics and natural philosophy at Coward's and would certainly be eligible to sponsor a former pupil. He was a great scholar and, although lacking in oratorical gifts, he attracted to his lectures some of the most distinguished pupils who ever entered a nonconformist academy. He was a friend of Sir Isaac Newton (1642–1727). Thomas's friend, Richard Price, attended this academy from 1740 to 1744 although he was not, of course, a contemporary of Thomas.

As far as we can ascertain, the theory of probability was not in the curriculum at Coward's, although under Eames's tuition the students learnt mechanics, statics, hydrostatics, optics, spherical geometry, and the use of applied mathematics in navigation, geography and astronomy—a comprehensive course. This fact, perhaps, strengthens Professor Barnard's theory that Thomas may have learnt the mathematics of probability from "poor De Moivre" who earned a living in London teaching mathematics at Slaughter's Coffee House in St Martin's Lane (Clarke, 1929).

Alternatively we may believe that Thomas received his education further afield, but no records have been found to substantiate this. It was not unusual for students to move between academies. Quite a number went to Scotland, especially to Glasgow, and to the Continent, mainly at Leyden. If the lists of students at Coward's Academy are traced and contain no reference to Thomas, it is by no means conclusive evidence that he was not a student at Coward's. According to the Rev. C. E. Surman, known lists of academical students are far from complete.

In 1723 Joshua Bayes became Pastor to the congregation at Leather Lane and Thomas assisted his father until about 1729. We next find Thomas's name on Dr John Evans's (1767-1827) list of "Approved Ministers of the Presbyterian Denomination" in 1727, and in 1731 he became the Presbyterian minister, succeeding the Rev. John Archer at the Meeting House, Mount Sion, in Tunbridge Wells (Strange, 1949). This chapel was opened in 1720 and was situated, at the time, in the fashionable quarter of the town. According to Bengé Burr (1766), it was a "capacious, handsome, presbyterian meeting house".

We do not know the reason Thomas went to this town, but we do know that it was customary (and still is) among Nonconformist congregations to invite approved ministers to settle over them in the pastoral office. A minister has complete freedom of choice where he settles or how long he remains. Thomas's estimation of Tunbridge Wells could well have been founded on the following (James, 1867): "There were Arminians and Socinians, Calvinists and Antinomians and Ranters and Libertines; there are many of them whimsical, giddy and unstable; yet it must at the same time be acknowledged there are many Christians among them." An excellent field for a young minister to begin work in.

It is of interest to know that Thomas's period as a minister at Tunbridge Wells coincided with the period when this town was at the height of fame as a centre of fashion and elegance and a favourite resort for London citizens in search of a healthy holiday. (See, for example, Church (1948), Knife (1916), Melville (1912), Pearce (1912), and Betsy Sheridan's Journal (1960).)

Tunbridge Wells was, in the words of Defoe, "agreeably covered by good houses, fine gardens, and fruit trees" and, indeed, the countryside has a particular charm and an ethereal beauty in apple-blossom time. The town was famed for its chalybeate waters whose efficacy was advertised to a degree that was only matched by the incredible credulity of the public. Art flourished and was a part of normal life and trade. The famous Tunbridge ware (originated in 1685 at Tonbridge), of design based on the natural colour of wood to form mosaics and patterns of great beauty, sold in quantity.

Most of the social activities of the town came under the direction of a Master of Ceremonies, firstly Belle Causey from 1725 to 1735, and then by Beau Nash until his death in 1761. Nash persuaded the formidable Sarah Porter to come from Bath and organize "touting" and to enlist subscribers for the assembly rooms ("touters" were named after the people of Footing). Nash was Master of Ceremonies in the grand manner, on easy terms with Royalty and men like Dr Johnson, Pitt, Garrick, Handel, and many other distinguished patrons of the town. He mixed with commoner and noble alike and managed to maintain an aloofness from his fellows as befitted his eminence; yet he caught the popular imagination and commanded their respect. He was a majestic figure who maintained his usefulness until his death.

