A richer gathering: On the history of the Nordic Congress of Mathematicians

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In this text, we consider the origins and evolution of the Nordic Congress of Mathematicians (NCM)*, held once every four years in Sweden, Finland, Denmark, Iceland, or Norway.*

1 Introduction

The 29th Nordic Congress of Mathematicians (NCM) will be held in Aalborg, Denmark, in July 2023, under the auspices of the Danish, Finnish, Icelandic, Norwegian, and Swedish national mathematical associations and in collaboration with the European Mathematical Society. This particular meeting also coincides with the sesquicentennial of the Danish Mathematical Society. Typically held once every four years, these meetings draw together scholars based not only in these nations, but also well beyond.

But for the scheduling and primary constituents, the modern incarnation of the congress only hints at the spirit the early gatherings were intended to embody. Yet the NCM was the product of a specific time and place. In the political tension following the secession of Norway from Sweden in 1905, the *Scandinavian* Congress of Mathematicians (SCM), as the NCM was formerly known, was originally framed as the extension of a "brotherly hand", one intended to help shape a shared Scandinavian identity for mutual cultural benefit through fruitful scientific cooperation [17].

2 Origin

Although the political map of Scandinavia[1] was relatively stable during the second half of the 19th century when compared to the rest of Europe, political changes early in the 20th century resulted in a reconfiguration of relations between Denmark, Finland, Norway, and Sweden. Of particular importance in the present context was the dissolution of the union between Norway and Sweden in 1905. Unsurprisingly, one outcome of this development was political tension, which temporarily disrupted scientific and cultural exchanges between the two nations. It was in this connection that Swedish mathematician Gösta Mittag-Leffler (1846–1927) conceived of the idea for a pan-Scandinavian mathematical meeting.

By then, Mittag-Leffler was established and well connected within the international mathematical research community. Upon completing his doctorate in Uppsala in 1872, he had studied in Paris and Berlin and built on Karl Weierstrass' work by proving the so-called Mittag-Leffler Theorem of complex analysis, the focus of his research activity between 1876 and 1884. He also founded *Acta Mathematica*, known as the first international journal of mathematics, in 1882, and served as its editor-in-chief until his death. He had a vast network of scientific correspondents and worked actively not only to shape the development of mathematics in his own country but also to shift the image of Sweden from that of a peripheral player to one that was accepted as serious and important among the major mathematical powers. The SCM was also relevant in connection with these latter aims [16, 17].

Mittag-Leffler evidently broached the idea for the SCM to some of his Scandinavian colleagues during the 1908 International Congress of Mathematicians (ICM) in Rome [8, 14]. His subsequent outgoing correspondence references various aspects of the planning, and although his influence is readily apparent in the organizational process, he was not engaged in this work alone. When official invitations were extended in Spring 1909, the signatories hailed not only from his own institution, *Stockholms Högskola*, but also from the two national universities in Uppsala and Lund. The four-day gathering would take place in Stockholm that September.

As for his intentions, they were first and foremost mathematical. "The intention is to *work* at the meeting," Mittag-Leffler stressed in a letter to Finnish mathematician Ernst Lindelöf (1870–1946), "so that we all have the greatest possible scientific benefit from it". Costs should be kept low, and the customary festivities reduced to a minimum.[2] Beyond this, Mittag-Leffler had a vision for the SCM that harkened back to the cultural and political currents of "Scandinavianism" embraced by many Danish and Swedish intellectuals

[1] This controversial term usually refers to Denmark, Norway, and Sweden. "Nordic" also includes Finland, Iceland, the Faroe Islands, Greenland, and Åland. Here, "Scandinavia" will refer to Denmark, Finland, Norway, and Sweden, though sometimes "Nordic" is used interchangeably.

[2] See Mittag-Leffler's letter to E. Lindelöf of 24 March, 1909.

in the mid-19th century, in part a reaction to perceived pressures from powerful nations to the east, south, and west. He advocated a collaboration between Denmark, Finland, Norway, and Sweden in matters of defense, diplomacy, and economic policy [16] and hoped that through mathematical exchange, the SCM could spark a new sort of Scandinavianism [17], one that might strengthen the four nations culturally. As he phrased it at the 1909 meeting,

