

Key points

- ▶ Networking (i.e. world-wide communication between computer systems) has become in recent years a fundamental part of higher education and research. This trend is expected to accelerate rapidly, demanding regular increase in the bandwidth available for electronic transmission.
- ▶ Enhanced networking not only permits an increase in the volume or speed of transmission, but encourages the development of totally new research methods and directions and new developments in the delivery of higher education. This has been recognised in the new Prodi initiative for e-Europe and the acceleration of Europe into an “Information Society”. This initiative recognises the particular needs of the research and higher education community, which are reflected in the recent discussion document “Towards a European Research Area” from EU Research Commissioner Busquin. High bandwidth networking is an essential prerequisite for these concepts.
- ▶ While Europe has made significant advances in its networking capacity, both within and between countries, it continues to lag well behind the facilities available in the major educational and research centres in the United States. If this situation is allowed to continue, Europe could find itself excluded from major new developments in research techniques.
- ▶ As electronic communication comes to play a larger role in many areas of society (for example in e-commerce, business and in the home) evidence is accumulating that healthy networking contributes to many other areas of the economy. At the same time, as pressure for bandwidth increases from these sectors, progressive increases in bandwidth must also be provided in order to protect the services available to research and education. Advanced methods of organising distributed computing, known as computational and data “grids”, will add further pressure.
- ▶ While the emphasis being placed on access by schools to electronic networking is welcomed, this potentially enormous increase in usage does carry some threat to the capacity available for higher education and research. Steps must be taken to provide the necessary bandwidth required by these two communities while protecting the needs of the research and higher education sector.
- ▶ Congestion and poor network performance may potentially occur at any point on the transmission path invoked. Attention has to be given to the capacity and quality of the network infrastructure at all sites, such as university campuses, where end-users work, as well as to the capacity of the national network and the international connections.
- ▶ European researchers need good intercontinental network connectivity. For this, a well-organised distributed access to the pan-European network backbone is required which can provide the link to North America and elsewhere.
- ▶ Both national authorities and the EU must recognise the need to secure a long-term commitment to invest in the provision of high bandwidth networks for Europe and to ensure that all regions have full access to them.
- ▶ The current high bandwidth network already in place needs to be maintained and developed. Following the launch of TEN-155, the present European research backbone, planning has already begun for the subsequent expansion, known by the working name of GÉANT. Due to the transition between the EU’s Fourth and Fifth Framework Programmes, and various other factors, progress has been delayed. This emphasises the difficulties in operating within the short-term funding approach of the Framework Programme. All parties, and especially the European Commission, must face up to their responsibilities and reach a definite conclusion in the coming weeks on the detailed mechanisms by which the transition from TEN-155 to GÉANT will be handled, in order that GÉANT can be fully operational by November 2000.
- ▶ Despite significant falls taking place in the unit cost of bandwidth, the overall level of funding for research and educational networking in Europe still needs to grow for quite some time to come. This is in order to meet the rapidly increasing demands for higher bandwidth and more access points. The potential rewards for research in Europe clearly warrant this investment both for research and the health of the overall economy.

Concepts of Time

12th Annual Meeting of the Academia Europaea, Prague, June 2000

Prague philosopher Jan Sokol set the theme for the 2000 Annual Meeting in his opening lecture "The Two Faces of Time". The two faces he identified were scientific time, measurable and definable; and time experienced, a much more slippery and difficult concept, with its sense of tenses, past, present and future events which can be realised together, and the agonising disappearance of the present into a single point of nothingness. These two faces of time, one precise and the other impossible to grasp, were to recur in many of the presentations.

The City of Prague provided a memorable and symbolic location, with its beautifully preserved streets representing many periods of European history, and its famous astronomical clock lending a visual motif for the event. The Mayor of Prague, Jan Kasl, reminded the Academia in his welcoming address of the importance of the city in the astronomical discoveries of Brahe and Kepler. Representatives of the Czech Academy, the Charles University and the Bohemian Learned Society also participated in the welcoming ceremony. Ten "Burgscholars", young post-docs selected by Czech members of the Academia for their highest quality achievements, were also introduced, and participated fully in the meeting.

The Erasmus Lecture was delivered by Kristof Glamann of Copenhagen, on the linear model of time in History. He analysed the problems faced by the historian in handling external and internal time. The fundamental historical concepts of sequence, duration, setting and frequency are themselves time-related parameters.

During two days of intensive and high quality presentations, the speakers



focused, according to their disciplinary perspective, on one or other of these twin foci: measurable time or experienced time. Disciplines were deliberately mixed within single sessions, to give breadth and wholeness to the conference theme. Philosophy was followed by physics, then geochronology, then psychology. A biologist gave the floor to an expert in time measurement, himself followed by a cosmologist. Music, mathematics and genetics were also included. The consensus of participants was that this risky experiment had been brilliantly successful, thanks to the adaptability of the speakers and their excellent sense of the interests of the audience.

André Berger's look into the past, explaining Ice Ages and other climatic variations by a masterful synthesis of the instabilities in the movements of the Earth and the Sun, was balanced by Igor Novikov's speculations about time travel and the possibility of encountering one's own past - mathematically viable, but is there more to be said? The historical development of timing in music was beautifully illustrated by Pierluigi Petrobelli with perfectly selected examples, while Guido Barbujani applied the modern techniques of genetics to answer other historical problems: how many human races exist, and how are Europeans related to others? (His answer was that the genetic differences among Europeans are several times larger than differences between Europeans and other races).

