Bulletins of the International Mathematical Union

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No. 37, October 1994

Contents:

Secretariat:

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International Mathematical Union

Executive Committee

January 1, 1991 to December 31, 1994

President
    Professor Jacques Louis Lions

Vice Presidents
    Professor John Coates
    Professor David Mumford

Secretary
    Professor Jacob Palis

Members
    Professor James Arthur
    Professor Albrecht Dold
    Professor Hikosaburo Komatsu
    Professor László Lovász
    Professor Eduard Zehnder

Ex Officio Member
    Professor Ludwig Faddeev

January 1, 1995 to December 31, 1998

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    Professor Vladimir Arnold
    Professor Albrecht Dold

Secretary
    Professor Jacob Palis

Members
    Professor James Arthur
    Professor Simon Donaldson
    Professor Björn Engquist
    Professor Shigefumi Mori
    Professor K.R. Parthasarathy

Ex Officio Member
    Professor Jacques Louis Lions

Report of the 12th General Assembly of IMU

Lucerne, Switzerland, July 31 - August 1, 1994

1. OPENING

The President opened the Assembly at 10 a.m. on July 31, 1994

2. ADDRESS BY THE PRESIDENT

The address given by the President is found in [Appendix 1](#). He also emphasized that every effort had been made to send the delegates all necessary information beforehand. This information is collected in Bulletin No. 36, Special Number for the General Assembly.

The Agenda was accepted in a modified order.

3. COMMITTEES

The following committees were appointed:

Credentials Committee:

- J. Rubinstein (Australia), Chairperson
- S. Dani (India)
- J. Lindenstrauss (Israel)
- J. Margalet-Roig (Spain)
- J. Mawhin (Belgium)
- J. Palis, ex-officio, Secretary

Resolutions Committee:

- J. Tits (France), Chairperson
- J. Ball (UK)
- R. Douglas (USA)
- J. Jarnik (Czech Republic)
- J. Timourian (Canada)
- J. Palis, ex-officio, Secretary

Tellers:

- K. S. Chang (South Korea)
- R. Gruber (Austria)
- V. Thomee (Sweden)

Committee for Finance and Dues:

- C. Terng (USA), Chairperson
- A. Gonchar (Russia)
- O. Lehto (Finland)
- D. Nguyen (Vietnam)
- J. Siciak (Poland)
- J. Palis, ex-officio, Secretary

Nominating Committee:

- J.L. Lions, ex-officio, Chairperson
- K.C. Chang (China)
- C. Ciliberto (Italy)
- R. Graham (USA)
- F. Hirzebruch (Germany)
- N. Hitchin (UK)
- R. Macias (Argentina)
- V. Sos (Hungary)
- M. Yamaguti (Japan)
- L. Faddeev, ex-officio, Past President

4. MEMBERS

4.1. NEW AFFILIATIONS:

- Armenia
- Kazakhstan
- Tunisia

will be addmitted to the Union in Group I as of January 1, 1995.

4.2. CHANGE OF GROUP OF ADHERENCE

The Group of Adherence of Chile and Iran were raised from I to II. The change will take effect on January 1, 1995. Concerning Israel, the General Assembly approved a raise from Group III to Group IV, as of January 1, 1995.

Bulgaria had its Group of Adherence lowered from II to I, on its own request. The change has taken effect as of January 1, 1994. The Secretary emphasized t hat this change will be reversed as soon as Bulgaria's economic situation improves, without another ballot. The presidente asked Prof. B. Sendov, a delegate from Bulgaria, to tell the Bulgarian Academy of Sciences, the Union's appreciation of the scientific work in that country.

4.3. DUES ARREARS:

The Secretary informed the Assembly that the situation is satisfactory, as no country has dues arrears for more than 4 years.

5. ACTIVITIES OF THE UNION - FINANCIAL REPORTS

The activities of the Union for the years 1990-1993, as well as the complete financial reports, including audited ones, had been reviewed in the Bulletin No. 36, Special Number, 1994.

The reports in the Bulletin covered symposia and conferences supported by IMU, IMU lectures, ICMS activities, CDE activities, ICHM activities, the IMU Bulletin, and the World Directory of Mathematicians. They were approved.

The 10th edition of the World Directory of Mathematicians compiled and printed by the American Mathematical Society under the supervision of Professor David Mumford , will be available at the ICM in Zurich.

6. REPORT OF THE TURN OF THE CENTURY COMMITTEE:

Prof. J. Palis, Chairperson of the Committee, reported on the work of the Committee.
This report is printed in [Appendix 2](#).
The discussion was interupted for lunch at 12:30.

The 2nd session started at 2 p.m. Prof. J. Timourian proposed a resolution on the "Turn of the Century" activities. The Assembly decided to transfer this proposal, as well as several others, to the Resolution Committee.

7. DISCUSSION ON THE FORMAT OF FUTURE ICMs

Prof. D. Mumford presented the three specific points of his proposal.
The text is presented in [Appendix 3](#).
It was decided that the topic should be the subject matter of some resolution of the General Assembly to be discussed for approval in the next day.

8. ICM 1998

The President announced that the Site Committee recommends Berlin as the Site for the 1998 International Congress of Mathematicians. The Assembly decided unanimously that the 1998 Congress be held in Berlin. Prof. F. Hirzebruch thanked the General Assembly and promised the mathematical community a good conference. He assured that there will be no visa problems and announced the date as August 18 to 28, 1998.

Prof. J. L. Lions told the Assembly that bids to host the Congress 2002 must be received by the Executive Committee by November 1996. The decision will be made by the E.C. by May, 1997, subject to a final deliberation by the General Assembly in August, 1998.

The second session was closed at 4 p.m.

The third session started at 10:10 on August 1.

9. ELECTION

The Nominating Committee had met in the early morning, from 8:00 to 9:00. The Committee had received two names for members of the Executive Committee from the floor. Prof. Lions explained the voting procedure. The IMU Executive Committee, elected by ballot, for the years 1995-1998, consists of:

IMU Executive Committee

President
>   David Mumford (Univ. Harvard, USA)

Vice Presidents
>   Vladimir Arnold (Steklov Inst., Moscow, Russia)
>   Albrecht Dold (Univ. of Heidelberg, Germany)

Secretary
>   Jacob Palis (IMPA, Brazil)

Members
>   James Arthur (Univ. Toronto, Canada)
>   Simon Donaldson (Univ. of Oxford, United Kingdom)
>   Björn Engquist (KTH Stockholm, Sweden)
>   Shigefumi Mori (RIMS, Kyoto Univ., Japan)
>   K.R. Parthasarathy (Indian Statist. Inst., New Delhi, India)

The Past President, J.L.Lions, will be an ex-officio member of the Executive Committee.

The ICMI, Executive Committee,

elected unanimously, for the years 1995-1998, consists of:

President
Miguel de Guzman (Univ. Complutense, Spain)

Vice Presidents
Jeremy Kilpatrick (Univ. Georgia, USA)
Anna Sierpinska (Univ. Montreal, Canada)

Secretary
Mogens Niss (Roskilde Univ., Denmark)

Members
Colette Laborde (Univ. Grenoble, France)
Gilash Leder (Monash Univ. Melbourne, Australia)
Carlos Vasco (Univ. Nac., Colombia)
Zhang Dian-Zhou (East China Normal Univ., Shanghai)

The ex-officio members are: the President of IMU, Prof. David Mumford, the Secretary of IMU, Prof. Jacob Palis and the Past President of ICMI, Prof. J.P. Kahane.

CDE (Commission on Development and Exchange) Executive Committee,

elected unanimously, for the years 1995-1998, consists of:

Chair
Rolando Rebolledo (Univ. Cat. de Chile)

Secretary
Pierre Bérard (Inst. Fourier, France)

Members
A.A. Ashour (Cairo Univ., Egypt)
C.H. Clemens (Univ. Utah, USA)
Kung Ching Chang (Pequim Univ., China)
Cesar Camacho (IMPA, Brazil)
Jean Mawhin (Univ. Louvain, Belgium)
Mitsuo Morimoto (Sophia Univ., Japan)

The ex-officio members are: the M.S. Narasimhan, as Past President of CDE, David Mumford, and Jacob Palis as President and Secretary of IMU.