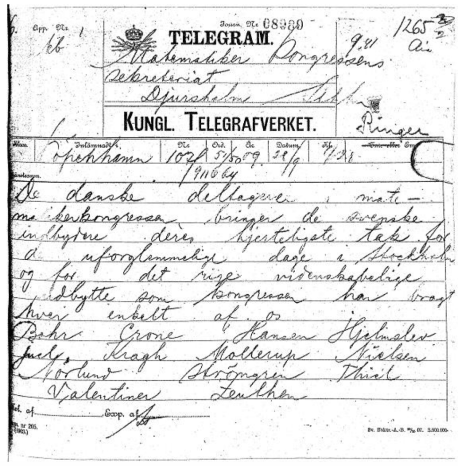
> In the herb garden of mathematical knowledge grow plants of a most varied kind, and it is not completely the same type of harvest that the [different] colleges of the north usually reap. How much richer our gathering therefore becomes when it includes mathematicians from all the north. [17]

Moreover, according to the report of Danish participant Carl Christian Hansen (1876–1935) published in the Danish newspaper *Politiken*, Mittag-Leffler viewed such collaboration as protective. Denmark, Norway, and Sweden, in particular, had a common historical development and cultural and linguistic connections. As he argued at the final banquet, "individually we are too small to benefit from standing on our own and our culture is too precious not to be carefully guarded" [17].

2.1 Reception and participation

The 1909 SCM drew roughly 130 registered participants and boasted 35 speakers from all four Scandinavian nations. Lectures were either general, lasting 45 minutes and treating important progress in various areas of the mathematical sciences, or special, not exceeding 20 minutes. Those giving the latter were instructed to bring necessary formulas and diagrams drawn clearly on cardboard to avoid the loss of time in writing demonstrations on the blackboard. Topics ranged from "real singularities in the three-body problem" (K. Sundman, Helsingfors – now Helsinki) to "convergence of series of orthogonal functions" (J. Mollerup, Copenhagen), to "new arithmetic properties of algebraic numbers applied to diophantine equalities" (A. Thue, Kristiania – now Oslo), to the "mathematical determination of pension" (K. Wicksell, Lund) [7].

Although the costs of the meeting were to be minimal, the affair was nevertheless festive, with formal and social programs modeled after those of the ICM [17]. The congress received several Royal telegrams, and the Crown Prince of Sweden attended Mittag-Leffler's opening lecture. The first evening featured a welcome party at the Grand Hôtel in Stockholm, and one day later, a "special train" shuttled participants, diplomatic representatives, and Swedish Cabinet Ministers to a dinner at Mittag-Leffler's villa in Djursholm [7]. The farewell banquet was held at the historic Hasselbacken restaurant, where 55 attendees each paid 10 Swedish crowns for a meal including coffee, wine and other beverages, and floral decorations and waitstaff [15]. Only congress delegates were invited to this dinner, but many brought their families to the meeting, combining it with a holiday [17]. This practice continued for decades, as did the inclusion of informal activities, often showcasing cultural, historical, or natural treasures. At the 1984 NCM in Reykjavik, for example, 36 individuals accompanied the 129 registered participants, and time was allocated to letting them become acquainted with one another and with the country and its people through a reception at the Kjarvalsstaðir art museum, an evening concert by Hallgrímskirkja Motet Choir, and a day trip through Upcountry Árnessýsla [13]. Similarly, in 1913, participants saw a National Theater performance of Norwegian playwright Bjørnstjerne Bjørnson's 1885 comedy "Geografi og kjærlighet" ("Geography and love") [14], and in 1922, went on a steamboat excursion to the maritime fortress Suomenlinna and the eastern archipelago of Helsinki [10].


TELEGRAM.

Matematiker Kongressens
Sekretariat
Djursholm

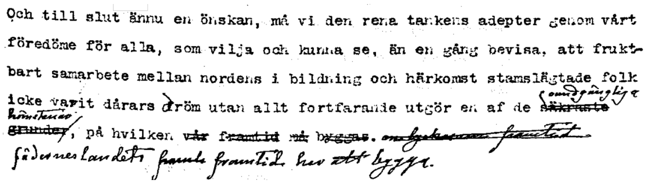
KUNGL. TELEGRAFVERKET.

De danske deltagere i matematikerkongressen bringer de svenske indbydere deres hjerteligste tak for de uforglemmelige dage i Stockholm og for det rige videnskabelige udbytte som kongressen har bragt hver enkelt af os
Bohr Crone Hansen Hjelmslev
Juel Kragh Mollerup Nielsen
Nörlund Strömgren Thiel
Valentiner Zeuthen

Figure 1. 1909 telegram from Danish participants to Swedish hosts. National Library of Sweden, MS L 233.