The importance of milliseconds in the human perception of meanings was explained by John Michon, while David

Ruelle analysed the role of entropy in preventing the reversal of some macroscopic physical changes. Jan Vondrak gave a comprehensive survey of the measurement of time from its historical beginnings to its present-day sophistication, while Jürgen Mittelstrass concentrated on the human experience of time and the significance of this process for revealing the nature of human beings. Jim Waterhouse explored the fascinating world of biological rhythms (plenty of scope for subjective questions!), Petr Horava raised participants' awareness of the latest thinking about time in quantum mathematics, and Martin Rees brought the proceedings to a climax with a time-history of the universe.

In addition to these multi-disciplinary symposia, the conference included three parallel specialist half-day symposia in the fields of Biology and Medicine, Linguistics and Physics.

Many of the presentations will be published in future editions of the Academia's journal the *European Review*. The meeting also included a concert of Mozart, Schulhoff and Dvorak pieces played by the Kocian Quartet in the Aula Magna of the Charles University, and ended with a magnificent reception in the Pantheon of the National Museum overlooking Wenceslas Square.

The Academia expresses its appreciation for the support of the Czech Academy, Charles University and the National Museum, and especially to Professor Jiri Niederle and Dr Tomas Kucera, for their essential roles in the planning and organisation.

Science and Higher Education in Croatia

The Academia Europaea has been invited by the Croatian Parliamentary Sub-committee for Science, Education and Culture to conduct an international assessment of Science and Higher Education in Croatia. An early fact-finding visit was made in June 2000 by a small group to prepare for more focused studies at a



(Left to right) Professors Inge Jonsson, Heinz Duddeck, Boris Kamenar and Arnold Burgen outside the Parliament Building in Zagreb, Croatia

later stage. The team from the Academia Europaea was composed of Arnold Burgen of Cambridge, Heinz Duddeck of Braunschweig, Inge Jonsson of Stockholm and Peter Colyer, Executive Secretary.

The team held interviews at the Ministry of Science, Technology and Higher Education; the Croatian Academy of Sciences and Arts; the University of Zagreb; several research institutes; and technology-based companies throughout the country. An audience was granted by President Mesic of the Republic of Croatia, and a preliminary report was presented to the Parliamentary Sub-committee.

Although Croatia is experiencing severe economic difficulties through the disruption of its traditional markets, the

team was impressed by the liveliness of the population and the generally good conditions. In some laboratories and institutes the quality of science was unquestionably high, though in others a long standing lack of investment was plainly visible. Some industries were profitable, though there was a serious lack of linkage between the industrial and research sectors. The team also encountered an excessive expectation of outside help and funding.

Another striking feature was the strong tendency towards centralised management, particularly a close involvement of the Ministry in the detailed operations of the academic and research sectors. This centralised system is partly a reaction against earlier methods of distributed “democracy” which were seen to create their own problems. The Academia team considered that this centralised system



Arnold Burgen and Heinz Duddeck discuss a point on the steps of the Croatian Academy of Sciences and Arts, Zagreb

had an adverse effect on academic and scientific freedom.

The University of Zagreb, while experiencing centralised management from the Ministry, is itself divided into over thirty autonomous faculties, which render the University itself almost



The Croatian Academy of Sciences and Arts

powerless. Moreover, there is very little co-operation between the faculties in research, in teaching, in academic appointments and even in simple matters such as purchasing. One example is that each scientific and technical faculty teaches its own courses in mathematics – at least ten different departments of mathematics.

Seven issues for examination in greater detail were identified, if the modest amount of funding required can be provided: the legal structure of Croatia; the organisation of the University; relationships between the University and industry; the need to handle public expenditures in research and education in a decentralised way; the organisation of the research institutes; the role of the national Academy; and the development of innovative ideas.

Towards a European research area

European Commissioner Philippe Busquin invited the Academia, along with other European organisations, to comment on his proposals for a “European Research Area”. Following a debate in the Council in March 2000, a working group was set up to finalise the Academia’s response, which was presented to M. Busquin by the President at a meeting in April.

A full copy of the Academia’s reply is available on request to the office. Some of the main points are set out below.

1 The Academia supports the Commission’s emphasis on the importance of research, pure and applied, as the basis of future economic success and quality of life. We also agree that European research is too fragmented, failing to take advantage of scale or recognising that the pressure from the research community is for increased international collaboration. Europe should have an overall research policy which is not merely an amalgamation of national policies.

2 Whilst taking this positive position, we are also aware of strong criticisms by the research community of the existing programmes and the way in which they operate. Programmes are perceived as being too ‘top-down’, too directive and showing insufficient flexibility.

3 EU research programmes include strongly applied research, some research related to the statutory needs of the European Commission, and fundamental research. A single approach to the decision-making about these programmes is not appropriate, and alternative non-politicised mechanisms are desirable, especially in relation to fundamental research. This would help to reassure the high percentage of researchers who have become disillusioned with existing mechanisms.

