

On the foundation of *Acta Mathematica*

by

YNGVE DOMAR

*University of Uppsala
Uppsala, Sweden*

In the proceedings of the congress of the Scandinavian mathematicians in 1925, the 79-year-old *Gösta Mittag-Leffler* gives Hermite and Weierstrass the credit for proposing an international journal edited from Sweden. Even if Mittag-Leffler's two foremost teachers had perhaps realized his talents as a potential journal editor and hinted to him something in that direction, we know, however, that the concrete proposal which led to the foundation of *Acta Mathematica* came from *Sophus Lie*. This is confirmed by many contemporary documents and also by Mittag-Leffler's brief obituary of Lie in volume 22 of this journal. Mittag-Leffler and Lie met in Stockholm in late spring 1881. Lie came up with the idea and suggested that Mittag-Leffler should be the editor. Mittag-Leffler was captivated by the project and took over the initiative from then on.

It can be seen from their correspondence in the following months that at least Lie meant that the greater part of the scientific material in the journal should be Scandinavian but at the same time of the highest international standard. To secure this, he and Mittag-Leffler found it best to have an editorial board formed of the leading Scandinavian mathematicians, who were supposed to give regular scientific contributions of their own. Mittag-Leffler emphasized in fact that board members should undertake to send all their best manuscripts to the new journal. Moreover, they should assist as referees for submitted manuscripts, Scandinavian or foreign. In order to be read abroad, the articles in the journal should be written in French or German, exceptionally English or Latin.

No journal specializing in advanced mathematical research existed at that time in the Scandinavian countries (Denmark and Iceland, Finland, Norway, and Sweden) and except for the brief but spectacular period of Abel in the twenties, it was not until the preceding decade that Scandinavia had reached a respectable standing in international mathematical research. By 1881, however, a considerable number of distinguished scientists had appeared, a circumstance that suggested possibilities for a quality journal

with Scandinavian dominance. Apart from Lie and Mittag-Leffler, it may suffice to mention *Albert Viktor Bäcklund*, *Ludvig Sylow*, and *Hieronymus Zeuthen* in pure mathematics and *Karl Anton Bjercknes*, *Hugo Gylden* and *Ludvig Valentin Lorenz* in applied mathematics. For the national promotion of mathematical science in these years, it was also important that there were three former university professors of mathematics who had reached very high administrative posts in their respective countries, *Ole Jacob Broch*, *Lorens Leonard Lindelöf* and *Carl Johan Malmsten*.

After the first discussion with Mittag-Leffler, Lie wrote to Zeuthen, who declared himself somewhat skeptical, in particular as to the possibility of attaining a satisfactory international circulation for a Scandinavian journal. Lie, too, admitted in a letter to Mittag-Leffler, later in 1881, that he saw difficulties in recruiting acceptable manuscripts from his own country.

Mittag-Leffler was more optimistic. To understand his attitude, one has to know that he had just been appointed to the chair of mathematics at the recently founded Stockholms Högskola, the embryo of the present University of Stockholm. With enthusiasm and very high ambitions, he planned a fast developing research activity in Stockholm, knowing his capacity for that task after four successful years as professor in Helsinki. He must have considered a journal as an essential factor in the build-up, and he was confident of his personal ability to conquer all organizational and economical difficulties. He discussed the journal project with Gylden and Malmsten, his closest scientific friends in Sweden.

There was, however, one circumstance that caused Mittag-Leffler some hesitation. In 1880, Weierstrass and Kronecker had been put in charge of *Crelle's Journal* and Mittag-Leffler, doubting their administrative ability, believed that this would lead to a decline, maybe even the end, for that old prestigious mathematical journal. In this situation, he was afraid of starting a competing journal, perhaps out of consideration for his old teacher Weierstrass, but evidently also out of fear that Weierstrass and Kronecker would lead the German mathematicians against his own project.

Mittag-Leffler is reputed to have been one of the foremost champions of Weierstrass and his ideas, and their relations were in general close and trustful. But judging from their correspondence, there was little contact in this period and perhaps also slight strains in those relations, which can explain Mittag-Leffler's uncertainty about the old master's possible reaction to a new journal.

