European Communities

EUROPEAN PARLIAMENT

Working Documents

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6 May 1983 DOCUMENT 1-270/83

REPORT

drawn up on behalf of the Committee on Energy and Research

on the proposal from the Commission of the European Communities to the Council (Doc. 1-1096/82 - COM(82) 808 final) for a decision adopting an experimental Community action to stimulate the efficacy of the European Economic Community's scientific and technical potential

Rapporteur: Mr C. MARKOPOULOS

PE 83.488/fin.

English Edition

By letter of 20 December 1982, the Council of the European Communities requested the European Parliament to deliver an opinion on a proposal from the Commission of the European Communities for a Council decision (EEC) adopting an experimental Community action to stimulate the efficacy of the European Economic Community's scientific and technical potential.

On 12 January 1983, the President of the European Parliament referred this proposal to the Committee on Energy and Research as the committee responsible and to the Committee on Budgets for an opinion.

At its meeting of 19 January 1983, the Committee on Energy and Research appointed Mr MARKOPOULOS rapporteur.

The committee considered the Commission's proposal and the draft report at its meetings of 27 January 1983, 23 March 1983 and 28 April 1983.

At the last meeting, it adopted the draft report and recommended that Parliament should approve the Commission's proposal with the following amendments.

The Commission notified the committee that it was prepared to accept the amendments, although for administrative reasons it had reservations about Amendments Nos. 2 and 3.

The committee then adopted the motion for a resolution as a whole by 12 votes to 7 with 2 abstentions.

The following took part in the vote: Mr Seligman, acting chairman; Mrs Walz, chairman; Mr Markopoulos, rapporteur; Mr Fuchs, Mr Gauthier, Mr Ghergo (deputizing for Mr Pedini), Mr Halligan, Mrs Nikolaou (deputizing for Mrs Lizin), Mr Pattison (deputizing for Mr Percheron), Mr Petronio, Mrs Phlix, Mr Poniridis (deputizing for Mr Schmid), Mr Protopapadakis, Mr Purvis, Mr Rinsche, Mr Sälzer, Mr Sassano, Sir Peter Vanneck, Mr Veronesi, Mrs Viehoff (deputizing for Mrs Théobald-Paoli) and Mr Ziagas (deputizing for Mr Rogalla).

The opinion of the Committee on Budgets is attached.

The report was submitted on 2 May 1983.

C O N T E N T S

The Committee on Energy and Research hereby submits to the European Parliament the following amendments to the Commission's proposal and motion for a resolution together with explanatory statement:

I. Proposal from the Commission to the Council for a Council decision adopting an experimental Community action to stimulate the efficacy of the European Economic Community's scientific and technical potential (COM(82) 808 final)

Amendments tabled by the Committee on Energy and Research	Text proposed by the Commission
Preamble and recitals unchanged	
Amendment No. 1	Article 1
An experimental action to stimulate the efficacy of the European Economic Community's scientific and technical potential, as set out in the Annex, is hereby adopted for a two-year period commencing on 1 January 1983. The experimental action shall consist of activities with the purpose of testing approaches to and methods of stimulation in the Community, in scientific and technical sectors of special and topical interest; as a guideline, seven sectors are listed in the Annex; to these may be added others suggested by consultation with scientific institutions.	An experimental action to stimulate the efficacy of the European Economic Community's scientific and technical potential, as set out in the Annex, is hereby adopted for a two-year period commencing on 1 January 1983. The experimental action shall consist of activities with the purpose of testing approaches to and methods of stimulation in the Community, basically within the seven fields defined in the Annex.

Amendments tabled by the Committee on Energy and Research	Text proposed by the Commission
Amendment No. 2	Article 2
The amount required to carry out the experimental activities is estimated at 7 million ECU, including expenditure on a staff of two (1A + 1C).	The amount required to carry out the experimental activities is estimated at 7 million ECU, including expenditure on a staff of three.
Amendment No. 3	Article 3
The Commission shall be responsible for the implementation of the action, by means of research allocations, grants to help laboratory twinning, and the mobility and interchange of research workers around the Community. It shall be assisted in this task by a small awards committee, which it shall set up for the purpose, made up of not more than five eminent personalities in the field of science and technology.	The Commission shall be responsible for the implementation of the action, by means of research allocations, grants to help laboratory twinning, development contracts, grants to assist research teams, seminars and courses. It shall be assisted in this task by an advisory committee (CODEST: Committee for the European Development of Science and Technology) which it shall set up for the purpose, made up of eminent personalities in the field of science and technology, of recognized standing, active in national research and development systems and aware of national policies, as well as by a group of consultants.
Amendment No. 4	
Article 3(a) (new)	
To keep scientific circles adequately informed and to assemble a wide range of ideas, the Commission shall use exceptional measures (seminars, meetings of researchers from different institutions, etc.) in addition to the traditional, bureaucratic ones; this will make it possible to identify areas of research more directed towards practical application and important sectors for collaboration between existing ones.	

