

Mathematics Without Borders. A History of the International Mathematical Union

Reviewed by J. W. S. Cassels

**Mathematics Without Borders. A History of the
International Mathematical Union**

Olli Lehto

Springer, 1998

ISBN 0-387-98358-9

xvi + 399 pages, \$34.00

The scope of this volume is broader than its title suggests. It is an account of formal international mathematical cooperation from its beginnings at the end of the nineteenth century until 1990, when the author ceased to be secretary of the International Mathematical Union. There are three main threads: the regular sequence of International Congresses of Mathematicians (ICMs); the International Commission on Mathematical Instruction (ICMI, originally known as the International Commission on the Teaching of Mathematics); and the International Mathematical Union (IMU), which also had two avatars. The tangled relation between these threads changes with time, and the whole story must be seen against the background of international scientific organization and politics.

The initiative for the International Congresses was largely German and French. The first two were Zürich 1897 and Paris 1900. Thereafter they have been at four-year intervals except for gaps caused by two world wars and for the delayed Warsaw Congress. At the 1908 Congress in Rome the International Commission on the Teaching of Mathematics was set up. In the aftermath of the First World War the victorious powers set up an

J. W. S. Cassels is emeritus professor of pure mathematics at the University of Cambridge. His e-mail address is jwsc@cam.ac.uk.

International Research Council from which the defeated Central Powers were excluded. The Council included an International Mathematical Union whose statutes were agreed at an International Congress of Mathematicians of doubtful status: it was held in 1920 in Strasbourg, just reverted to France from Germany, and it excluded German participation. The new Union had a checkered history and was formally suspended in 1932; it seems to have had little or no influence on international mathematical life. The International Research Council was replaced in 1931 as an umbrella organization by the International Council of Scientific Unions (ICSU), which was open to all countries (though boycotted initially by Germany); it had, however, no mathematical union. By 1928 the International Congresses of Mathematicians abandoned the anti-German stance of the IMU: Bologna 1928 and later congresses were open to all mathematicians, irrespective of nationality. The last ICM before the Second World War was Oslo 1936, when it was agreed that the next would be in the USA in 1940. In the meantime the Commission on the Teaching of Mathematics, which was a creature of the congresses, was instructed to dissolve itself in 1920 but was revived in 1928 and worked in full universality (with a German on its Central Committee) until the outbreak of war in 1939.

The congress planned for 1940 ultimately happened in Harvard in the summer of 1950. Every effort was made to attract mathematicians irrespective of national or geographic origin. United States mathematicians also took the initiative to revive an International Mathematical Union. After much negotiation designed to ensure the widest

possible participation, a constitution was agreed at a conference held just before the Harvard Congress, and after ratification the first General Assembly of the new era took place in Rome in 1952. The new body was in the conventional jargon “a member of the ICSU family”. Whether it was a continuation of the old union or entirely new was left intentionally vague.

The three threads described at the beginning of this review started to come together. The International Commission on the Teaching of Mathematics resumed activity after the war; after a period of some confusion it was reestablished at the 1954 General Assembly of the IMU as a commission of the Union with a new constitution and a new title: the International Commission on Mathematical Instruction (ICMI). Previously there had been no continuing organization of the International Congresses: at each congress the site of the next was chosen, and the new hosts took responsibility. The IMU began now to have an input. The Swedish National Committee and the IMU worked together in the preparation for the 1962 Stockholm Congress. A framework under which the IMU became a partner in the organization of future congresses was adopted at the 1962 General Assembly. The Union also took responsibility for the Fields Medals. These had been established with part of the surplus from the 1924 Toronto Congress and were initially awarded by committees appointed by the organizing committees of congresses.