Defoe says, "Tunbridge Wells wants nothing that can add to the Felicities of life, or that can make a Man or Woman completely happy, always provided they have

money.” This comment is in line with other material, and expresses in some degree the solace that was sought by the inhabitants from ominous events of national concern. For example, in 1745, Prince Charles had become ruler of most of Scotland, had established an invasion base at Gravelines and had marched as far as Derby.

Reference to letters and other writings of people who were likely to have had some personal contact with Thomas reveal very little information about him. A capable reporter of the times was Mrs Elizabeth Montagu (1720–1800), wife of the grandson of the Earl of Sandwich. She held parties where “cards would not be thought of and where ladies might participate in conversation with literary and ingenious men”. She was the first of the “Blue Stockings”, so named because once a “gentleman appeared at one of her assemblies in blue worsted instead of black silk stockings”. The list of eminent scientists who visited the town includes Dr Robert Smith, Master of Trinity College, a noted mathematician, and Mrs Montagu cannot understand why he was so fond of Tunbridge Wells “for it seems not very agreeable to the nature of a philosopher”. Again from her letters, she names a person “most taken of” Philip, the second Earl of Stanhope (one of Thomas’s sponsors to the Royal Society). She says, “He is always making mathematical scratches in his pocket book.”

Mrs Montagu’s comments on intellectuals is worth recording. Of one gentleman she writes, “He has not found that the wisest man in the Company is not always the most welcome, and that people are not at all times disposed to be informed.”

William Whiston (see Whiston, 1753), who succeeded Sir Isaac Newton as Lucasian Professor of Mathematics at Cambridge, met Thomas in 1746 and they breakfasted together. Whiston records “respectful admiration” for his host’s mathematical ability. Samuel Richardson, the novelist, records in 1748: “An extraordinary old man we have had here . . . the noted Mr. Whiston, showing eclipses and explaining other phenomena of the stars.”

The Pantiles was the main promenade for important people who visited the town, and the scene of pageantry and glitter at the height of the season can have been rarely equalled except perhaps at Bath. The Beaux strolled along in pigtail wig, long-decorated coat, lace ruffle and shirt front, velvet breeches, gay stockings, and high-heeled shoes. Swords were forbidden by Beau Nash and he banned smoking in public places. Feminine dress was equally colourful and very large hats were worn of almost every shape known to geometry. Dairymaids and fruit girls wore hooped-out dresses and sold their goods in the Lower Walk.

Thomas himself was no doubt suitably attired. There are plenty of engravings and portraits at Dr Williams’s Library which show ministers of the period dressed in full wig, Geneva-type preaching gown, cravat and “bands”. Away from the pulpit, the normal attire was a wig (often a tricorne hat), dress coat, knee breeches, stockings, silver-buckled shoes, and a cravat, often of a distinctive ministerial type of folding. Mount Sion Chapel is only some four hundred yards from the Pantiles and Thomas’s comments on the scene and life in general in this unique town would have been of interest.

In 1731, presumably after his arrival in Tunbridge Wells, Thomas Bayes wrote a tract, which attracted notice. It was in answer to Balguy and Grove who maintained that moral uprightness (rectitude) and wisdom were the “first spring of action in the Deity”. The following quotations are taken from this tract:

(Page 22.) “I don’t find (I am sorry to say it) any necessary connection between mere intelligence, though ever so great, and the love or approbation of kind and beneficent actions.”

(Page 27.) "If kindness or a good disposition be not the spring no matter what the nature or consequence of the action be, however beneficial it may be to us, we like the being that produced it never the better; we don't think ourselves obliged to gratitude, or imagine him any ways the more perfect, as to his moral character on account of it."

(Page 46.) "He says, the essentials of beauty are order and proportion; but if I am mistaken not, the essence of deformity may as truly be asserted to be also order and proportion. In the same sense that one kind of order and proportion constitute beauty another kind of order and proportion seems to constitute deformity. Objects are not therefore ugly because they want order and proportion."