4 The concept of a European Research Area must always keep in mind a greater Europe than the 15 member states plus the current candidate countries. Whilst recognising funding realities, research programmes should wherever possible include other European countries.

5 To create a truly integrated European research area it is necessary that the higher education systems in the various countries move towards greater harmonisation. This requires a lot of work at both undergraduate and postgraduate levels.

6 The concept of “centres of excellence” must be handled with very great sensitivity. Scientific excellence is recognised by the scientific community, not awarded by a selection process or competition. A task of higher priority is to produce conditions in Europe that would enable every research centre to function optimally, rather than divide the research community into various classes of excellence. It should be recognised that the quality of any centre may change with time. The concept of a “centre of excellence” should not be translated into a “large research centre”. Many excellent centres, particularly in the Life Sciences, are quite small. A virtual centre connecting smaller groups by electronic means may in many cases lead to a more flexible and efficient structure.

7 We place a particular stress on the acquisition of the necessary linguistic skills in the academic and research communities.

Gold Medal awarded to Jacques Delors

(Left to right) The Swedish Ambassador to France, Örjan Berner, Jacques Delors and Professor Stig Strömholm at the presentation of the Academia's Gold Medal to M. Delors



The Academia's Gold Medal, awarded to those who have displayed supreme commitment to "the support and inspiration of European science", was presented to Jacques Delors, former French Minister and President of the European Commission, at a ceremony held at the Swedish Embassy in Paris on 12 May 2000, by generous invitation of the Swedish Ambassador. The event was attended by members of the Academia and of the diplomatic and press corps in Paris.

The President of the Academia, Professor Stig Strömholm, gave the following address before presenting the medal.

**Cher Monsieur Delors
Excellences,
Chers Confrères et Collègues,
Mesdames et Messieurs,**

Dans le baragouin académique et universitaire suédois - langue du pays dont l'Ambassadeur nous accueille aujourd'hui avec tant d'hospitalité, et du pays où les insignes du doctorat comportent encore, entre autres objets, un chapeau - c'est d'ailleurs un très beau chapeau qui remonte à ces chapeaux espagnols du 16^e siècle que nous voyons sur les têtes des derniers Valois et de leurs courtisans dessinés par Jean Clouet - eh bien, dans ce langage académique, on dit qu'il existe deux catégories de personnes qui reçoivent ce remarquable couvre-chef: ce sont d'un côté ceux que le chapeau honore, d'un autre côté ceux qui honorent le chapeau.

Cette façon de parler demeure vraie à propos de tous les signes extérieurs de la gloire, y compris bien-entendu les médailles. Je n'hésite pas,

cher Monsieur Delors, à vous placer dans la deuxième catégorie, parmi ceux que les autorités et les organismes qui ont la mission et le pouvoir de décerner des distinctions cherchent pour redoubler le lustre des pièces d'or, de vermeil ou d'argent dont ils disposent.

Ceci n'est pas pour dire que l'honorable Compagnie dont j'ai l'honneur d'être aujourd'hui le porte-parole manquerait entièrement de lustre. Elle compte parmi ses fondateurs et ses membres un nombre considérable de savants et de chercheurs de grand renom, français et étrangers; parmi eux vous trouverez la majorité des lauréats européens du prix Nobel. Je suis fier de voir plusieurs membres de la Compagnie parmi nous ce soir. Cette Académie a survécu pendant 12 ans, non, pensons-nous, sans rendre quelques services à la science européenne, et cela dans une honnête pauvreté et même en faisant face à des disgrâces politiques qui auraient effrayé de plus faibles. Si nobles que soient donc nos jeunes parchemins, nous avons trouvé, cher Monsieur Delors, que vous manquiez à notre gloire, et nous avons voulu y porter remède en vous décernant la médaille d'or de la Compagnie, la distinction la plus noble et la plus élevée qu'il soit en notre pouvoir de donner.

Un des avantages des personnes de votre catégorie, c'est que l'on peut être très bref en vous présentant et en expliquant les motifs de la distinction. Vos travaux, depuis vos années à la Banque de France dans l'après-guerre immédiat, depuis votre mission au

Commissariat Général au Plan Monnet au commencement des années 60, depuis votre premier porte-feuille de Ministre en 1981, ont témoigné avec netteté de l'importance que vous avez donnée à l'éducation sur tous les niveaux, à la formation professionnelle et à la recherche. Vous avez même mis main à la pâte en acceptant des postes d'enseignant à l'Université Paris-Dauphine, en présidant la prestigieuse pépinière d'Européens conscients de leurs responsabilités qu'est le Collège d'Europe à Bruges, en dirigeant le Centre de recherches sur le travail et la Société, en fondant le Club Échange et Projets, en acceptant enfin la présidence de la Commission internationale sur l'éducation pour le vingt-et-unième siècle et la présidence de l'association Notre Europe.

Les noms de ces deux derniers postes reflètent les deux éléments principaux de votre contribution à la construction de notre Europe: l'éducation, dont la recherche constitue la continuation, et la foi en l'Europe et en son avenir. Vos dix ans de présidence à la Commission Européenne, votre règne si l'on peut dire, ont été - et voilà enfin le motif principal de la distinction que j'ai l'honneur et la joie de vous remettre - ces années ont été caractérisées par un climat intellectuel et moral propice à la science, à la recherche et à l'éducation supérieure: ce sont les activités, et au coeur des activités, les valeurs que l'Academia Europaea a pour vocation de défendre et de promouvoir.

