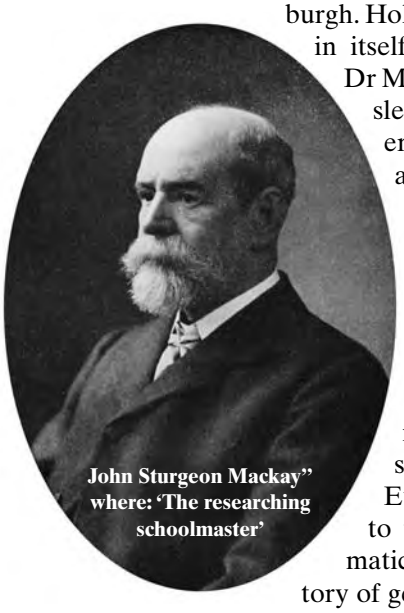
Death of a Schoolmaster

Marit Hartveit

The Edinburgh Mathematical Society has, since its foundation in 1883, provided its members with lectures on advanced mathematics and, since 1884, the publication 'Proceedings of the Edinburgh Mathematical Society'. The society is today a research society mainly for academics. It started out rather differently and the path towards the current state was not necessarily the obvious route. This article will sketch how the society was shaped into the society it is today.

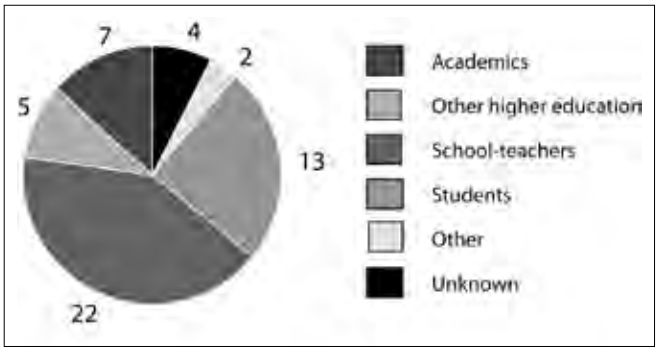
The researching schoolmaster

Dr John Sturgeon Mackay would have been a rather unusual man by today's standards. He was the head mathematical master at Edinburgh Academy, which at the time was the most prestigious school for boys in Edinburgh. Holding that position was in itself an achievement but Dr Mackay had more up his sleeve. Few schoolteachers of today can boast an honorary doctorate from the University of St Andrews, nor an election to the Royal Society of Edinburgh, yet Dr Mackay could. Such honours were easily justified by his substantial contribution to Euclidean geometry and to the history of mathematics, in particular the history of geometry. He had quite the scholarly knowledge of Greek and Latin and spent years meticulously editing what could have been the first complete edition of Pappus' *Collections*. This Magnum Opus of his never saw the light of day, as Friedrich Hultsch beat him to the finishing line. Undeterred, he kept working and put vast amounts of time and effort into improving mathematical teaching in secondary schools. Amongst the fruits of his labour were several textbooks, the most important being *Elements of Euclid* (1884) and *Plane Geometry* (1905) [G].[1]

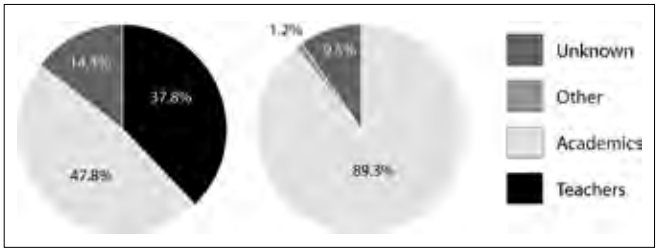


John Sturgeon Mackay" where: 'The researching schoolmaster'

As useful as these two textbooks may have been at the time, he would perhaps have been entirely forgotten today had it not been for his work in the Edinburgh Mathematical Society. He was involved with this society from the very beginning, when he became its first president. He was not, however, one of the founding fathers; the initiative had in fact come from two other schoolmasters, Alexander Yule Fraser and Andrews J G Barclay, both working at George Watson's College in Edinburgh. They felt there was very little provision in Scotland for those who wished to pursue their studies of mathematics after university. The mathematical foundation they had from university was far from ideal. The mathematics taught in the M.A., which was the degree most students took, left something to be desired. The subjects were more or less fixed, so the mathematical courses had to cater for everyone, even students with little love or understanding for the subject. This unavoidably kept the level of difficulty to a minimum. Fraser and Barclay believed a society with strong ties to the university would solve the problem and so they joined forces with Cargill Gilston Knott. Dr Knott had all the necessary contacts, being as he was the assistant of Professor P. G. Tait, who held the Chair of Natural Philosophy at Edinburgh University.[2]



Occupation of the founding members



Occupation of authors, 1890–95 and 1930–35

The trio composed a letter, stating their aims and goals, which they proceeded to send out to everyone they thought might take an interest. The noble goal of the 'mutual improvement of [the society's] members in the mathematical sciences, pure and applied' [EMS83] attracted no less than 53 men to the first meeting on 2 February 1883. As one might expect, considering the profession of the founding fathers, teachers were heavily represented

[1] For more information on Mackay, see the MacTutor History of Mathematics http://www.gap-system.org/~history/Mathematicians/Mackay_J_S.html.