(Page 72.) "If the universe was to consist of uniform sort of beings however happy they might be 'tis evident that they could not in some respects enjoy so great a happiness as they might by variety; there would then be one uniform object of contemplation, one uniform relation among all the creatures of the universe; which could never afford so great a happiness as variety of these to intelligent and rational creatures, whose happiness is in great measure derived from objects of contemplation, and the relations they stand in one to another."

About this period Sir Isaac Newton's work on fluxions was subjected to fierce attack. Some of these attacks contained sly innuendoes and veiled insults and were highly abusive.

One of Sir Isaac's antagonists was Bishop Berkeley, a contemporary of Bishops Butler, Bentley and William Law. The bishops, almost without exception, were either relatives of noblemen or wealthy men and yet none had been raised to the Episcopate for services rendered to the Church (Trevelyan, 1946). The custom was, however, not without some benefit. Bishop Berkeley was a noted philosopher and metaphysician. He attacked Sir Isaac's work under the pseudonym of the "Analyst" and also, we believe, on another occasion as the author of *The Minute Philosopher*. The *Analyst* was printed in 1734 and resulted in several controversies becoming the starting point for all philosophical discussion of the new mathematics in England during the eighteenth century (Clarke, 1929).

Sir Isaac's work was defended by a number of intellectuals, including Benjamin Robins, F.R.S., and J. Walton, but the most scathing reply, in Sir Isaac's defence, came from Thomas's pen in a tract published in 1736. (This tract was anonymous for reasons that are well understood but is ascribed to Bayes by his contemporaries, as may be seen in copies at the British Museum and Dr Williams's Library.) The following are quotations:

(Preface.) "But the invidious light in which he has put debate by representing it as a consequence to the interests of religion is I think truly unjustifiable, as well as highly impudent."

(Page 47.) "To suspect Sir Isaac Newton of the mean design of seeking reputation among the ignorant by venting unintelligible notions, and defending them by artful cunning and cunning sophistry, is what I think no man is capable of doing."

(Page 48.) "He [i.e. the Analyst—Bishop Berkeley] represents the disputes and controversies among mathematicians as disparaging the evidence of their methods; and, Query 51, he represents Logics and Metaphysics as proper to open their eyes, and extricate them from their difficulties. Now were ever two things thus put together? If the disputes of the professors of any science disparage

the science itself, Logics and Metaphysics are much more to be disparaged than Mathematics; why, therefore, if I am half blind, must I take for my guide one that can't see at all?"

In 1746 Thomas lost his father and he inherited about £2,000 and his father's library. He and his brother Samuel were appointed executors to a trust fund amounting to £1,400 on behalf of his sister Rebecca in order to prevent Thomas Cotton, Rebecca's husband, from paying his debts with his wife's money. Rebecca received "the sum of £40 for mourning" and the rest of the family shared a sum of nearly £10,000 between them. (A considerable sum in those days. A craftsman's wages in 1740 were approximately £50 per year, and a labourer's wages were about £15 less than this figure (Cole and Postgate, 1946).)

Thomas's inheritance seems to have been untouched because he left most of it to be divided between his family and friends including £200 to be divided between "John Hoyle late preacher at Newington and now I suppose at Norwich and Richard Price now I suppose preacher at Newington Green".

There is little to add to the scant documentation that exists with respect to Thomas's life in Tunbridge Wells. A reference by Timpson (1859) describes him as "a gentleman of fortune but not a popular preacher", an attribute he shared with Richard Price. Popularity can be of an ephemeral nature and, in relation to a minister, the term may not include the gift of guidance or the ability to give lasting comfort to those most in need; or even the ability to strengthen belief already held.

The Rev. Onelly, a clergyman of nearby Speldhurst, described Thomas as the "best Greek scholar he had ever met" (Timpson, 1859) and we also find that he was a friend of a local family named Jeffrey. Thomas left "£500 and my watch made by Elliot and all my linen and wearing apparel and household stuff to Sarah Jeffrey daughter of John Jeffrey (a holloware turner) living with her father at the corner of Jourdain Lane".

