Charles Hutton and the ‘Dissensions’ of 1783–84: Scientific networking and its failures

Summary

This paper proposes a fresh look at the ‘Dissensions’ that held up scientific business at the Royal Society during the spring of 1784. It focuses attention on the career and personal networks of Charles Hutton, whose dismissal from the role of Foreign Secretary ignited the row. It shows that the incident had no single cause but was the outcome of a number of factors that made Hutton intolerable to Joseph Banks, president of the Society, and of a number of factors that made Banks unpopular as President among a group of about forty otherwise rather disparate fellows.

Keywords

Royal Society, Charles Hutton, Joseph Banks, Dissensions, networks

Introduction

What really happened at the Royal Society in 1783–84? Everyone who has worked on British science in the period has heard of the ‘Dissensions’ that held up scientific business at the Society for several weeks early in 1784; it was the largest row the Society had ever seen and it threatened to unseat Joseph Banks from his role as President, a role he in fact continued to hold until his death in 1820. The story is told in histories of the Society, biographies of Joseph Banks and biographies of Nevil Maskelyne and Henry Cavendish among others.[1] The incident has been interpreted as a personality clash between Banks and Charles Hutton, Foreign Secretary; as a rebellion of the serious natural philosophers against the dilettantes; as a ‘mathematicians’ mutiny’; as driven by class, with Banks determined to make ‘great men rather than wise men’ fellows; and in a number of other ways.

This paper proposes a new look at the ‘Dissensions’ of 1783–84, focusing attention on the career and the personal and professional networks of Charles Hutton, the mathematician whose treatment by Banks instigated the trouble towards the end of 1783. This turns out to be revealing, and I propose that it enables us to cut through some of the layers of reinterpretation now surrounding the incident and see it not as a

straightforward rebellion of one group against another but rather as a more complex case in which mutual suspicion and mistrust between a number of different groups was engaged.

In this paper I discuss first some of Hutton's successes as a networker in his career before 1778 and the unique set of roles he had come to occupy by that date. I provide a narrative of the events of 1778–1784 – the 'Dissensions' proper – and finally I show how even Hutton's attempts to recover during that period saw his personal networks and connections become a liability rather than an asset. The result is both a fresh look at an old incident and a reminder of how early modern scientific networking worked and how it sometimes failed.

Hutton's career before 1778

Charles Hutton (1737–1823) was a superb networker. It would be possible to tell the story of his life almost entirely in terms of the various different personal and professional networks he worked in, used, exploited and controlled.[2] This was typical, of course, of how scientific careers worked in this period.[3] Hutton propelled himself from the North Tyneside coal pits to schoolteaching, from village schools to a purpose-built establishment in Newcastle and from there to a professorship at the Royal Military Academy, through skilled use of both local and national networks of mathematical practitioners and philomaths and of personal connections with friends and patrons. Once in Woolwich he navigated a complex set of interrelated networks of practitioners and philomaths, including that centred on Nevil Maskelyne and the Royal Observatory, and made real progress within the very special network that was the Royal Society.[4]

A few examples will show what sort of activities and connections were involved. During the 1760s Hutton was a contributor of mathematical problems and solutions to several periodicals including the *Ladies' Diary*, the *Gentleman's Diary* and *Martin's Magazine*. He was thus a member of that community normally described – then and now – as the 'philomaths': a loose community of those interested in mathematics including both professional practitioners and those who aspired to become professional practitioners, and amateurs of the subject. In the late 1760s, Hutton used that network to promote his forthcoming treatise on mensuration: and to remarkable

effect. Without any unusual fanfare in terms of publishers' advertisements, he achieved a subscription list of more than 600 for a dense book on geometry by an author not yet at all well known.[5] Most of the names were either Hutton's personal connections in the North-East, or people known to him through the philomath journals and to whom he had, presumably, written personally to solicit a subscription.

Another example concerns the Astronomer Royal Nevil Maskelyne. For several years after his 1773 arrival at the Royal Military Academy in Woolwich, Hutton felt and described himself as 'recluse as a hermit', lamenting in letters to northern friends his intellectual isolation.[6] But in fact he was during that period busily making himself part of the professional network around Maskelyne. Maskelyne had been a member of the committee that appointed Hutton to his teaching job at Woolwich;[7] by September 1773 Hutton was corresponding with Maskelyne's assistant Reuben Burrow, lending books back and forth,[8] and by 1777 he was doing occasional work for the Astronomer Royal as 'Comparer' of the *Nautical Almanac*, checking and correcting the work of the team who computed the *Almanac*'s tables of lunar positions for use in navigation.[9] Maskelyne introduced him to the Board of Longitude, which paid for the printing of a volume of mathematical tables compiled by Hutton,[10] and gave him other pieces of work including translation and proof-checking.[11] Contact with Maskelyne also led to Hutton's celebrated work on the density of the earth.[12] Maskelyne carried out astronomical observations on either side of a Scottish hill to determine how far the hill's gravitation deflected a plumb-line from vertical. Hutton, in a heroic, year-long labour of calculation, used the data, and a detailed survey of the site, to deduce the relative density of the hill and the earth and hence to estimate the mean density of the earth.

