

**INTERNATIONAL MATHEMATICAL NEWS**  
**NOUVELLES MATHÉMATIQUES INTERNATIONALES**  
**INTERNATIONALE MATHEMATISCHE NACHRICHTEN**

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**BULLETIN OF THE**  
**INTERNATIONAL MATHEMATICAL UNION**

REPORT OF THE EXECUTIVE COMMITTEE  
OF THE INTERNATIONAL MATHEMATICAL UNION  
TO THE NATIONAL ADHERING ORGANIZATIONS

1 January — 31 December 1964

**A. Membership.**

The following 41 countries were members of the Union in 1964:

- Group I: Argentina, Australia, Brazil, Bulgaria, China-Taiwan, Cuba, Greece, East Germany, Iceland, Ireland, Malaya-Singapore, Mexico, North Korea, Norway, Portugal, South Africa, Turkey;
- Group II: Austria, Denmark, Finland, Israel, Pakistan, Rumania, Spain, Sweden, Yugoslavia;
- Group III: Belgium, Canada, Czechoslovakia, Hungary, India, the Netherlands, Switzerland;
- Group IV: France, Germany, Italy, Japan, Poland;
- Group V: Great Britain, U. S. A., U. S. S. R.

This membership corresponded to a total voting strength of 91 and an annual income from membership dues of \$10,269.00 (equivalent to 105 units).

**B. Scientific Activities.**

**I. Colloquia and Symposia:** The following research colloquia were co-sponsored by the Union in 1964.

(i) *International Colloquium on Differential Analysis, Bombay, India, January 7—14, 1964.*

The Colloquium was organized by the Tata Institute of Fundamental Research under the co-sponsorship of the International Mathematical Union. The Organizing Committee consisted of Professor K. Chandrasekharan (Chairman), Professors M. S. Narasimhan, Raghavan Narasimhan, K. G. Ramanathan

and C. S. Seshadri, with Professor G. de Rham and Professor D. Montgomery as representatives of the International Mathematical Union. There were in all 50 participants from 8 countries, viz. France, India, Japan, Netherlands, Sweden, Switzerland, U. K., and U. S. A.

The proceedings of the Colloquium have been published as a book with the title „Differential Analysis” by Oxford University Press. (For the detailed scientific programme, see Appendix I.)

(ii) *International Conference on Algebraic Topology, Manchester, U. K., April 6—17, 1964.*

The Conference was organized by the University of Manchester under the co-sponsorship of IMU, and was assisted financially by IMU and NATO. The Organizing Committee consisted of Professor M. H. A. Newman (Chairman), Professor J. F. Adams (Secretary), Professors M. F. Atiyah, M. G. Barrot, I. M. James, E. C. Zeeman and two representatives of the Executive Committee of IMU (Professors H. Hopf and F. Hirzebruch). There were in all 68 participants from 11 countries, viz. Belgium, Denmark, France, Germany, Japan, Poland, Rumania, Switzerland, U. K., Yugoslavia and U. S. A. For the formal scientific programme, see Appendix II.

(iii) *Symposium on Global Differential Geometry, Bucarest, Rumania, 20. June—4 July, 1964.*

The Conference was organized by the Mathematical Institute of the Rumanian Academy under the co-sponsorship of IMU. The Organizing Committee consisted of Acad. O. Mayer (President), Acad. G. Vranceanu, Acad. Gr. C. Moisil (Vice-Presidents), Professors G. Galbura, I. Bucur, C. Teleman, Th. Hangan, A. Lascu, M. Jurchescu und A. Deleanu, and Professors G. de Rham and H. Cartan representing the IMU. There were in all 42 participants from 12 countries, viz. Belgium, Brazil, Czechoslovakia, East Germany, West Germany, Italy, France, Poland, Rumania, Switzerland, U. S. A. and U. S. S. R. Nearly 60 papers were presented to the Symposium. (For a list of speakers, see Appendix III.)

(iv) *Conference on the Classical Theory of Functions of one Complex Variable, London, September 6—12, 1964.*

The Conference was sponsored by the IMU, the London Mathematical Society and NATO (though without any financial assistance from IMU), and was organized by Prof. W. K. Hayman. The nominees of the Executive Committee of IMU on the Organizing Committee were Professors R. Nevanlinna and M. Lavrentiev. There were nearly 70 participants from 13 countries — France, Finland, Germany, Hungary, Italy, Israel, Poland, Switzerland, Turkey, Sweden, U. K., U. S. A. and U. S. S. R. Nearly 30 communications were presented. (For the list of speakers, see Appendix IV.)