Professors Laura Toti Rigatelli and Karen V.H. Parshall were elected as IMU Members to the Executive Committee of the Joint International Commission on the History of Mathematicians for the years 1995-1998.

The IMU representatives to ICSU bodies elected by acclamation are:

Professor Jacob Palis was re-elected to represent IMU at ICSU in the years 1995-1998

Professor J. L.Lions, was re-electerd to represent IMU at COSPAR in the years 1995-1998

The IMU representatives at these organizations should report to the General Assembly of their activities.

10. Report of Committee on Finance and Dues

Professor C. Terng, Chairperson of Committee for Finance and Dues reported on the work of the Committee. Her report is presented as [Appendix 5](#).

The Committee recommended the approval of the financial reports for the years 1990-1993 and the audited accounts. They were unanimously approved by the General Assembly.

The budget for 1995-1998 had been prepared on the basis of about ten per cent increase on the dues of the Union.

The Committee recommended the acceptance of the budget proposed.

The budget was approved unanimously by the General Assembly. It is printed as [Appendix 6](#).

11. Adoption of Resolutions

The Resolution Committee presented proposals of resolutions for approval of the General Assembly.

After discussion of these and some other proposals presented from the floor, the following ones were approved:

Resolutions of the IMU General Assembly 1994

Resolution 1

The General Assembly resolves that the next meeting of the Assembly be held at a time and place conveniently linked to the International Congress of Mathematicians in Berlin, Germany, in 1998.

Resolution 2

The General Assembly thanks the Turn of the Century Committee for its report. The General Assembly asks the new Executive Committee to proceed with the planning of World Mathematical Year 2000, and to organize and coordinate activities such as

1. an invitation to a select group of outstanding mathematicians to present their views on topics they expect to be central to mathematical activity in the next century;

2. the selection of a number of symposia, some possibly organized together with other scientific bodies, dedicated to mathematics, its applications and to its role in society;

3. events held under the auspices of ICMI, CDE and ICHM. The Executive Committee is asked to explore the possibilities provided by communication technology to unite activities occurring around the world.

Resolution 3

The General Assembly recommends that the name of the Chair of the Programme Committee be made public on appointment.

Resolution 4

The General Assembly recommends that the Programme Committee explores ways of involving more effectively mathematicians from applied areas in the next Congress, including the possibility of introducing sessions co-sponsored with other scientific bodies.

Resolution 5

The General Assembly recommends that the Programme Committee schedule some less formal scientific

events of broad interest during the Congress.

Resolution 6

The EC is asked to redraft the electoral procedures to improve them in the light of the points that have been made in the discussion at the General Assembly, and the recommendations be sent to the national committees before the end of 1995.

Resolution 7

The General Assembly expresses its gratitude to UNESCO and ICSU for the help and support that these organizations have provided for various mathematical activities, in particular those carried out in cooperation with the Commission for Development and Exchange (CDE) and the International Commission on Mathematical Instruction (ICMI) of the IMU.

Resolution 8

The 12th General Assembly expresses warm thanks to the Executive Committee of the IMU for the work done during the period 1991-1994.

Resolution 9

The General Assembly gives special thanks to Professor J.L. Lions for his important contributions, first as Secretary, and then as President of the IMU, assisted by Mme Renault and Mme Theis, and to Professor J. Palis for his considerable and dedicated work as the Secretary of IMU, with the help of Mme Lima and Mme Dold. The General Assembly recognizes with gratitude the generous support provided by the Collège de France and IMPA to the IMU Secretariat.

Resolution 10

The General Assembly expresses its gratitude to the Swiss organizers of the 1994 Congress, for its hospitable reception, and for the excellent arrangements for this meeting of the Assembly.

12. Next meeting

The German delegation invited the General Assembly to meet on August 15-16, 1998 at a place linked to the International Congress of Mathematicians to take place in Berlin, Germany.

13. Closing

The President thanked the Assembly for its work and declared the 12th General Assembly of IMU closed at 1:00 p.m.

The report of the Credentials Committee is presented as Appendix 4, the list of participants as Appendix 7.

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Appendix 1:

ADDRESS BY THE PRESIDENT AT THE TWELFTH GENERAL ASSEMBLY OF IMU

Dear Colleagues,

On behalf of the Executive Committee of IMU, welcome to the General Assembly of IMU - welcome to all of you, in particular to all new members, elected to IMU since the previous General Assembly of Kobe, four years ago, namely Saudi Arabia and Venezuela.

On account of the very important geopolitical changes in the European landscape, many countries, which were already members of the Union, have been re-admitted under their new identity after your approval by postal ballot. Such is the case of Russia, Georgia, the Czech and the Slovak Republics, Croatia and for Slovenia. The candidacy of other countries will be submitted to your approval during this Assembly. Welcome to all of you.

We are happy to greet the several observers who are A. Marzollo, Director for Mathematics at UNESCO, de Guzman, Chairman of ICMI, Santiago Sologuren, Bolivia, U.M. Sultangazin, Kazakhstan.

The General Assembly of IMU is an important event. The Executive Committee has paid the greatest attention to all resolutions passed in Kobe and to all the wishes expressed in this previous 11th General Assembly in Kobe.

We have also followed Resolution 2 concerning the Turn of the Century Committee. Let me remind you its content: "whereas the IMU wishes to mark the turn of the century in a manner appropriate to the standard set by David Hilbert in 1900, the General Assembly directs the Executive Committee to set up a committee to report to the adhering bodies by September 1991, how to accomplish this so that in 1994 the Assembly can discuss it and decide how to proceed".

A Committee has been formed, Turn of the Century Committee, chaired by our Secretary General, Jacob Palis. He will report to you today on the work accomplished and on the proposals that are presented to you.

We, at the Executive Committee, have also, in all its actions, carefully listened to the wishes strongly expressed in Kobe, namely to have a good equilibrium betwwen all branches of mathematicians, including those developing in connection with other fields.

The importance of the American proposal, unanimously endorsed by the General Assembly of Kobe, concerning the Turn of the Century, and this strong wish for developing mathematics both internally and in connection with other disciplines, has led us to propose, with UNESCO and the Third World Academy of Sciences sponsorship the year 2,000 as the World Mathematical Year - in short WMY 2000.

We will further discuss the work made in this respect, in cooperation with our two main commissions CDE and ICMI, when Jacob Palis presents his report on the Turn of the Century Committee. We convey our thanks to UNESCO, represented here by our colleague, Angelo Marzollo. Our thanks also to the CDE and ICMI commissions, some of their members being here with us in Lucern.

WMY 2000 has already been reported to ICSU. Our position at ICSU will certainly be reinforced by the election at its General Assembly in Chile, at the end of last year, of Professor Jacob Palis to the Executive Board of ICSU. I am sure to express the general opinion of this Assembly when extending my congratulations to Jacob Palis.

During this four-years period, IMU has supported a number of meetings. They are reported in the Special Number of the Bulletin of this year.

We have made very special efforts for having as many as possible young research mathematicians from

countries facing very difficult economic situations - in these times of crisis, to attend ICM 94. Thanks to the generous donations of many mathematical societies, scientific institutions and agencies, to the Special Development Fund of IMU, our Travel Grants Committee has been able to help this time up to about 80 young mathematicians from the Third World, making an effort doubled since the last ICM in Kyoto. Let me heartily thank all donors for such an important help: the complete list of them appear in the special issue of the IMU Bulletin.

Let me emphasize all these points. We have increased as much as possible the scientific activities, keeping to its minimum the administrative part. We have to proceed further. In particular, the CDE , financed by IMU itself and in conjunction with ICSU/UNESCO, has spent about three times more than before. Also, the number of young people from developing countries attending the ICM has doubled. It is very important to continue our action towards supporting good level mathematical activities in developing countries.

Since 1971, the E.C. of IMU has been inviting, from time to time, a distinguished and active mathematician of high international standing, to give a set of four to six lectures on important new developments in mathematics to which the lecturer, directly or indirectly, has made a contribution. These lectures are published in "LÉnseignement Mathématique". None of these lectures have been delivered in this period but these IMU lectures will start again in 1995. The EC is hopeful that more institutions around the world apply for the IMU lectures, especially from institutions from a developing country; in that case, the travel expenses are taken care of by IMU.

You all know that one of the tasks of the E.C. in connection with the Organizing Committee is to nominate the chairman of the Program Committee and its members. Once this is done, the E.C. has no interference whatsoever with the Program Committee. The composition of the Program Committee is kept confidential, up to the first day of the General Assembly.