Thomas was unmarried and it is possible that Sarah looked after his household or assisted in some useful manner at Mount Zion chapel. She was married to Robert Jeffrey, a wheelwright. No further information has been found about Sarah or her family. Her date of birth is uncertain. There were five "Sarah Jeffreys" buried in the churchyard between 1777 and 1815 and the name is common, according to the Rector of Speldhurst who checked the Registers.

In 1749 Thomas wished to retire from his ministry and he allowed the Independent ministers from London to use the Chapel and take services each week (Timpson, 1859). It is recorded: "All that summer of 1749 we had supplies from London, Sabbath after Sabbath; 'twas indeed a summer to be remembered." This arrangement was terminated on Easter Sunday in 1750 when Thomas resumed his pulpit because of dislike of the Independents' doctrine and despite protests they had to find other accommodation (Strange, 1949). (In the early part of the eighteenth century the division between various forms of religious belief, even among Non-conformists, was greater than it is today. According to Thorncroft (1958), the "Independents stood for orthodoxy and soundness of doctrine, while the Presbyterians placed greater emphasis on integrity and free enquiry". Furthermore, the sombre philosophy and narrow religious viewpoint of John Calvin still exercised considerable influence on Independent thought.)

A valuable relic has been preserved in Thomas's notebook. This book is in the muniment room of the Equitable Life Assurance Society, the "Old Equitable" founded in 1761, and came into their possession through Richard Price and his

nephew, William Morgan, who gave advice to the Society on actuarial matters. The notes are undated but the pages are numbered and may be representative of a number of such books Thomas entered and kept for reference purposes. The writing is distinctive and contains the same characterizations noted in Thomas's Essay and other material lodged at the Royal Society. The material includes a method of "finding the time and place" of the conjunction of two planets, some notes on weights and measures, on a method of differentiation and a note on logarithms.

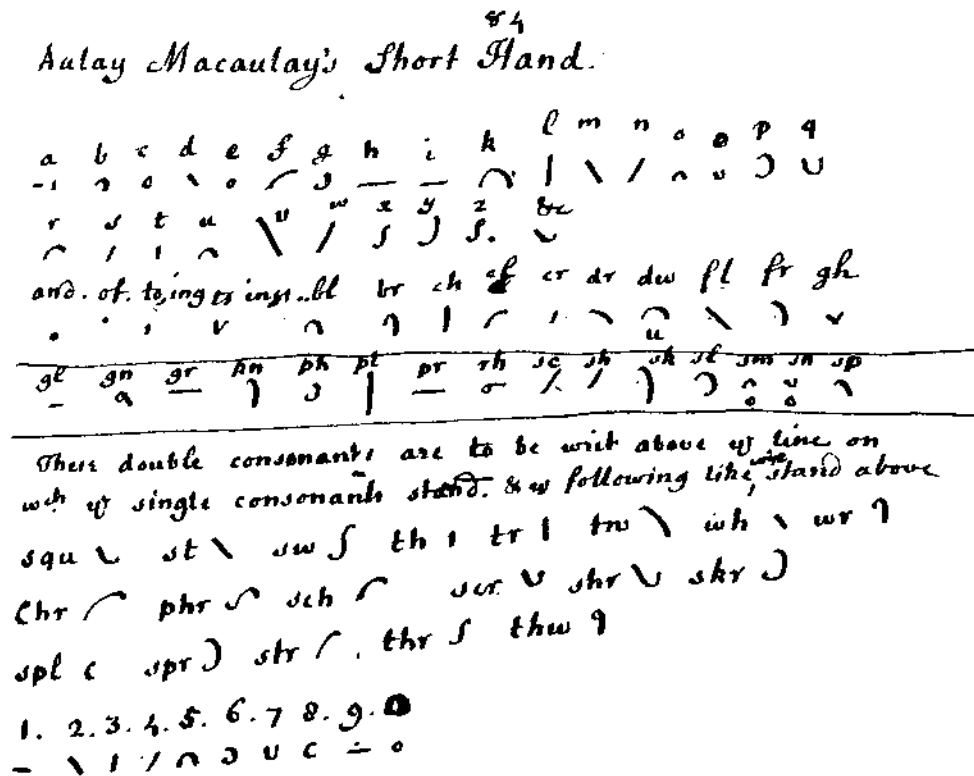


FIG. 1.