II. Exchange Programme — IMU Lectureships: Under the Exchange Programme, Pakistan and Spain were granted an IMU Lectureship each in 1964. The lecturers were Professors M. H. Stone (Chicago) and Professor P. Dedecker (Liège).

(i) Professor *M. H. Stone* visited Pakistan in January 1964, and lectured at various universities in Pakistan.

(ii) Professor *P. Dedecker* visited the University of Santiago, and gave a course of 14 lectures on „Introduction to the theory of Lie groups: differential topology”, from November 23 to December 5, 1964. Each one of these lectures was followed by a seminar of about one hour, in the course of which questions relating to the lecture were treated: categories, homotopy groups, Lie groups, differential topology.

### III. International Commission on Mathematical Instruction (ICMI).

(a) *The Executive Committee of ICMI* met in Paris on February 14—15, 1964, and the following decisions were arrived at:

(i) That special sub-commissions for ICMI be set up, if necessary, even in countries which are not members of the Union, in order to enable them to participate in the work of ICMI, and that Luxembourg and Senegal be admitted to ICMI under this scheme;

(ii) That a Conference be organized in Utrecht late in 1964 for a discussion of mathematical education at the secondary level, the organizing committee to consist of Prof. H. Freudenthal (President) and Professors E. Moise, G. Choquet and H. Behnke;

(iii) That a regional seminar on a smaller scale be organized in Luxembourg in 1965, with Prof. M. Gloden (President), H. Behnke, H. Freudenthal and Servais forming the Organizing Committee;

(iv) To propose to the Organizing Committee of the International Congress of Mathematicians 1966 that an eminent Soviet mathematician be invited to give a lecture on the Teaching of Numerical Analysis at the university level;

(v) To present three reports to the 1966 Congress on

(1) Mathematical preparation for physicists at the university level,

(2) Arithmetic methods in secondary education, and

(3) Methods of promoting mathematical activity among students;

(vi) To enlarge the editorial committee of *L'Enseignement Mathématique*;

(vii) To organize a colloquium in Africa, probably at Dakar, in 1965.

(b) *Colloquium on Modern Curricula in Secondary Mathematical Education*, Utrecht, December 19—22, 1964. The Colloquium was attended by 17 experts on mathematical education from Belgium, Canada, Denmark, France, Germany, Great Britain, Luxembourg, Poland, Switzerland and the U. S. A., and by 24 ones from the Netherlands. (For the list of participants, see Appendix V.)

Most of the lectures dealt with programmes for secondary education and retraining of teachers which had been tested in the last few years or which will be tested in the near future. However, this happened not by merely summarizing programmes and test results, but rather in an outspoken pedagogical context. Most of the lectures dealt with their subjects with a stress on the background educational problems and their anticipated solutions. By this reason the lectures of a more general character harmonized quite well with the more specialized ones. The difference between the British and American empiricist approach and the more rationalist continental European one was strongly felt in the discussions. On the other hand, there was a good insight into the consequences of a stress on mass education (USA, Poland) as opposed to that on elite education (other countries). The dangers of a modernisation with a merely scientific rather than a pedagogical motivation were considered by quite a few lecturers. The need for more international information on national activities in mathematical education was urgently felt. In the closure session a resolution with respect to this question has been voted by acclamation.

*Resolution:* The attendants of the Utrecht Colloquium on Modern Curricula in Secondary Mathematical Education feel the urgent need for more international information on national activities in mathematical education, which could be organized and spread by an active and accessible international center of information or by a high level international periodical on mathematical education.

## C. Meetings of the Executive Committee.

The 19th meeting of the Executive Committee held in Geneva on July 9—10, 1964 was attended by Professor G. de Rham (President), Professors H. Cartan and K. Kuratowski (Vice-Presidents), Professor K. Chandrasekharan (Secretary), Professors J. C. Burkill, F. Hirzebruch and B. Segre (Members).