Social impacts of Virtual information

Recommendations for public policy

In March 2000 the Academia Europaea organised, in association with the Heinz Nixdorf Stiftung of Germany and the UK's "Virtual Society?" Programme, a conference on the social impacts of virtual information. The conference was attended by sixty experts with interests ranging from public policy to the development of applicable goods and services, and to research. The following Recommendations for public policy arose from the event.

Private and public domains

Electronic communications have changed the boundary between "private" and "public". The openness of the new communication systems is welcome in some areas, such as entertainment, education and e-commerce. Indeed many activities in these fields are developing specifically to meet the opportunities of open communication. However, other areas may find the changed boundaries more difficult to accept – in particular the areas of government and research. The general public will increasingly have access to these areas, which will have to introduce new practices to accommodate the interests of non-specialists. Improved public access to previously closed areas is generally to be welcomed if it leads to greater responsiveness by public representatives and better decisions, though the requirements of privacy at the personal, institutional and national levels will also have to be defined.

The public acceptance of technology

Some current technologies may have the character of "solutions seeking problems". However, these are likely to be overwhelmed by market pressures as the public identifies those applications of virtual technology which are most acceptable.

Some individuals will continue to

show resistance to computer-based interfaces. This may be an age-related problem, as younger people are generally much more open to the routine use of communication technologies. However, public authorities will have to be aware of the need for dual information systems for a possibly lengthy transitional period.

Impacts on the structure of society

The social levelling claimed for virtual technology is still unproven. Evidence points to the new technologies being more accessible to those already in a materially advantageous position.

Quality

The quality of much virtual information (websites, entertainment, games) is currently very poor. While this is regrettable, the problem is not limited to electronic media – the same could also be said of printed material and "traditional" radio and TV broadcasts. Public authorities should not try to determine artistic tastes, but will have to take action against any encouragement of illegal or anti-social behaviour.

Costs and commercial practices

Costs will be one among several constraints on the use of virtual technologies. For the user, the costs incurred whilst on-line are only one factor – hardware costs may be even more significant and the provision of public access points is a priority. For creators of virtual information, the degree of "reality" which can be introduced into virtual information is also controlled by costs.

Virtual technologies are open to abuse by monopolies. This may occur in the provision of hardware (through the deliberate design of incompatible systems) or at the commercial level (through the promotion of the products of a single supplier). Public authorities should be aware of these potential new

areas of non-competitive practice and of the need to introduce specific measures to promote commercial competition in the virtual domain.

Academic research and publishing

The nature of research is itself changing as high-powered processing and computing "grids" become increasingly available. These enhancements mean not only that traditional scientific tasks can be performed more quickly and reliably, but also that totally new types of research in previously inaccessible fields can be undertaken. Institutions which do not have access to high powered facilities and networking will begin to lose out to their rivals.

Publishing is one area, of particular interest to the academic community, where the relative economics of printed and electronic publishing have not yet stabilised. The apparent advantages of electronic media are not being fully realised, perhaps because of the necessity to continue simultaneously with both printed and electronic media.

The philosophy and ethics of virtuality

Philosophical debate about reality and non-reality has existed for many years, but the spread of electronic information introduces a new dimension to the distinction between virtuality and reality. Several recent examples of children finding difficulty in distinguishing between the virtual and the real, sometimes with tragic consequences, have been well publicised. New technologies introduce severe dangers that relationships will become de-humanised, even in caring areas such as medicine. However, the ability of some people to relate more easily to "virtual" information has potential benefits which should not be ignored. Public authorities have a responsibility to examine carefully the continuing impacts of virtual information in these areas.

“Science and Language”

The 13th Annual Meeting of the Academia, Rotterdam, 14-16 June 2001



ERASMUS UNIVERSITEIT ROTTERDAM



The main theme of the Annual Meeting in 2001 will be “Science and Language”.

Language is an important factor in all disciplines and is developing all the time. The digital revolution is adding new problems and new possibilities. Four symposia topics have been identified, on Linguistics, Genetics, Information Technology, and Land-sea interactions. Mini-symposia organised by Sections will also be included in the programme.

The Meeting will be held at the Expo- and Congress building of the Erasmus University, where registration will take place on Thursday 14 June. The Opening Ceremony and the Erasmus Lecture will be at the Town Hall in the centre of Rotterdam. The main scientific programme will occupy Friday 15 and Saturday 16 June.

A visit to the Museum Boijmans van Beuningen will also be included – this museum holds paintings by Pieter Breughel, including the famous Tower

of Babel which will be used as the logo of the Meeting, symbolising the diversity of languages and the need for good co-ordination in a stable society.

Accommodation will be available in the Novotel just outside the campus (80 Euro for a double room), with additional rooms also available in the city (125–150 Euro for a double room).

The final programme and registration information will be sent to members early in 2001. The registration fee for participants will be 100 Euro, and for accompanying persons 50 Euro. Local students will also be encouraged to participate.

