

Mystery at the Rectory: some light on John Michell

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'John Michell, BD is a little short Man, of a black Complexion, and fat; but having no Acquaintance with him, can say little of him. I think he had the care of St. Botolph's Church [Cambridge], while he continued Fellow of Queens' College, where he was esteemed a very ingenious Man, and an excellent Philosopher. He has published some things in that way, on the Magnet and Electricity.'

As there is, so far as I know, no extant portrait of John Michell, the best I can do is to frame the above quotation from a contemporary diary (Cole MSS XXXIII, 156, British Library).

I. YORKSHIRE AND SCIENCE

Yorkshire's claim to the Rev. John Michell, FRS (1724-1793) is that for over 25 years he was Rector of St. Michael's, Thornhill, near Dewsbury. Science's claim is that, following an early treatise on artificial magnetism, in which he established the inverse square law of magnetic attraction, he had established his scientific reputation with a paper (Phil. Trans. 51, 566-634, 1760) entitled 'Conjectures concerning the cause, and Observations upon the Phenomena of Earthquakes; particularly of that great Earthquake of the first of November 1755 which proved so fatal to the City of Lisbon, and whose effects were felt as far as Africa, and more or less throughout almost all of Europe'. This he read to the Royal Society in five parts in successive meetings in March 1760, resulting in the following recommendation: 'The Rev. Mr. John Michell MA Fellow of Queens' College, Cambridge, who has recommended himself to the Publick by his Experiments in Magnetism, and has lately communicated to this Society a Dissertation upon earthquakes, being very desirous of the honour of becoming a member of the Royal Society, We, whose names are underwritten, recommend him as a gentleman extremely well qualify'd for that honour'. The 'names underwritten' included those of Birch, the Secretary of the Royal Society, Knight, an expert on magnetism, and two other Fellows of Queens', Hadley, the Professor of Chemistry at Cambridge, and Sir George Savile, Bt, MP for Yorkshire. In his paper Michell put forward, in effect, the theory of tectonic plates, thus ensuring his reputation amongst geologists; no doubt this paper was also

responsible for Michell's appointment in preference to Neville Maskelyne, to the Woodwardian chair of Geology in 1762. To physicists Michell is best known as the designer of the extraordinarily delicate experiment to measure Newton's gravitational constant G . His death prevented him from carrying out his experiment, but he bequeathed his apparatus, the torsion balance, to Wollaston, Jacksonian Professor at Cambridge who, in turn, passed it on to Cavendish. He modified Michell's apparatus and carried out the experiment successfully. The result is usually attributed to Cavendish, but he himself made quite clear his debt to Michell.

But today Michell's name is best known because every popular Cosmology text attributes to him the first proposal of the existence of 'black holes', presented to the Royal Society in 1783, getting on for 200 years before Wheeler gave these 'dark stars' this name. Michell's proposal arose, logically enough, from the view that light was particulate ('non-relativistic photons'); these particles, escaping from a star, will be attracted back again by gravity. So for a sufficiently massive star light cannot escape. One begins to wonder what other proposals of comparable foresight await discovery in Michell's work!

The above scarcely covers even the highlights of Michell's scientific work. He made important contributions to Astronomy (the comet of 1760, the transit of Venus of 1761, theoretical work to suggest that 'double stars' really are likely to be close together and so likely to rotate about each other, rather than merely lying in the same direction; he obtained by a theoretical argument the first realistic estimate of the distance of the stars), and to Navigation (he served on the Committee of the Board of Longitude which examined Harrison's watch-chronometer 'H-4', and published a paper on the determination of Longitude; he also studied the flow of water around Spurn Point at the mouth of the Humber). How did he manage to do all these different things, many of them while carrying out his parish duties in Thornhill? What happened at the Rectory? Very little is known by way of answers to these questions; not only that, very little is known about John Michell himself. But there's a clue in the church at Thornhill!

II. FROM THORNHILL TO RUFFORD

'The one object of importance in the church ... [is] the Savile Chapel [which] contains a remarkable number of monuments' [Pevsner].

The Saviles have been, over the centuries, one of West Yorkshire's leading families. Of French extraction, they seem to have settled around Elland by the thirteenth century and to have spread out to estates at

Stainland (near Huddersfield), Over Bradley, Copley (Halifax), Thornhill, Lupset (Wakefield), Howley (Batley), Methley, and more. One of these Saviles, Sir Henry Savile (1549-1622) of Over Bradley, was founder of the Savilian chairs of Geometry and Astronomy at Oxford; we would need to go back another 250 years to trace the family connection with the Saviles who feature importantly in the story of John Michell.