Of particular interest, written in the concise style of an engineering report, is a discourse on an electrifying machine. Rather strangely, the first page of this report is headed "Paris July 4th 1746" and the material concludes with some astonishing results which make good reading. Interposed in the notebook is material which appears to be subject matter for sermons. These notes are partially in shorthand, and on page 84 is the complete key to a system of shorthand (Fig. 1) which was later found to bear no relation to the material in the notes or to that taken from the Sir John Canton papers (MM.1.17, Royal Society) and shown in Fig. 2.

Thomas's interest in electricity in relation to electrically charged bodies is evident and it would have been of interest to know what he had to say on a problem that was not solved until nearly a century had elapsed. The shorthand has been examined by a number of authorities (Mr W. J. Carlton, of Andover; Mr F. McD. Turner,

Pepysian Library, Magdalene College, Cambridge; and Professor W. Matthews, Department of English, University of California, Los Angeles).

together exert their forces in one or w same direction between them; the flow of the Electrical fluid into w ball electrified minus is facilitated by w endeavor of w Electrical fluid to get out of w ball electrified plus; & vice versa: & so the two balls & w air between them very readily return to their natural states.

~~Ob. How it is that the two balls do not attract each other.~~

P. 20. b / r 4' 1 4 C 2. 9 L n. r Elect⁺: G, E 5 9
5' r. C e-72 b + l. 417 1. L 4 u 47 4, 6 b + C Elect
plus or minus m r 5, appearance r v 5' 5 n 5. E 9 C
unelectrify, 5: But a. 6₂ v 5 chain v r 6 C 00 00
71 + 71 5² 1. 9 6 b + n. r e-72 plus v 5/2 6, 4-72
1: Fasten 2 cork balls y' 4 2 6 1. 2 piece w thread
4, eight inches - 1 / doubling v d' v. r bar n 5.
e-72 5' v balls 1. 5 4 7. 1 6 4 v r n 4 v 5' 6 /
1/2 v bar v thread / v balls 02 a 52 v 4 body
equally r' 1. n e-72 eb plus v 5/2: 1^{mo} C C
5' r bar 62 1. n e-72 minus / 5 294 v b n e-72 4
1- v balls 1. repel 4 3/2 / 5 4 L 4 v 4 v 5 2 4 5
1' n 1/2: 1/2 - 4 excited Tube n r, 1 a certain
distance 4 v 4th balls 5 4th inches / 1' C 4 v 4 v 5 2
4 02: m v force v 5 4th Tube C - condense v atmos
phere 02 v balls 02-02 1- v resistance 4 b surfaces
r v. 72: 6 C - 5 v 02 - L 12 72 6 b atmospheric n
2^{mo} v C - repel 2 4 3/2 / n v Tube C n 1' 5:
But 02 02 4 v r v 4th v v. 72: v 4th Tube drives
v atmospheric 5 v balls 62 / 294. n / 1. unelectrify 4th

FIG. 2.

The system shown in Fig. 1 was, it seems, extracted by Thomas from Aulay Macaulay's Polygraphy or Short-Hand, Manchester, published in 1747 (3rd edition in 1756). The shorthand shown in Fig. 2 is not, as at first thought, that of Thomas Shelton which Pepys used in his diary. Professor Matthews suggests that the symbols should be examined on a frequency basis, compared with the frequencies of letters

of the alphabet, and then the analysis collated with Julius Ensign Rockwell's book on early shorthands. If the system is discovered, the British Museum or Pitman's may have the original text-book from which the system can be learnt and the notes transcribed. Shorthand was freely used in the eighteenth century, particularly by ministers, and one system that was "easily acquired" was invented by Jeremiah Rice in the seventeenth century, but the key to this system has not been traced (McLachlan, 1931). (A certain John Orton had made himself "so perfect a master of it that he could take down the whole of most of the sermons which he heard".)