A third example, from the many that might be mentioned, involves the 'Military Society' that was formed in Woolwich a few years before Hutton's arrival.[13] Its avowed purpose was to pursue improvements in military science through practical experiments, and within a few years of his arrival Hutton was both the society's secretary and its main beneficiary. It sponsored his long-running series of experiments on the explosive force of gunpowder and the flight of projectiles. It arranged the provision of artillery pieces, projectiles including over 1300 round shot, the building of a series of huge ballistic pendulums and the supply of personnel to work the

equipment under Hutton's direction.[14] The work led to several publications in which Hutton was named as sole author despite the obvious – and occasionally acknowledged – involvement of others in the practical and the organisational work; for the first, which appeared in the *Philosophical Transactions* in 1778, he was awarded the Copley Medal by the Royal Society.[15]

Hutton was elected to Fellowship of the Royal Society in 1774, supported by Maskelyne among others. He became personally known to the President of the Royal Society, Sir John Pringle, during 1778, when Pringle was preparing his speech to mark the award of the Copley medal to Hutton.[16] It had become Pringle's custom to speak at some length about the earlier history of the scientific topic which was the subject of the award each year, and he presumably consulted Hutton as to the sources of information for the history of ballistics.[17] Pringle liked Hutton, and the result was an invitation to attend the prestigious Royal Society Club as a guest.[18] In Hutton's own later account the Club during this period,

> after the usual weekly meeting of the Royal Society, retired to Slaughter's Coffee-House … to eat a few oysters, and hold familiar discourse together on the subjects that had occurred at the Society's meeting, and on any other current scientific matters.[19]

For a few happy months, all was as well as could be in nascent Hutton's career as a natural philosopher and F.R.S.

All of this was not just a question of the exploitation of separate networks one after another. The worlds in which Hutton moved were not self-contained but interconnected and, as these examples show, the deft use of one set of connections regularly led to success, promotion or other benefits conferred by another. The visibility achieved by his successful promotion of the 1770 *Mensuration* enabled Hutton to launch an even more ambitious five-volume publication a few years later consisting of a collection of material from the *Ladies' Diary*. That in turn made him the natural choice to take over as editor of the *Diary* when its previous editor died in 1773. Hutton's status as Professor of Mathematics at Woolwich and his fellowship of the Royal Society placed him in a strong position when negotiating with the

Stationers' Company of London concerning his work as editor of the *Ladies' Diary* and other almanacs; the outcome was that he was paid well over £100 per year by the Company, despite much of the actual calculation work being done by an assistant paid just £20.[20] His years of work as controller of the *Diary*'s network of philomaths subsequently enabled Hutton to function as a mathematical patron: when an editor was needed for the sister publication the *Gentleman's Diary* in 1780 Hutton was consulted;[21] over the years he plucked a number of men including Charles Wildbore, Lewis Evans, David Kinnebrook, Edward Riddle, John Bonnycastle and Olinthus Gregory from the pages of the *Ladies' Diary* to become mathematical practitioners – teachers or observatory assistants – in London.[22] And his *Diary* work also gave him a vast store of information about recent British mathematicians and their work that he deployed to great effect in his *Dictionary* of 1795.[23]

So, again and again Hutton was able to get things that he wanted by the skilled exploitation of personal connections within the various networks – philomaths, mathematical practitioners, the Royal Observatory, the Board of Longitude, the Military Society and others – in which he moved. The rewards included work, money, education, books and access to libraries, memberships of learned societies, an honorary degree and jobs for various of his friends. Although Hutton was without doubt very good at mathematics, a good deal of his professional success resulted from the combination of that with his skills as a worker of networks.

Sometimes, however, those skills failed him: most prominently at the Royal Society in the period 1778–1784. On such occasions his personal connections could quickly become a liability, his memberships of diverse networks not mutually supportive but mutually destructive.

Charles Hutton and Joseph Banks

John Pringle was himself in serious difficulty as President by the time Hutton's Copley medal was awarded. In a dispute about the best shape for lightning conductors, he and others in the Royal Society had sided with Benjamin Franklin, giving official advice to the Board of Ordnance on the subject in 1773 and 1777. When the American war broke out, Franklin's politics, and by association his natural philosophy, became unwelcome in the eyes of the British governmernt, and it did not

help that one of the Ordnance Board's gunpowder magazines had in fact sustained damage due to a lightning strike after being fitted with Franklin-style lightning conductors.[24] Rumour said the King himself had asked Pringle to step down as President since it had become clear he would not change his stance on the disputed matter, and step down he did at the same 1778 meeting at which he delivered his speech in praise of Hutton. He was replaced by Joseph Banks.

A great deal has been written about Banks's relationship with Hutton, narratives of what went wrong at the Royal Society over the following few years appearing in every biography of Banks, in every history of the Society in the period and in the biographies of a number of other British natural philosophers from the period. Hutton was not just a victim of Banks's arbitrary dislike, nor was there a particular incident that incited their mutual mistrust and eventual falling-out. Nor was Hutton merely a victim of Banks's preferences as to scientific subject or social class. There were good reasons why any President of the Royal Society must have felt uneasy at some of the agendas and personal connections Hutton brought to the Society.