The Saviles obtained Thornhill by marriage in about 1390 and made it their principal family seat; hence the chapel, built in 1447. The present Lord Savile lives not far from Thornhill. Of the Saviles entombed in the chapel the earliest of interest here is Sir George Savile, an almost exact contemporary of Sir Henry. They were fourth cousins though, amazingly, six times removed; both were knighted by James I in 1604, and Sir George rose to Baronet seven years later. George married, firstly, Lady Mary Talbot, daughter of the sixth Earl of Shrewsbury, and secondly Mrs. Elizabeth Savile, presumably a distant relative, of whom we will hear more presently. As dowry Mary brought to the Saviles the Rufford estate, which lies on the eastern side of Sherwood Forest in Nottinghamshire. (Rufford Abbey had been a Cistercian foundation, a rather minor daughter-house of Rievaulx; at the dissolution of the monasteries Henry VIII had given it to Mary's father, a court favourite.)

We can now fast-forward about sixty years to the closing stages of the Civil War, when the Saviles were able to demonstrate their loyalty to the Royalist cause. Sir William Savile, grandson of Sir George and Lady Mary and third baronet, had been with the King at the raising of the Royal Standard at Nottingham (22nd August 1642), which event marked the start of military activity. He was appointed Governor of Sheffield Castle and then, in 1643, Governor of York, but died early the following year, just six months before the defeat of Marston Moor (2nd July 1644) and the fall of York two weeks later. His widow, Lady Anne, showed her mettle by taking her husband's place at Sheffield. This castle now came under attack (27th July), the royalists only conceding (11th August) because of the advanced state of Lady Anne's pregnancy. She, her five children and their retainers were allowed to leave Sheffield under safe conduct; the very next night she gave birth to her fourth son.

After the battle of Naseby the following year this 'first' Civil War was more or less at an end, the King eventually surrendering to the Scottish army at Newark (May 1646). Nevertheless Royalist activity - in which Lady Anne was surely involved - continued, and in the so-called second Civil War the opportunity was taken to seize Pontefract Castle for the King (June 1648). Thence a detachment was sent to occupy and fortify Thornhill Hall - again Lady Anne must have been involved - but Parliamentarians under Colonel Sir Charles Fairfax pursued them, occupied the church and rectory and laid siege to the Hall. What

happened next is not entirely clear. Whether by accident or design the powder store blew up and the Hall was destroyed (18th July); possibly this was by order of Lady Anne's first son and Sir William's heir, the fourth baronet, now fifteen. The siege of Pontefract, however, continued, even two months after the execution of Charles I (30th January 1649). When the Royalists there surrendered the second Civil War was over.

So the Saviles of Thornhill moved to Rufford Abbey, where they would stay for nearly 300 years. The fourth baronet, another George (1633-1695), proved to be the most distinguished of the line, achieving fame as the first Marquess of Halifax and interest to us as the first Savile to be elected Fellow of the Royal Society (1675). His son left no male heir, however, so the marquissate became extinct, the baronetcy reverted right back to descendants of the first baronet by his second wife Elizabeth Savile. These included a John Savile who was Rector of Thornhill (1671-1701). His son George, born in Thornhill Rectory, became seventh baronet (1704) and FRS. (1721); he plays the key role in this story.

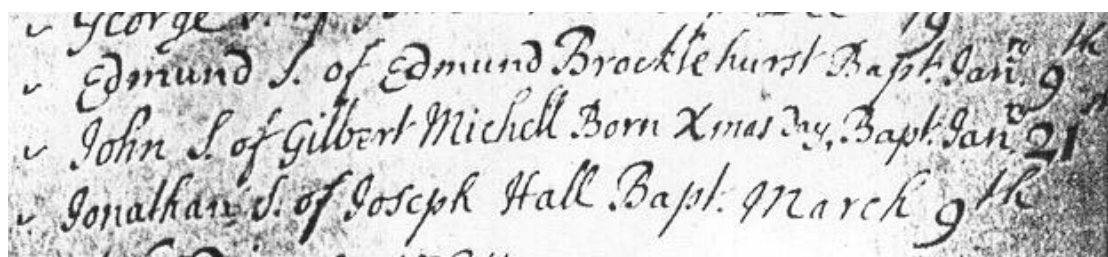


Rufford Abbey before its demolition in 1959

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Rufford, by now a very large stately home, had its own chapel in the house but the estate workers lived in adjacent villages. Of these Eakring, two miles to the south-east, has achieved fame for two reasons. Firstly William Mompesson, rector of the 'plague village' of Eyam, Derbyshire, became Rector of Eakring in 1669; a memorial to him stands in the village. Secondly Eakring was the site of the first productive oil-well in this country (1938), appropriately enough, as now can be