For ICM 94 the Chairman of the Program Committee is Professor Louis Nirenberg. The members are: S.K.Donaldson, P. de la Harpe, R. Karp, H.Kraft, A.Majda, M.Raynaud, M.Sato and Y.Sinai.

The Awards of the Union - Fields Medal and Rolf Nevanlinna Prizes - will be presented at the Opening Ceremony of the ICM. The EC has nominated the Committees to select the winners. For the Fields Medals, the chairman is Prof. D. Mumford and the members are L.Caffarelli, M. Kashiwara, B. Mazur, A. Schrijver, D. Sullivan, J.Tits, S. Varadhan, and for the Rolf Nevanlinna Prize, H.W. Lenstra Jr., J.V. Matiyasevic, R.E. Tarjan, M. Yamaguti, and myself as Chairman. Professor David Mumford will not be, in any case, the Chairman of the next Fields Medal Committee.

Those of you who have already participated in the General Assembly, and those of you who have been engaged in some of the activities of IMU, you know that the strengh of our Union is greatly increased by the general friendly atmosphere in which we are working.

I am sure that such will be again the case in the present meeting.

The quality of the reception from our Swiss colleagues and friends, the splendid organization which has been set up, the beauty of the city, will certainly contribute to the relaxed, friendly and efficient Assembly that I now declare open.

Appendix 2:

Turn of the Century Committee

Report to the IMU General Assembly 1994

In 1990, at the previous IMU General Assembly in Kobe, Japan, the American National Committee proposed the creation of the Turn of the Century Committee to provide suggestions for IMU to mark the turn of the century in a manner appropriate to the standard set by David Hilbert in 1900, so that the present Assembly can decide how to proceed.

Subsequently, such a committeee was set up by the IMU Executive Committee having as members Professors V. Arnold, F. Hirzebruch, L. Lovász, B. Mazur, S. Mizohata, W. Thurston, J. Tits, S. Varadhan and J. Palis.

Meanwhile, in May of 1992, Professor J.L. Lions, in the name of the Union, declared 2,000 as a World Mathematical Year (WMY 2,000) having as first aim the IMU activities to envision what the great challenges of the next century would be. In his own words, the Turn of the Century Committee suggestions to this General Assembly could be a starting point to organize such efforts. The second aim of the Declaration is *Mathematics, keys for development* and the third is *The image of mathematics*.

Members of the Committee had different views on how to proceed, but one common idea is to have articles/monographs/uniform series of addresses at various Symposia written by main mathematicians with a broad perspective and comprehensive views of mathematics, achievements of the present century and open problems. Unity of mathematics was much stressed. Another very relevant point raised was the connections between mathematics and other sciences. The importance of communication with the general public has also been mentioned. On the other hand, on the issue of how to proceed to obtain these "articles of the turn of the century", the disparity of views was quite clear: several symposia, or one main congress with a format somewhat different from the usual ICMs or perhaps no congress at all but having leading mathematicians to write, individually, a collection of problems (Fields medalists and a few others would be invited to do so).

From all these discussions and many comments by the members of the present EC, specially Prof. J.L. Lions, and several other colleagues, one possible set of suggestions is the following:

- to invite a number of Fields medalists/N evalinna prize winners and a few other outstanding mathematicians to write their views (past, present) on topics they consider to be important and corresponding open problems; the invitations should be issued by a small Editorial Board to be designated by the next EC by May, 1995;

- to organize a small number of symposia in different regions of the world, to be selected by the next IMU Executive Committee, one of the objectives being again the production of a few outstanding surveys/sets of open problems;

- of particular importance is to organize some symposia on the applications of mathematics to other sciences and their impact on society. To that end, cooperation with other scientific unions and societies should be pursued.

A detailed set of procedures could be prepared by May, 1995 and be known to all Adhering Organizations/ National Committees immediately after that. Suggestions concerning the set of activities above will be welcome.

In addition to the consultations done in the framework of the Turn of the Century Committee, I want to mention the other aims of WMY 2000 concerning education and development aspects and to emphasize the work being carried out in this respect by ICMI, CDE and ICHM. For instance, ICMI is experimenting at ICME 96 the use of worldwide communication techniques, to be much pursued at ICME 2000, if successful. I

also want to mention the publication of the newsletter WMY 2000, organized through Institut H. Poincaré with the support of the École Polytechnique in Paris.

In any case, no matter what course we take, it is a formidable task for the international mathematical community. On that, I would very much like to agree with a committee member when he says: "if we choose absolutely any of the suggestions of the committee members and if we follow it diligently, we will come up with something of substantial value for the mathematical community".

Jacob Palis

Appendix 3:

I C M FORMAT

The Executive Committee has been discussing ways, specially the ones presented by Prof. David Mumford, in which the organization and structure of the International Congresses might evolve in order to better serve the needs of the mathematical community. For many years, the Congresses have been organized in the same way: the Executive Committee appoints a Program Committee, which decides on the sections and appoints subcommittees for each section. These recommend section speakers to the Program Committee, which makes a final selection of both plenary and sectional speakers. To prevent any pressure being exerted on the organizations, these committees have all been secret, the Program Committee being announced at the Congress itself. The Executive Committee has been considering whether there are ways to involve a larger group of people in the organization and to offer talks with different aims from the plenary and sectional talks. The purpose of this agenda item is to get feedback from the entire membership of the IMU on wether such changes should be explored. Our proposal is not to make definitive decisions, but to generate a set of suggestions and recommendations to give the next Program Committte for their consideration.

The specific ideas which we have considered include these:

1. Make the name of the chairman of the Program Committee public so that any mathematician may write to this person with names of proposed speakers or topics of proposed talks. Such input might even be solicited by announcements in the newsletters of various professional journals.

2. In order to involve more effectively mathematicians from applied areas (including computer science, mathematical physics, statistics as well as industrial and applied mathematics), some sessions can be sponsored and organized by a joint subcommittee between the IMU and other professional organizations. Rather than attempting to systematically cover all major developments in the previous 4 years in applied areas (which would be a major enlargement of the Congress), such sessions might take specific 'hot' topics and present a set of talks on such topics which give mathematicians in unrelated fields a chance to get an overview of this development. The joint committee sponsoring these sessions might also give feedback to the Program Committee for talks in other areas which could attract more participation from mathematicians in their applied area.

3. The program might include some less formal talks of broad interest possibly in the evenings. Ideas here range from something like the Gibbs lectures given at the AMS to non-research topics like a survey of mathematical software now available for research or teaching. Getting names for such speakers may especially need suggestions from the community at large.

We hope that all National Committees and their delegations will consider these questions prior to the General Assem bly and will feel free to raise any other idea in this discussion.

Appendix 4:

Report of the Credential Committee to the

12th General Assembly of IMU, 1994

The Committee verified that on July 31, 1994, there were representatives from 48 countries with a total of 108 votes. Absent were 8 countries.

The Committee also verified that on August 1, 1994, there were representatives from 49 countries with a total of 110 votes. Absent were 7 countries.

Professor A. Marzollo, UNESCO, was present on both days as an observer.

Appendix 5:

Report of the Finance and Dues Committee to the

12th General Assembly of IMU, 1994

The Committee consisted of C.L. Terng, USA (Chairperson); A. Gonchar, Russia; O. Lehto, Finland; D. Nguyen, Vietnam; J.Siciak, Poland and J. Palis, IMU Secretary;

The Committee studied the financial report for the years 1989-1993 presented by the Secretary of the IMU, and examined the budget for the period 1995-1998 prepared by the Executive Committee.

The Committee recommends to the General Assembly the acceptance of the financial report for the years 1990-1993 and the Executive Committee budget for the 1995-1998 period.

The budget for 1995-1998 has been prepared on a basis of about 10% increase in the dues of the Union. The committee supports the proposal of this raise of the basic unit dues to 1200 Swiss Francs. The increase is justified in view of the projected inflation for the next four years.

It is to be pointed out that the IMU can operate with notable efficiency based on such a limit budget only because it gets institutional support. The most important contribution is made by IMPA to the Secretary, Prof. Jacob Palis.

In addition, several professional societies made generous contributions to the Special Development Fund during the past four years. This allowed IMU to support many more young mathematicians from developing countries to participate in the ICM 94 and to substantially increase the support to the important activities of Commission on Development and Exchange.

