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INTERNATIONAL COMMISSION ON MATHEMATICAL INSTRUCTION

REPORT FOR THE PERIOD 1959-62

1. *Meetings.* The principal activity of I.C.M.I. during the period 1959-62 has been to organize and hold meetings for the discussion of significant themes relating to mathematical education. Most of these meetings were jointly sponsored and organized in cooperation with other organizations. With one exception the proceedings either have been published already or are about to be published. The details of the six meetings held are as follows.

Symposium on "The Teaching of Geometry in the Secondary School," AARHUS (Denmark), May 30-June 2, 1960, jointly sponsored by I.C.M.I. and the Mathematical Institute of Aarhus University. The organizing committee comprised: H. BEHNKE, S. BUNDGAARD (chairman), J. G. KEMENY, K. PIENE, and S. STRASZEWICZ. The proceedings were published by the Mathematical Institute of Aarhus University.

Symposium on "The Co-ordination of the Teaching of Mathematics and Physics," Belgrade (Yugoslavia), September 19-24, 1960, jointly sponsored by I.C.M.I. and the Yugoslav Association of Mathematicians and Physicists. The organizing committee comprised: G. KUREPA (chairman), M. H. STONE and V. DAJOVIĆ. The proceedings are to be published by the Yugoslav Association of Mathematicians and Physicists.

Seminar on "The Teaching of Analysis in the Secondary School and the University," Lausanne (Switzerland), June 26-29, 1961, jointly sponsored by I.C.M.I. and the Swiss Mathematical Society. The organizing committee comprised: H. BEHNKE, G. DE RHAM, and M. RUEFF (Chairman). The proceedings will be published in "L'Enseignement Mathématique."

Seminar for "A Discussion of the Aarhus and Dubrovnik Reports on the Teaching of Geometry at the Secondary Level,"

Bologna (Italy), October 4-7, 1961, jointly sponsored by I.C.M.I. and the Italian National Commission on Mathematical Instruction. The organizing committee comprised: P. BUZANO, M. H. STONE, M. VILLA (chairman), T. VIOLA, G. WALUSINSKI. The proceedings will be published in "L'Enseignement Mathématique."

Inter-American Conference on Mathematical Education (I.A.C.M.E.), Bogotá (Colombia), December 4-9, 1961, organized by I.C.M.I. with the co-operation and support of U.N.E.S.C.O., the Organization of American States, the National Science Foundation, and the Colombian Association of Universities. The organizing committee comprised: MARCELO ALONSO, JOSE BABINI, HOWARD FEHR (secretary), L. NACHBIN, M. H. STONE (chairman), R. TORRES, and PABLO CASAL. The proceedings will be published by the Organizing Committee under the editorship of Professor HOWARD FEHR, Secretary. The Conference formed an Inter-American Committee on Mathematical Education comprising: B. ALFARO SAGOT (Costa Rica), A. GONZALEZ DOMINGUEZ (Argentina), A. PEREIRA GOMES (Brasil), M. H. STONE (U.S.A., president), and JOSÉ TOLA P. (Peru).

Colloquium on "Three Selected Topics—I. Modern Mathematics in the Secondary School (J. G. Kemeny, reporter)—II. The Teaching of Algebra and Arithmetic (S. Straszewicz, reporter)—III. The Training of Teachers (K. Piene, reporter)". Stockholm (Sweden), August 15, 16, and 18, 1962, organized by I.C.M.I. in connection with the International Congress of Mathematicians 1962. The organizing committee comprised: O. FROSTMAN, Å. PLEIJEL, L. SANDGREN, M. H. STONE (chairman), G. WALUSINSKI. Arrangements for publication of the Proceedings have not been completed.

2. *Publications.* The status of "L'Enseignement Mathématique" as the official organ of I.C.M.I. was clarified in 1959 by the co-optation of the Editor, Professor J. KARAMATA, as a member of the Commission. A completely satisfactory *modus operandi* has not yet been worked out between I.C.M.I. and the editors of "L'Enseignement Mathématique". However work on the proceedings of the Lausanne and Bologna Seminars has

strengthened the co-operation toward which both organizations have directed their efforts.

As noted in the preceding section, it has been possible to arrange for the publication of the proceedings of all scientific meetings of I.C.M.I. held during 1959-62 with the exception of the Stockholm Colloquium. It is hoped that this exception will be removed shortly.

3. *Meetings of the Executive Committee.* Meetings of the Committee have been infrequent, and much of its business has of necessity been transacted by mail. Apart from its first meeting, held in Paris on May 26-27, 1959, to discuss the themes for the 1962 Stockholm Colloquium and other scientific matters, and a meeting in Paris on December 7-8, 1960, these meetings were held in conjunction with scientific sessions of I.C.M.I.—namely, in Belgrade in September 21, 1960, and in Saltsjöbaden on August 10, 1962. An attempt to hold a meeting in Bombay in January, 1960, at the time of the Second Conference on Mathematical Education in South Asia failed because attendance fell short by one of the necessary quorum of four.