One fact that emerges from this study is Thomas's reticence and dislike of publicity. He could well afford a funeral oration (a common practice in those days) but he directed that his funeral expenses "may be as frugal as possible". It seems doubtful that Thomas took any personal steps to gain admittance to the Royal Society. His 1736 tract in defence of the mathematical art was published at an opportune time and was of such merit that it is likely that his election was unanimously agreed to by members of this distinguished body. (We note that the President, Martin Folkes, was a sponsor.) We do not believe he obtained election in the manner of some members who contributed nothing of merit but were wealthy enough to pay the high admittance fees and yearly dues. More stringent measures taken about 1743 led to a resolution "not to receive any person as a member who had not first distinguished himself by something curious" (Clarke, 1929).

He left his papers and books to the Rev. William Johnston, his successor at Mount Zion in 1752 (see Strange, 1949), and it was fortunate that Richard Price found Thomas's Essay. The greatest credit belongs to Richard for forwarding the Essay to Sir John Canton.

The friendship of Thomas with Richard Price remains an enigma. It would seem that a feeling existed between them that amounted to more than respect for each other's intellectual ability and in a number of ways both men had similar characteristics and shared a common interest. Both were interested in the new mathematics, both were indifferent preachers but were able to express themselves in writing of lasting quality on religious and philosophic subjects. Furthermore, both held the same shade of religious belief; Richard was an avowed Arian (the forerunner of modern Unitarianism) and Thomas, according to Dr S. W. Carruthers, was also an Arian. It is likely that Thomas discussed the theory of probability with Richard, a point we infer from a study of Bayes (1763)—but Richard's omission of Thomas's introduction to his Essay is unfortunate. We might then have understood the reason that prompted Thomas to solve a problem not attempted by mathematicians of the calibre of De Moivre, Jean Bernoulli, Von Leibniz, and others.

We have included the names of scientists and mathematicians who visited Tunbridge Wells, but it is doubtful if Thomas discussed the fundamental problem he solved because he makes no reference to the work of others in his Essay; a point that would not have escaped him. He did, however, point out the fallacy in Mr Simpson's hypothesis relating to a method of taking the mean of a number of observations in relation to astronomical work (in a letter in the Sir John Canton Papers). The mathematicians in this country were a brilliant set and included men like Brook Taylor, De Moivre, Ditton, Whiston, Robins, Maclaurin, Simpson and Robert Smith. Mathematical societies flourished and an old-established gathering was in Spital Market where, it is reported, "each man had his pipe, his pot, and his problem" (Clarke, 1929).

Richard Price's close friends for 30 years were Sir John Canton, Benjamin Franklin and Joseph Priestley. Thomas may have been acquainted with them yet we cannot find evidence on this; further study on these lines is continuing.

It may be thought that Thomas's parochial duties confined him to Tunbridge Wells; furthermore travelling, even to London, was not without hazard. The turnpike road was almost impassable in winter, and in summer a light white sand blew everywhere. Not until 1762 was the road improved. Tunbridge Wells to the Golden Cross Inn at Charing Cross was a journey of 7 hours, representing an average speed of about 5 m.p.h. Stops not listed were frequent owing to Sarah Porter's "touters" and the occasional peril from highwaymen was real. The coaches had no springs but despite the discomforts the service was much used and was fiercely competitive. Arrival at the destination on time, despite these hazards, was a matter of prestige to the coachmen who maintained a bawdy outlook to anything that hindered their progress.

This quiet man, of earnest thought and abiding faith and of immense intellectual stature, died on April 17th, 1761, and rests (within a few yards of Richard Price) with most of his family in Bunhill Fields Burial Ground by Moorgate.