[2] Natural philosophy would eventually evolve into physics.

with 22 of the 53. It should be noted that the society was not aimed specifically at teachers. It was open to everyone who wished to improve themselves in the mathematical sciences, provided they had the necessary background, and the reason for the large proportion of teachers was simply the job market at the time. There were precious few job opportunities for a graduate who wished to do research or even keep in touch with current mathematics. Scotland had four universities, each with one professor of mathematics and one or two assistants. Even when including the natural philosophers, the number of positions was only between 15 and 20 and these positions were very rarely available. There were other institutions for higher education but the vast majority of the graduates had to look elsewhere for work and many highly skilled mathematicians chose a teaching career out of necessity rather than anything else. Many of these then joined the society and, although most of them participated as audience only, a fair few took a more active role by giving talks and writing papers. Dr Mackay was certainly the most prolific of the lot, with well over 30 papers published. Other teachers deserve a mention too, such as R.F. Muirhead and the rather more famous Thomas Muir (later Sir), who was working at Glasgow High School at the time. He would eventually take up positions in South Africa, where he finished his *History of Determinants* [A].[3]

This predominance of teachers was not to last and by the 1930s things had changed radically. Although the actual number of teachers had increased, it had not increased as much as one might expect, considering how the number of teachers in Scotland had soared [Cr]. The number of academic members had increased a lot more and so the percentage of teacher members was now almost halved. However, the real change between the late 19th century and the 1930s does not become apparent until we consider how active the groups were. Between 1890 and 1895, teachers were responsible for almost 40% of the papers in the proceedings, albeit most of them being written by three authors. Between 1930 and 1935, the corresponding figure was 0%.

The teachers were slowly and steadily retreating from society life. This process had been going on for quite some time and the reasons for this can, although fairly complex, be narrowed down to two major events. The first thing to happen was the arrival of Edmund Taylor Whittaker (later Sir) in 1912, when he took up the Chair of Mathematics at Edinburgh University [Ma].

New times

Professor Whittaker was one of the leading figures of his day. Not only was he a first-class researcher, who contributed greatly to bringing British mathematics up-to-date, but he was also unusually skilled at communicating new research to others [Mc].[4] He spurred the society forwards, turning the focus to current, more advanced mathematics. This had an unfortunate effect on the average teacher member who found it very difficult to keep up. The talks would no longer explain the underlying theory but rather assume a certain level of knowledge in the audience. This would not have been as great a problem in the early days, as the teachers and academics had a common meeting-ground in Euclidean geometry, which formed a major part of the curricula for both groups. By 1930, the universities hardly taught any Euclidean geometry at all but the schools still did and so the common interest had almost disappeared.

Sir Edmund Taylor Whittaker

This leads on to the second event, which was the exodus of the researching teacher, aptly symbolised by the death of Dr Mackay in 1914. Dr Mackay and his like-minded colleagues would most likely have been able to keep up with the new mathematics, as their own research interests covered more than just Euclidean geometry. The difference was that people like Mackay no longer went into school teaching. For one, they did not have to; the Scottish universities combined had more than tripled their mathematical staff, and Edinburgh and Glasgow had quadrupled theirs. This would efficiently have skimmed the top off a student body that would otherwise have been forced into school teaching.

One would perhaps expect that the increased student body would counter this and leave approximately the same percentage of excellent students out of academia. However, there appears to have been a change of attitude amongst the students, in particular amongst those considering the teaching profession. There was now quite a different breed of teachers. One aspect of this would be teacher training. Although it was not a novel idea, it was fairly new that everyone had to go through it [Cr]. All the new secondary school mathematics teachers in the 1930s would have an honours degree in mathematics with an added year of teacher training. Although this system was excellent for securing a minimum level of education and teaching skills, it was criticised for not encouraging further studies [I]. One interpretation of this could be that

[3] For more information, see their biographies at the MacTutor History of Mathematics:
Muirhead – http://www.gap-system.org/~history/Mathematicians/Muirhead.html;
Muir – http://www.gap-system.org/~history/Mathematicians/Muir.html.

