
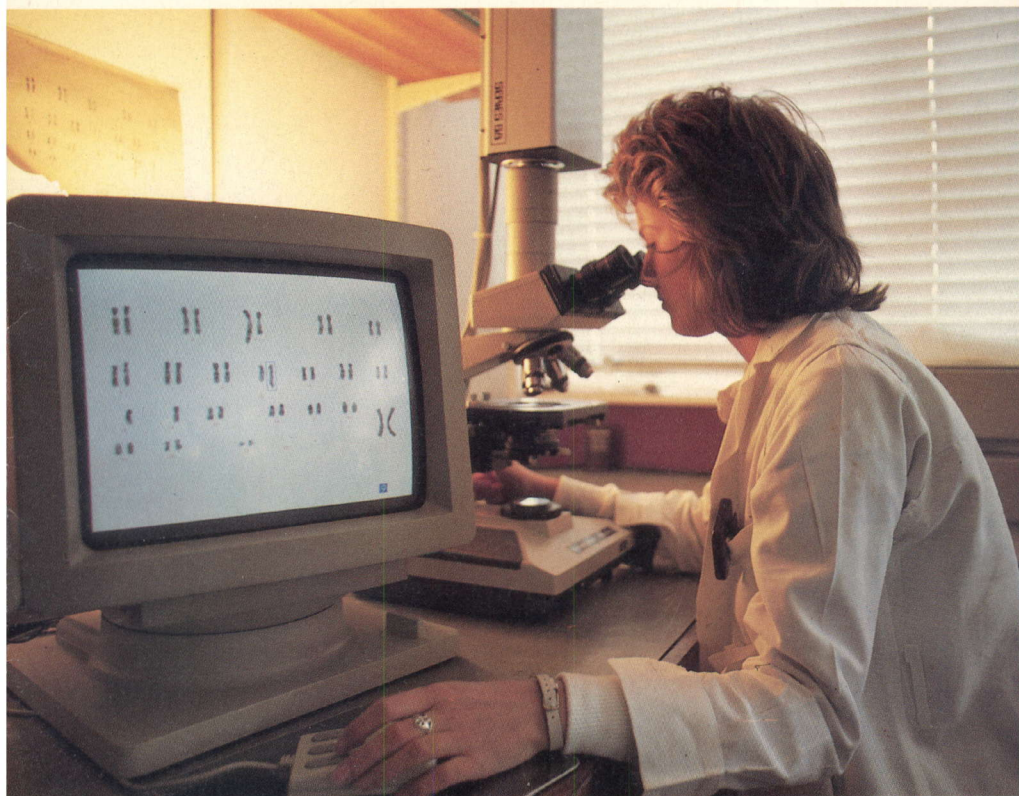
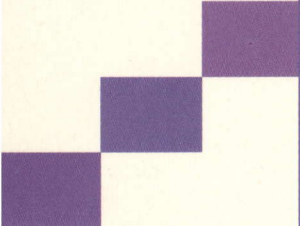




SCIENCE AND TECHNOLOGY IN EUROPE



Europe
on the move



Ever since it was set up the Community has been concerned with research and technology. However, with the entry into force in 1987 of the Treaty reforms and the launch of the programme for the completion of the internal market, these activities took on a completely new dimension. Computers, telecommunications, industrial technologies, biotechnology, energy: today the Community is active in all the key sectors which have an increasingly direct impact on industrial competitiveness. Cancer, AIDS, ageing: Community activities also extend to the field of health care, where progress is closely related to advances in medicine and pharmaceutical know-how. The build-up of carbon dioxide (CO₂) in the atmosphere and global warming, forest die-back, water pollution: all major environmental issues are now being studied at the European level.

'Science conducted on a cooperative basis could be a driving force for the construction of a real "European culture", since it achieves exactly the right combination of universality and specificity.'

Jacques Delors,
President of the
European
Commission

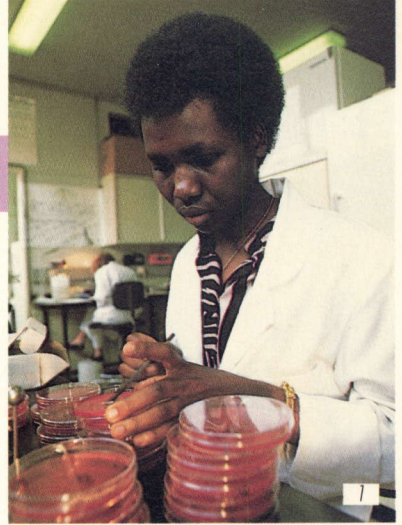
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Cancer, AIDS, ageing: Community activities also extend to the field of health care. The 1990-94 framework programme includes ECU 741 million for life sciences and technologies. Research on AIDS in the tropics.