- (a) The Financial Statement for 1963 was adopted.
- (b) The Union decided to support the following colloquia in 1965:
  - (i) International Colloquium on Group Theory, Canberra, Australia, August 1965.
  - (ii) International Colloquium on Algebraic Geometry, Madrid, Spain, August 1965.
  - (iii) International Colloquium on Analytic Functions, Erevan, USSR, September 6—14, 1965.
  - (iv) International Colloquium on Algebraic Geometry, Rome, Italy, October 1965.
  - (v) Instructional Conference on Algebraic Number Theory, Sussex, Brighton, September 1965.
  - (vi) Summer School on Topology, Prague, 1965.
  - (vii) Bulgarian Mathematical Congress, 1965.
- (c) It was decided to nominate, in place of Professor van Wijngaarden who had requested to be relieved, a South American mathematician as the Union's representative on COSPAR. (Prof. Sadosky has since been nominated.)
- (d) It was decided that a suggestion from ICMI to invite an eminent Soviet mathematician to give a lecture on the teaching numerical analysis at the university level at the 1966 Congress be passed on to the Congress Consultative Committee.
- (e) It was decided to prepare a third edition of the World Directory of Mathematicians before the 1966 Congress, under the existing pattern of collaboration with the Tata Institute of Fundamental Research, and that the money standing in the Directory account in Bombay be utilized for secretarial services.
- (f) It was decided that the Union accede to the request from the Sir Dorabji Tata Trust, Bombay, asking for the co-operation of the Executive Committee in the selection of two mathematicians of exceptional achievement and promise, every four years, for the award of the Tata Medals, and that the selection be made by the same Committee which selects candidates for the Fields Medals.
- (g) It was decided to hold the next meeting of the Executive Committee in Europe late in April 1965.

## D. Relations with ICSU-UNESCO.

The Executive Committee of ICSU met in London, 15—17 June 1964. It was resolved that the Inter-Union Commission on the Teaching of Science be requested to prepare a definitive and precise programme of activities which should include the coordination of the work of the different Unions and the

study, on an international basis, of the problem of coordinating and inter-relating the teaching of different branches of science and that the Finance Committee be requested to give sympathetic consideration to a request for financial support by ICSU to the Commission. The Executive Committee also decided to hold its IIIrd Meeting in Munich in April 1965, and its IVth Meeting and 11th General Assembly in Bombay in January 1966.

Applications from new unions for admission to ICSU are causing difficulties, since the strength of the Union representatives on the Executive Committee is limited to 14 members, corresponding to the existing 14 units. A special Committee has been appointed to consider amendments to the present constitution of ICSU. A preliminary report made by this Committee recommends that new unions be admitted, if there were grounds for their admission, and that two years be allowed to elapse from the date of admission before they become entitled to have a representation on the Executive Committee.

## E. Financial Report.

The Financial Report for 1964 is presented separately.

## APPENDIX I

### International Colloquium on Differential Analysis

#### Programme

1. G. de Rham: Reidemeister's torsion invariant and rotations of  $S^n$ .
2. R. Bott: The periodicity theorem for the complex linear group from the point of view of elliptic systems of differential equations.
3. L. Hörmander:  $L^2$  estimates and existence theorems for the  $\bar{\partial}$ -operator.
4. D. Montgomery: Compact groups of transformations.
5. S. Smale: On the calculus of variations.
6. M. F. Atiyah: The index of an elliptic operator on manifolds with boundary.
7. J. Milnor: Some actions of cyclic groups on spheres.
8. M. S. Narasimhan-C. S. Seshadri: Holomorphic vector bundles on compact Riemann surfaces.
9. J. J. Kohn: Differential operators on manifolds with boundary.
10. R. Thom: Basic theorems in differential topology.
11. D. C. Spencer: Existence of local co-ordinates for structures defined by elliptic pseudogroups.
12. L. Garding: Energy inequalities for hyperbolic systems.
13. M. S. Raghunathan: Deformations of linear connections.
14. C. B. Morrey: The  $\bar{\partial}$ -Neumann problem on strongly pseudo-convex manifolds.
15. B. Malgrange: Weierstrass preparation theorem for  $C^\infty$ -functions.
16. Y. Matsushima: On the cohomology of compact locally symmetric Riemannian manifolds.
17. A. Van de Ven: Holomorphic fields of complex line elements.
18. J. Moser: On invariant manifolds of vector fields and symmetric partial differential equations.