4. *Membership of I.C.M.I.* Certain subcommissions failed to designate delegates for the period 1959-62 and thus effectively withdrew from the work of I.C.M.I.—it is to be hoped, only temporarily. In addition some subcommissions named their delegates very tardily. In consequence the election of officers and members of the Executive Committee was somewhat delayed; but it was completed in time to hold a first meeting in May, 1959. The Committee consisted of: Y. AKIZUKI, A. D. ALEXANDROV, H. BEHNKE (Vice President), O. FROSTMAN, G. KUREPA (Vice President), M. H. STONE (President), and G. WALUSINSKI (Secretary). Professor H. HOPF was co-opted as a member of I.C.M.I. to represent the President of I.M.U. and to exercise the latter's statutory functions as a member of I.C.M.I. He was accorded the status of a non-voting member of the Executive Committee.

The status of Luxembourg in relation to I.C.M.I. was clarified, in accordance with the new terms of reference for I.C.M.I. adopted by I.M.U., through the co-optation of Professor A.

GLODEN as a member of I.C.M.I. The co-optation of the Editor of "L'Enseignement Mathématique", Professor J. KARAMATA, as a member of I.C.M.I. has already been mentioned above.

Czechoslovakia, Hungary, and Israel have taken advantage of their membership in I.M.U. to associate themselves with the work of I.C.M.I. and have named delegates to the Commission during the period under review. Inquiries about such association have been made by certain other member-countries of I.M.U. but there are still many which do not participate in the work of I.C.M.I.

5. *Finances.* I.C.M.I. has been financed during the period 1959-62 chiefly by funds appropriated for its use by I.M.U. An annual subvention of \$300 has been voted by I.M.U. from its own funds to cover the operating expenses of the offices of the President and Secretary of I.C.M.I. Each year a larger subvention has been provided out of funds made available to I.M.U. by I.C.S.U. for the organization of scientific meetings, the expenditure of these funds being subject to limitations set by I.C.S.U. In particular no administrative expenses or publication costs could be paid with these funds. The amount thus appropriated by I.M.U. from I.C.S.U. funds in support of I.C.M.I.'s scientific programme varied from year to year. Payments from these appropriations have been handled directly by the Secretary of I.M.U. on certification of the Secretary of I.C.M.I., as this procedure greatly simplifies the necessary accounting and auditing formalities. For a complete statement reference must therefore be made to the report of the Secretary of I.M.U. for the period 1959-62.

I.C.M.I. has sought to set up also a separate fund of its own to supplement in useful ways the subventions received from I.M.U., especially for purposes for which the latter were by the terms of grant unavailable. By vote of the Executive Committee taken in May, 1959, voluntary contributions in multiples of a unit contribution of \$25 were solicited from the countries represented in I.C.M.I. The following contributions have been gratefully received: in 1959, \$100 from Denmark, and \$50 from Italy; in 1960, \$25 from Luxembourg, \$25 from the Netherlands and \$25 from Sweden; in 1961, \$50 from Italy and \$25 from

Luxembourg; in 1962, \$50 from Italy and \$1,250 from the U.S.A. The Secretary's account of this fund is appended.

The financial means hitherto available to I.C.M.I. have been inadequate, on the average, for a satisfactory execution of its program of scientific meetings and publication. Without the generous co-operation of other organizations fewer meetings could have been held during the period under review, and no publication at all could have been achieved. Meetings such as those held in Aarhus, Belgrade, Lausanne, and Bologna were unavoidably small and of a regional character because of financial limitations. For such meetings I.C.M.I. has been able to authorize an expenditure of at most \$1,000 each in direct support of the scientific program. Usually the authorized amount could not be fully expended because of last-minute withdrawals of invited participants. Experience shows that I.C.M.I. should have not less than \$1,500 for each such scientific meeting. Moreover, if such meetings are to have a broader, less regional character, the expenditures for the scientific program should be increased to \$2,500 each.

Because of geographical considerations, I.C.M.I. should be in a position to convene three rather than two scientific meetings each year, with a view to exerting a greater influence outside Europe. Thus it would be entirely reasonable for I.C.M.I. to envisage an annual budget of approximately \$9,000. World interest in the field of mathematical instruction is becoming intense, and I.C.M.I. can hardly play its proper role in relation to the resulting movements for experimentation and reform unless it is able to maintain this rather modest level of activity.

The organization of large scientific meetings with participants drawn from a wide area is very expensive and can be undertaken only as a special activity supported by special contributions outside the regular budget of I.C.M.I. The Bogotá Conference (I.A.C.M.E.) of 1961 was provided for entirely outside the 1961 budget of I.C.M.I., through the generous aid obtained from the various sponsors listed above. Some \$36,500 was raised for the organization of I.A.C.M.E. and the publication of its proceedings. The actual expenses are expected to fall little short of this figure when the final accounting is made.

6. *Contacts and Consultations.* I.C.M.I has sought at all times. to establish contacts with other bodies working in the field of mathematical education with a view to finding promising areas for co-operation. Most of the contacts made have remained on an informal basis up to the present time.

