

A resource supporting the development of mathematics: The IMU/ICMI Archive

ICMI column in this issue presented by Birgit Seeliger and Bernard R. Hodgson

For a body such as the International Commission on Mathematical Instruction (ICMI), maintaining an archive of documents of various sorts is a responsibility of paramount importance. For those in a leadership position inside ICMI at a given time, this may serve as a source for first-hand background information about recent or distant episodes in the earlier life of ICMI. And for historians of today and tomorrow, archive material is of course crucial in the understanding of the development of mathematical education as seen from an international perspective. Keeping memory of the past is thus an act of social and scientific responsibility, not merely to honour the efforts of our predecessors, but more importantly to provide access to an essential tool for fostering an accurate image of the evolution of ICMI as a body, including moments of tension or significant phases in the decision-making process.

ICMI was established at the General Assembly of the 4th International Congress of Mathematicians (ICM) held in Rome in 1908 and has been a commission of the International Mathematical Union (IMU) since 1952,¹ so that the ICMI Archive is in fact a subset of the Archive of the IMU.

About the IMU/ICMI Archive

Since January 2011, the IMU Secretariat has been permanently based in Berlin, Germany. Under the supervision of the IMU Executive Committee (IMU EC), the Secretariat runs IMU's day-to-day business and provides support for the IMU operations, including administrative assistance for ICMI and the Commission for Developing Countries (CDC).

The IMU Secretariat also hosts the IMU Archive. Until 2010, the IMU Secretariat (and thus the Archive) was located with the IMU Secretary of the time. By the end of a term, documents were partially forwarded to the next IMU Secretary's office, and partially to the ETH Zurich University Archives [9, p. v], which kept original documents dating back to the early 1950s, when the IMU was

re-established after the turmoil caused by WW2.² In a talk [10] presented at the inauguration ceremony of the "Archive room" within the premises of the Berlin Secretariat, Olli Lehto (1925–2020) spoke of the context which had led him, in the mid-1990s, to give the IMU Archive a new start by first agreeing to organize and catalogue the "largely unorganized archives of the Union" [9, p. v], and, eventually, arranging for the archives to be hosted at the University of Helsinki.³ The idea of moving the IMU papers from Zurich to Helsinki had been raised for the first time in the 1980s by IMU President Jürgen Moser. In 1994, in view of the shortage of space in Zurich combined with the availability of new archive facilities at the University of Helsinki, the IMU papers were moved from Zurich to Helsinki [9, pp. v–vi].

Through his involvement as an IMU EC member (1975–1982) and IMU Secretary (1983–1990), Lehto had developed a profound knowledge of the IMU. Thanks to him, the records of the IMU – in spite of their "formidable" volume [9, p. v] – were sorted and catalogued at the University of Helsinki Archives and for the first time in accordance with the structure and historical development of the IMU, as announced in *IMU Bulletin* (see [6, 7]). Based on this material and on his direct experience and knowledge, Lehto subsequently published the first book devoted to the history of the IMU, *Mathematics Without Borders* [9], written at the invitation of the IMU EC [9, p. vi]. The very title of his book strongly reflects Lehto's belief in "the notion that the IMU is a large mathematical family transcending national borders" [9, p. 122].

Since its re-establishment in Berlin, the IMU Archive is now equipped with its own facilities, including IT support, and is run by a professional archivist,⁴ in consultation with the two Archive

² This pivotal archive role played by the ETH may be seen as following from the fact that two IMU Secretaries who served in the early years after the rebirth of the IMU in 1951, Beno Eckmann (1956–1961) and Komaravolu Chandrasekharan (1961–1966), both held a professorship in mathematics at the ETH.

³ Those records form today the so-called Helsinki Subfond (SF1) of the IMU Archive in Berlin.

⁴ Birgit Seeliger (since 2011).

¹ Information on the context in which ICMI became a commission of the IMU can be found in Olli Lehto's history of the IMU [9, Section 5.4 (pp. 108–113)].



Olli Lehto in 2011 at the Archive of the IMU, University of Helsinki.
(Photo: IMU)

curators.⁵ The process of archiving is based on general criteria including the authenticity, reliability, integrity, and usability of the material. As potential interest is not easy to assess, it is usually considered better to archive more than less.

The IMU/ICMI Archive, from paper to digital

The IMU/ICMI Archive holds both analogue and digital records. The latter induce new challenges, being in constant technological change per their own nature. Therefore, their life cycle management requires long-term preservation storage and formats to ensure the survival of their content.

The development of the Berlin Archive, in the early years following its inauguration in 2011, was closely monitored by the IMU Committee on Electronic Information and Communication (CEIC), in order to counter the risk of losing born-digital documents – mostly emails. Nowadays, a storage strategy based on a Linear Tape File System (LTFS) is employed to safeguard the rapidly growing electronic records. Born-digital data and digitized material are kept in their original form, as well as in a migrated and long-term readable format (PDF-A). The PDF files are readable with OCR. Using archiving software, they are enriched with indices and metadata so that various search functions are possible.