Amendments tabled by the Committee on Energy and Research	Text proposed by the Commission

Articles 4 and 5 unchanged

Annex A, paragraph 1 unchanged

Amendment No. 5	Annex A (paragraph 2)
In these fields different kinds of illustrative stimulation activities are to be tried out: research allocations, laboratory twinning, mobility of research workers, subsidies for research teams. On the other hand a specific project of a multidisciplinary nature will be started up, to enable joint working by teams in different countries to bring it to successful conclusion.	In these fields different kinds of illustrative stimulation activities are to be tried out: research allocations, laboratory twinning, seminars or workshops, subsidies for research teams. On the other hand a specific project of a multi-disciplinary nature will be started up, to enable joint working by teams in different countries to bring it to successful conclusion.

Paragraphs 3 and 4 unchanged

Amendments tabled by the Committee on Energy and Research	Text proposed by the Commission

Annex B (Financial record)

Paragraphs 1 and 2 unchanged

Amendment No. 6	Annex B (paragraph 3)
Delete the indent 'workshops, seminars'.	
Delete the phrase 'contribution to the dissemination of the best available knowledge and the development of contacts between researchers.'	3. Description of the action
	The stimulation action consists of carrying out various activities of an incentive nature
	- research allocations:
	Payment of an allowance to cover travel, lodging and research expenses of scientists who, during a stay at a foreign laboratory (within the EEC) are to make use of new knowledge to carry out research into a complex problem; or the provision of complementary support to a sub-critical team,
	- workshops, seminars:
	contribution to the dissemination of the best available knowledge and the development of contacts between researchers,
	- twinning of laboratories in different countries:
	making it possible for researchers in various countries of the Community who are working in parallel in an advanced field to get together and thus reach 'critical' numbers; in order to do this it will be necessary to grant subsidies making it possible for

Amendments tabled by the Committee on Energy and Research

Text proposed by the Commission

researchers to meet, carry out joint experiments and exchange results,

- the development of multidisciplinary and multinational operations:

to make it possible, via development contracts, to bring together the best available skilled persons in various countries and various disciplines in order to achieve a pre-determined objective.

The experimental action 1984-1987 will be a test and pilot experiment phase for these new activities.
Its objective will be:

- set up the structures and procedures for defining and selecting activities and interventions;

- set up and calibrate the intervention mechanisms, making use of specific examples by developing some limited scale experiments.

Rest unchanged

A

MOTION FOR A RESOLUTION

closing the procedure for consultation of the European Parliament on the proposal from the Commission of the European Communities to the Council for a decision adopting an experimental Community action to stimulate the efficacy of the European Economic Community's scientific and technical potential

The European Parliament,

- having regard to the proposal from the Commission of the European Communities (COM(82) 808 final)[1],
- having been consulted by the Council pursuant to Article 235 of the EEC Treaty (Doc. 1-1096/82),
- having regard to the communications from the Commission to the Council COM(81) 574 final, COM(82) 322 final and COM(82) 493 final,
- having regard to the communication from the Commission to the Council on a European scientific and technical strategy (framework programme 1984-1987, COM(82) 865 final),
- having regard to the report by Mr Rolf Linkohr on the common research policy: problems and perspectives (Doc. 1-654/82),
- having regard to the report of the Committee on Energy and Research and the opinion of the Committee on Budgets (Doc. 1-270/83),
- having regard to the result of the votes on the Commission's proposal,

A. having regard to the proceedings of the conference on research and development within the European Economic Community held in Strasbourg from 20 to 22.10.1980,

B. noting that, although the Community's scientific and technical potential is both qualitatively and quantitatively high, the efficacy of its scientific and technological research systems is limited, mainly in regard to the ability to commercialize the often useful and innovative results of the research,

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[1] OJ No. C 337, 23.12.1982, p. 6

C. noting that considerable scientific potential remains unexploited and that efforts will have to be made as soon as possible to develop it and incorporate it into the overall scientific system which makes its contribution to the interests of the peoples and countries of the Community,

D. believing that the development of better research coordination systems at Community level will enhance the efficacy of the Community's scientific and technical potential, so long as they do not inhibit enterprise with a heavy load of bureaucratic intervention,