For example, U.N.E.S.C.O.'s Department of Education has consulted various members of I.C.M.I., especially the President and Secretary, with regard to the Symposium to be held in Budapest (Hungary) on August 27-September 8 under the auspices of the Hungarian National Commission for U.N.E.S.C.O.

In formulating and carrying out its program for the modernization of mathematical instruction O.E.E.C. (now O.E.C.D.) has had the benefit of similar informal consultations. Several members of I.C.M.I. made important individual contributions to O.E.E.C.'s Royaumont Seminar in 1959 and to the work on its Dubrovnik Report in 1960. Furthermore, a formal request was made by O.E.E.C. to I.C.M.I. in 1959 for assistance in preparing a list of outstanding mathematical texts suitable for widespread translation, and a tentative list was made up by a special subcommittee of I.C.M.I.

In 1960 U.N.E.S.C.O.'s Department of Natural Sciences began discussing with I.M.U. the possibilities of formal co-operation in the field of mathematical instruction at the university level. These discussions resulted in the conclusion of a contract for this purpose between U.N.E.S.C.O. and I.M.U. early in 1962, but the Executive Committee of I.M.U. decided to create a Special Committee on the Teaching of Science (S.C.O.T.S.) to handle its obligations under the contract as well as its developing general interests in the broader field of science education. A close co-operation between I.C.M.I. and S.C.O.T.S. is thus to be desired in the future.

For a long time there has existed a semi-formal understanding between I.C.M.I. and the Musée Pédagogique to share the work of mounting the exhibitions of books and other educational materials at the International Congresses of Mathematicians. This arrangement was continued in 1962. The Musée Pédagogique benefits under it through the permanent acquisition of the books offered for exhibition at the Congresses.

Several international organizations interested in the improvement of mathematical education have come into being during recent years. Among these I.C.M.I. has ties with at least three by virtue of common memberships—namely, with the International Commission for the Improvement of Mathematics Teaching, the Committee on Mathematics in South Asia, and the Inter-American Committee on Mathematical Education. The establishment of closer cooperation between I.C.M.I. and these bodies, even on a purely informal basis, is much to be desired.

7. *Recommendations.* The formulation and execution of I.C.M.I.'s program for 1963-66 becomes on January 1, 1963, the responsibility of the new membership and the new Executive Committee. However, some general recommendations based on the experiences of the last four years may be offered here as an aid in the work of expanding I.C.M.I.'s role in stimulating fruitful discussion of the changing problems of mathematical education. It is therefore recommended:

- (1) that the general program of I.C.M.I. provide for not less than three scientific meetings during each calendar year, at least one of which should be outside Europe, with an annual budget of \$9,000;
- (2) that I.C.M.I. study methods and means for satisfying the growing demand for an international bibliographical and informational service in the field of mathematical education which will promote and facilitate the exchange of information about studies, experiments, and action in this field;
- (3) that I.C.M.I. extend its activity to new areas, such as Africa, where current interest in the field of mathematical education would benefit through better information as to the current thinking of mathematicians concerning the problems, both new and old, which must be solved if mathematical education is to keep pace with mathematical and pedagogical progress.

These recommendation are either explained in the preceding text (viz. (1)) or are in large measure self-explanatory. In

reference to (2), it should be mentioned that there is already evidence of a broader demand for such an international service to cover all science teaching rather than mathematics teaching alone. Conceivably it would be easier to obtain support for such a general service than for one disseminating information exclusively in the field of mathematical education.

By order of the Executive Committee, I.C.M.I., August 1962.

Marshall H. STONE, *President*, G. WALUSINSKI, *Secretary*.

RÉUNION DE L'ICMI A SALTSJÖBADEN, le 10-8-62

La séance est ouverte à 10 heures, sous la présidence de Monsieur M. H. STONE.

Présents : MM. BEHNKE, FROSTMAN, AKIZUKI, HOPF, ROOM, MAXWELL, CHATELET, CHOQUET, STRASZEWICZ, KUREPA, FREUDENTHAL.

Secrétaire : M. REVUZ (représentant WALUSINSKI).

Le quorum est atteint.

Lecture est donnée, par le Président, du rapport d'activité concernant la période 1959-1962. Le rapport est adopté à mains levées à la fin de la séance qui fut levée à 13 heures.

Les remarques suivantes ont été faites :

1) *Publication des compte-rendus des symposiums organisés par l'ICMI*

a) MM. BEHNKE, KUREPA, STONE souhaitent que ces compte-rendus, lorsqu'ils sont édités par l'« Enseignement Mathématique », fassent l'objet d'un fascicule spécial, et que la même revue donne la référence de ces compte-rendus, lorsqu'ils ne sont pas publiés par la revue elle-même.

Cette question se rattache à celle, plus générale, de la création d'un Centre d'Information, concernant toutes les activités se rapportant à l'enseignement des mathématiques, ou même des sciences en général.