revealed, for the birthplace of one of the founders of geology. The advowson of Eakring, most unusually, was divided between the Saviles of Rufford and their near neighbours, the Pierrepoints of Thoresby (they were of course related). In 1722 it was Savile's turn to present, and Sir George presented the Rev. Gilbert Michell. As it happens, this name was curiously common at the time, which has prevented firm identification of this Gilbert Michell, but it does seem probable that his family came from Helston in Cornwall. Furthermore, at about the time he moved to Eakring he must have married, for his wife soon produced a son whose baptismal entry in the Eakring parish register most unusually gives the date of birth: '1724: John S[on] of



The entry for John Michell's baptism in the 1724 parish register of Eakring. Comparison with the adjacent entries illustrates the unusual nature of showing the date of birth as well as that of baptism

Gilbert Michell Born Xmas Day'. Perhaps the Rector did not have at the forefront of his mind that his son thus shared his birthday with Isaac Newton.

Footnote for tourists: the church at Thornhill (just south of Dewsbury) is, understandably, normally closed but the key may be obtained from the present Rector; the rectory, now a nursing home, stands opposite the church, and beyond, in Thornhill Park, may be seen what is left of the old Thornhill Hall. Rufford stands on the A614 less than two miles south of the Ollerton roundabout; the Park is now a 'Country Park' run by Nottinghamshire County Council, open every day, while what is left of the (old and new) Abbey is in the care of English Heritage, with opening hours according.

III. CAMBRIDGE

At about this time Sir George, then in his forties, took his much younger sister Gertrude to do 'the season' at Bath, perhaps with an eye to finding a suitable husband for her. But in the event it was Sir George who made the catch - or was it caught? In short order he married May Pratt of Dublin, aged sixteen. She duly bore Sir George an heir, inevitably christened George (1726), and in due course two daughters besides. Any reader

shocked by the age discrepancy will be pleased to learn that Mary then embarked on a scandalous affair, eventually running off with her lover.

We do not know anything about John Michell's early education, nor about that of his brother (Gilbert again!) and sister, but it would not be unusual were the three of them to have been educated at home; besides, it seems likely that the Rector acted as tutor to young George and educated all four children together. Certainly, in his voluminous correspondence with Gertrude Savile (Nottinghamshire County Records Office), the Rector refers to 'my four children' and regards George Savile as 'my own son'.

John Michell entered Queens' College, Cambridge, as a Pensioner in June 1742. Eighteen months later George, following the death of his father now Sir George Savile, 8th and last Baronet, followed him there. Despite the interruption caused by the Jacobite rebellion of 1745 (the Young Pretender reached Derby before Christmas of that year; Sir George was made captain and raised his own company of 50 men) he obtained the degrees of MA and LLD in 1749, by which time he was already FRS. Michell made much slower progress (and now, not without a feeling of relief, your scribe can turn to Sir Archibald Geikie's admirable *Memoir of John Michell*, CUP, 1918), obtaining his BA as fourth wrangler, in 1749; just before that he had been ordained Deacon and appointed Curate to his father at Eakring, but immediately after graduating he was elected Fellow of his college. His MA followed in 1752.

The next ten years saw Michell, perhaps for financial reasons, undertaking a remarkable range of college and university duties, including lecturing and examining in Arithmetic, Geometry, Greek, Hebrew and Philosophy. Meanwhile he began scientific research in magnetism, both theoretical and experimental, very probably inspired by the work of Dr Gowin Knight, FRS, another Fellow of Queens', who had established a lucrative business making magnetic compass needles. Since there was at the time no patent law, Knight kept his method secret. Michell published *A Treatise of Artificial Magnets* (Cambridge 1750), in which he claimed (but without giving detailed evidence) the inverse square law of magnetic attraction usually attributed to Coulomb. Geology also attracted his attention; his lengthy treatment of the Lisbon earthquake of 1755 ensured his election to the Royal Society (1760) and his appointment to the Woodwardian Chair of Geology at Cambridge (1762). Meanwhile he had, in 1760, been made Rector of St Botolph's Church, Cambridge (in the gift of Queens' College) and, even more suggestive of his interest in the Church, taken the BD degree in 1761.