Finally, the Committee expresses its thanks to the Executive Committee and in particular to the Secretary, Prof. Jacob Palis, for the preparation of the clearly written financial reports and proposed budget.

Appendix 6:

Approved IMU Budget for the years 1995--1998,

in Swiss francs

EXPENDITURE

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Schedule A:                           1991-1994  1995-1998

Secretarial help, IMU office             19.400     15.000
Secretarial help, President               2.000      3.000
ICMI                                     10.000     11.000
CDE                                       5.500      6.000
Office expenses (including postage)       7.500      8.400
Travel expenses of the E.C.              25.000     27.600
President's and Secretary's expenses      2.000      2.000
Contribution to ICSU                      5.000      7.000
IMU Bulletin                              2.000      2.000
Audit fee                                 2.000      2.000
General Assembly - 1998                   3.500      4.000
World Directory of Mathematicians        18.000     20.000
Contigencies                              2.000      2.000

Subtotal                                104.500    110.000


Schedule B:

Symposia, confer, IMU lectures           56.000     65.000
ICMI scientific activities               18.000     22.000
CDE scientific activities                15.000     40.000
Program Committee for ICM 98              5.500      6.000
Travel grants                            15.000     25.000
Subvention to ICM 1998                   24.000     26.000

Subtotal                                133.500    184.000


Total                                   238.000    294.000
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INCOME:

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Membership dues (175x1200)              187.000    210.000
ICSU subvention                          20.000     26.000
Sales of W.D.M.                          12.500     10.000
Special Development Fund                 15.000     25.000
Interest on bank accounts                 3.500     23.000

T o t a l                               238.000    294.000
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Appendix 7:

List of Participants: Delegates, Alternates and Observers

```
Reg   Code  Country              Group   Name

001   1     Argentina              II    MACIAS, Roberto
002   1     Argentina                    SANCHEZ, Christian Urbano

003   1     Australia                    MORRIS, S.A.
004   1     Australia             III    RUBINSTEIN,J. H.
005   1     Australia                    SLOAN,  I.H.

006   1     Austria                      GRUBER, R.P.
007   2     Austria                II    HELMBERG, G.
008   1     Austria                      HLAWKA, E.
009   2     Austria                      REICH, L.

010   1     Belgium                      MAWHIN,  J.
011   1     Belgium               III    SCHMETS, J.
012   1     Belgium                      VANHECKE, L.

013   3     Bosnia                       AVDISPAHIC

014   3     Bolivia                      SOLOGUREN, S.

015   1     Brazil                       MENDES, P.
016   1     Brazil                 IV    VIANA, M.
017   1     Brazil                       SOARES, M.

018   1     Bulgaria                I    SENDOV, B.

019   1     Cameroon                I    HOGBE NLEND, H.

020   1     Canada                       FILLMORE, P.
021   1     Canada                 IV    FRIEDLANDER, J.
022   1     Canada                       HUSSIN, V.
023   1     Canada                       TIMOURIAN, J.

024   1     Chile                   I    REBOLLEDO, R.

025   1     Chinese Math. Society        CHANG, K.
026   1     Chinese Math. Society        FENG, K.
027   2     Chinese Math. Society III    LI, Z.
028   2     Chinese Math. Society        SHI, S.Z.
029   1     Chinese Math. Society        YANG, L.

030   1     Math.Soc.loc. in Taipei      HWANG, C.
031   1     Math.Soc.loc. in Taipei II   WANG, H.C.
032   2     Math.Soc.loc. in Taipei      CHANG, G.J.
033   2     Math.Soc.loc. in Taipei      LIU, F.C.

034   1     Croatia                 I    IVANSIC, I.

035   1     Cuba                    I    LAGOMASINO,G.L.
036   2     Cuba                    I    MARTINEZ-FINKELSTHEIN

037   1     Czech Rep.                   FIEDLER, M.
038   1     Czech Rep.             II    JARNIK, J.
039   2     Czech Rep.                   PUDLAK, P.

040   1     Denmark                II    FUGLEDGE, B.
041   1     Denmark                      HANSEN, V.L.

042   1     Egypt                   I    ASHOUR, A.

043   1     Finland                II    LEHTO, O.
044   1     Finland                      RICKMAN, S.

045   1     France                       BISMUT, J.M.

046   1     France                       HERMAN, M.
047   1     France                       LABORDE, C.
048   2     France                 V     PUEL, J.P.
049   2     France                       CHALEYAT-MAUREL, M.
050   1     France                       PANSU, P.
051   1     France                       TITS, J.
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052   3   UNESCO - France              MARZOLLO, A.

053   1   Georgia              II      GORDEZIANI, D.
054   1   Georgia                      KIGURADZE, I.

055   1   Germany                      AIGNER, M.
056   1   Germany                      BIERSTEDT, K.D.
057   1   Germany              V       GRÖTSCHEL, M.
058   1   Germany                      HIRZEBRUCH, F.
059   1   Germany                      WINKLER, Z.

060   1   Greece               I       ARTEMIADIS, N.

061   1   Hong Kong            I       SHUM, K.P.

062   1   Hungary                      BABAI, L.
063   1   Hungary              III     KATONA, G.O.H.
064   1   Hungary                      SOS, V.T.

065   1   Iceland              I       STEFANSSON, J.R.

066   1   India                        DANI, S.G.
067   1   India                III     PARIMALA, R.
068   1   India                        PARTHASARATHY, K.R.

069   1   Iran                 II      SEDDIGHI, K.

070   1   Ireland              II      GOLDSMITH, B.
071   1   Ireland                      HOLLAND, F.

072   1   Israel                       DVORETZKY, A.
073   1   Israel               III     LINDENSTRAUSS, J.
074   1   Israel                       LUBOTZKY, A.

075   1   Italy                        CILIBERTO,  C.
076   1   Italy                        CERCIGNANI, C.
077   1   Italy                IV      CONTE, A
078   2   Italy                        ROBBIANA, L.
079   1   Italy                        SBORDONE, C.
080   2   Italy                        VOLCIC, A.

081   1   Ivory Coast          I       NEZIT, P.

082   1   Japan                        ARAKI, H.
083   1   Japan                        IITAKA, S.
084   1   Japan                V       MORIMOTO, M.
085   1   Japan                        SAWADA, T.
086   1   Japan                        YAMAGUTI, M.

087   3   Kazakhstan                   SULTANGAZIN, U.M.

088   1   Korea, Rep. of               CHANG, K.S.

089   2   Korea, Rep. of       II      CHOI, B.D.
090   1   Korea, Rep. of               WOO, M.H.

091   1   Mexico                       ACOSTA, M.E.C.
092   1   Mexico               II      AGUILAR-GONZALEZ, M.
093   2   Mexico                       EUDAVE-MUNOZ, M.
094   2   Mexico                       NEUMANN COTO, M.

095   1   Netherlands          III     THOMAS, E.G.F.
096   1   Netherlands                  VAN DER WEIDE, J.A.M.

097   1   New Zealand          I       CONDER, M.D.E.

098   1   Nigeria              I       KUKU, A.

099   1   Norway               I       STOERMER, E.

100   3   Palestinian Math. Society    SHEBAN

101   2   Philippines          I       CEJALVO, F.
102   1   Philippines                  NAVARRO, M.P.

103   1   Poland                       CIESIELSKI, Z.
104   1   Poland                       HULANICKI, A.
105   2   Poland               III     JAKUBCZYK, B.
106   1   Poland                       SICIAK, J.
107   2   Poland                       SIMSON, D.

108   1   Portugal             I       DIAS-ADUDO, F.R.

109   1   Russia                       ARNOLD, V.
110   1   Russia                       GONCHAR, A.
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111    1    Russia                V     IBRAGIMOV, I.
112    2    Russia                      LAVRENTIEV, M.
113    1    Russia                      OSIPOV, Y.
114    1    Russia                      ZIZCENKO, A.

115    2    Saudi Arabia          I     AL-SALMAN, S.A.
116    1    Saudi Arabia                AL-THUKAIR, F.

117    1    Singapore             I     TAN, E.C.

118    1    Slovakia              II    BRUNOVSKY, P.
119    1    Slovakia                    JENDROL, S.

120    1    Slovenia              I     LEGISA, P.
121    2    Slovenia                    PETEK, P.

122    1    South Africa          II    BECKER, R. I.
123    1    South Africa                VAN DER WALT, A.P.J.

124    1    Spain                       ALSINA, C.
125    1    Spain                 III   AROCA, J. M.
126    1    Spain                       MARGALEF-ROIG, J.

127    1    Sweden                      HEDBERG, L.I.
128    1    Sweden                III   SJÖGREN, P.
129    1    Sweden                      THOMEE, V.

130    1    Switzerland                 CARNAL, H.
131    1    Switzerland           III   CHATTERJI, S.D.
132    1    Switzerland                 SIGRIST, F.

133    1    UK                          BALL, J.M.
134    1    UK                          HITCHIN, N.J.
135    1    UK                    V     LANCE, E.C.
136    1    UK                          RINGROSE, J.R.
137    1    UK                          WRIGHT, J.D.M.

138    1    USA                         DOUGLAS, R.
139    1    USA                         GRAHAM, R.
140    2    USA                   V     KREIDER, D.L.
141    1    USA                         POLLAK, H.O.
142    1    USA                         RICHARDS, D.
143    1    USA                         TERNG, C.L.

144    1    Venezuela             I     OCTAVIO, A.

145    1    Vietnam               I     NGUYEN, D.T.

146    1    Yugoslavia            II    KADELBURG, Z.
147    1    Yugoslavia                  PERIC, V.
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Code:
1 Delegates
2 Alternate Delegates
3 Observers

Report of the International Congress of Mathematicians 1994

By Professor Henri Carnal, President of ICM/94

The International Congress of Mathematicians 1994, was held in Zurich, Switzerland, on August 3-11. A total of 2536 participants from 87 countries attended together with 363 accompanying members and 77 exhibitors of publishing companies. The Congress was organized under the auspices of the International Mathematical Union by the Swiss Mathematical Society and was supported by the University Foundation of the Canton Zurich, the ETH domain of the Swiss Confederation, the Swiss National Science Foundation, the City of Zurich, the Swiss Academy of Sciences and many private corporations.

The Opening Ceremony took place in the Congress Hall of Zurich in the morning of Wednesday, August 3. The President of the International Mathematical Union, Prof. Jacques Louis Lions, declared the Congress open and announced the following members of the Program Committee, wish was responsible for the scientific program of the Congress: L.Nirenberg (Chairman), S.K.Donaldson, V. Drinfield, P. de la Harpe, R. Karp, H. Kraft, A.Majda, M. Raynaud and Ya. Sinai. Then, by his proposal, Prof. Henri Carnal, the President of the Organizing Committee, was elected President of the Congress and, by proposal of the Organizing Committee, Beno Eckmann, the founder of the Mathematical Research Institute at ETH-Zurich and former Secretary of IMU, was elected Honorary President. Welcome Addresses were given by Mrs. Ruth Dreifuss, Head of the Swiss Federal Department of Home Affairs, by Dr. Alfred Gilgen, Head of the Department of Education of the Canton Zurich and by Dr. Thomas Wagner, City Councillor of Zurich. The Chairman of the Fields Medals Committee, Prof. D. Mumford, announced the recipients of the Fields Medals: Jean Bourgain, Pierre-Louis Lions, Jean Christophe Yoccoz and Efim Zelmanov. Prof Eckman handed the medals and the prizes to the winners. The Chairman of the Nevanlinna Prize Committee, Prof. J.L. Lions, announced Avi Wigderson as teh recipient of the prize, which was handed again by Prof. Eckman. The Fields Medal Committee consisted of Prof. David Mumford (Chairman), J. Tits, V. Arnold, L. Cafarelli, B. Mazur, S. Varadhan, D. Sullivan, M. Kashiwara and A. Schrijver, and the Rolf Nevanlinna Prize Committee consisted of Prof. J.L. Lions (Chairman), H.W. Lenstra, R. Tarjan, M. Yamaguti and J. Matijasevic.