The family memorial (156 in Section 12) is approximately midway between Bunhill Row and City Road and is in great disrepair. According to the City Surveyor, the Corporation of London have recently obtained Parliamentary power to effect improvements to this Ground, but as far as can be seen this memorial will not be disturbed.

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REFERENCES

- BARNARD, G. A. (1958), "Biographical notes on Thomas Bayes and reprint of his Essay", *Biometrika*, **45**, 293-315.
- BAYES, T. (1731), *Divine Benevolence, or an attempt to prove that the Principle End of the Divine Providence and Government is the Happiness of his Creatures*. Printed by John Noon at the White Hart, Mercers Chapel in Cheapside. (Dr Williams's Library, 14 Gordon Square, London, W.C.1.)
- (1736), *An Introduction to the Doctrine of Fluxions and a Defence of the Mathematicians against the objections of the Author of the Analyst*. Printed by John Noon (price 1s.). (Dr Williams's Library.)
- (1763), "An Essay towards solving a problem in the doctrine of chances", *Phil. Trans.*, **53**, 269, 370-418.
- BURR, T. B. (1766), *The History of Tunbridge Wells*. London, Sold by M. Hingeston, J. Dodsley and T. Caslon. (British Museum.)
- CHURCH, R. (1948), *Kent*. London: Hale.
- CLARKE, F. M. (1929), *Thomas Simpson and his Times*. New York. Composed and printed at the Waverley Press, Inc., Baltimore, Ind., U.S.A.

- COLE, G. H. and POSTGATE, R. (1946), *The Common People*. London: Methuen.
- JAMES, T. S. (1867), *Presbyterian Chapels and Charities in England and Ireland*. London: Hamilton Adams. (Dr Williams's Library.)
- JONES, J. A. (1849), *Bunhill Memorials*. London: James Paul.
- KNIFE, H. R. (1916), *Tunbridge Wells and Neighbourhood*. Tunbridge Wells: Pelton.
- MCLACHLAN (1931), *English Education under the Test Acts*. Manchester University Press.
- MELVILLE, L. (1912), *Society at Royal Tunbridge Wells*. London: Eveleigh Nash.
- PEARCE, L. (1912), *Historical Associations of Tunbridge Wells from 1606 to 1909*. Tunbridge Wells: Pearce.
- SMITH, J. W. ASHLEY (1954), *The Birth of Modern Education*. London: Independent Press.
- SHERIDAN, B. (1960), *Betsy Sheridan's Journal*. London: Eyre & Spottiswood.
- STRANGE, C. H. (1949), *Nonconformity in Tunbridge Wells*. Tunbridge Wells: The Courier and Publishing Co.
- THOMAS, R. (1924), *Richard Price*. Oxford University Press.
- THORNCROFT, M. (1958), *The Story of Newington Green Unitarian Church*. London. Printed for the Trustees of the Unitarian Church by Barnes, Printers.
- TIMPSON, T. (1859), *Church History of Kent*. London: Ward.
- TOULMIN, J. (1814), *History of Dissenters*. London: Longmans.
- TREVELYAN, G. M. (1946), *English Social History*. London: Longmans.
- URWICK, W. (1884), *Nonconformity in Hertfordshire*. London: Hazell, Watson & Viney.
- WHISTON, W. (1753), *Memoirs of the Life and Writings of Mr. William Whiston containing memoirs of several of his Friends also written by himself*. Fleet Street, London: Printed for J. Whiston and B. White. (British Museum.)
- WILSON, W. (1814), *The History and Antiquities of Dissenting Churches and Meeting Houses*. London: W. Button. (Dr Williams's Library.)
- MINUTES BOOK OF COWARD TRUST, New College, 527 Finchley Road, N.W.3.
- WILLS OF JOSHUA BAYES AND THOMAS BAYES, The Superintendent, Principal Probate Registry, Somerset House.
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