A new approach to elections to the Academia

The Council recently created a sub-group to advise on the “Rejuvenation” of the Academia. Following the work of this group, the Council has taken the following decisions concerning the election process.

- The membership target should be raised from the previous informal figure of 2000 to 2500. This will eliminate any sense that the membership, currently around 1900, is approaching its limit, and will give fresh impetus to new nominations.
- At least 50% of all future candidates submitted by the Sections should be below the age of 55, with a particular preference for candidates below the age of 50. Older candidates will continue to be elected if they remain academically active.
- The Nominations and Elections procedure should be consolidated into

an annual process, enabling the members and Sections to be aware of regular dates for the receipt of nominations and other stages in the election process.

- Candidates should be permitted to complete the factual parts of their own nomination form (personal details, career record, publications), once they have been nominated by a member. If preferred, nominators could continue to retain the previous practice under which candidates were not aware they were being considered for membership.
- New members should be welcomed personally during the Annual Meeting.

The Annual Nomination and Election cycle

The annual cycle decided by the Council is as follows:

End of May

Deadline for nominations by Members to Section Chairpersons.

June - September

Assessment by the Section Committee.

End of September

Deadline for Section Chairpersons to send their nominations to the office.

Autumn

Meeting of the Nominations Subcommittee.

Winter

Election by the Council. Newly elected members informed.

Annual Meeting

Newly elected members publicly welcomed.

This cycle will be implemented from 2001 onwards. As a transitional measure, a further round of nominations will take place in late 2000, for which nominations by the Sections should be received at the office by the end of October 2000.

Nomination forms are available on request to the office.

New members of the Academia Europaea

HUMANITIES I

Margarethe Billerbeck	Professor of Classical Philology, University of Fribourg, Switzerland
Robert Evans	Professor of Modern History, University of Oxford
Ole Feldbaek	Professor of History, University of Copenhagen
Alexander Fursenko	Chairman of the Division of History, Russian Academy of Sciences, St. Petersburg
Jonathan Israel	Professor of Dutch History, University of London
Wolfgang Lebek	Professor of Classical Philology, University of Cologne
Vivian Nutton	Professor of the History of Medicine, University of London
Asko Parpola	Professor of Indology, University of Helsinki
Winfried Schulze	Professor of Modern History, University of Munich
Gabriel Tortella	Professor of Economic History, University of Alcalá, Madrid

HUMANITIES II

Bernard Aikema	Professor of Art History, Katholieke Universiteit, Nijmegen
Piero Boitani	Professor of Comparative Literature, Università di Roma "La Sapienza"
Theo D'haen	Professor of English and American Literature, Leiden University
Gilles de Van	Professor of Italian Literature, Université Paris III
Anders Jeffner	Secretary General of the Swedish Research Council for the Humanities and Social Sciences, Stockholm
Ruth Kempson	Professor of Linguistics, University of London
Roger Parker	Professor of Music, University of Cambridge
Roger Stalley	Professor of the History of Art, Trinity College, Dublin
Gabriele Stein	Professor of Linguistics, University of Heidelberg
Antony Tatlow	Professor of Comparative Literature, Trinity College, Dublin

BEHAVIOURAL SCIENCES

Lars Bäckman	Professor of Cognitive Psychology, Uppsala
Gian Caprara	Professor of Psychology, Università di Roma "La Sapienza"
Anne Cutler	Scientific Director, Max-Planck-Institut für Psycholinguistik, Nijmegen
Chris Frith	Professor of Neuropsychology, University of London
Pio Enrico Ricci Bitti	Professor of Psychology, University of Bologna
Johannes Siegrist	Professor of Medical Sociology, University of Düsseldorf

SOCIAL SCIENCES

Hans Blotevogel	Professor of Social & Economic Geography, Gerhard Mercator Universität, Duisburg
Michel Crozier	Emeritus Professor of Sociology, Harvard, and Director of Research, CNRS, Paris
Abram De Swaan	Professor of Sociology, University of Amsterdam
Peter Flora	Professor of Sociology, University of Mannheim
Mogens Koktvedgaard	Professor of Law, University of Copenhagen
Erkki Koskela	Professor of Economics, University of Helsinki
Hans van Ginkel	Rector of The United Nations University, Tokyo
Charles Withers	Professor of Historical Geography, University of Edinburgh

MATHEMATICS & INFORMATICS

Alexander Beilinson	Professor of Mathematics, University of Chicago
Petr Hájek	Professor of the Institute of Computer Science, Czech Academy of Sciences, Prague
Hermann Maurer	Professor of Computer Science, Graz
Marko Tadic	Professor of Mathematics, University of Zagreb

PHYSICS & ENGINEERING SCIENCES

Alexander Bradshaw	Scientific Director, Max-Planck-Institut für Plasmaphysik, Garching
Brian Cantor	Professor of Materials, University of Oxford
Lászlo Pál Csernai	Professor of Theoretical and Computational Physics, University of Bergen
Tom Kibble	Professor of Theoretical Physics, Imperial College, London
André Martin	Physicist Emeritus at CERN, Switzerland
Jan Nilsson	President Emeritus, University of Gothenburg
Mikko Paalanen	Professor and Director of Low Temperature Laboratory, Helsinki
Dagmar Schipanski	Thüringian Minister of Science, Research and Art, Erfurt
Charles Townes	Professor of Physics, Berkeley, University of Technology
Paavo Uronen	Rector of Helsinki University of Technology
Paul Vandenplas	Director of Plasma Physics, Royal Military Academy, Brussels
Joseph Vandewalle	Professor of Physical Chemistry, Charles University, Prague