In that connection, every email sent to or from the official “@mathunion.org” addresses of both IMU and ICMI Presidents and Secretaries General gets automatically archived on the IMU server.

The content and scope of the IMU and ICMI Archive have thus in recent years greatly evolved and expanded, changing from

traditional paper letters and documents to mostly digital records. The Helsinki Subfond (SF1) has been supplemented with other subfonds, mainly based on documents from former IMU Presidents and Secretaries General for the terms since the first catalogue (1996), as well as from officers of the commissions (including ICMI) and committees. The Archive is still being actively enlarged by searching and contacting various sources, sometimes outside the strict IMU/ICMI communities. For instance, scans of papers of Børge Jessen, IMU Secretary and EC member in the first years following the reincarnation of IMU after WW2, were obtained from the University of Copenhagen. Online and in-person searches by the IMU archivist were also made in several archives, among others at ETH Zurich and the Royal Academy of Belgium.

Efforts are also made to enrich the collection with books, pictures, and artefacts related to various IMU or ICMI events – notably the Proceedings of the International Congresses of Mathematicians (ICMs)⁶ and of the International Congresses on Mathematical Education (ICMEs), the major quadrennial events of IMU and ICMI respectively. (The Archive even includes memorabilia such as t-shirts or mugs from both the ICMs and the ICMEs). These Proceedings usually reflect the state of the art in mathematics and/or mathematics education in the years preceding a given congress, and they generally contain original articles (for which the IMU sometimes holds the copyright).

Accessing the Archive: the IMU Archiving Guidelines

To ensure the consistency and stability of archiving, *IMU Archiving Guidelines* were prepared and endorsed by the IMU General Assembly in 2014 – with subsequent amendments by the IMU EC (most recently in December 2023 [8]). Cooperation and awareness between the producer of documents and an archive are not a matter of course. The guidelines thus include the commitment “to archive all documents/material created by the IMU President and Secretary General, as well as by officers of IMU commissions and committees, and that of IMU administrative staff. Further, IMU prize chairs/committees – including those of IMU commissions – have the obligation to provide material to the IMU Archive” [8, #3]. This stipulation provides the framework for a more complete accumulation of records than was previously the case. Moreover, in addition to the automatic storage of emails, a tool has been implemented that migrates them into long-term file formats by means of additional indexing. This ultimately makes it possible to include emails in the search across all the contents of the IMU Archive.

⁶ Though the IMU is known for its connection with the ICMs, not every ICM was organized under the auspices of the IMU, as described by Norbert Schappacher in his recent book [11].

⁵ Guillermo Curbera (2011–2020) and June Barrow-Green (since 2021) for the IMU, and Bernard Hodgson (since 2011) for ICMI.

It should be noted that the IMU Archiving Guidelines make provision for a three-tier embargo period – 0, 20 or 70 years – in connection with the level of confidentiality attached to each document. Examples of the latter include material archived by the committees for the various IMU prizes and awards (notably the Fields Medal), and the ICMI Felix Klein, Hans Freudenthal and Emma Castelnuovo Awards.

General information about the IMU and its commissions and committees, as well as documents of special interest (e.g., Proceedings of ICMs or ICMEs, reports of the IMU/ICMI General Assemblies, IMU and ICMI Bulletins/News, etc.), are available with open access on the IMU homepage⁷ or the ICMI homepage.⁸ Even though the IMU Archive serves to a large extent to support the work of the IMU and ICMI ECs, the material is also available for historical research (in accordance with the *IMU Archiving Guidelines*). To use the IMU Archive, an initial look at the “Finding Aids”⁹ may be helpful, namely:

- the *Hierarchical thesaurus*, with a list of topics on the IMU and its commissions and committees, and
- the *Tectonic*, detailing the structure of the IMU Archive into subfonds, series and files.

Work is in progress to make more material from the Archive freely available online via a search menu on the IMU website.

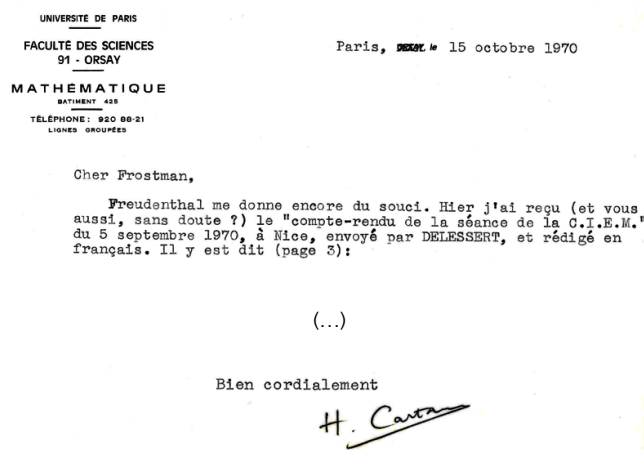
Despite its substantial collection, there are still gaps in the records of the IMU Archive. For example, print editions of the Proceedings of the first ICMs in Zurich, Paris and Heidelberg are still missing from the Archive’s shelves. And moreover, there are no original documents covering the existence of the IMU or ICMI between 1920 and 1932. We are therefore always grateful to receive donations from the public, such as was the case recently with materials from the 1928 and 1954 ICMs which were donated to the IMU Archive.¹⁰