First, as we have seen, Hutton was quite strongly associated with Pringle and his circle. It was natural that Banks would wish to replace members of his predecessor's circle with members of his own, in a perfectly normal consolidation of his own power base at the Royal Society. But there was more. The connection with Franklin remained a problem for the Pringle circle throughout the period of the American War, and like many Englishmen Hutton had been sympathetic to the cause of American liberty at least in its early stages.[25] It is not certain Banks knew that, but Hutton was not a man to keep his opinions to himself.[26] And Hutton may well have maintained a personal connection with Franklin himself, though direct evidence is missing.[27]

Furthermore, both Hutton and the Pringle circle were tainted by association with Protestant nonconformism, another source of difficulty during a period of heightened national anxiety about loyalty and disloyalty. Hutton had been a Methodist convert in his youth and was said to have preached at Methodist meetings in Newcastle; he had later attended a unitarian chapel for a number of years and at least two of his children had been baptised there.[28] It may not have been true, but Hutton put it about, and it was believed by some, that he was a cousin of the prominent leader of the Moravian

Brethren James Hutton, whose family was close to the Wesleys.[29] From 1782, too, Hutton was a member of the philosophical club based at the Chapter Coffee House on Paternoster Row, of which unitarian Joseph Priestley and radical Richard Price were also members.[30]

Another thing Hutton of course represented was mathematics. Joseph Banks was no admirer of the subject; in a letter to John Lloyd in 1780 he wrote the following:

> Ld. Mahon had published a book upon Electricity … he has done little but apply Conic Sections infinite series & Fluxions to explain the laws of Electricity which I look upon in the same light as driving it like a Fox into an Earth from whence our electricians will never be able to dig it.[31]

There was room in the world, of course, for more than one view about the utility of mathematics in scientific explanation, but as well as Banks's personal feelings about mathematics and his preference for natural history and botany, there was also the question of its suitability for presentation at the Royal Society. The main business of the weekly meetings of the Society at this period consisted of the two main secretaries reading out papers that had been submitted by fellows and sifted by the Council. It was notorious that the result could be rather dull.[32] Mathematics was a particular problem in this context, because neither tables of data nor pages of algebra, nor yet geometrical diagrams, could be read out in any meaningful way, and in practice they had to be omitted. Although some of the problems were common to other technical scientific subjects, it seems likely that mathematics suffered more than most.

In some cases mathematical papers were simply not read, the covering letter alone being taken to suffice. In other cases the author seems to have prepared a brief(er) summary of the matter of the paper for reading at the meeting. In yet other cases the minutes record that 'part' of a technical paper was read.[33] It is not clear that any of these expedients could really have helped non-specialists to grasp the substance of a complex paper, and even the non-technical summaries recorded in the minutes of meetings on some occasions must have made very heavy listening indeed for fellows not familiar with the mathematics they contained.

The *Philosophical Transactions* was still one of the very few periodicals in the English-speaking world to carry original mathematical research papers of more than a page or two (the Edinburgh *Transactions* had not yet started and the philomath journals mostly published only short pieces). British mathematicians writing at article length on new subjects therefore had little choice but to send their work to the Royal Society (unless they felt it could stand alone in pamphlet form, which few did). But the situation was not satisfactory, and it was not adding to the reputation of the weekly meetings.

As well as mathematics itself, there was the particular kind of mathematics Hutton did and the kind of professional roles he occupied. He was strongly identified with the world of the philomaths and the philomath journals. Though he was not named in print as its editor, it was no secret that he was the editor of the *Ladies' Diary*, and by 1781 he was the compiler of eight other almanacs for the Stationers' Company. And as well as an employee of the Stationers' Company, Hutton was the author of a growing list of commercially successful textbooks. The world of metropolitan periodicals was strongly associated, again, with protestant nonconformity,[34] while professional authorship was something of which Banks took a dim view. He was later quoted, very plausibly, as saying of one prospective Fellow of the Royal Society 'He! why he is an *author!* Who could think of proposing him? We want no *authors*'.[35]

Furthermore Hutton was not just an author but a practitioner; he had worked in Newcastle as a surveyor, and that fact was certainly known in London. An obituarist of Banks repeated in 1820 a jingle about Hutton from the 1780s:

> Lands he could measure, terms and tides presage;
> And even the saying ran, that he could gauge.[36]

There was, to the end of his life and beyond, a lingering suspicion that Hutton was merely a technician, an assistant, a back-room boy who had somehow been promoted far beyond his proper sphere.[37]

Thus, Hutton was associated with a number of different intellectual and practical worlds of which Banks had reasons – sometimes perfectly good reasons – to

disapprove. One reading of what followed would make Hutton the victim: he was simply in the wrong place at the wrong time, and it was scarcely his fault that he occupied a unique position at the intersection of networks Banks disliked. I believe a look at the sequence of events shows in fact that Hutton was not so passive, and indeed that his own attempts to recover from the situation became themselves part of the problem.