That the 1909 meeting was viewed as a success is evidenced by a telegram sent to the Swedish hosts by several Danish participants conveying "their warmest thanks for the unforgettable days in Stockholm and for the rich scientific exchange" that the congress had brought them (Figure 1). Prior to the meeting's end it was decided that the Stockholm gathering was to be the first in a series of congresses. Denmark would host the second in 1911, and in 1913, Norway would host the third. As Mittag-Leffler had proclaimed at the end of his opening speech at the 1909 SCM, "the fruitful cooperation among the culturally connected and equivalent peoples of the North is not the dream of a fool but rather a cornerstone on which the future of the nations is to be built" [17] (Figure 2).

Further attesting to the positive reception of the SCM, the second meeting was supported financially by the Danish State and private individuals, with the Carlsberg Foundation subsidizing the publication of the proceedings. The 1913 meeting and proceedings



Och till slut ännu en önskan, må vi den rena tankens adepter genom vårt föredöme för alla, som vilja och kunna se, än en gång bevisa, att frukt-bart samarbete mellan nordens i bildning och härkomst stamslägtade folk icke varit dårars dröm utan allt fortfarande utgör en af de ~~säkraste~~ oundgängliga hörnstenar ~~grunder~~, på hvilken ~~vår framtid må byggas.~~
fädernesländets ~~framtid~~ framtid har att byggas.

Figure 2. Final remarks of Mittag-Leffler's opening speech at the 1909 SCM. National Library of Sweden, MS L 233.

were similarly funded by contributions from the Norwegian government, life insurance companies, and private donations [14]. That said, the perceived value of the SCM to scholars, philanthropists, government officials, and commercial executives did not always translate to the broader public. In [12], Sørensen notes that the opening ceremonies were described in *Politiken* as "extremely subdued", and that

> Only once in the middle of Prof. Zeuthen's lecture came a crash; one of the student marshals couldn't take any more, and just as the renowned old man at the rostrum dwelt on Theodorus of Cyrene and on the long-dead colleague's pursuits of square root extraction, the young man became ill. He fell down with a smack and was lifted up and led out of the hall with one of Scandinavia's most famous mathematicians under each arm. Many eyes followed him with envious expressions.

Sørensen highlights a similar tone in the coverage of the 1913 SCM in Norwegian newspapers, which described the meeting as noteworthy and the lectures as "scientifically interesting" but completely inaccessible to the general public. When Henrik Mohn (1835–1916), a professor of meteorology in Kristiania, spoke to a reporter about the lecture of Gustaf Strömberg (1882–1962) on his analysis of air temperatures in Stockholm, he cautioned that it was impossible to give a popular account. Strömberg's lecture was nevertheless featured in the newspaper *Aftenposten* by a journalist who had

> rarely, in any case, seen more off-putting mathematical equations than those Mr. Strömberg drew on the blackboard […] What were they talking about? Don't ask. Amplitude, lunar period, dynamic effect and an arbitrary coefficient in the 5th or 6th power […]

2.2 Collaboration and Cooperation

Despite its novelty, the SCM was not the first gathering of Scandinavian scholars. A history of scientific collaboration aimed at the exchange of literature and ideas had taken place since 1839, albeit at irregular intervals, via the *Skandinaviske Naturforskermøder* (SN), the meetings of the Scandinavian Association for the Advancement of Science. These meetings saw considerable participation from mathematicians until 1909 [17].[3] That said, no SN meetings were organized between 1898 and 1916; currents of Scandinavianism had suffered a serious setback during the Second Schleswig War, when Denmark received no significant support against Prussia in 1864 in the way of military reinforcements from the United Kingdoms of Sweden and Norway, and again in 1905 as described above.

Regardless of past tensions, the SCM was a shared effort from the outset. For the first 75 years, its location rotated sequentially through Sweden, Finland, Denmark, and Norway. When Iceland became a sponsoring nation, it was added to this list. Although individual congresses were largely determined by local organizers, with local publishers frequently handling the proceedings, the regular rotation of the hosts, the ongoing participation by individuals from all nations involved, and the agreements reached about practical matters like scheduling changes, all attest to the endurance of the cooperative and collaborative aspects of the NCM across time.[4]

3 Evolution

The SCM has changed in several notable ways across the span of its history. From 1984, the first year the meeting was held in Iceland, it has been called the *Nordic Congress of Mathematicians*.[5] From the Middle Ages, Iceland had been ruled by Norway, and then the three crowns of Denmark, Norway, and Sweden under the Kalmar Union. When Sweden seceded from the union in 1523, Iceland became a Danish dependency, and remained so until the 20th century, gaining status as a sovereign state in 1918, and complete independence in 1944.