A TASK FOR EUROPE

Why is action needed at European level in all these fields? Europe is the cradle of science and technology in the forms in which we know them today. However, it can no longer claim the lead in most of the major areas of research and technological development. For several decades the United States has played a leading role on the international scientific scene, and a number of economically crucial technological sectors are dominated by Japan.

Europe does not lack potential. It has many research scientists, mostly of extremely high calibre. Its research spending, while lower than that of its competitors, is still quite respectable. Nevertheless, divided as it is into different countries, Europe does not make the most of its substantial intellectual and economic potential. Dispersed funding, isolated research, lack of mobility among research scientists, duplication of effort under national programmes: these are all factors which tend to reduce the impact of European research work.



1

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Accumulation of carbon dioxide in the atmosphere and forest die-back (photo) — major environmental problems are studied at European level. The current framework programme includes ECU 518 million for environmental research.

By bringing together the resources of the various countries we can take advantage of the complementary know-how and abilities available in Europe. Cooperation can lead to synergy, the integration of research in interdisciplinary areas, and support for coordinated industrial strategies.

As the clearest expression and the most powerful instrument of European integration, the European Community can play a pivotal role in this. Spurred on by its commitment to complete the internal market by the end of 1992, the Community can provide a framework for the establishment of a true 'European scientific area'. However, the aim is not to transfer as many research activities as possible to the European level. Community policy is based on a very clear fundamental principle: to promote at European level projects which it would be less rational, more costly and less efficient to run at national level.



2

A MULTIFACETED PROGRAMME

Most Community research activities involve research centres, university laboratories, and small and large firms getting together to carry out joint projects with financial assistance from and in close cooperation with the Commission. Several thousand different teams and tens of thousands of research scientists from all over Europe are today involved in such projects.

Information technology is one area in which the situation of European industry caused particular concern 10 years ago. Confronted with competition from the United States and Japan, European firms were in disarray. Launched in the early 1980s, the Esprit programme taught large firms which had traditionally competed with each other to pool some of their research work and share the risks and results. This approach proved highly successful. For example, Esprit can take the credit for the development in the Supernode project of a completely new parallel computer architecture which led to a substantial improvement in computer graphics (picture synthesis techniques).

Similarly, the Community has been running the Brite/Euram programme for many years. This deals with the application of new technologies to traditional industries: motor vehicles, textiles, aeronautics, etc. For example, a very promising car engine containing several plastic components and with improved fuel consumption was developed and tested under Brite/Euram.

Many cross-border networks bringing together engineers and scientists from all over Europe have been set up in fields such as biotechnology, renewable energy and the environment. In the medical field, university laboratories and various types of hospital units throughout Europe are joining forces to tackle major health care problems, such as cancer and



AIDS. For example, a whole range of European research centres are working together to develop an AIDS vaccine.

However, Community research activities can also take other forms. These include a number of major projects the scale of which is beyond the financial and human resources of a single country. Controlled thermonuclear fusion is a potentially inexhaustible source of energy for the twenty-first century. Research in this field requires considerable resources. In Europe it is carried out under an integrated programme coordinated by the Community. A major component of this programme is the Joint European Torus (JET), the largest experimental fusion machine in the world. Thanks to JET, this is one field in which Europe leads the world.

The Community also has its own Joint Research Centre (JRC). This provides the Community with the independent research facilities it needs in key areas for which it is responsible. The JRC is made up of nine institutes located at four sites, at Ispra (Italy), Karlsruhe (Germany), Petten (Netherlands) and Geel (Belgium). Each institute specializes in a specific area: the environment, remote sensing, nuclear safety, new materials, etc.

Esprit takes the credit for the development of a new computer architecture which led to a substantial improvement in computer graphics (photo: computer 'electronic card'). The Community programme includes ECU 2 221 million for information and communications technologies and ECU 888 million for industrial and materials technologies.

Controlled thermonuclear fusion is a potentially inexhaustible source of energy for the twenty-first century. Research in this field is the subject of a programme coordinated by the European Community. A major component of this programme is the Joint European Torus (JET), the largest experimental fusion machine in the world (picture of the inside of JET). The 1990-94 framework programme includes ECU 814 million for energy research.

'Our action is aimed at strengthening the technological and scientific base of European industry with a view to the single market of 1993. This strategy is based on the definition of research objectives and the mobilization of research potential through cooperative programmes of precompetitive research open to firms, laboratories, and research centres.'