CHEMICAL SCIENCES

Wilhelm Keim	Director of the Institute of Technical Chemistry, Technische Hochschule, Aachen
Jean Pierre Majoral	Co-Director of the Laboratoire de Chimie de Coordination, Toulouse
Henryk Ratajczak	Director of the Centre Scientifique de l'Académie Polonaise, Paris
Yuri Tretiakov	Head of Inorganic Chemistry, Lomonosov Moscow State University
Rudolf Zahradnik	Professor of Physical Chemistry, Charles University, Prague

EARTH & COSMIC SCIENCES

Jacques Angelier	Professor of Structural Geology, Université Pierre et Marie Curie, Paris
Nicholas Arndt	Professor, Laboratoire de Géodynamique des Chaînes Alpines, Grenoble
Martin Beniston	Professor of Geography, University of Fribourg, Switzerland
Catherine Cesarsky	Director General, European Southern Observatory, Garching

Martin Claussen	Professor and Head of Climate Systems, Inst. für Klimafolgenforschung, Potsdam
Bruno D'Argenio	Professor of Geology, Geomare Sud, Naples
Ghislain de Marsily	Professor of Geology, Laboratoire de Géologie Appliquée, Université Paris VI
Véronique Dehant	Professor and Head of Time, Earth Rotation and Space Geodesy, Royal Observatory of Belgium
Joseph Egger	Scientific Director, Meteorologisches Institut der Universität München
Roy Gabrielsen	Professor of Structural and Petroleum Geology, University of Bergen
David Gee	Professor of Orogen Dynamics, University of Uppsala
Jan Glinski	Director of the Institute of Agrophysics, Polish Academy of Sciences, Lublin
Georgui Golitsyn	Director of A.M. Obukhov Institute of Atmospheric Physics, Russian Academy of Sciences, Moscow
Alan Green	Professor of Applied and Environmental Geophysics, ETH Zurich
James Hansen	Director of the NASA Goddard Institute for Space Studies, New York
Marc Javoy	Professor of Earth Science, University of Paris VII
Eugenia Kalnay	Professor of Meteorology, University of Maryland
Vladimir Keilis-Borok	Professor, International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian Academy of Sciences, Moscow
Dieter Kley	Professor of Atmospheric Chemistry, University of Wuppertal
Antoine Labeyrie	Director of the Observatoire de Haute Provence, France
Hervé Le Treut	Head of Climate Modelling, Laboratoire de Météorologie Dynamique, Université Paris VI
William Lowrie	Professor of Geophysics, ETH Zurich
Günter Lugmair	Director of Cosmochemistry, Max-Planck-Institut für Chemie, Mainz
Konrad Mauersberger	Director of Max-Planck Institut für Kernphysik, Heidelberg
Lawrence Mysak	Professor of Meteorology, McGill University, Montreal
Anatoly Nikishin	Professor of Stratigraphy, Moscow State University

Atsumu Ohmura	Professor & Chairman of Geographisches Institut, ETH Zurich
Joseph Pedlosky	Professor of Oceanography, Woods Hole Oceanographic Institution, Massachusetts
Ulrich Platt	Professor of Environmental Physics, University of Heidelberg
David Price	Professor of Geology, University of London
Roberto Sabadini	Professor of Physics of the Earth, University of Milan
Susan Solomon	Professor Adjunct, Atmospheric and Ocean Sciences, NOAA, Boulder, Colorado
Erwin Suess	Professor of Marine Environmental Geology, GEOMAR, Kiel
Agustin Udias	Professor of Geophysics, Universidad Complutense de Madrid
Antony Watts	Professor of Marine Geology and Geophysics, University of Oxford
Sergei Ziltinkevich	Professor of Meteorology, Uppsala University
Anton Ziolkowski	Professor of Petroleum Geoscience, University of Edinburgh

BIOCHEMISTRY & MOLECULAR BIOLOGY

Martin Billeter	Emeritus Professor, Institute of Molecular Biology, Zurich
Alexey Bogdanov	Head of Nucleoproteins, A. N. Belozersky Institute, Moscow
Bernard Dujon	Professor of Genetics and Molecular Biology, Université Pierre et Marie Curie, Paris
Pavel Georgiev	Head of Genetic Processes, Institute of Gene Biology, Russian Academy of Sciences, Moscow
Alain Israel	Head of Molecular Biology, Institut Pasteur, Paris
Josef Jiricny	Director of the Institute of Medical Radiobiology, University of Zurich
Ada Kruisbeek	Professor of Molecular Immunology, Netherlands Cancer Institute, Amsterdam
César Nombela Cano	President of the Council of Scientific Research, Madrid
Timothy Richmond	Professor for Crystallography of Biological Macromolecules, ETH Zurich
Erling Seeberg	Professor of Medical Microbiology, University of Oslo
Nathan Sharon	Professor Emeritus of Biological Chemistry, Weizmann Institute, Israel
Stephen West	Head of Genetic Recombination, Imperial Cancer Research Fund, London