Amongst the many distinguished people at Cambridge in Michell's time, two families require special mention: the Darwins and the Cavendishes. Between these families there was a link in that Lord George

Cavendish of Chatsworth, second son of the Duke of Devonshire, Erasmus Darwin, and his elder brothers Robert and John, of Elston near Newark, all attended the Rev. William Burrows's Free Grammar School at Chesterfield, considered at the time the best school in the north of England. This school had a particular connection with St John's College, Cambridge, to which all four boys proceeded. Michell, it seems, tutored Erasmus, who was especially friendly with Lord George, whose first cousin, Henry Cavendish (born in Nice, son of the scientist Lord Charles Cavendish, and an undergraduate at Peterhouse, Cambridge) became a close colleague of Michell's. Add to these the Duke of Newcastle, of Clumber Park, Chancellor of the University and Prime Minister, and we have a remarkable collection of people all from within a few miles of Rufford!

Besides, there were distinguished visitors to Cambridge. It was Michell himself who provided Benjamin Franklin with a letter of introduction to Matthew Boulton and the Lunar Society in Birmingham (1758), and Michell was one of the 14 Cambridge academics who met the Croatian Jesuit Roger Boscovich when he visited in 1760. Boscovich noted that Michell carried out 'magnetic experiments' but they will certainly have compared their philosophical ideas concerning 'atomism - the nature of matter and force (see Kant: *Metaphysical Foundations in Natural Philosophy*, 1786). Thus Michell's standing in Cambridge seems beyond question.

In the spring of 1763 Michell gave up residence at Cambridge, exchanging his rectorship at St Botolph's for another at Compton, near Winchester. No doubt he was already planning marriage. The following year he resigned his professorship and fellowship. On 23rd August 1764, by licence, he married Sarah Williamson, described in the *Cambridge Chronicle* as a 'young lady of considerable fortune', at Rolleston, only a few miles south of Eakring. One year later a daughter, Mary, was born. Seven weeks later the register at Rolleston recorded the burial of 'Sarah, wife of the Revd. Mr. John Michell'.

IV. THORNHILL

The death of his wife in 1765 was the great tragedy of John Michell's life. We can only speculate as to Michell's intentions; had he always intended to go into the church - his Cambridge BD suggests this, and very likely this was his father's hope for his elder son - or, had not marriage intervened, would he have stayed in academe where not only his fellowship but also the very curious terms of the Woodwardian lectureship (as it was originally termed) required celibacy. Now the die was cast: for marriage he had given up his academic positions, and now

his wife had died.

At the time he was Rector of Havant in Hampshire but two years later the altogether more significant Rectorship at Thornhill near Dewsbury became available; John Michell was duly presented by the patron Sir George Savile. We may read this as an act of generosity to a personal friend, but there were things a distinguished geologist could do for a landowner; as Geikie puts it in his *Memoir of John Michell* 'his rectory lay in the heart of the great Yorkshire coal-field where the progress of the mining industry continually brought geological questions to his notice'.

Michell remained at Thornhill until the end of his life in 1793. His daughter, Mary, married Thomas Turton of Jesus College Cambridge in 1786; they had at least one son. She seems to have died about 1840. This information relies in part on a letter, over the strange nom-de-plume 'Khoda Bux', published in *English Mechanic* in June 1871 as a contribution to correspondence following the death the previous month of Sir William Herschel's very distinguished son, Sir John Herschel; the author, who claimed to be John Michell's great-grandson, admitted that he wrote, roundly a century after the events described, 'from hearsay and family tradition'. It is curious that a century ago (Agnes Clerke in the *Dictionary of National Biography*) the contents of this letter were generally accepted, whereas more recently (Zdenek Kopal in the *Dictionary of Scientific Biography*) the letter has been dismissed out-of-hand.

Yet this letter is just about the sum total of information we have as to 'what happened at the Rectory'. Any papers or letters at John Michell's death seem to have been destroyed; although his instruments and apparatus were given to Queens' College, they too have disappeared. Consequently the only light available comes from the publications and preserved papers of those who visited Michell at Thornhill, or were in correspondence with him there. We may essay a list: Priestley, Smeaton, Cavendish and Herschel, and then there are lesser luminaries; nor should we overlook Erasmus Darwin, nor forget Sir George Savile. And maybe Black and Watt were of the party, for we are assured 'splendid parties' were held at Thornhill Rectory. Was Michell really an excellent violinist? It would be nice to know, especially as William Herschel was of course a professional musician, even when he discovered Uranus in 1781.