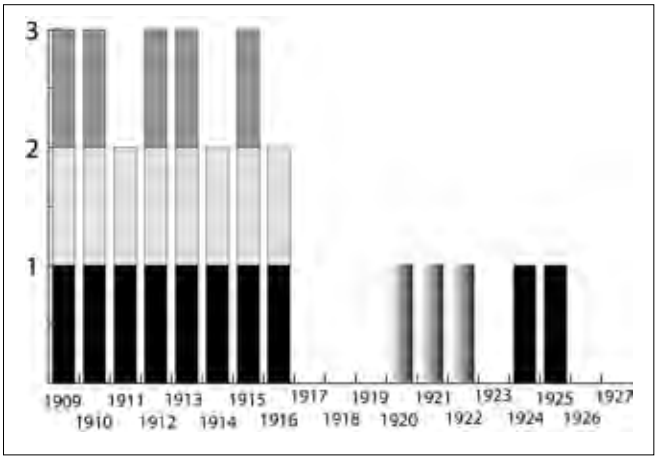
[4] For more information on Whittaker, see MacTutor: http://www.gap-system.org/~history/Biographies/Whittaker.html.

where the teachers from the 19th century had chosen subject first and then profession, the new teachers chose profession first and then subject. This could in turn make the average teacher less interested in new mathematical developments. There were certainly voices within the society that felt the teachers were losing ground because of their indifference.

This indifference could have been an effect of the social conditions at the time. Interwar Europe was arguably not in the most stable of positions, especially not with an ongoing depression. This could lead students to hunger more for a steady job rather than academic excellence.[5] There would, quite simply, be fewer students aspiring to research and the academic world than before.

A journal for teachers

These factors do not fully explain why the teachers were leaving. No society wants to lose half of its members and the Edinburgh Mathematical Society certainly did not. They might have conquered these obstacles and managed to keep a high percentage of both professions and, in fact, they made a very decent attempt. The problem with the increasing level of mathematics was present even before Whittaker's arrival, though on a smaller scale. In an attempt to please the teachers, the society decided to establish a teacher-friendly journal. In 1909,



Issues of the *Mathematical Notes* 1909–1927

the first issue of *Mathematical Notes: A Review of Elementary Mathematics and Science appeared*. When it ultimately failed to bridge the ever-increasing gap between the teachers and the academics, most teachers must have felt there was nothing left for them in the society. The circumstances regarding the journal's ultimate demise are therefore crucial to understanding how and why the teachers disappeared.

The Notes was off to a very decent start, enjoying moderate success for several years, before reaching an abrupt stop in 1916. It is perhaps understandable that matters were a little out of the ordinary around that time but it is less clear why the Notes never picked up the pace again after that; no proper issue was then published until 1924. Three batches of notes appeared between 1920 and 1922 but these were simply stuck in at the back of the Proceedings. All in all, the Notes quite suddenly changed into a journal of no consequence to anyone and was, as a committee member put it, 'for all practical purposes, dead' [Co].

The long struggle

As the minute books from the committee meetings show, this was not taken lightly by several of the committee members, especially not by Professor Thomas M. MacRobert of Glasgow University [EMS]. He, and others with him, argued that the society owed its very existence to the teachers and they felt obliged to provide something for them. In early 1927, a long and arduous debate began that would not end for the next four years. It originated with a discussion on publishing policy. The aforementioned gap had just been expanded even further by the new custom of accepting papers for the Proceedings that had not been given to the society as talks. This allowed the papers to become even more technical, which made the teachers lose ground faster than ever before. The committee agreed that something had to be done and decided that the way to go was to revive the Notes.

Thomas Murray MacRobert

This, however, turned out to be a lot more difficult than they had anticipated.

In the autumn of 1927, Professor MacRobert suggested replacing the Notes with a new journal. He proposed to call it the *Journal of the Edinburgh Mathematical Society* and after much debate, the committee agreed. In May the following year they decided to start issuing the journal in its new form. All seemed settled but something must have happened behind the scenes. When the next issue appeared in 1929, it was under the name of the Notes and not the Journal. The committee never rescinded their decision and there is no explanation for why the Journal did not get to see the light of day.

Despite the setback, Professor MacRobert did not consider the battle lost. He re-launched the idea in 1930, during a process of updating the society's rules. This time

[5] This, at least, was the case with the biology students at St Andrews, as Professor D'Arcy Thompson wrote in a letter to G.T. Bennett at Cambridge, on 8 February 1940 [St Andrews University Library, ms26240].

he met firm opposition. Professor Whittaker raised objections to the name, arguing that it would conflict with *the Journal of the London Mathematical Society*, which was a rather different type of journal. The subsequent committee meetings must have been a trying experience for everyone involved, as hardly anything is reported from them. On the surface, it looks as if they spent the next few months arguing about something as trivial as a name but that was not the core of the struggle. The discussion was really on the future of the society and whether or not it should take an even sharper turn towards pure research. Although he did not say so explicitly at the time, Whittaker believed the time had come for two societies, one for teachers and one for researchers. He did not confess to holding such sentiments until later, when it had all ended in the academic version of an uproar.