The 'Dissensions': 1778–1784

As mentioned, this is a story that has many times been told: first of all in letters to the press of 1783–84 and pamphlets issued by friends of Banks and friends of Hutton during 1784–86. The following brief account is based on the full range of contemporary information, although there are points, some of them important, where that information is not consistent and certainty cannot be attained.[38]

Prior to the anniversary meeting late in 1778 at which Banks became President, Hutton had been promised employment as one of the two Secretaries of the Royal Society to fill the place of Samuel Horsley who was stepping down. (Horsley, a career clergyman and subsequently editor of the works of Isaac Newton, was another of the panel who appointed Hutton to the teaching position at Woolwich, and seems to have been consistently well-disposed towards him). In fact the position went on a vote to Paul Henry Maty, an Anglican clergyman who had recently discovered he did not believe in the Holy Trinity and who was therefore in unusually urgent need of other employment. Hutton's friends felt Maty had campaigned rather more vigorously for the position than was decent; Hutton was consoled with a seat on the Council of the Society, a promise of the next secretaryship that should fall vacant, and, after a few weeks' delay, with the little-known job of Foreign Secretary.[39]

There were two possible aspects to this role. On the one hand, the Royal Society received a certain amount of correspondence and a certain number of presents from overseas, and there was a need to have someone deal with it who could read and write at least tolerable French. On the other hand, papers intended for reading at meetings and publication in the *Philosophical Transactions* were sometimes received in languages other than English. Policy varied somewhat over time, and in any event

depended on the language concerned; in Hutton's day the theory was that Latin papers were translated and the translations kept on file at the Society, while papers in other languages were translated and the translations read at the meeting and published in the *Transactions*, sometimes alongside the originals. Initially it seems to have been understood that Hutton would mainly undertake the translation of papers, and during 1779–81 he appears to have translated or commissioned translations of a total of about a dozen papers in Latin, French, Italian and Swedish.[40]

Meanwhile Hutton attended Council diligently during 1779 and 1780, missing only a handful of meetings. Banks manifested a dislike for him for which contemporaries were somewhat puzzled to account, stating that there had been no particular inciting incident.[41] We have seen, above, that there were perfectly adequate reasons in Hutton's personal and professional connections for Banks to wish to replace him with someone else.

At the end of 1780 Hutton was dropped from Council; normal rotation of members meant that this was not particularly unusual, but it was probably no accident. About a year later, in early 1782, Banks instigated an attempt to remove him as Foreign Secretary. Under the pretext of a concern about the efficiency with which foreign correspondence and presents were being dealt with, Council altered the understanding on which Hutton held the position, switching him from the translation of papers to exclusive work on foreign correspondence and the acknowledgement of foreign gifts. Hutton understood this to be an attempt to provoke him to resign the position, but after a certain amount of delay he agreed to continue in the role on the new terms.[42]

He insisted on having those terms in writing, perhaps realising that ambiguity could become problematic for him. Unfortunately the terms to which he agreed still left open quite considerable possibilities for unclarity. One question was what counted as foreign. In practice, correspondence from various parts of the world reached the Society and much of it, whether foreign or not, was taken away and dealt with – or sometimes taken away and not dealt with – by the two main or domestic secretaries, without Hutton ever seeing it.[43] On a few occasions they left alone items from overseas and Hutton worked on them, but it is not clear that he was receiving detailed instructions about individual items or that any general policy was in place which

would have established where responsibility lay in such ambiguous cases as letters in English sent from France.

Another question was what exactly to do about gifts. In theory, all gifts were acknowledged by the Society wth a brief printed form: all Hutton or the secretaries had to do was fill in the blanks and send it.[44] Banks would later claim, plausibly, that it was perfectly obvious this was not the whole of the matter and that a secretary was on many occasions expected to add a note *in propria persona* congratulating the author, flattering or thanking in whatever way seemeed appropriate.[45] It cannot be demonstrated that Hutton was instructed to do this, but one example of such a letter from him survives, so he was certainly aware of the possibility and the need to which it responded.[46] Banks continued to watch and wait, and relations became very awkward, with the two men apparently not speaking despite Hutton's regular attendance at meetings of the Society.[47] Finally during 1783 a series of errors gave Banks a second chance at removing Hutton from the Foreign Secretary role.

In 1782 or 1783, Charles Bonnet, based in Geneva, sent a copy of some of his works to the Royal Society via John Turton. There was a covering letter, but this was taken away by one of the secretaries (Maty, as it happened) and seems never to have been answered. Hutton sent the form of thanks and nothing more. Eventually Bonnet complained to Turton about what he felt was rudeness from the Society, and Turton went to Banks.[48] By early 1783 Banks was in possession of letters about the matter from both Turton and Bonnet, and in November he moved against Hutton, raising at Council what he described as systematic neglect of the foreign correspondence.

Despite protests by Maskelyne and Maty, the Council passed a resolution that the Foreign Secretary should live in London, obliging Hutton to resign (he lived at the Royal Military Academy in Woolwich, where he worked).[49] Resign he did, not privately but at the next meeting of the Society, with the obvious purpose of letting as many fellows as possible know that Banks had forced him out. Maskelyne was dropped from Council at the annual election, which fell just a week later,[50] and on 11 December 1783 the Society voted thanks to Hutton for his work as Foreign Secretary, against Banks's evident wishes and after an acrimonious debate.[51]

Hutton's written defence of his conduct as Foreign Secretary was read both at Council and at the 18 December meeting of the Society, and a motion that he had vindicated himself was there carried by 45 votes to 15.[52] Samuel Horsley now saw what he clearly perceived as a chance to oust Banks and (perhaps) install himself as President. Horsley, later bishop of St Asaph, was and is admired for the quality of his pulpit rhetoric; on this and a number of subsequent occasions he seems to have made a remarkable spectacle of himself at Somerset House. A supporter of Banks wrote of Horsley that