In contrast to Denmark and Sweden, Finland, and Norway, with universities dating, respectively, back to the 15th, 17th, and 19th centuries, the first university in Iceland was founded in 1911. It offered no studies in any science until the 1940s, when an engineering department was created. A mathematics stream was established at the Reykjavik High School in 1919, but those who wished to study mathematics beyond that level had to travel abroad. One who did so was Ólafur Daníelsson (1877–1957), who left Iceland in 1897 to study in Copenhagen, and in 1909 became the first

[3] *Acta Mathematica*, which had a Scandinavian editorial board, was another cooperative enterprise between the Scandinavian nations. Much has been written about the history of this journal; see, for example, [2].

[4] Further examples of Nordic cooperation in mathematics are the journals *Mathematica Scandinavica*, devoted to research, and *Nordisk Matematisk Tidskrift* (*Normat*), for more elementary topics, both created in 1953 (Normat is no longer in publication). On the histories of these and other Nordic mathematical journals from 1859, see [11].

[5] Somewhat curiously, the congress in 2000 was called the First American Mathematical Society–*Scandinavian* International Mathematics Meeting.

Icelander to earn a doctorate in mathematics. During the 1920s, he published several mathematics textbooks and engaged in research in algebraic geometry. He took part in the 1925 and 1929 SCMs [3]. By 1984, the Icelandic mathematical community had blossomed; 40 of the 129 registered participants were listed as Icelandic, and the Icelandic Mathematical Society, founded in 1947, was instrumental in the organization of the meeting [13].

Figure 3. Participants of the 1934 SCM. Reproduced from [9].

The frequency of the meetings also changed. Although SCMs were held in 1909, 1911, and 1913, the fourth was held in 1916; it was to be merged with the ICM, to be held in Stockholm that year.[6] From 1922, SCMs were held at least three years apart, sometimes reflecting the timing of other international meetings [4], and from 1964 this increased to four years, to place each meeting two years from an ICM [6].[7]

As for the languages of presentations and proceedings, and the body of participants and speakers, during the first few SCMs, talks were given in Danish, Norwegian, and Swedish, with participants from Finland presenting in the latter. This limited participation by mathematicians outside Scandinavia [17]. When Finnish-speaking Finns began attending the SCM in 1922, however, the languages of the academic program shifted primarily to French, German, and English, a decision also intended to make the scientific results more accessible to foreign scholars [10, 17]. Presentations in these languages continued for decades, but ultimately English came to dominate. With time, too, participation from mathematicians at non-Scandinavian institutions also increased, as did the opportunities for participants to speak. That is, while participation was very open in the early years of the SCM, the organizers restricted the opportunity to give a presentation [17]; from 1909 to 1925, only 22 to 34 percent of participants gave lectures. By 1972, however, all participants were offered the opportunity to speak [5], and in 1984 more than half of the participants delivered a longer or shorter talk [13].

In reflecting upon the evolution of the SCM and NCM, one might wonder about the level of involvement by women. In addition to the many wives, fiancées, daughters, and sisters that accompanied men to the SCM, the scientific programs show women participants, even in the early years. Of the 93 who took part in the 1911 meeting, for example, eight were women. They included Thyra Eibe (1866–1955), who had translated Euclid's *Elements* into Danish and was the first woman to earn a degree (*candidata magisterii*) in mathematics at Copenhagen; Inge Lehmann (1888–1993), also Danish, who later became a seismologist and discovered the solid inner core of the Earth; and Louise Petrén (1880–1977) and Elisabeth Stephansen (1872–1961), the first women to earn doctorates in mathematics in Sweden and Norway, respectively. No woman spoke at that meeting; non-male speakers have been relatively few for much of the history of the SCM.