In the afternoon of August 3, addresses on the works of the prize winners were given. L.Caffarelli described the work of J.Bourgain, S. Varadhan the work of P.L.Lions, J.Matijasevic the work of A.Widgerson, A.Douady the work of J.C. Yoccoz and W.Feit that of E.Zelmanov. From August 4 to August 11, except for Saturday, August 7, one-hour plenary addresses were delivered in the Congress Hall in the morning (on the last day also in the afternoon) and 45-minutes section lectures in up to 7 parallel sessions were held during the afternnon in the rooms of the University and of the ETH Zurich. In total, there were 16 plenary and 148 section lectures. The speakers had been invited by the Organizing Committee according to the decisions of the Program Committee. Six invited speakers declined for different reasons and two didn't show up. In addition, there were 4 lectures invited by the International Commission on the History of Mathematics, which were scheduled along with the section lectures and 978 short communications appeared in a Book of Abstracts. Most of them and some 100 additional contributions were presented at the poster session which took place at ETH during the afternoon. There were also several informal seminars as well as a symposium organized on Thursday, August 4, by the Association for Women in Mathematics and European Women in Mathematics.

The Organizing Committee was able to support the prize winners, the officials of IMU, 19 of the invited speakers and some 200 participants from Eastern Europe. The International Mathematical Union through its Special Development Fund, paid the travel expenses of 79 young scholars from developing countries whose living expenses were covered by the Organizing Committee.

At the Closing Ceremony in the afternoon of August 11, Prof. J.L.Lions announced the new members of IMU Executive Committee and of ICMI, CDE and ICHM for the term 1995-1998 and the site or ICM98, as decided by the General Assembly in Lucern. Prof. F. Hirzebruch invited the mathematicians of the world to meet in Berlin in 1998. A banquet was offered to the participants on Friday, August 5, a classical concert by H.H.Schneeberger (violin) and G.Wyss (piano) on Tuesday, August 9 and a performance by the pantomime

group Mummenschanz together with the folk music group Trio da Besto on the same evening.

Opening Ceremony of the XXII International Congress of Mathematicians

Speech by Prof. Jacques Louis Lions, President of IMU

Mesdames, Messieurs,

Jái l'honneur de saluer:
Madame Ruth Dreifuss, Conseillère Fédérale,
Madame Hedi Land, Présidente du Gouvernement Cantonal Zürichois,
Monsieur le Dr. Thomas Wagner, représentant du Conseil Municipal de la Ville de Zürich,
Monsieur le Dr. Alfred Gilgen, Directeur de lÍnstruction Publique du Canton de Zürich,

Je les remercie trés vivement de leur présence ainsi que les Professeurs
Clive Kuenzie, Prorecteur de l'Université de Zürich,
Ralf Hütter, Vice-Président de l'École Polytechnique Féderale de Zürich,
Dominique de Werra, Vice-Président de l'École Polytechnique Fédérale de Lausanne,
André Aeschlimann, Président du Conseil de la Recherche au Fonds National et
Les Professeurs K. Chandrasekharan et J. Moser, anciens Présidents de l'Union Mathématique Internationale.

Je poursuis en Anglais
Excellencies,
Ladies and Gentlemen,

Already now mathematics, in addtion to its intrinsic importance, is one of the keys for the development of other sciences and of industry. Everything indicates that this already fundamental role will increase during the net century.

This implies *responsibilities* for *us* and for our *governments*:

1. continue, and even increase the support to mathematical research of the highest quality;
2. further develop collaborations and exchanges with other disciplines and with industry;
3. help as much as possible the Mathematical Instruction and the Mathematical Research in countries suffering of difficult economic situations;
4. we should explain as clearly as possile what we are doing to a not too specialized public.

These four points are the aims pursued by the Executive Committee of IMU, according to the wishes of the General Assembly in Kobe in 1990, and Lucern in 1994. These are also the aims of the Commissions of IMU, namely ICMI and CDE and of the WMY 2000, launched by IMU at IMPA, Rio de Janeiro, co-sponsored by UNESCO and the Third World Academy of Sciences.

These four points are also reflected in the present Congress.

The Program Committee has been nominated by the Executive Committee of IMU and by the Swiss Organizing Committee. It had the responsability of the selection of the speakers.

The Chairman of the Program Committee is Professor Louis Nirenberg and the members are: S.K.Donaldson, V. Drinfeld, P.de la Harpe, R. Karp, H. Kraft, A. Majda, M. Raynaud, M.Sato and Ya. Sinai.

Je passe maintenant la parole au Professeur Henri Carnal, Président du Comité d'Organisation du Congrès International des Mathématiciens 1994, qui devient le President du Congres par acclamation.

Words at the Opening Ceremony of the ICM 94 on the Fields Medals

by David Mumford

I would like to thank our Swiss hosts very warmly for organizing so flawlessly and for giving us such a beautiful locale for the 1994 ICM.

I am here as the chairman of the Fields Medal Committee for this Congress, whose other members are:

- Luis Caffarelli
- Masaki Kashiwara
- Barry Mazur
- Alexander Schrijver
- Dennis Sullivan
- Jacques Tits
- S.R.S. Varadhan

I should add that we consulted many others in making our decisions.

As the committee compiled lists of names of candidates and their accomplishments, we found ourselves both pleased and awed by the great fecundity of recent mathematics, and by the great number of possible candidates representing a great number of areas of mathematical research. What to me it the most miraculous aspect of our field is that it is growing in so many directions: limbs sprout new growth and new shoots go off in unexpected dimensions. There is growth by deep and subtle proofs of old problems, and by the discovery and exploration of wholly new phenomena with new models. Our response to this is to try to reward excellence in as many areas as possible. Fields himself realized that at least two medals were needed "because of the multiplicity of the branches of mathematics" and, as you know, this has grown to three or four medals. With at most four, we have to make quite a few very painful choices.

Fields also said in his 1932 memorandum on the Medals:
"It is understood that in making the awards, while it was in recognition of work already done, it was at the same time intended to be an encouragement for further achievements on the part of the recipients and a stimulus to renewed effort on the part of others... with a view to encouraging furter development along these lines".

We have followed previous committees interpreting his intend by restricting ourselves to considering candidates who are at most 40 (forty), in the year of the award ceremony. His words also bring up an issue which is central to the future of our field: in many countries, governments have been attempting in the last few years to channel mathematical research along lines that bureaucrats deem to be productive and useful. Note that Fields' recommendation is instead to let mathematics develop by its internal forces, to let its success encourage further success. I agree with him that, in the long run, this will produce more results for both mathematics and for society.

Finally, we must bear in mind how clearly hindsight shows that past recipients of the Fields' Medal were only a selection from a much larger group of mathematicans whose impact on mathematics was at least as great as that of the chosen.

So now, with great pleasure, let me announce the recipients whose work, in the view of the whole committee, embodies the best in mathematicas today. In alphabetical order, they are:

- Jean Bourgain (IHES, Univ. of Illinois, Inst. for Advanced Study)
- Pierre-Louis Lions (Univ. de Paris, Dauphine)
- Jean-Christiphe Yoccoz (Univ. de Paris-Sud, Orsay)
- Efim Zelmanov (Univ. of Wisconsin, Univ. of Chicago)

Speech by Henri Carnal,

President of the Organizing Committee of ICM/94

In the name of the organizing committee to Zürich today. As you know, this is the third time that the International Congress of Mathematicians takes place in this city. In the year 1897, at the very first of these meetings, the plenary speakers were Hurwitz, Felix Klein, Peano and Poincaré, four outstanding scientists, whose names and achievements are still familiar to us, even after one hundred years of tremendous change in science and society.

This lasting quality of mathematical ideas is certainly one of the most fascinating aspects of our science. Another aspect, which is at least as important, is the universality of mathematical activity, a feature that Hermann Weyl emphasized in a speech in 1932, when the Congress came to Zürich for the second time. On that occasion, at the beginning of the darkest period of our century, the world's scientific community was called upon to develop a new sense of solidarity, arising from a joint search for truth.

Six decades later, we face a completely different world balanced (precariously) between order and chaos. When we began our preparatios for this event, in the summer of 1989, the borders in Europe seemed to be topologically and even metrically invariant, so that we didn't include them in the list of problems that we might have to cope with. Since then, we have witnessed the birth of many new countries and of many new mathematical societies. We are very glad to note that most of them have found their way to Zürich. We are especially pleased to be able to welcome tha representatives of the Bosnian Mathematical Society, and to thank the authorities and the people who helped to organize their journey out of Sarajevo.

As well as the political instability of the last few years, we have also seen serious world economic problems, from which Switzerland has not been completely excluded, and it was by no means evident that we would find the financial support we needed for the Congress. We are therefore deeply grateful to all of those who have helped us, and with unexpected generosity. I would like especially to mention the federal authorities, the ETH's of Zürich and Lausanne, the Swiss National Science Foundation, the Cantonal Government of Zürich and its University Department, the City of Zürich, many private companies in insurance, banking, chemicals, commerce and industry and, last but not least, the International Science Foundation in Washington. I wish to thank my colleagues in the Finance Committee who not only helped us to raise funds, but who also suggested many ways to make this event more attractive.

We have tried to use the money we received with the greatest possible efficiency, but we have been forced to the conclusion that optimization problems in real life are very different from what they are in theory! We hope nonetheless that the positive aspects outweigh the negative ones, and that you will enjoy the former and forgive us the latter.

Let me end with two pleasant remarks about the Congress of 1932: The first one is that we have among us Prof. J. J. Burckhardt, who was active in the organization 62 years ago. By extrapolation, we may assume that some of today's participants will be able to attend the fourth congress in Zürich in the middle of the next century. The second remark relates to a comment that I found in a historical survey on the International Mathematical Congresses concerning that meeting of 1932: "In a country which at that time didn't allow women to vote, it was distinguished by the inclusion of a woman mathematician - Emmy Noether... But the number of women who have been invited to speak at the international congresses since Noether does not differ much from 0! I am therefore happy to observe, not only that the number of plenary lectures by women will be this time greater than 0, and even greater than 1, but also that the highest federal and cantonal authorities are both represented here by women. This shows that we can always hope for positive changes!