CELL BIOLOGY

Ueli Aebi	Professor and Chairman, Müller Institute for Structural Biology, Basel
David Baltimore	President, California Institute of Technology
Konrad Basler	Professor of Molecular Biology, University of Zurich
Rosa Beddington	Head of Mammalian Development, National Institute for Medical Research, London
Michael Dexter	Director of The Wellcome Trust, London
Carl-Henrik Heldin	Director of the Ludwig Institute for Cancer Research, Uppsala
Marc Kirschner	Professor of Cell Biology, Harvard Medical School
Renato Paro	Professor of Molecular Biology, University of Heidelberg
Ralf Pettersson	Director of Ludwig Institute for Cancer Research, Stockholm
André Sentenac	Head of Biochemistry and Molecular Genetics, CEA/Saclay, Gif-sur-Yvette
John Sulston	Director of the Sanger Centre, Cambridge
Richard Treisman	Head of the Transcription Laboratory, Imperial Cancer Research Fund, London

PHYSIOLOGY & MEDICINE

Raymond Ardaillou	Emeritus Professor of Physiology, Hôpital Tenon, Paris
Xavier Bertagna	Professor of Endocrinology, Hôpital Cochin, Paris
Uwe Heinemann	Director of the Johannes-Müller Institute of Physiology, Berlin
Ulrich Pohl	Professor of Vegetative Physiology, University of Munich
George Radda	Chief Executive, Medical Research Council, London
András Spät	Professor of Physiology, Semmelweis University, Budapest

ORGANISMIC & EVOLUTIONARY BIOLOGY

Jacques Blondel	Director of Research, Centre d'Ecologie Fonctionnelle et Evolutive, Montpellier
Elias Fereres	Professor of Engineering and Ecology, University of Cordoba
Yvon Le Maho	Director of the Centre d'Ecologie et Physiologie Énergétiques, Strasbourg
Lars Walløe	Professor of Physiology, University of Oslo

Annual Business Meeting, Prague, 15 June 2000

The 2000 Annual Business Meeting of the Academia was held in Prague in the course of the Annual Scientific Meeting. The meeting was attended by about sixty members of the Academia.

President's report

The President described the activities of the previous year, including several conferences and the workshop on High Bandwidth requirements for Europe which had been particularly influential on ministerial decisions in the EU. The President also described advice given to the European Commissioner in the context of the European Research Area, and further activities in preparation.

One hundred and twenty new members had been elected during the year. The Council was placing special emphasis on the need to elect younger candidates and women candidates. The

Academia's prize-awards and publishing programme were continuing.

Treasurer's Report

The Treasurer, Professor David Spearman reported that the 1999–2000 accounts showed a deficit of £25 865, which was entirely due to the non-payment, for technical reasons, of an expected contribution to a conference. Donations for General Purposes showed a decline, but members' voluntary contributions had doubled. The Academia had received its first bequest.

A copy of the Annual Report and Accounts is available from the office on request.

Appointments and re-appointments

The President announced several appointments and re-appointments of officers (given below). The members present conducted a written ballot and elected Professor Alessandro Cavalli of

Pavia and Professor Risto Näätänen of Helsinki to serve on the Council in place of two retiring members.

Development of a European Academy?

The President informed the Meeting that the French Science Minister had proposed that a European Academy of Science and Technology should be given a formal role in the assessment and evaluation of European programmes. One possibility under examination was that the Academia Europaea might form the basis of this independent, consultative body. The Board and Council believed that the Academia could meet the requirements which had been identified, and discussions with the French authorities were continuing. This matter was likely to feature prominently in the forthcoming French Presidency of the EU.

Officers of the Academia Europaea



Professor Strömholm thanks Professor Spearman (right) for his years of service as treasurer of the Academia

Several Officers of the Academia have recently been re-appointed for a further term, or new appointments have been made.

The President, Professor Stig Strömholm of Uppsala, has been re-appointed for a second term. **Professor Ian Butterworth of London** has been re-appointed as a Vice-President for a second term. **Professor Werner Rathmayer of Konstanz** has been appointed as a Vice-President in place of Jürgen Mittelstrass who has completed his two terms of office.

Professor Peter Day of London and Oxford has been appointed Treasurer, replacing David Spearman who has stepped down after eleven years in this position.

The Annual Meeting of members, held in Prague in June 2000, elected **Professors Alessandro Cavalli of Pavia and Risto Näätänen of Helsinki** to serve on the Council, in place of Pietro Rossi and Heikki Solin who have completed their terms of office.

The other Officers of the Academia remain unchanged.

Donations to the Academia

Donations by members have doubled in the past year. Even so, the opportunities for the Academia to undertake new initiatives would be substantially improved if more members contributed the recommended voluntary contribution of 80 Euros (£50 sterling) per year.

Payments to the Academia by credit card, for purchases or conference bookings as well as donations, may now be made by telephone or written instruction direct to the office. We are able to accept MasterCard, Visa, Maestro or Switch but not American

Express or Diners.

You will need to supply the card number, the expiry date and (for Switch only) the Issue number.

Ties with the Academia logo

Silk ties with the Academia logo and a fine stripe in gold, against a blue background, may be purchased from the office, price 23 Euros (£15).