> [t]he manner which he assumed … will not easily be forgotten. The impression will long remain … of the power of voice, and the energy of words, with which his denunciations were delivered. The high tone he adopted went beyond the usual custom of public debates.[53]

And Hutton's wife wrote a poem about his performances:

> Tis Horsley's voice loud strikes the ear,
> And forceful strikes the guilty chair;
> Agast Sir Joseph stares:
> And, husht, around the listning throng.
> Nor breathe, nor stir, nor move the tongue,
> While painful truths he hears. …[54]

At this point the affair ceased to be about Charles Hutton and came to be about other things. Hutton himself jotted down eleven different points against Banks, including 'Rude interference at the Election of fellows', improper control of the reading of papers, 'Mismanagem[en]t of finances' and simply 'Tyrannical overbearing conduct', his temper being 'hot, passionate, hasty, indecent & unbecoming'.[55] Horsley's own plan of attack against Banks focused specifically on Banks's interference in the election of fellows, which Horsley and a number of others felt had gone beyond the bounds of decency over the previous few years. Horsley prepared a list of those who had been excluded from fellowship, but a lasting problem for him was that a discussion of specific personalities would certainly have given offence and could also have provided grounds for legal action.[56] He was never allowed to make his charges

in full. Horsley and others also attacked Banks on the grounds that he favoured natural history over mathematics, and dilettantes over intellectually serious natural philosophers. Others during the subsequent debates would raise different objections to the President, and the result was an impression of disunity, with no really decisive case assembled against him, nor a clear sense that his opponents were agreed on any one charge or list of charges.

Publications from the period reinforce the fact that there were a number of different groups dissatisfied with Banks for different reasons. Opposition to Banks united a number of fellows – about forty – with different concerns and agendas: some were mathematicians; some were serious practising natural philosophers and experimentalists; some were neither, and there were conversely mathematicians who supported Banks and serious natural philosophers who thought Horsley a much greater danger to the Society.

Simplification of all this began early. Several authors have given nuanced accounts of the row, but most have tried to see in it two definite and self-evident factions, or at the very least one group of rebels with some clear reason for existing as a group; I believe no such reason existed. The physician William Heberden, for instance, suggested to Charles Blagden, another supporter of Banks, that Horsley was motivated personally by ‘a grudge of old standing’. Blagden himself reported to Banks that the ‘malcontents’ saw the affair as ‘the men of science versus the Macaronis’; Horsley and Maskelyne asserted that they represented ‘real learning’ against the President’s ‘train of feeble amateurs’.[57] Yet Horsley himself had as little claim to be a practising natural philosopher as anyone in the room, while anyone less like a ‘Macaroni’ than Banks’s supporter Henry Cavendish can scarcely be imagined. If Horsley really bore a personal grudge against Banks, no-one seems to have known what it was. Banks took ‘real learning’ to refer specifically to mathematics, and elsewhere, too, he focussed – I think disproportionately – on the role of mathematicians in the opposition to him. Heilbron’s account of the ‘Dissensions’ takes this up, calling the incident a ‘mathematicians’ mutiny’: yet only a minority of those who spoke against Banks were mathematicians in even the broadest sense. We do not know the names of all those – forty odd – who voted against Banks, but a look at the list of names in the Society for the period makes it clear that there were not forty mathematicians in fellowship at the

time, perhaps not even twenty. And not all of those prominent in the row (Maty, for instance) had any documented sympathy or connection with mathematics at all.

One of the few uniting threads in the speeches against Banks was a rhetoric of defiance against tyranny, linked with a defence of professional skill and individual merit. But definace against (alleged) tyranny was perhaps not the best line to take in a country that had just swallowed the loss of thirteen American colonies and was watching with – on the whole – alarm as anti-monarchical sentiment developed in France. As one of Banks's supporters said, what was happening at Somerset House was 'very like what was passing in another place'.[58] Some of the leaders of the rebellion were already tarred with the radical brush: Hutton, as has been said; Maty, for his religious radicalism; Thomas Brand Hollis – best known for his radical politics and signatory to several of the anti-Banks motions – while several of the excluded candidates to whose names they drew attention were metropolitan journalists, a group generally assumed to be dominated by religious and political radicals. Yet others were not: Horsley would stand up for the established church in controversy with Priestley, for instance, and no-one can have suspected steady Maskelyne of Jacobin tendencies.

Banks's supporters were both more unified and much better organised than his opponents. Led by Charles Blagden, they canvassed furiously over the Christmas recess, and the distinguished man of science Henry Cavendish was instrumental in drafting motions to put before the society. At a private meeting of fellows at Banks's house on 1 January 1784 a substantial number – perhaps fifty – engaged themselves to vote for Banks.[59] These supporters – most of them fellows of the Society who did not normally attend its meetings – then packed the meeting on 8 January, and a carefully worded motion in support of Banks as president passed after prolonged and tumultuous debate by 119 to 42.[60]

Much of what Horsley and others had to say against Banks had been either cut off or shouted down, and no serious debate of their charges had taken place. And the number of those voting against Banks had not significantly diminished since December. All that the outcome really demonstrated was Banks's ability to pack the meeting with his friends. But that ability was, in the end, what mattered. They quickly carried another motion requiring two weeks' notice of any further motions for debate

and voting, ensuring that Banks would have sufficient warning to pack any future contentious meeting.[61]