And now I request your help in the election by acclamation of the Honorary President of the Congress. I propose to you fhe former secretary of the IMU and founder of the Mathematical Research Institute at the ETH, Prof. Beno Eckmann.

Speech by Professor Beno Eckmann,

Honorary President of ICM '94

Ich danke Ihnen und dem Kongress-Komitee herzlich für die grosse Ehre, die ich im Namen der Schweizer und im besondern der Zürcher Mathematik annehme.

Je vous remercie ainsi que le Comité du Congrès trés sincérement pour le grand honneur que vous venez de me témoigner. Je voudrais aussi exprimer ma reconnaissance à nos amis de la Suisse Romande pour leur contribution si importante a la vie mathématique.

Vorrei ringraziare cordialmente il Comitato e tutti i presenti per il grande onore reso a me con questa nomine; e saluto in modo particolare i matematici della Svizzera di lingua italiana.

I accept the great honor in the names of Swiss and, in particular, Zurich Mathematics. I have expressed my most sincere thanks in three of our national languages; to my regret I don't speak the fourth, so I have switched to English. Let me add a few words in that language. I have to confess that I did not participate in the tremendous work of preparing this Congress. So, in any case from that viewpoint, I do not deserve being elected Honorary President. I can accept, however, that honor with not too bad a conscience: Indeed I have been very active in the preparation of two earlier Congresses, namely 1958 Edinburgh and 1962 Stockholm, when I was Secretary of the International Mathematical Union. It can be said that this was a very important and interesting period for international collaboration in all aspects of Mathematics. May I recall first of all that just at that time many countries, which did not up until then adhere to the IMU, became members. One can imagine that quite some difficulties of a political, personal and financial nature had to be overcome, but it was a gratifying challenge. For, through the Union, mathematicians became a truly worldwide family. Secondly, a decision was taken which today seems most natural, namely, that the Scientific Program of the International Congress be prepared by the IMU, since that task could not be handled any longer by a single country. Stockholm was the first Congress where the new scheme was adopted, after several - very friendly - discussions. Nowadays, the functioning of the international collaboration in Mathematics can certainly be considered as a model for many other fields.

Something else has, since these times, considerably changed local and global mathematical life. I think, of course, of the computer, as a tool within our science and as a marvellous means of communication. I believe there are very few mathamaticians who have not taken advantage of any derived great benefit from the fabulous possibilities of this tool. But we should not forget taht the most important tool of a mathematician is the fellow mathematician! And that is why we are all here today: to exchange ideas, views, and results, and to listen to each other.

With regard to the computer I have heard over and over again the saying: *Whether mathematicians like it or not, the computer is here to stay.* I do not agree with that formulation. We like the computer and we use it. But today I find it important to turn that phrase around and say: *Whether the computer likes it or not, mathematics are here to stay.* This means Mathematics as the art of creating concepts out of the vague intuition and evidence of the real world and of everyday life; and then to put these concepts to work and experiment with them by all available means; to see relations, conjectures and theorems emerge; and to prove the same by the good old traditional proof, which is at the heart of our science. For mathematics is, and remains, an abstract intellectural enterprise, despite the fact that natural sciences and technology, and much more, bear witness to its practical usefulness. Sometimes it is the same person who speculates and conjectures, provides proofs, and makes applications to our real world; but more often this is done by different people and at different times - personal collaboration always remains an essential feature.

Most beautiful evidence of all the above is given by the scientific program of our Congress - and by the impressive work of the laureates of the Fields Medal, which is the most prestigious distinction in Mathematics. It will be my duty and immense pleasure to hand over the medals to the winners. Let me congratulate them in advance. I share their feelings of pride and accomplishment, and I am looking forward to their continued success - hoping that I will be able for some time to understand their work. I also share the feelings of the many who are disappointed because they did not get the medal; there is simply too much

excellent work being done!

Mathematical research indeed seems to live in a golden age. As for the mathematical education of coming generations, however, I must say that I see some danger: there are worlwide trends trying to completely replace rigorous reasoning and proving by computer visualisation and experimentation. This is not the place to elaborate on the theme of the central importance of rigorous proof. Instead let me quote Hermann Weyl (who spent a long and very important period of his scientific life in Zürich):

Mathematics, besides language and music, is one of the primary manifestations of the free creative power of the human mind and it is the universal organ for world-understanding through theoretical construction. It has to remain an essential element of the knowledge and abilities we have to teach, of the culture we have to transmit to the next generations.

May I just add: To achieve more we dare not hope; to achieve less we mus t not try.

SPEECH BY FRAU BUNDESRÄTIN RUTH DREIFUSS, Conseillère Fédérale

Ladies and Gentlemen,

A hundred years ago, in 1897, the first International Congress of Mathematicians was held in Zurich. In 1932, the Congress met in Switzerland for the second time. On that occasion, the Fields Medal was introduced as your Nobel Prize equivalent. Today, our country hosts your Congress for the third time. No other country has been honoured in such a way by your scientific community and I am sure, that the "genius loci"will show his gratitude for your fidelity and ensure the success of your work.

I feel personally very honoured to open your Congress. It is a rare opportunity to host the world's leading masters of this art and to come into contact with their scientific debate.

If the subject of your congress was cancer research or modern history, for a lay person it would be simpler to understand what the discussion is about. In contrast, mathematics at first sight, seems to be an abstract tool for its own purpose or an exclusive art.

Two years ago, in Rio de Janeiro, under the sponsorship of the UNESCO, the "World Mathematical Year 2000"was launched. On this occasion, the International Mathematical Union defined a vision for mathematics which stresses the relationship between science and society. The DECLARATION OF RIO DE JANEIRO states that "Pure and Applied Mathematics are one of the main keys to understanding the world and its development". I am sure, that society needs these keys.

But since I am not a mathematcian myself, I wonder what doors they open, and what society will find behind them. Therefore like to learn from you how mathematicians view their role in society.

With the relationship between science and society in mind, I sent three questions to over a dozen of world's most eminent mathematicians and I am very grateful for all the answers I received. For the first two questions, I refered to the distinction between pure and applied mathematics cited in the Declaration of Rio.

The first questions concerns *Pure mathematics*. Pure mathematics seems to function within a realm of complete independence. Its results have their purpose not in their usefulness to society, but in their Truth. The clarity of this truthfinds a beauty which elevates pure mathematics to an art form. But, in contrast to a harpist who delights others by her music, I fear that the pure mathematician cannot make his art accessible to a wider public. My questions then was: How can pure mathemtics justify its art to the State who finances it?

For Breno Eckmann, Mathematics "sets the standard for every objective thought"and according to Friedrich Hirzebruch, "Without mathematics there would be no structure logical thinking".

For Raoul Bott "the treasure (the mathematician) hunts is at the very core of all ... precise inquire into the world. As such (his) search must be a central concern of any enlightened state".

I agree that I am convinced of the need of mathematical thinking as a fundamental component of the modern World. Historically mathematics has been a key to open the doors to Englightment. Today, pure mathematics can still be considered as the guardian of the grail of logical thinking.

But as Roland Bulirsch puts it, "Mathematics is invisible culture". Further Jürgen Moser says that "mathematics may not be accessible for the enjoyment of a broad audience". If this culture of pure mathematicss is invisible and inaccesible how then can one show its practical use and demonstrate its tangible results?

Armand Borel explains that "mathematics resembles an iceberg: beneath the surface is the realm of pure mathematics, hiden from the public view.... Above the water is the tip, the visible part which we call applied mathematics".

According to Phillip Griffiths, one of the deep mysteries of life is the way in which the best pure mathematics, pursued for its own sake, inexplicably and unpredictably turns out to be useful".

Jürgen Moser adds "The difficulty in getting this message across, lies in the longer time span needed to recognize the significance of mathematical discoveries.... sometimes twenty or more years have to elapse... Politicians unformtunately often think in much shorter terms". This is certainly true not only for politicians but for society as a whole. In modern times we insist on increasing shorter timespans for everything in our life. We ask for immediate return on investment. We want real time information. The life span of technologies are getting shorter and shorter: Cost efficiency and speed have become the basic criteria to judge any human activity. This is dangerous because it is shortsighted.

In such an environment it is very important to continue to recognize that knowledge is a value of itself. Mathematics or Philosohpy or any basic research developments only thanks to the principle which is an important part of our civilization. If we start to forget it, we jeopardize the roots of our progress.