Let us begin with Joseph Priestley. Michell probably first met Priestley in Lunar Society circles in Birmingham for, around 1760, he was a frequent guest of Erasmus Darwin in Lichfield; at this time Priestley was teaching at the Warrington Academy. The year 1767 which brought Michell to Thornhill also brought Priestley to Leeds, where he was to stay for ten years; Priestley's own writings make clear the

closeness of their scientific relationship, both in chemistry, where Michell's 'atomism' provided the theoretical underpinning for Priestley's work on gases, and in optics: (see Priestley's *History of Vision*, 1772). Michell provided Priestley with an introduction to Boscovich in Paris, and no doubt Priestley brought some of his own scientific visitors to Thornhill, in accordance with his advocacy of 'mini-Lunar Societies' - small groups meeting informally for scientific discussion. Smeaton may also have been involved, for on the death of his mother in 1759 he had taken up residence in the old family home at Austhorpe. Smeaton also had a connection with Sir George Savile, for after he had made his name with the Eddystone Light he was engaged to construct lighthouses for Spurn, a project in which Savile was especially interested (see the Appendix to Smeaton's ... *Eddystone* ... (1791). Michell's own work on the flow of water round Spurn was no doubt connected.

Michell was probably introduced to Cavendish by another of that very extended family, but certainly met him at the Royal Society. Their relationship seems to have been especially close (see the recent biography of Cavendish by Jungnickel and McCormach, Bucknell 1999, in which correspondence between Michell and Cavendish from the Cavendish archives is published) and it was perhaps Michell who interested Cavendish in stratigraphy - he and his Boswell, Sir Charles Blagden, one of the Secretaries of the Royal Society, made lengthy tours, even visiting Thornhill on the way to inspect Lord Mulgrave's alum works at Whitby. Smeaton may well have been involved in these geological excursions.

The relationship between Michell and Herschel has been much debated. Suffice to say here that correspondence between Herschel, Herschel's patron Sir William Watson (another Queens' man) and Michell appears in Turner's *Science and Music in 18th century Bath* (Bath 1977). Herschel was aware of Michell's efforts to produce a powerful telescope and of his success in casting a 30" speculum mirror for it. He called at Thornhill in 1792 and saw the telescope; a year later, after Michell's death, he called again and 'bought Mr. Michell's great telescope and paid Mr. Turton £30'. On the other hand, though Sir George Savile must surely have visited Thornhill many times during Michell's incumbency, any information that may exist has yet to be unearthed from the very extensive Savile family papers in the Nottinghamshire County Record Office and elsewhere. It is extraordinary that there should be no proper biography of this very remarkable man, who died early in 1784.

That leaves us with Erasmus Darwin. Very likely he never visited Thornhill but his connection with Michell is perhaps the longest and deepest of all; in his *Phytologia* (1800) he refers to Michell as 'a man of such accurate and universal knowledge whose friendship I long possessed, and whose loss I have long lamented.' They probably met

before Cambridge; they certainly met there where, according to Whittaker (*History ... of the Aether and Electricity*, 2nd. edn., London 1951) ‘the only natural philosopher of distinction ... was Michell’. Indeed Michell appears to have acted for a time as Darwin’s tutor.

Michell’s visits to Lichfield, mentioned above, earned him the approval of Darwin’s neighbour, admirer and biographer Anna Seward (*Memoirs of the Life of Dr. Darwin*, 1804) who refers to ‘a knot of philosophical friends, in frequent visitation. The Rev. Mr. Michell, many years deceased’ has pride of place in her account. ‘He was skilled in astronomic science, modest and wise.’ Much later, in 1782, Darwin himself, then living near Derby, reported to Josiah Wedgwood on a visit from Michell: ‘It is so long that I have existed here without seeing a mechanical philosopher, that I had almost forgotten there were such things; till last week Mr. Michel [sic], a comet of the first magnitude, journeyed through this part of space or rather of vacuity’. They discussed Darwin’s plans to build a steam-engine. Darwin memorialised Michell in his strange poetical works which express his scientific knowledge. Of magnetism:

‘Last MICHELL’s hands with touch of potent charm ...’

(*Temple of Nature*, 1803),

and of black holes:

‘Star after star from heaven’s high arc shall rush,
Suns sink on suns, and systems systems crush;
Headlong extinct, to one dark centre fall,
And death and night and chaos mingle all.’

(*Economy of Vegetation*, 1791, Canto IV).

This last, with the previous and succeeding verses, even appears as hymn No.52, ‘Roll on, ye Stars’, in the Unitarian Universalist Association hymn book *Hymns for the Celebration of Life* (Boston, Mass., 1964).

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