“Gold nuggets” from the ICMI Archive

Part of the ICMI Archive is made of books produced in the context of ICMI activities (ICME Proceedings, ICMI Study Volumes or Pre-proceedings, etc.), generally accessible both physically in situ and electronically. A most interesting part of the Archive comprises five boxes of paper documents – mainly letters – collected during the second half of the 20th century. A large portion of these goes back to the early days of the Archive, fewer paper documents having been filed in the years 1990–2010, as email was becoming the main channel of communication. The archived paper documents

are mostly in English, with a few in French, German or Italian. Of notable interest are for instance documents related to moments of turbulence in the life of ICMI. Here are a few samples.

A delightful example in that connection is the *cri du cœur* from IMU President Henri Cartan, at the very beginning of a letter (15 October 1970) to IMU Secretary Otto Frostman: “*Freudenthal me donne encore du souci*” (“Freudenthal again causes me worries”). Cartan was then reacting to yet another impetuous move by ICMI President Hans Freudenthal, very near the end of his term, without even consulting on that matter the incoming ICMI President – see [3] or [5, p. 233] for details.



Excerpts from a letter of Henri Cartan to Otto Frostman (15 October 1970). (Source: IMU)

Another striking moment, symptomatic of internal difficulties inside the 1979–1982 ICMI EC, is crystallized in a letter (September 1980) from Peter Hilton to the IMU Secretary, stating that he was presenting his resignation as ICMI Secretary on the ground that being expected by some of his colleagues, in his opinion, “to act in a purely ‘secretarial’ capacity, (...) [he] could not exercise the influence [he] hoped to have from that position” – see [5, p. 234]. However, for reasons (yet) unknown, this resignation did not materialize, and Hilton completed his term.

An episode of a more recent vintage, and thus connected to email archiving, is related to the dramatic change in the ICMI election procedure that occurred during the first years of this century, in reaction to a resolution adopted at the 2002 IMU General Assembly requesting the development by IMU of a new election scheme for IMU and its commissions. The general spirit behind this move was to lessen the influence of the outgoing IMU (and ICMI) EC on the next EC. It took a while for the IMU and ICMI ECs to agree on a scheme for the ICMI election that would meet the specificity of ICMI as a commission of IMU. Most of the discussions took place through a series of emails, some of which reached a somewhat

⁷ <https://www.mathunion.org>

⁸ <https://www.mathunion.org/icmi>

⁹ <https://www.mathunion.org/organization/imu-archive>

¹⁰ Information on these newly deposited IMU Archive materials can be found in the companion article by June Barrow-Green [1].

intense level, pointing to issues of “trusteeship” between IMU and ICMI, in contrast with recent “hard-won progress” in the relations between the two bodies. Eventually it was agreed to have for ICMI a Nominating Committee distinct from the one for the IMU EC election. And even more important: it was decided to transfer the ICMI election from the IMU General Assembly to the ICMI General Assembly, the first election under the new scheme being held in 2008. (A discussion of this episode, including references to Archive documents, can be found in [4].)

A fine example of the benefit gained by accessing archive documents is offered by the recent paper of L. Giacardi [2], proposing a selection of 69 archive documents (including four scan copies of original documents, three being handwritten). Among these documents, 44 belong to the IMU Archive, coming from the 1952–1966 and 1967–1980 ICMI boxes. Other documents belong to archives related to former ICMI and IMU officers. In the introduction to her paper, Giacardi points to the importance of having access to original correspondences and archival documents, so to better “reconstruct the spirit of an era in its various facets” [2, p. 137]. Moreover, providing access to the full document often provides a much stronger feeling for the background behind the issues at stake. This can be seen for instance in the letter (mentioned above) of Cartan to Frostman, which is quoted at length in [2, pp. 220–221], thus allowing the reader to develop a better sense for the crux behind this moment of tension in the IMU–ICMI relationship.

Conclusion

The records housed in the IMU/ICMI Archive richly reflect various aspects of the “life” surrounding mathematics and/or mathematics education from the early years of the 20th century up to the present day: for instance, how mathematicians and mathematics educators are interconnected at the international level through organizations such as the IMU and ICMI; what activities are necessary to foster the development of a mathematical infrastructure in all countries, including in connection with its teaching and learning; or what initiatives are taking place around the world to foster the enjoyment of mathematics – such as the International Day of Mathematics, an event led by the IMU and organized under the patronage of UNESCO each year on 14 March, since its inauguration in 2020, as a worldwide celebration aimed at students and the general public alike.

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