Mathematically and personally, Mittag-Leffler had at that time far more intimate contacts with Hermite, with whom he maintained a steady exchange of notes and letters. Through Hermite, he obtained detailed information on the mathematical life in

Paris, and very early he had become aware of the trio of exceptionally gifted young students of Hermite: Appell, Picard and Poincaré. Hermite had written about Poincaré's marvellous talents, and Mittag-Leffler had taken up a regular correspondence with the young genius. In March 1882, Mittag-Leffler suddenly realized how he could use Poincaré in order to give a Scandinavian journal a brilliant start and that this had to outweigh the possible complications with Weierstrass. In a letter to Malmsten some days later, he writes:

“According to my firm belief, we now find ourselves in a period quite similar to that of the discovery of elliptic functions. Then Abel made the success of Crelle's *German* journal. In the same way Poincaré will make the success of our *Swedish* journal.”

Once Mittag-Leffler had made up his mind, he acted with speed and determination. On March 29 he wrote to Poincaré, describing to him the journal project. Laying all his cards on the table, he explained Poincaré's key rôle in the enterprise, using words that no doubt appealed to the young mathematician. Mittag-Leffler asked in the first place for Poincaré's big manuscript on Fuchsian groups (which, as he knew, had been intended for the *Journal de l'école polytechnique*) and four other manuscripts for the next year, promising exceptionally fast and generous editing service. Already before Poincaré answered, Mittag-Leffler, full of confidence, had informed his friends Gyldén, Lie, Malmsten and Zeuthen that the journal project was started. Poincaré's reply was positive, and Mittag-Leffler's four Scandinavian confidants, too, gave their full support, all their doubts taken away by his enthusiasm and belief in success. Hermite was also given all details of the journal plan, and he gave the enterprise his blessing.

Mittag-Leffler's original selection for the editorial board consisted of the Scandinavian mathematicians listed above, except for Bäcklund. However, at the advice of Lie, Malmsten and Zeuthen, he added *Herman Daug*, *Hjalmar Holmgren*, *Julius Petersen*, and, after much hesitation, Bäcklund, whose scientific qualifications he was inclined to call in question. All proposed board members declared themselves willing to participate in the enterprise. It has to be stated, though, that the editorial board as a whole had very little influence on the organization of the journal or its management during the first years. Establishing the journal was essentially Mittag-Leffler's work. There were only a few board members who gave essential assistance, mainly Malmsten and Zeuthen. Lie's interest and involvement seem to have cooled down gradually, perhaps due to his intimate association with Felix Klein, editor of *Mathematische Annalen* and Poincaré's scientific rival.

Many details in the early planning of the new journal are revealed in the rich

correspondence between Mittag-Leffler and Malmsten, the former professor, cabinet minister and provincial governor, retired at that time and living in Uppsala. They were very close personally, in a kind of son-father relation of mutual benefit. Mittag-Leffler had revitalized Malmsten's mathematical interests and had introduced him some years before to the mathematical circles in Germany. In Sweden and abroad, Malmsten's influence combined with his enthusiasm for mathematics made him a very valuable friend for Mittag-Leffler, in particular in the journal project.

It was clear to Mittag-Leffler that considerable economic contributions were necessary in the first years before the journal could become self-supporting and that he had to look primarily for private donations. He and Malmsten composed, in early April 1882, a memorandum intended for potential Scandinavian sponsors. The document describes in very negative terms the current situation for the leading mathematical journals, stressing the need for a new one and also referring to the tension between France and Germany (which still subsisted since the Franco-Prussian war in 1870-71). It emphasizes the expected positive effect a new journal would have on Scandinavian mathematics and the great honor it would mean for the small Scandinavian countries to be able thus to take part in the steering of international mathematical research. As a whole, the memorandum is more international in its spirit than the first correspondence between Mittag-Leffler and Lie. Probably Mittag-Leffler realized at this stage that the international contributions had to dominate if the quality was to be kept high.

Mittag-Leffler's intention was to show the memorandum to selected well-known Scandinavian patrons of art and science, asking each of them for a contribution of 1 500 Swedish crowns distributed over three years. (As a comparison, it can be noted that Mittag-Leffler's own yearly salary as professor was 7 000 crowns.) To give prestige to the project, Malmsten and Mittag-Leffler requested an audience from King Oscar II, asking him to take the enterprise under his wing. The king showed great interest and offered to join the list of donors, subscribing the 1 500 crowns from his personal purse. With the king and Malmsten on the list of sponsors, it was now easy for Mittag-Leffler to obtain a sufficient number of donors, most of them Swedes. Quite unexpectedly Hermite contributed with the equivalent of 720 crowns, and altogether close to 26 000 crowns were secured very soon in 1882. (The complete list of sponsors can be found in volume 1 of the journal.) In addition Mittag-Leffler knew that he could expect 1 000 crowns a year from each of the governments of Denmark, Norway and Sweden starting from 1883. Since he estimated the cost for each volume to be 4 500 crowns—later it turned out that the real cost became somewhat higher—the prospects were good indeed for the first years.