The way the Union works is roughly as follows. Members are countries, where a sophisticated (and sophisticated?) definition of “country” aims to secure universality (e.g., when a country is not recognized as such by some other countries). Each country is represented by an Adhering Organization (e.g., an academy) which forms a National Committee for Mathematics. Only countries with enough mathematical research activity are admitted, and those admitted are allocated to one of Groups I, II, III, IV, or V agreed between the country and the Union. Countries pay dues: the higher the group, the higher the dues (see below). The supreme body of the Union is the General Assembly, which normally meets every four years, shortly before a congress in a pleasant location nearby. Each country is entitled to appoint a number of delegates equal to the number of its group. The General Assembly appoints an Executive Committee consisting of a president, a secretary, two vice-presidents, and five other members; the immediate past president is also a member. The Executive Committee normally meets once a year. What the volume under review does not bring out, except between the lines, is the degree to which the smooth running depends on the president and on the secretary, who also acts as treasurer and is the linchpin of the entire setup. The Executive Committee of ICMI is also chosen by the General Assembly and includes

the president and secretary of the IMU *ex officio*. The scientific programs of the International Congresses are arranged by a committee largely appointed by the IMU Executive Committee, with some members appointed by the local Organizing Committee. This was at first rather misleadingly called the Consultative Committee, but is now known as the Program Committee.

It is not possible to summarize an already condensed account of the subsequent activities of the Union. Main themes are the extension of the activity of the Union to include sponsored Union lectures and the support of specialized symposia, the sometimes difficult relations with Soviet mathematicians, and the problem of finding formulations to bring the Chinese into the IMU without sacrificing the interests of mathematicians in Taiwan. Other developments were the establishment of the *World Directory of Mathematicians* and of a Commission on Development and Exchange, which promotes mathematics in underdeveloped countries. ICMI in practice is largely autonomous. It draws in mathematical communities outside the countries represented in the IMU and has a wide program of activities, including the International Congresses on Mathematical Education held every four years between the ICMS.

One theme to which Lehto reverts from time to time is the extent to which the Union now runs in the English language. In my time on the Executive Committee (1975–82) it was the only language used, although the official languages of the Union were declared to be English, French, and Russian, with equal validity. When I commented on this to Jacques-Louis Lions, the secretary at the time, he quipped “Some languages are more equal than others.” He also told me that the English-language minutes were translated after the meeting into French and Russian and put in the archive, where they were preserved unread. He added that there were difficulties in translating the pragmatic fudge of the English original into the logical lucidity of the French language. I believe that this practice of translating the minutes has been abandoned.

Perhaps my recollections can shed light on a rather mysterious passage on page 182. As already mentioned, members of the Union are in groups and pay dues accordingly. Originally the dues for Groups I–V were in the ratios of the Fibonacci numbers 1, 2, 3, 5, 8, a formula found in other unions. At the 1974 General Assembly this was changed to 1, 2, 4, 7, 10, a change which Lehto calls a delicate issue. As I remember, what happened was this. The American mathematicians believed that they could persuade their government to contribute more cash to international mathematics and thought that the best way to get it past their bureaucrats was to increase the amount payable in dues by the USA. They therefore proposed either that there should be a Group VI with much

higher dues or that the dues of Group V should be substantially increased. At that time Group V consisted of the USA (of course), the USSR (which regarded it as a point of honor to match the USA), Japan (which had just moved up), and the UK. The USSR already had difficulties in finding hard currency to pay the existing dues and regarded the US proposal as a dastardly attempt to push them from the top table. The UK would also have found difficulty in funding the increase and would probably have grimaced and moved down. In the end a compromise was agreed in the expectation that some other countries would move up: indeed, by 1978 France and the Federal Republic of Germany had joined Group V.

For the earlier IMU no formal archive remains. The author uses a wide variety of sources, including personal papers which he has tracked down, and sets the story in the context of general scientific cooperation of the period. "In contrast"—to quote—"the volume of archival material covering the new Union is overwhelming." It was transferred to the University of Helsinki in 1994 (fourteen mail sacks, each twenty kilos), where it has been organized and augmented. The history of the Union and its related organizations is a complicated and tangled tale with a multiplicity of participants. There is much to interest the reader, but I must admit that I did not find the story always easy to follow. I felt a lack of balance: for example, the ceremonies surrounding the awarding of the Fields Medals are reported in inordinate detail. What I found most interesting is where Lehto tells of his personal experiences, in particular the organizing of the Helsinki Congress, in which he had a leading part.

A series of thirteen appendices lists such things as the membership of the Union at various times, the membership of the Executive Committee, the times and places of its meetings, the Fields Medalists, and the membership of the Fields Medal Committees. There is an impressive index, but I did not find it helpful; for example, there is no entry for the Consultative Committee. The text is decorated by portraits of many of the protagonists.