Payment may be made by credit card (telephone or written orders) or by cheque denominated in Euros, sterling or French francs.

Members are invited to contact the office for further information concerning the following conferences in preparation:

Council of Europe conference, "Science and Technology in Europe - Prospects for the 21st Century". Gdansk, 9-11 October 2000. Professor van der Molen will represent the Academia.

"Reconstructing science in the Adriatic and Ionian countries", a workshop organised jointly by the Academia and the UNESCO office in Venice, Winter 2000/2001.

Imaging and Models of Brain Function, Heidelberg, 15-17 March 2001, organised by the Physiology and Medicine Section in association with the Tschira Foundation.

Collaboration and Ownership in the Digital Economy (CODE), Cambridge, 4-6 April 2001. The Academia is working with the Arts Council of England in the planning and organisation of this event, which will focus on legal and cultural aspects of the open use of software.

Humanities and European Values. The possibility of holding this event in Autumn 2001 is being actively explored.

Excellence in Higher Education, Stockholm, 31 May - 1 June 2002. This conference, organised jointly with the International Academy of Education, will be sponsored by the Wenner Gren Foundation. A working group has been formed and has made preliminary plans.

"I will live and die with this testimony: that I loved good studies and a good conscience; that I never invaded another man's liberty, and that I preserved my own."

Seneca 1st century AD

Section Chairpersons and Committees

The Chairpersons and committees of the Academia's twelve Sections are listed below.

Section:	Chairperson:	Committee Members:
Humanities I (History, Archaeology, Classics, Oriental Studies)	Heikki Solin Klassillisen Filologian Laitos Helsingin Yliopisto PL4, (Yliopistonkatu 3) FIN-00014, Helsinki	François Crouzet Gerhard Oberhammer Lord Renfrew Raoul van Caenegem
Humanities II (Linguistics, Literature, Philosophy, Musicology, Art History)	Göran Hermerén Department of Medical Ethics Stora Grabrödersgatan 16 S-222 22 Lund SWEDEN	Manfred Bierwisch Erika Fischer-Lichte Douwe Fokkema Dagfinn Føllesdal Max Lütolf Mihaly Szegedy- Maszak Barbara Wright Clas Ziliacus
Behavioural Sciences	Michael Marmot Dept. of Epidemiology & Public Health International Centre for Health & Society University College London 1-19 Torrington Place London WC1E 6BT UNITED KINGDOM	
Social Sciences	Guido Martinotti Istituto Superiore di Sociologia c/o CNPDS Piazza Castello 3 20121 Milan ITALY	Jean Blondel Elina Haavio-Mannila Konstantinos Kerameus Walther Manshard Adalberto Vallega
Mathematics and Informatics	Peter Swinnerton-Dyer The Dower House Thriplow Royston Herts SG8 7RJ UNITED KINGDOM	Jaco de Bakker Dines Bjørner Manfred Broy David Cox Hans Föllmer Lars Hörmander László Lovasz Yuri Manin Robin Milner Maurice Nivat Pal Revesz

Section:	Chairperson:	Committee Members:
Physics and Engineering Sciences (including Materials Science)	Norbert Kroo Hungarian Academy of Sciences Roosevelt tér 9 H-1051 Budapest HUNGARY	Ian Butterworth Robert Daustray Heinz Duddeck Vladimir Kljuev William Mitchell Herbert Walther Peter de Witt Huberts
Chemical Sciences	Jerzy Haber Institute of Catalysis and Surface Chemistry ul. Niezapominajek 30239 Cracow POLAND	Peter Day Torbjörn Norin Frigyes Solymosi John Meurig Thomas Günther Wilke
Earth and Cosmic Sciences	Sierd Cloetingh Faculty of Earth Sciences Vrije Universiteit De Boelelaan 1085 1081 Amsterdam NETHERLANDS	Enric Banda André Berger Paul Crutzen Jean Dercourt Jean-Claude Duplessy Kerstin Fredga Camiel de Loore
Biochemistry and Molecular Biology	Moshe Yaniv Institut Pasteur Dept. des Biotechnologies 25 rue du Docteur Roux 75724 Paris Cedex 15 FRANCE	Piet Borst Riccardo Cortese Michel Lazdunski Tomas Lindahl Margarita Salas Gottfried Schatz
Cell Biology	Mary Osborn Max Planck Institute for Biophysical Chemistry Am Fassberg 11 D-37077 Göttingen GERMANY	Edoardo Boncinelli Bertil Daneholt Richard Flavell Kim Nasmyth Rolf Zinkernagel
Physiology and Medicine	Ole Petersen University of Liverpool Department of Physiology P.O. Box 147 Crown Street Liverpool L69 3BX UNITED KINGDOM	Raymond Ardaillou Carlos Belmonte Theophile Godfraind Barbro Johansson Oleg Krishtal Harald Reuter Klaus Thurau David Williams
Organismic and Evolutionary Biology	Werner Rathmayer Universität Konstanz Fakultät für Biologie Universitätstrasse 10 7750 Constance GERMANY	Friedrich Ehrendorfer Gotthilf Hempel Carlos Herrera Richard Southwood Rüdiger Wehner