E. noting that time, money and resources are being squandered on disconnected, multiple, parallel and duplicated research in various Community Member States, and that efforts must be made with the least possible delay to coordinate such activities with a view to making them more productive,

F. considering that measures for enhancing the efficacy of the Community's scientific and technical potential must be taken, with a view to improving the Community's effectiveness in the technological and industrial sectors as quickly as possible,

G. hoping that such strengthening measures will be a first step towards capitalizing fully on the best aspects and programmes in Member States and so achieve timeous commercial advantage,

1. Urges that this programme should concentrate on the mobility of, and cooperation between, individual researchers and teams of researchers in the chosen areas of science and technology so as to maximize the Community's scientific and technological research potential;

2. Defines the basic objectives of the experimental measures as follows:

   (a) to increase the competitiveness of the scientific and technological sectors and hence of the Community's industrial and services sectors;

   (b) to coordinate research and technology programmes where this is patently beneficial, but bearing in mind that competition between research teams can often produce useful results more quickly;

   (c) to contribute to raising the level of the least developed Member States of the Community;

(d) to contribute to realizing the scientific potential of the Community and particularly that of young scientists;

3. Considers that the most useful contribution would be to encourage cross-fertilization between, and strengthening of, Community research teams by means of promoting and supporting exchanges of researchers and joint ventures;

4. Calls for the taking of all such measures as will enable direct contact to be made between scientists working in the same field but in different laboratories, institutes or universities in the ten Member States of the Community, namely by the adoption of specific measures to establish immediate post-graduate study schemes for those constituting this scientific potential and to ensure the rapid dissemination of information by reciprocal visits to related laboratories and by scholarships to create employment openings for such persons;

5. Proposes that the programme of experimentation to enhance the efficacy of the Community's scientific and technical potential should be focussed in the first instance on the seven sectors referred to in the scientific annex; that the experimental measures should run for a period of two years as from 1 January 1983;

6. Suggests that, if the scheme is considered primarily as one of personnel mobility by way of scholarships and meeting necessary costs, the staffing can be restricted to two persons (1A, 1C) to administer the scheme;

7. Similarly there is no need for an advisory committee and a consultancy group, as envisaged in the proposal, and suggests instead a small, distinguished and independent awards panel to select the most deserving proposals within the programme's guidelines;

8. Agrees with the proposal in Article 4 of the proposal for a Council decision that an evaluation of the programme should be made at the end of the first year of activity (and at the end of each year thereafter), including a full listing of the projects supported;

9. Instructs its President to forward to the Commission and the Council, as Parliament's opinion, the Commission's proposal as voted by Parliament and the corresponding resolution.

B

EXPLANATORY STATEMENT

I. Introduction

It is generally accepted that the European Community, as a single economic entity, cannot ensure either its economic or its social progress unless it strengthens its competitiveness at all levels. One such level - if not the most important - is certainly that of industry, which, without any doubt, if it is to sustain its momentum, must keep right up to date with the rapid international developments taking place in technology.

Moreover, it is well known that if the results of research are to be put to immediate use, and if industry is to have any chance of adapting to constantly developing technology, the skills and opportunities afforded by the entire scientific and technical potential of all the Community Member States must be exploited, in conjunction with overall organization and full coordination of the way that potential works, functions and is deployed within the confines of the Community.

Finally, it is well known that the Community possesses a scientific and technical potential of considerable size, but also - and more importantly - of high quality, whereas every day it is noted and acknowledged that, for various reasons, there are weaknesses in the coordination of research and, generally speaking, in the way it is organized, as also in the way in which the development and use of research findings is organized. There are weaknesses, too, in the method of proceeding from results to their application, so that in the end very often the research is rendered ineffective, and, what is more, the research efforts of this qualitatively and quantitatively high-level scientific and technical potential of the Community become unexploitable.

Consequently, if Europe is to survive at all as a special entity, it is essential, but also unavoidable, that some way of remedying these weaknesses be found. The aim must be to create interdependent scientific, technological and industrial structures capable of increasing their competitiveness in the shortest possible time and of changing the defensive stance they currently adopt towards the other two great economic entities, the USA and Japan, into an offensive one.

The report which follows basically examines:

a) the principal reasons for the weaknesses of the Community which make for a general backwardness in the effectiveness of research, and

b) the ways in which these reasons must be expunged so that research becomes more effective and its results immediately exploitable.

II. Causes of, and factors in, European backwardness

The reasons which have caused European research and development to put up a far-from-vigorous response to the challenges of modern technology, and have made it less competitive in the face of its main industrial rivals, can be summed up under two main headings: the historical, with their roots in the immediate post-war years, and the objective, relating to developments in the present day.