## APPENDIX II

### International Conference on Algebraic Topology

#### Programme

1. V. Poenaru: Regular homotopy and isotopy.
2. C. T. C. Wall: Poincaré Complexes with fundamental group  $Z_2$ .
3. M. Curtis: Infinite sums of manifolds.
4. I. M. James: Non-stable vector bundles; an approach to the enumeration problem.
5. A. Haefliger: The work of J. Levine on knotted spheres.
6. R. Wood: Generalization of the periodicity theorem.
7. I. Berstein: On the imbedding covering-number of real projective spaces.
8. A. Dold: On the Lefschetz fixed-point number.
9. J. W. Milnor: Manifolds with finite fundamental group.
10. M. R. Mather: Paracompactness.
11. R. Wood (*Splinter group*): Generalization of the periodicity theorem, continued.
12. P. J. Hilton: Spectral sequences in an abelian category.
13. F. Hirzebruch: Embeddings.
14. E. C. Zeeman: Homology of tolerance spaces.
15. S. Lubkin: Topological methods in algebraic geometry.
16. J. Cerf: One parameter Smale theory.
17. M. Kervaire: Higher-dimensional knots.
18. *Splinter groups* — Brinkmann, Maunder, Moss: Questions related to the Adams spectral sequence.  
J. Cerf: One parameter Smale theory, continued.
19. K. Geba: Methods of algebraic topology in Banach spaces.
20. I. Tamura: A remark on the classification of sufficiently connected manifolds.
21. M. W. Hirsch: Smoothings of piecewise linear manifolds.
22. *Splinter group*  $\rightarrow$  airing of problems  
M. Brown: Topological Topology (a theorem of J. Cantrell).
23. A. Haefliger: The work of Novikov on foliations.
24. W. Browder: Fixed-point free involutions on spheres.
25. *Splinter group* — V. Poenaru: A new method for attacking the Poincaré conjecture.
26. R. Schwarzenberger: On vector bundles whose fibres change dimension.
27. R. Lickorish - A. Douady: The space of submodules of a Banach module.
28. *Splinter group* — M. André: Adjoint factors.  
B. Morin: Singularities of maps.
29. J. F. P. Hudson: On the classification of piecewise linear embeddings.

## APPENDIX III

### Symposium on Global Differential Geometry

#### List of Speakers

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|-------------------------------|---------------------------|
| 1. Andreian-Cazacu (Bucarest) | 4. P. Caraman (Iasi)      |
| 2. I. Bucur (Bucarest)        | 5. B. Cenkli (Prague)     |
| 3. D. Burghilea (Bucarest)    | 6. V. Cruceanu (Bucarest) |

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| 7. E. Davies (Southampton)             | 33. M. Morse (Princeton)               |
| 8. P. Dedecker (Lille)                 | 34. E. Martinelli (Rome)               |
| 9. P. Dolbeault (Poitiers)             | 35. J. Naas (Berlin)                   |
| 10. S. Dolbeault (Poitiers)            | 36. N. Ostianu (Moscow)                |
| 11. N. Efimov (Moscow)                 | 37. O. Onicescu (Bucarest)             |
| 12. S. Gähler (Berlin)                 | 38. I. Popescu (Timisoara)             |
| 13. W. Gähler (Berlin)                 | 39. N. Popescu (Bucarest)              |
| 14. Gh. Gheorghiev (Iasi)              | 40. H. Reichardt (Berlin)              |
| 15. Gh. Th. Gheorghiev (Bucarest)      | 41. G. de Rham (Lausanne)              |
| 16. L. Godeaux (Liège)                 | 42. M. Roth (Bucarest)                 |
| 17. A. Haefliger (Geneva)              | 43. R. Rosca (Bucarest)                |
| 18. A. Haimovici (Iasi)                | 44. G. Soos (Budapest)                 |
| 19. Th. Hangan (Bucarest)              | 45. M. Stoka (Bucarest)                |
| 20. W. Huebsch (Princeton)             | 46. A. Svec (Prague)                   |
| 21. T. Huskowskii (Wroclaw)            | 47. K. Svoboda (Brno)                  |
| 22. R. Iordanescu (Bucarest)           | 48. G. Tallini (Rome)                  |
| 23. G. I. Ispas (Bucarest)             | 49. G. Teleman (Bucarest)              |
| 24. M. Jurchescu (Bucarest)            | 50. M. Tarina (Cluj)                   |
| 25. W. Klingenberg (Mainz)             | 51. W. Tutschke (Berlin)               |
| 26. G. Laptev (Moscow)                 | 52. P. Vincensini (Marseille)          |
| 27. P. Libermann (Rennes)              | 53. G. G. Vranceanu (Bucarest)         |
| 28. Ch. Galbura - Al. Lascu (Bucarest) | 54. W. Wrona (Varsovie)                |
| 29. L. Markus (Lausanne)               | 55. T. Albu - T. Zamfirescu (Bucarest) |
| 30. D. Mangeron (Iasi)                 | 56. G. Calugareanu (Cluj)              |
| 31. P. Mocanu (Bucarest)               | 57. St. Ruscior (Iasi)                 |
| 32. R. Miron (Iasi)                    | 58. G. Vranceanu (Bucarest)            |