At this point all was over besides a certain amount of inevitable shouting. Several further attempts to pass anti-Banks motions were defeated at predictably packed meetings over the following weeks,[62] while both sides took to the newspapers and the pamphlet press to make their respective cases, Horsley publishing his list of excluded fellows in full. Maty, who had been responsible both for Hutton initially missing out on a full secretaryship and for the loss of Bonnet's covering letter which had led to Hutton's forced resignation, penned his own attack on Banks and in a bizarre incident presented it to the Society at a meeting on 25 March. Refusing to continue with the meeting when the customary thanks to him as author were not given nor even proposed for a vote, he resigned his secretaryship and walked out.[63]

Back in 1778, Hutton had been promised the next vacant secretaryship, and he rather ludicrously attempted to insist on this, standing for election on 5 May against Blagden who had Banks's explicit endorsement. The outcome was the same as in the previous votes between Banks's supporters and those of Horsley.[64] There the matter ended, and Hutton never went back to the Royal Society during Banks's lifetime.

Aftermath

The incident had held up the scientific business of the Society considerably during January and February 1784 and had been reported widely in the press at home and abroad as well as through the correspondence of fellows. (The term 'Dissensions' was coined in this context, in the title of one of several pamplets claiming to give the true word on the incident.)[65] Banks was still dealing with concerned enquiries from as far afield as India in the summer of 1785.[66] The visibility of the incident made it all the more mortifying to Banks. To the specific charge of disfavouring mathematics he attempted to reply by organising the award of the 1784 Copley medal to Edward Waring, Lucasian Professor at Cambridge, for an abstruse paper on series which Banks frankly admitted he could not understand. It was not a success: his speech on the occasion was reportedly greeted with cries of 'rigmarol!' and Waring himself did not turn up to be honoured.[67]

But for Banks and his friends the ‘Dissensions’ had nevertheless few long-term consequences, were little more than a ripple in the great man’s progress. He went on to be the society’s longest-serving president, continuing in that role until his death in 1820. The degree to which Banks subsequently modified his own conduct is a matter of debate. Some reckoned that certain types of candidate still tended to be excluded from fellowship more often than was just. Certainly Banks acted where he could for what he termed the ‘peace’ of the Society – including, indeed, by blocking candidates likely to threaten that peace – and he succeeded in avoiding any repetition of outspoken opposition to his rule.[68]

For Horsley and his friends, however, it was much harder to recover. Hutton himself made several attempts to regain lost ground both during and after the ‘Dissensions’. One of his first moves once he had begun to feel that he was being systematically slighted at the Royal Society was to invoke his status at the Royal Military Academy. In the printed list of fellows of the Royal Society for 1781 Hutton was styled ‘Mr’. He insisted on his right to be called Professor, even producing his warrant from the Academy in support of this; he won, but it seems to have been a hollow victory, since it merely tended to emphasise his status as a mathematics teacher, a mathematical practitioner: someone with interested motives, dirty hands and inescapable links to mathematics and science as a trade.[69] The connection would be fuel for his opponents during and after the ‘Dissensions’, when it would be claimed that he needed the £20 a year the Foreign Secretaryship brought him and rehearsed at length that he was a mere practitioner.[70]

Once the real trouble had started, Hutton’s first and most constant supporter was Nevil Maskelyne, who spoke in his favour at the Council meeting in November 1783 and was dropped from Council a fortnight later: surely not a coincidence. But there was a similar problem here. In relation to Maskelyne, Hutton was a calculating assistant, someone who did back-room work on the *Nautical Almanac* and for the Board of Longitude, and had done more visible but still ultimately subsidiary calculation work on the density of the Earth: Maskelyne designed the experiment and carried out the observations; Hutton did the laborious calculations. In all three cases Hutton was paid: for the density calculations handsomely paid.[71] Emphasising his relationship with Maskelyne, then, could also support the view that he was a mere

technician with inescapably interested motives for everything he did.

After the ‘Dissensions’ proper had died away it was rumoured that Hutton planned to start up a rival publication to the *Philosophical Transactions*; a press report stated that the seceeding members planned a half-yearly publication of their work. Blagden reported to Banks during 1785 that Hutton was collecting material and that the first issue of such a new scientific periodical was to be expected quite shortly.[72] In fact, nothing came of it, and Hutton seems to have contented himself with issuing his own scientific papers, which were numerous and which he now refused to send to the Royal Society for publication in the *Philosophical Transactions*, in volumes of ‘Tracts’ of which one appeared in 1786 and three in 1812.[73] There is no evidence that the papers were published separately or in any sort of periodical form.

But, again, what would editing a new scientific periodical have achieved in terms of Hutton’s status? For hostile critics it would merely have cemented more strongly his association with the world of metropolitan journalists and commercial publication, a world that was already under suspicion at the Royal Society because of disputes about republication of material from the *Transactions*.[74]

Hutton’s own career nevertheless continued impressively up to his retirement in 1807 and indeed beyond, and he found ways to compensate for his self-imposed exclusion from the Royal Society by developing a role for himself as mathematical spokesman through his textbooks and popular writings, notably the celebrated *Dictionary*. He continued to do experimental science at Woolwich and to function in his various other roles, including increasingly as a patron of other mathematicians, able to get jobs and other rewards for those of whom he approved.