Simultaneously Mittag-Leffler negotiated with printing and publishing companies and reached an advantageous agreement with F. and G. Beijer in Stockholm, its president joining as a donor. The international distribution was guaranteed by contracts with Mayer and Müller in Berlin and Hermann in Paris. *Gustaf Eneström*, then a young assistant librarian at the start of his career as researcher in the bibliography and history of mathematics, was engaged as proof-reader. His work for the journal would ultimately lead to the founding of his own journal *Bibliotheca Mathematica*.

As for the scientific material, Mittag-Leffler knew that he could rely on the French mathematicians, not only Poincaré but also Hermite, Appell, Picard, Goursat, Halphen, and others. He expected some Scandinavian contributions, but he realized that their number and quality could not balance the French articles in the way he wished. It was necessary to engage Germany, still the dominant mathematical power at that time.

In the first two months of the organizational work, high confidentiality had been requested by Mittag-Leffler from everybody involved, members of the editorial board, sponsors, and scientific contributors, in order to keep the matter secret from Weierstrass and the other Germans. Not even Mittag-Leffler's friend Georg Cantor or Malmsten's son-in-law Ernst Schering knew anything about the intense activity. Mittag-Leffler wanted to have a secure position first and then surprise the Germans and try to win them to his side. He conceived a plan to reach his goal by using the king. The strategy was presented in a letter to Malmsten. He was asked to lay the problem before the king and suggest to him to express the wish that the German mathematicians should contribute scientifically to the journal. Malmsten acted as requested, and the king was very helpful. On behalf of the king, Malmsten could now send a well formulated letter to Kummer, Kronecker, Schering and Weierstrass, all of whom had some years before (directly or indirectly through Malmsten's influence) been honored with a Swedish royal order. The letter broke the news about the journal and the king's interest in it, and asked for scientific support in a way which made it difficult to turn down the request. Weierstrass replied to Malmsten in a warm and friendly spirit; perhaps Mittag-Leffler's anxiety had been unfounded, or else Weierstrass was mollified by the royal expression of support for mathematics. The three others, too, responded positively. Contributions were promised by Kronecker, Schering, and Weierstrass, and this paved the way for a general German support of the project. Later, however, it turned out that neither Kronecker nor Weierstrass sent any manuscripts.

In the summer, after most of the preparatory work had been successfully concluded, Mittag-Leffler set out on a journey through Europe. It had been scheduled well in

advance—it was in fact his and his young wife’s honeymoon trip. But he took now this opportunity to make personal contacts at mathematical centers in France and Germany and talk about his journal. He returned with promises of manuscripts, for instance from Fuchs, Netto, and Reye, which meant a substantial German contribution already in the first volume of the journal. In addition to these contacts, Mittag-Leffler prepared the ground for the journal by sending information to individual mathematicians, learned societies, and scientific journals all over the world; in Scandinavia a particularly intensive information campaign was organized.

The first issue was scheduled to appear at the end of 1882. Mittag-Leffler had decided very early that Crelle’s journal would stand as pattern in typography, size, even in the price, nine crowns per volume. Everything was prepared well in advance, except one thing: the name of the journal. In Mittag-Leffler’s correspondence with Malmsten and Hermite, there is a continuous discussion since June on this question with a stream of suggestions: *Disquisitiones Mathematicae*, *Arkimedes*, *Analecta Mathematica*, *Museum Mathematicum*, to mention a few. At the end of October, all seemed to be set for *Acta Mathematica Eruditorum*, and the printers had started to use the name. Then came a last-minute suggestion from Mayer and Müller in Berlin to exclude the word *eruditorum*. This turned out to be a possible change, for the printers in Stockholm had so far only used the title on the sheet signatures and had then already chosen the abbreviated form. Malmsten consulted rapidly one of the Latin professors at the University of Uppsala, who admitted that *Acta Mathematica* was acceptable, even if *Acta Mathematicorum* would have been better from the linguistic point of view. So the journal finally got its name on November 2, 1882. On December 12, Mittag-Leffler presented the king with the first copy of volume 1, part 1, of the new journal.