The four-year-long debate culminated with MacRobert's resignation from the committee, closely followed by the resignation of the editor of the *Notes*, Dr William Arthur, also a Glasgow academic. Whittaker, possibly having waited for such an occasion, immediately began pushing for two societies. Interestingly enough, this seems to have been the only time that Whittaker actually lost the argument, as the rest of the committee disagreed. The following session saw a complete revision of the intended syllabus and the new version provided only talks of general interest. The committee hoped that this would counter for the failure of the *Notes* and were quite prepared to keep it up if it worked. It did not, and gradually the number of general talks fell, until they struggled to keep it at one a year.

As for the *Notes*, the committee eventually came to see matters from Whittaker's point of view and they made a few attempts to find another organisation that could take over responsibility for publication. They failed at this and grudgingly agreed to keep publishing. The journal limped along, with approximately one issue every second year, before it finally collapsed in 1961.

Why the teachers left

The main question that remains to be answered is then: exactly why did the Notes fail? If one were to ask the society itself, in 1927, it would have said it was because of a lack of material. This was broadly speaking true but that was a consequence and not a cause. It is hardly surprising that few would consider submitting their articles to a journal that was hardly ever issued. Another explanation is therefore required and it turns out to be this: shortly after the First World War, the cost of printing rose considerably and the society was forced to prioritise. By 1920, the situation had become so severe that the society had to send out an appeal to various businesses around Scotland in order to pay their bills. Incidentally, 1920 was the same year that the *Notes* appeared inside the *Proceedings* for the first time, presumably done as an attempt to save money. By 1927, the society was dependent on financial aid from outside in order to publish anything at all.

This long break created the problem of lack of material. This would remain a problem but it was not the only factor at work. When Whittaker argued for two societies, he had financial aspects in mind. He knew that the financial grants the society had come to rely on required that the society's main activity was novel research. The *Notes* did in general not contain novel research and so, allowing it to become too great an expenditure could make them lose funding. The society did later have the opportunity to publish larger issues of the *Notes* but the offer was rejected for this particular reason.

It would be very unfair to give Whittaker the blame for the departure of the teachers. It is true that it was under his influence that the society turned towards current research and under his guidance that they prioritised the Proceedings over the *Notes* in times of financial crisis but it was all done in the spirit of the founding fathers. The society was not founded to educate the schoolteachers; it was founded to promote higher mathematics. In a sense, the society took over where the university education stopped. When the universities changed their courses and taught more advanced mathematics, the society followed suit. Had Whittaker not steered the ship, the society could easily have swung the other way and become a true teacher organisation. In my opinion, this would have been a much bigger breach with the old ways of the society than the turn towards research. This way, the aim of the society remained the same.

References

[A] Aitken, A. C., *Sir Thomas Muir C.M.G. LL.D. F.R.S.,* Proceedings of the Edinburgh Mathematical Society, **4**, pp 263–67.

[Co] Copson, E. T., *Letter to H. W. Turnbull, 31 January 1927*, The EMS Archive.

[Cr] Cruickshank, M. *A history of the training of teachers in Scotland*, University of London Press, 1970, pg. 236.

[EMS] Minute book for Committee meetings, The EMS Archive.

[EMS83] Knott, Barclay, Fraser, Circular, 23 January 1883, http://www.gap-system.org/~history/ems/minutes/index1883.html.

[G] Gibson, G. A., *John Sturgeon Mackay M.A. LL.D*, Proceedings of the Edinburgh Mathematical Society, **32**, pp 151–159.

[I] Inglis, A, *Letter to I. M. H. Etherington, 11 December 1937*, The EMS Archive.

[Ma] Martin, D., *Sir Edmund Whittaker F.R.S.*, Proceedings of Edinburgh Mathematical Society, **11**, pp 1–9.

[Mc] McCrea, W H., *Edmund Taylor Whittaker*, J. London Math. Soc. 1957 s1-32: 234–256.

Marit Hartveit [mh429@st-andrews.ac.uk] is doing a PhD on the History of Mathematics at the University of St Andrews. Under the supervision of Professor Edmund Robertson and Dr John O'Connor, she is piecing together the history of the Edinburgh Mathematical Society. Her current work also includes the study of mathematical correspondence between Alexander Aitken and Sir D'Arcy Wentworth Thompson. She is currently the assistant general secretary of the Edinburgh Mathematical Society.