But Hutton’s career had also suffered a setback from which it would never fully recover. Up to about 1780 he had undergone a series of moves to increased visibility and reward, but from 1778 onwards he was devoting effort to damage limitation exercises, some of which in fact made his problems at the Royal Society worse, as we have seen. His aspirations as man of science, to status and in terms of publication were never fully realised, and the trajectory on which he attempted to place himself at the Royal Society never found a substitute. The costs of his failures in 1778–84 were

real and quite heavy.

Although the group of fellows voting against Banks in 1783 and 1784 was united by little more than the fact of their opposition to Banks, variously motivated, several of them were mathematicians, and much of Banks's resentment settled in the long term on that particular subset of his opponents. The 'Dissensions', as a result, had a long-term effect not just on Charles Hutton but on the whole community of mathematicians and mathematical practitioners in and around the metropolis.

Although no-one resigned his fellowship and no-one was expelled from fellowship, a number of mathematical fellows ceased temporarily or permanently to publish in the *Philosophical Transactions*. Hutton did so; others included Horsley, the Cambridge mathematician George Atwood and Cambridge astronomer Thomas Hornsby, the mathematical practitioners John Landen and James Glenie, and the colonial administrator and mathematical author and editor Francis Maseres.[75] (Nevil Maskelyne as Astronomer Royal did not have the option of continuing hostility with Banks, as the funding of the Royal Observatory was controlled by the President and Council of the Royal Society. The two arrived at an uneasy *modus operandi*, though tension continued.)[76] Some of these men formed a dining club of their own, the so-called Friday Club alluded to occasionally in their correspondence up to 1802: Hutton, Maseres, and Maskelyne, with the actuary William Frend, the politican William Windham and perhaps a few more.[77]

Over time for the circle of mathematicians around Hutton, and especially for the generation of British mathematicians who came to intellectual maturity in the decade or two after the 'Dissensions', the row was a key element in a folklore in which they, the mathematicians, were a minority oppressed for their class, their profession(s), their intellectual seriousness, and on account of Joseph Banks's preference for natural history. Olinthus Gregory, Hutton's friend and his successor at both Woolwich and the Stationers' Company, led the way in collecting lists of grievances and penning public attacks on Banks, notably on Banks's death in 1820.[78] For the mathematicians the 'Dissensions' thus became an important prompt to create a distinct, self-conscious identity.

That identity eventually issued forth in the creation, in 1820, of the Astronomical Society of London, in defiance of Banks's open opposition. In it, 'scientific servicemen' associated with the Royal Military Academy and navy were prominent, as were associates of Hutton such as Gregory (though Hutton himself was not a member). Much later the foundation of the London Mathematical Society, in very different circumstances, illustrated – and responded to – a contining sense that mathematics was not wholly welcome at the Royal Society.[79]

Conclusions

The 'Dissensions' of 1783–84 were not a merely personal spat, nor were they driven by a single issue. Nor, again, were they simply a mathematicians' mutiny, nor indeed a straightforward rebellion of any one group against another. They were the outcome of a complex of factors which made Charles Hutton intolerable to Joseph Banks (despite his merits) and mathematics uncomfortable at best at the Royal Society (despite its utility), as well as of a different complex of factors which briefly united about forty fellows, otherwise very disparate in their interests, in opposition to their president. Its long-term effects included a growing self-consciousness among (mainly metropolitan) British mathematicians, whose subsequent activities did something to realise the 'mathematicians' mutiny' that the 'Dissensions' themselves were not.

This was how science and scientific careers worked in this period: through complex sets of individual, personal connections and networks. Success consisted of making those connections work together in mutually supporting ways; failure of the opposite, when relationships, roles and skills became mutually antagonistic. The career of Charles Hutton and the incident that struck it in 1783–84 illustrate both sides of this coin: the very diversity of the roles he played became a liability when he attempted to become (also) an experimental natural philosopher and active Fellow of the Royal Society. It turned out that some networks to which he belonged were incompatible with others to which he wished to belong; that some of the roles he played and continued to play were not compatible with the new role(s) he wished to take on. Most particularly, his deep embeddedness in the worlds of commercial print and mathematical practice, which were an asset at the Royal Observatory and the Board of Longitude, got in the way of his attempts to turn himself into a front-rank natural

philosopher at the Royal Society. Charles Hutton thus provides a window into the micropolitics of British science in his time, his career unusual for its successes and for its one most spectacular failure.

Acknowledgements

Work on this paper was funded by an AHRC Early Career Research Grant, reference AH/L015196/1: 'A biography of Charles Hutton (1737–1823)'. My thanks also to the Bodleian Library, the British Library, Cambridge University Library, Portsmouth History Centre, the Royal Artillery Museum, the Royal Society Archive, Senate House Library, and University College London Library where archival and rare-books research for this paper was carried out. The text has benefitted from insightful suggestions from two anonymous referees, for which I am most grateful.

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[54] The Royal Artillery Museum ("Firepower"), MD/913/3c.

[55] The Royal Artillery Museum ("Firepower"), MD/913/3b; cf. Maty, *op. cit.* (note 43), pp. 56, 59, 142–3; Anonymous, *op. cit.* (An history: note 24), pp. 5–12; Kippis, *op. cit.* (note 39), pp. 87–100.