#### APPENDIX IV

### Conference on the Classical Theory of Functions Variable of one Complex

#### List of Speakers

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|--------------------|-------------------|
| 1. S. Agard        | 18. J. Krysz      |
| 2. L. V. Ahlfors   | 19. C. N. Linden  |
| 3. L. Alpar        | 20. P. Malliavin  |
| 4. P. D. Barry     | 21. Z. Nehari     |
| 5. E. Bombieri     | 22. R. Nevanlinna |
| 6. E. Collingwood  | 23. A. C. Offord  |
| 7. I. Dancz        | 24. A. Pfluger    |
| 8. P. L. Duren     | 25. G. Piranian   |
| 9. M. M. Dzrbysyan | 26. C. Rényi      |
| 10. T. Ganelius    | 27. L. A. Rubel   |
| 11. F. W. Gehring  | 28. D. Shea       |
| 12. G. S. Goodman  | 29. A. Steiner    |
| 13. W. H. J. Fuchs | 30. K. Szilárd    |
| 14. W. K. Hayman   | 31. P. Turán      |
| 15. P. B. Kennedy  | 32. R. Wilson     |
| 16. T. Kövari      | 33. H. Wittich    |
| 17. U. Kurán       |                   |

## Colloquium on Modern Curricula in Secondary Mathematical Education

### List of Participants

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|---------------------------------------|--|
| 1. M. Bebermann (U.S.A.)              | 22. L. N. H. Bunt (Netherlands)          |
| 2. Miß Emma Castelnuovo (Italy)       | 23. J. C. H. Gerretsen (Netherlands)     |
| 3. A. Delessert (Switzerland)         | 24. A. W. Grootendorst (Netherlands)     |
| 4. J. Dzewas (Germany)                | 25. P. M. van Hiele (Netherlands)        |
| 5. E. Bouque (Belgium)                | 26. J. Hoepman (Netherlands)             |
| 6. Sv. Bundgaard (Belgium)            | 27. J. van Lint (Netherlands)            |
| 7. Mme. Lucienne Félix (France)       | 28. Th. J. Korthagen (Netherlands)       |
| 8. A. Zofia Krygowska (Poland)        | 29. Herm J. Jacobs (Netherlands)         |
| 9. M. Michels (Luxembourg)            | 30. D. N. van der Neut (Netherlands)     |
| 10. Ole Rindung (Denmark)             | 31. A. Querelle (Netherlands)            |
| 11. W. Servais (Belgium)              | 32. H. A. G. Schellekens (Netherlands)   |
| 12. H. G. Steiner (Germany)           | 33. J. J. Seidel (Netherlands)           |
| 13. W. O. Storer (U.K.)               | 34. H. Streefkerk (Netherlands)          |
| 14. St. Straszewicz (Poland)          | 35. P. Troelstra (Netherlands)           |
| 15. Mme. C. Tcherkawsky (France)      | 36. A. F. Monna (Netherlands)            |
| 16. B. Thwaites (U.K.)                | 37. H. Freudenthal (Netherlands)         |
| 17. A. Wittenberg (Canada)            | 38. R. G. J. Vredenduin (Netherlands)    |
| 18. C. J. Alders (Netherlands)        | 39. Joh. H. Wansink (Netherlands)        |
| 19. F. van der Blij (Netherlands)     | 40. B. J. Westerhof (Netherlands)        |
| 20. W. J. M. Borm (Netherlands)       | 41. L. R. J. Westermann<br>(Netherlands) |
| 21. J. K. van der Briel (Netherlands) |  |

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### International Congress of Mathematicians, 1970

In accordance with established practice, a joint Committee consisting of representatives of the International Mathematical Union, and of the Organizing Committee of the International Congress of Mathematicians 1966, has been set up to discuss the location of the International Congress in 1970 and to prepare a proposition to be presented to the Congress in Moscow in August 1966.

This Committee requests that any national body desirous of inviting the Congress to their country should inform the Secretary of the International Mathematical Union (Professor K. Chandrasekharan, Tata Institute of Fundamental Research, Colaba, Bombay 5, India) of their intention as soon as possible, and *before February 1, 1966 at the latest*. It would greatly help the Committee, if prospective hosts would supply as much information as possible about their plans for the Congress. The Committee will be pleased to answer any inquiries in this respect, and to give such advice as it can, on any matters concerning the organization of the Congress, to any country which asks for it.

*Professor K. Chandrasekharan,  
Secretary  
International Mathematical Union.*

*End of the Bulletin of the International Mathematical Union.*