The future is unpredictable. We cannot judge knowledge on the basis of its immediate usefulness. As an example, the work of Vaughan Jones, who connected three dimensional knot theory with functional analysis, was awarded the Fields Medal at your last congress in Kyoto on the basis of its intrinsic merit. Later, his theory was utilized by physicists in statistical mechanics and by biologists to explain the structure of DNA. It is only through the recognition and support of basic research that society can ensure the continued and full development of scientific progress.

Let us turn to applied mathematics. Today, *applied mathematics* has become a basis for all other siciences and has a tremendous impact on life in modern societies. Applied mathematics is hereby both hightly relevant and useful to society but it has lost its innocence. However, in contrast to the debate on the responsability of nuclear physics and genetechnology, it seems to me that there has been little ethical discussion on the role of mathemtics in society. Thus here was my second question: *Has mathematics avoided such discussions?*

There are mathematicians who claim moral neutrality for their science. René Thom for example writes me that "Mathematics by itself is ethically neutral".

But Sir Michael Attiah reminded me in his answer, that the "atomic bomb was only built after extensive mathematical calculations" and Jürgen Moser adds that "the renown mathematicians von Neumann and Ulam played an important role" in this project.

Armand Boreal asks "should one see the fact that mathematics is at the base of artillery or guided bombs as an ethical problem?" Yes, I think one should.

It is true that "most mathematicians are away from the decisions of the application" of their work, as Friedrich Hirzebruch puts it. Breno Eckmann goes even further, when he days: "For mathematics itself this (ethical and political) discussion is not relevant... As a purely intellectual activity, it could not be influenced by such a discussion, Of course, those who apply mathematics have to face (this) discussion".

However, I do not think that making a distinction between abstract theory and practical application can altogether eliminate the ethical problem. We owe much of our progress in society to mathematicians and we have to recognize their merits while at the same time they have to assume their responsibilities.

Raoul Bott has expressed his argument against ethical neutrality, writing to me "That the age of innocence has come to an end for us all".

I am convinced this is true not only for science, but for most human activities. Today, thanks to science, our socity has developed a tremendous power to control nature. This power enables us to take our destiny in our hands. But this power forces us to assume the responsabilityites bound to it. If the age of innocence has come to an end, we have to recgnize that it is the age of responsability that has replaced it.

Let's turn now to my last question: If, as Minister of Science, I had the possibility to create 10 new professorhsips in Swiss Universitites, *how many of them should I give to mathematics and why?*

Phillip Griffiths is generous with his science and answers: "They should all go to mathematical scientists".

So is Gerd Faltings: nine chairs for mathematics, but - as he likes music - he leaves the tenth chair to the harpists.

Sir Michael Attyiah, Friedrich Hirzebruch and Jürgen Moser request four or five chairs for mathematics. That is about the average of all the answers. In fact, in. Switzerland today only one chair out of twenty is held by mathematics.

Some replies focus exclusively on the needs of natural sciences. This is surprinsing. When one considers the complexities of the problems that face society, I am convinced that their solution will require a support and dedi cated effort of the social sciences and humanities in close collaborations with natural sciences.

In view of the growing importance of science I understand why scientist ask for more means, why they want more professorships than they have. Scientists are increasingly expected to find solutions to all of all problems. It is more than legitimate that you ask for the necessary means from society.

Science and research are crucial today. You don't have to convince me of this as minister of science, but together we have to convince the public and the Parlament. We have to convince the taxpayer. This is a difficult task when public budgets are running huge deficits.

One problem is that the growing impact of science in society is not felt when we drive a car or use a phone. Most people are not aware of the scientists whose work is behind everything in our everyday life. Ask for instance any Swiss "Whose portrait is on the ten francs note?" They won't be able to tell you. They have never notice that it is Leonhard Euler. Probably they don't even know who Euler is.

It is the task of the scientific community to tell the public why science matters. It is your task - and it is mine.

I wish all the best for your Congress - Thank you.

Travel Grants Report

The Travel Grants Committee (Professors M.S. Narasimhan, A.O. Kuku, Gu Chaohao, Eduard Zehnder and Jacob Palis), met in Paris, at Collége de France on April 9, 1994. The Committee received 197 applications by February 94. The Committee decided to give travel grants to 85 mathematicians, but six of them regreted that they had to decline the invitation for personal reasons. So IMU provided travel grants to 78 young researchers from developing countries and indicated one more to the Swiss Organizing Committee for local expenses. Actually, the local expenses to the 79 guarantees were covered by the Swiss.

TRAVEL GRANTS SUPPORT IN SWISS FRANCS

N A M E	C O U N T R Y	C H F
Annaby, Mahmoud H.	Egypt	963.00
Akkouchi, Mohamed	Marrocs	1,078.00
Akpan, Edet Peter	Nigeria	463.00
Ashour, Samir Abdel-Karin	Egypt	963.00
Balmaceda, Jose Maria	Phillipines	2,290.00
Basak, Gopal	India	1,640.00
Biswas, Indranil	India	261.00
Casado, Lorenzo	Brazil	1,770.00
Cheng, Qing-Ming	China	194.00
Coelho, Flavio	Brazil	1,669.00
Collier, Severino	Brazil	1,895.00
Dung, Nguyen tien	Vietnam	182.00
Eudave-Mu=Floz, Mario	Mexico	1,511.00
Finkelshtein, Andrei M.	Cuba	676.80
Flores, Fabian	Peru	1,990.50
Florit, Luis Adrian	Argentina	1,783.00
Gangbo, Wilfrid	Puorto Novo	1,643.55
Gonzales, Jorge Alberto	Cuba	2,055.00
Gunawan, Hendra	Indonesia	2,470.00
Guo, Lei	China	2,333.00
Hai, Nguyen Thanh	Vietnam	1,237.00
He, Wu	China	1,678.00
Hernandez, Carlos	Mexico	1,237.00
Hui, Kin Ming	China	2,333.00
Inamar, S.P.	India	1,744.00
Iturriaga, Renato	Mexico	1,511.00
Jiang, Yue-Mei	China	2,333.00
Jiayu, Li	China	2,333.00
Jidoumou, Ahmedou Ould	Mauritania	1,168.50
Kang, Seok-Jin (*)	Korea	0.00
Ke, Wen-Fong	China	2,333.00
Khammash, Ahmed	Saudi Arabia	1,449.00
Kohatsu-Higa, Arturo	Mexico	1,511.00
Kohayakawa, Yoshiharu	Brazil	511.00
Kwak, Minkyu	Korea	2,333.00
Li, Ma	China	2,333.00
Ling, San	Singapore	2,333.00
Lizama, Carlos	Chile	1,991.00
Ma, Wen-Xiu	China	2,333.00
Mampassi, Benjamin	Kongo	1,657.00
Maoan, Han	China	2,333.00
Marcantognini, Stefania	Venezuela	2,036.00
Moreira, Carlos Gustavo	Brazil	276.80
Nanthakumar, A.	Sri Lanka	2,333.00
Octavio, Alfredo	Venezuela	2,036.00
Okoya, Samuel Segun	Nigeria	1,511.00
Olmos, Carlos	Argentina	2,333.00
Parameswaran, A.J.	India	1,744.00
Parameswaran, Sankaran	India	1,992.00
Ramirez Alfonsin, Jorge	Mexico	1,887.00
Raghavan, K.N.	India	272.34
Recalde, Marco Vinicio	Equador	2,062.50
Ren, Jiagang	China	2,333.00
Riahi, Hasna	Tunisia	229.00
Roy, Rahul	India	1,785.00
Ruggiero, Rafael Oswaldo	Venezuela	187.00
Salinas, Oscar	Argentina	2,265.00
Sastry, Pramathanath	India	335.52
Sidoravicius, Vladas	Brazil	1,985.00
Srisatkunrajah, S.	Sri Lanka	2,333.00
Sujata, R.	India	1,785.00
Svaiter, Bernar Fux	Brazil	1,922.00
Tang, Zi-Zhou	China	2,286.61

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Tapia, Cesar                    Phillipines      2,333.00
Thang, Le Tu Quoc               Vietnam            182.00
Tiep, Pham Hu                   Vietnam            304.00
Tojeiro, Rui                    Brazil           1,922.00
Ures, Raul                      Uruguay          2,055.00
Uko, Livinius Ugochukwu         Nigeria          1,511.00
Wenchan, Chu                    China              367.00
Wu, Jyh-Yang                    China            2,333.00
Xi Nanhua                       China              223.00
Ye, Xiandong                    China            2,257.00
Yuan, Ya-xiang                  China            2,333.00
Zhang, De-Qi                    Singapore        2,333.00
Zhang, Jian                     China            2,333.00
Zhang, Liqun                    China            2,333.00
Zhu, Chengbo                    Singapore        2,333.00
Zubelli, Jorge                  Brazil           1,922.00


TOTAL IN SWISS FRANCS                          126,526.13
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(*) only local support

The funds for these grants came from: The Royal Society, United Kingdom, Donnations from mathematical societies, CNPq, Brazil, Committee Nat. Français, as follows:

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        1 9 9 1

American Mathematical Society           US $  14.772,93
Royal Society                           US $   8.780,27
London Math. Society                    US $   1.730,10


        1 9 9 2

American Mathematical Society           US $  27.787,00
Wiskundig Gennotschap, Netherlands      US $   1.825,40
Royal Society                           US $   8.377,21
Deutsche Math. Vereinigung              US $   6.406,74


        1 9 9 3

American Mathematical Society           US $  32.500,95
Wiskundig Gennotschap, Netherlands      US $   1.418,43


        1 9 9 4

Mathematical Society of Japan           US $  18.881,11
Royal Society                           US $   7.572,00
Comité Français des Unions Scientifiques US $  3.404,86
CNPq, Brazil                            US $   6.944,44
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Special Grants

Much in the spirit of IMU, an special effort was made to allow some mathematicians from Bosnia and Herzegovina, to attend e International Congress of Mathematicians/94. The Swiss Organizing Committee and the European Mathematical Society played a key role in helping them to leave that country and to reach Switzerland. From an early stage, IMU supported this action and promise to cover the expenses as needed. In financial terms, IMU granted CHF 1,810 to support Professors Muharem Avdispahic, M.R.S. Kulenovic and Huse Fatkic.

Also, as can be seen from the report of the President of the ICM/94, Prof. Henri Carnal, in this Bulletin, about 200 participants from Eastern Europe had their local expenses covered by the Swiss Organizing Committee.

These special programs were generously complemented by several European Mathematical Institutions that invited mathematicians from several parts of the world, to participate in satellites conferences or other activities, allowing them to also attend the Congress and, in some cases, the meeting of General Assembly.