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[63] Anonymous, *op. cit.* (An history: note 24), p. 27; Royal Society, MM/1/47c and JBO/31, 371–2 (with a very different account of the incident). See also Chambers, *op. cit.* (note 59), vol. 2, pp. 263–4 (letter 473, Blagden to Banks, 1 March 1784) and pp. 266–7 (letter 476, Banks to Blagden 6 March 1784); Anonymous, *op. cit.* (An history: note 24), p. 9; and Royal Society, MM/1/32, referring to Maty's behaviour at the meeting of 4 March.

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[65] Maty, *op. cit.* (note 43), title page.

[66] Chambers, *op. cit.* (note 59), vol. 2, pp. 200–202 (letter 424, Blagden, 30 Oct 1783), pp. 281–2 (letter 491, John Hope to Banks, Edinburgh, 13 May 1784), pp. 283–4 (letter 493, Abbé Theodore Augustin Mann, Brussels 4 June 1784), pp. 309–10 (letter 514, Banks to Jaques Pierre Brissot de Warville, 23 Sep 1784); Dawson, *op. cit.* (note 56), p. 154 (Jean Pierre Brissot de Warville to Banks, Newman Street, 20 April 1784), p. 158 (Pierre Marie Auguste Broussonet to Banks, Paris 11 February 1784), p. 184 (Thomas Bugge to Banks, Copenhagen 12 October 1784), p. 523 (Louis Léon Félicité, Comte de Lauraguais, Duc de Brancas to Banks, Brussels 4 April 1785), p. 724 (Patrick Russell to Banks, Vizagapatam 26 December 1784, 9 July and 4 August 1785).

[67] Gregory, *op. cit.* (note 24), pp. 167–9.

[68] Chambers, *op. cit.* (note 59), vol. 1, pp. xxiv, xxvi–xxvii and vol. 2, pp. 271–2 (letter 482, Banks to Sir George Augustus William Shuckburgh-Evelyn, 28 March 1784); but compare Anonymous, *op. cit.* (An history: note 24), p. 15; Gregory, *op. cit.* (note 24), pp. 246–55; Miller, *op. cit.* (note 37), p. 12; and Watts, *op. cit* (note 34), p. 405.

[69] Royal Society, CMO/7, 81 (2 August 1781), 59 (16 Nov 1780), 89 (15 Nov 1781); cf. Maty, *op. cit.* (note 43), pp. 108–9.

[70] Chambers, *op. cit.* (note 59), vol. 2, pp. 333–4 (letter 535: Banks to Franklin, 19 November 1784), at p. 334.

[71] Cambridge University Library, RGO 14/17, 337–339 (Board of Longitude, account with Charles Hutton, 1779–82); RGO 4/325, 54^{v}–55^{r} (account with Charles Hutton concerning the Nautical Almanac); Royal Society, CMO/6, 333 (payment for 'Computations of the Attraction of Schehallion', 18 June 1788).

[72] Royal Artillery Museum, MS 913/5f (unattributed press clipping of 1784 or 1785); Chambers, *op. cit.* (note 59), vol. 3, pp. 92–4, 105–6, 110–11 (letters 605, 612, 614, Blagden to Banks, 30 September, 23 October, 30 October 1785).

[73] Hutton, *op. cit.* (Tracts (1786) and Tracts (1812): note 14).

[74] Watts, *op. cit* (note 34).

[75] [Wolcot], *op. cit.* (note 24), p. 12; Anonymous, *op. cit.* ('Charles Hutton': note 16), p. 119; John Bruce, A memoir of Charles Hutton, p. 17 (Newcastle, 1823); 'Memoir of the Late Dr. Hutton', Gentleman's Magazine, 228–32, at p. 230 (March 1823); Geikie, *op. cit.* (note 18), p. 145; Heilbron, *op. cit.* (note 1), pp. 89–91. On Horsley, who eventually went back to the Royal Society, see Cameron, *op. cit.* (note 1), p. 132.

[76] Higgitt, *op. cit.* (note 1), pp. 236–63.

[77] Cambridge University Library, RGO 4/187/11:1–2 (letter of Hutton to Maskelyne, 27 June 1785); MS Add. 7886/117 (letter of Hutton to William Frend, 21 May 1791); RGO 4/187/18 (letter of Hutton to Maskelyne, 19 December 1793); RGO 4/187/22: 22:1–2 (letter of Mr Rowed of the Globe Tavern, Fleet Street to Maskelyne, June 1795); British Library, Add. MS 37915, ff. 218–19 (letter of Hutton to Windham, 15 September 1802); see also Derek Howse, Nevil Maskelyne: the seaman's astronomer, p. 161 (Cambridge: C.U.P., 1989).

[78] 'Misogallus' [Samuel Horsley], A letter to the Right Honourable Sir Joseph Banks, K.B. (London: Cobbett and Morgan, 1802); Gregory, *op. cit* (note 24), *passim*; Miller, *op. cit.* (note 37), p. 12; David Philip Miller, 'Sir Joseph Banks: An Historiographical Perspective', Hist. Sci. **19**, 284–292, at p. 289 (1981).

[79] David Philip Miller, 'The Revival of the Physical Sciences in Britain, 1815–1840', Osiris **2**, 107–34 (1986); Rebekah Higgitt, 'Why I don't FRS my Tail: Augustus De Morgan and the Royal Society', Notes Rec. Roy. Soc. **60**, 253–259 (2006).