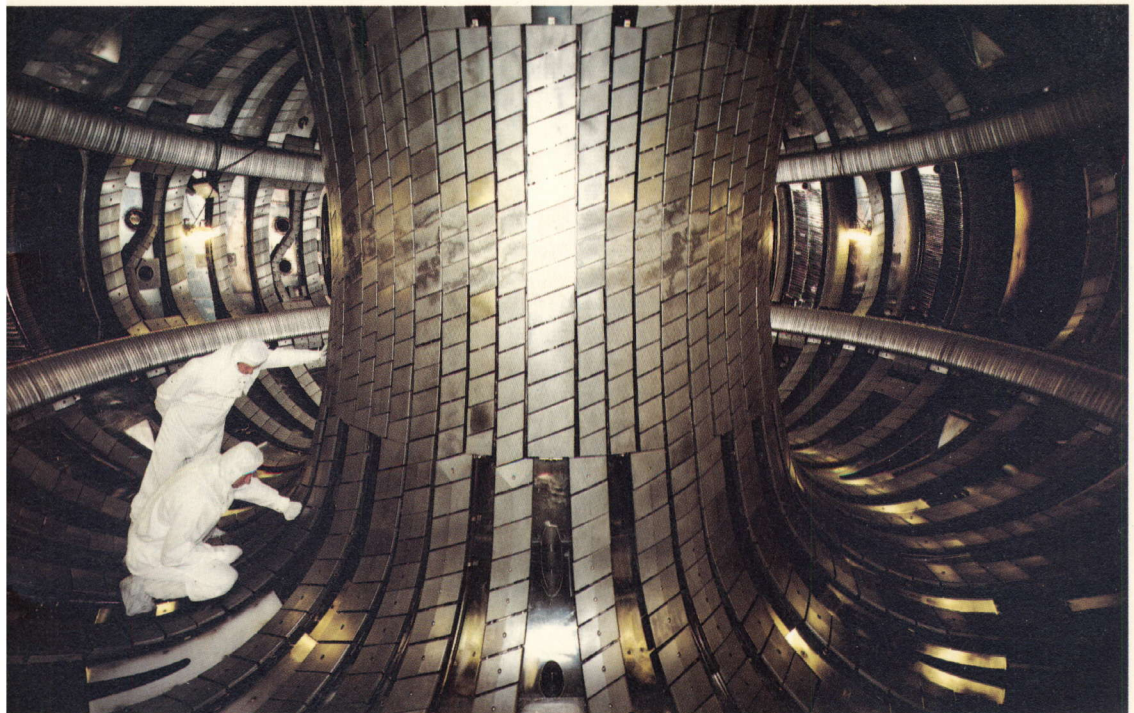
*Filippo Maria Pandolfi,
Vice-President of the
European Commission*

Joint decision-making

According to a Eurobarometer survey carried out in the autumn of 1990, three out of four Europeans think that scientific and technological research policy should be decided jointly within the European Community.

A STRATEGY FOR THE YEARS TO COME

All activities undertaken by the Community in the field of science and technology are coordinated within 'framework programmes' which last several years. The current (third) framework programme covers the period 1990-94. It is built around three major themes: enabling technologies, management of natural resources, and utilization of intellectual resources. It brings with it new priorities. For example, the environment is now more than just a field of investigation, it is a dimension common to all Community research activities. In all areas, particular emphasis has been placed on 'prenormative' or 'prelegislative' research, i.e. research providing the



DOMESTIC RESEARCH SPENDING
AS A PERCENTAGE OF GROSS DOMESTIC PRODUCT

	1982	1983	1984	1985	1986	1987	1988	1989
EUR 12	1,8	1,85	1,9	1,97	1,99	2,04	2,02	
USA	2,62	2,71	2,77	2,92	2,92	2,90	2,86	2,80
JAPAN	2,23	2,36	2,45	2,62	2,59	2,67	2,72	

Source: OECD.

scientific and technological basis for the adoption of common legislative provisions.