4 Significance and legacy

On the occasion of his 70th birthday in 1916, Mittag-Leffler and his wife, Signe, published his will. In it were plans to create a foundation to support research in pure mathematics in Sweden and the other Nordic countries [15]. At the 25th anniversary of the SCM in 1934, during which the foundation also celebrated its anniversary, participants (Figure 3) were invited to the unveiling of a memorial to Mittag-Leffler at the cemetery in Djursholm. There, in a speech given by Torsten Carleman (1892–1949), then the director of the IML, Mittag-Leffler was described as a "warm friend of understanding and cooperation between the Nordic peoples" [9]. Indeed, while the SCM served Scandinavian mathematicians at personal, local, national, regional, and international levels, fundamentally, it was envisioned and advertised as a means of bridging the post-1905 gap between Sweden and Norway, and of protecting the shared culture and asserting the collective scientific strength of the Scandinavian nations. These aims appear to have been embraced early in the history of the SCM. As Danish mathematician Nils Erik Nørlund (1885–1981) proclaimed at the opening of the 1925 meeting, "When the Nordic countries unite as one, they are not inferior to any country" [17]. These national and regional identities are emphasized in the proceedings of many SCMs, which for decades grouped participants according to nationality.

Hosting the SCM was a measure of belonging; that it became the NCM precisely when Iceland first served as host is suggestive of this theme, as is the assertion of Finnish Chancellor Anders Donner (1854–1938) at the 1922 SCM (when Finland first hosted

[6] The First World War thwarted the plan for the ICM.

[7] Occasionally the timeline has been shifted to mark special events (such as the 100th anniversary of the Institut Mittag-Leffler (IML) in 2016) or out of necessary (the 2020 NCM was postponed due to the COVID-19 pandemic).

29TH NORDIC CONGRESS OF MATHEMATICIANS

The 29th Nordic Congress of Mathematicians, organized in collaboration with the European Mathematical Society, takes place in Aalborg in Northern Jutland, Denmark, in the week July 3–7, 2023, in a hybrid format. The scientific program starts on July 4. It comprises plenary talks, given to a mathematical audience at the beautiful House of Music, and around 30 specialized sessions in a nearby modern university building. Moreover, participants will be able to join in an excursion and in a conference dinner. The organizers are proud to announce that the following mathematicians have agreed to give plenary talks:

Kathryn Hess	EPFL Lausanne, CH
Nina Holden	Courant Institute NY, US
Daniel Král'	Masaryk University, Brno, CZ
Finnur Lárusson	Adelaide University, AU
Jonatan Lennels	KTH Stockholm, SE
Eveliina Peltola	Aalto University, FI, and University of Bonn, DE
Daniel Peralta-Salas	Instituto de Ciencias Matemáticas, Madrid, ES
Nathalie Wahl	University of Copenhagen, DK

For further information about the congress, including fees and registration, onsite and online, please consult the web site https://ncm29.math.aau.dk.

the congress) that Finns placed "special value on not being considered outsiders" within that community [17]. Hosting the meetings was also considered a *right*. When the Danes considered holding the 1922 meeting in Copenhagen, some in Finland expressed their frustration. In a 1921 letter sent to Mittag-Leffler, who was addressed as "Uncle" (an indication of close friendship), Lindelöf wrote: "If we cannot have *this* congress, it would mean that in the future Finnish participation in the [SCM] is all but over" [17].

Participation also forged scientific connections. Norwegian Fields Medalist mathematician Atle Selberg (1917–2007), who spent most of his scientific career at the Institute for Advanced Study in Princeton, would later recall his experiences at the 1938 SCM in Helsingfors, where he gave the first talk of his career. There, he met Lindelöf, Carleman, and Harald Bohr (1887–1951), and was particularly influenced by the lecture of Arne Beurling (1905–1986) on generalized prime numbers, which "made a deep impression" on him [1]. For some, there was a real desire for such contact, as was the case in Finland in 1922. By then, Finland had endured both WWI and civil war, which brought political and economical turmoil and left many unable to afford to travel. According to Lindelöf, the younger Finnish mathematicians, in particular, expected a great outcome from the 1922 SCM, "as most of them have no other possibilities of establishing contact with scholars outside of the country" [17].

The NCM still represents a means of forging and maintaining connections, both within the Nordic countries and now well beyond. This has been especially true since the year 2000, declared "World Mathematical Year" by the International Mathematical Union, when the American Mathematical Society jointly sponsored the 23rd meeting. This practice has now become common, with co-sponsors of the NCM including the French (2005), London and Edinburgh (2009), and European (2013, 2020, and 2023) mathematical societies.

As such, while its core constituents remain the mathematicians of the Nordic nations, over time the NCM has become increasingly international, and its history has been largely forgotten by its participants. When the NCM meets in July 2023, for the seventh time in Denmark and the first time in Aalborg, may its members recall the spirit of friendship embraced by its founders, and the richness of the mathematical harvest that stands to be reaped by all who take part.

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