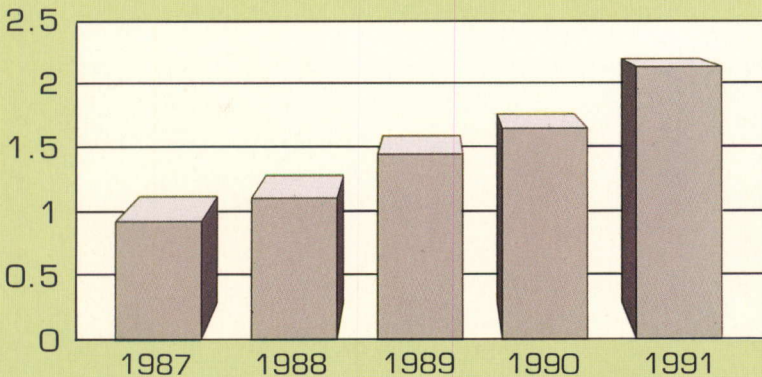
Another key element of the Community's research effort is the interconnection of the various telematic networks in the Member States. Essential to the effective completion of the single market, only a genuine 'European nervous system' will be able, once internal borders have been abolished, to manage effectively flows of informa-

tion concerning customs, transport, social security, etc. Particular attention is paid to the utilization of the human capital available in Europe in the research field, and its mobility. In order to increase the quantity and quality of Europe's human potential in the research field, the Community will promote the participation of young research scientists in high-level activities in centres of excellence in countries other than their own.

'We need prophets, but we also need engineers.'

*Jacques Delors,
President of the
European Commission*

COMMUNITY RESEARCH EXPENDITURE
(ECU BILLION)



1 ECU = approximately UKL 0.69, IRL 0.77 or USD 1.24.

'There is general agreement that the Community's strategy has made a substantial contribution to improving Europe's technological level and bringing about synergies between firms. However, the Community's research strategy needs to be better coordinated with its other policies, and the priority objectives of its long-term strategy must be defined. Our efforts must be more market-related, innovation should respond to demand.'

*Filippo Maria Pandolfi,
Vice-President of the
European Commission*

LINKS WITH THE REST OF THE WORLD

The Community's research and technological development programme is not limited to activities concerning exclusively the 12 Member States. International cooperation is an important aspect. For example, the Community intends to take its share of responsibility for resolving problems which affect the whole planet, such as climate change and the greenhouse effect. It is also involved in a number of scientific and technological cooperation activities compatible with international trade law and competition rules. The countries most directly concerned are the Community's immediate neighbours: agreements authorize the EFTA countries (Sweden, Austria, Switzerland, Finland, Norway and Iceland) to participate in various ways in Community programmes. The Community is also involved in the Eureka technological cooperation initiative: focusing on research immediately preceding the marketing of technological products, Eureka supplements and extends certain aspects of the Community programmes.

The Community also plans to set up specific instruments for cooperation with the countries of Central and Eastern Europe. In certain selected fields it cooperates with major industrial powers such as the United States and Japan. For years it has helped many Third World countries to apply science and technology to development problems.

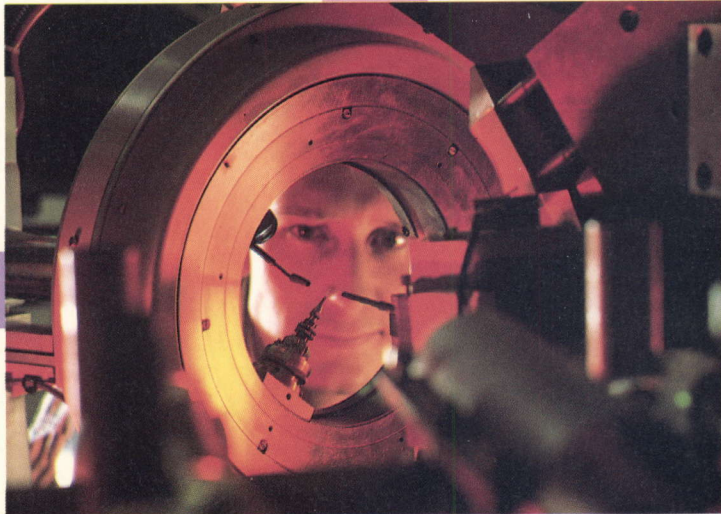
TOWARDS A RESEARCH SCIENTISTS' EUROPE

Thanks to the Community's activities, research scientists today think increasingly along European lines. A real tradition of joint research has developed, involving close, frequent and prolonged cooperation between research centres, universities and firms in all Member States. This tradition can only go from strength to strength. Beside the economic and political Europe, in the context of and in support of the large market, a 'scientific Europe' is rapidly coming into being.

'A dynamic research policy is an investment in the future. Today's science and technology will determine tomorrow's industrial reality. Training young research scientists today provides a pool of intellectual capital for the future. The discoveries of today will lead to improvements in our standard of living in years to come.'

*Filippo Maria Pandolfi,
Vice-President of the
European Commission*

Europe has many research scientists of extremely high calibre. Divided as it is into different countries, Europe does not make the most of its human potential. The 1990-94 framework programme includes ECU 518 million for the utilization of intellectual resources.





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