A. Historical reasons

The term 'historical' is used to refer to all the reasons deriving from the adverse effects of the 2nd World War on the European continent, as well as those which spring from the continent's special peculiarities, the legacy of which continues to affect our present-day condition. These are:

1. The difference in the economic and industrial position between Europe and the USA at the end of the 2nd World War. The end of the war saw a weak and almost completely destroyed Europe trying to get back on its feet, recover economically and resume its accustomed pace, relying, on the one hand, on super-human efforts and work by its human potential and, on the other, on economic aid from abroad. Meanwhile the United States, its industry virtually unscathed, began to take the lead in the technological revolution which had already got under way.
2. The dependence which European states acquired after the 2nd World War and still maintain, either politically, with repercussions on institutional changes and decisions, or economically, with the consequence that Europe itself cannot control and determine its own development.

   This dependence must be taken to include the energy problem, which has reached crisis proportions, either through an accumulation of mistakes in Europe's energy policies, or through the imposition of policies deriving from its dependence.
3. The leachingaway of its scientific potential during and after the war and the direct exploitation of the achievements of European brain-power by the USA.
4. The lack of European homogeneity, a natural consequence of there being so many nationalities, unlike the USA or Japan, where the human factor is homogeneous and there is a single state which is able to set up a single, compact system of research and development. This fact has worked, and continues to work, with a multiplying effect, against every European attempt at technological development.

5. The social stagnation caused by an immovable and impenetrable university hierarchy is one of the reasons for the brain drain, especially among young researchers. In the USA a young scientist of quality is taken off the usual circuit and gets the financial and human resources to develop his ideas. Europe must provide similar opportunities if it wants to hold onto its valuable resources.

6. The divergent rates of development at almost all levels by European states in the post-war years, an inevitable consequence of the different historical, national and social complexion of each state. This lack of uniformity explains why today the Member States of the Community find themselves on different rungs of the technological and industrial development ladder.

B. Objective reasons

The term 'objective' is used to describe the reasons which are, in the present day, objectively speaking, obstacles to the effectiveness and exploitation of research, whether they have historical causes or have emerged in the course of developments leading up to the present-day situation. They are:

1. The inability of the structures in a fair number of Community Member States to adapt to the rapid present-day advances in science and technology. There is no doubt that the rate at which technology advances today cannot be determined by a single entity such as Europe, nor can a single entity put a brake on it, even if it wants to. The international character of science, the free movement of ideas despite a number of cases in which achievements have been jealously guarded by isolated groups or states, the free publication and circulation of research work and the capacity of organizations or states other than those which have achieved research results to adopt them - all this has created an international network of scientific interdependence, and anyone incapable of adapting to it remains permanently outside it, with ever-diminishing chances of getting back in. The Community, unfortunately, has so far proved incapable of shaping its structures in such a way as to be able to make immediate use of advances in science deriving from competitive forces; yet to those same forces, it has generously handed over its own significant scientific achievements, either through an inability to protect them, to make the best use of them, or to exploit them directly,

2. The multiplicity of activities by numerically small groupings is an important factor in preventing the systematization of research. In each of the Community Member States it is natural, given that up to the present there has not been sufficient coordination, for there to be a growing fragmentation of the scientific potential in all sectors of interest in science and technology. However, this leads to the splintering of a state's scientific activities and consequently reduces its ability to give aid to scientific programmes, whether from the point of view of scientific potential or from the economic angle.

3. The similarity and duplication of research programmes and activities within the Community. A consequence of the preceding reason, and likewise of the plurality of nations in Europe, is the existence of similar programmes in practically all Member States. Programmes covering the same area and with the same end in view are being pursued simultaneously in all the Member States and, in most of them, by more than one research team, each team working independently of the others. Money is obviously being wasted; even more obvious, though, is the waste of human potential, at a time when the concept of a common approach to scientific and technical problems is being promoted by a Community Europe. The multiplicity of operations and resources, the splintering of operations, the dispersion of effort, all these make it clear that Europe is debasing its own scientific effectiveness in the face of the Community's two great competitors, who, because they show cohesion, are able to develop uniform programming and decide on spheres of activity on which scientific potential and resources are to be directly focussed, while avoiding pointless duplication.

4. The lack of correctly structured links between state institutions and industry undoubtedly leads to a weakening of the research result application and exploitation relationship.

It is a well-known fact that in many Member States the development of links between the public-sector bodies responsible for the various research efforts, and industrial production, which essentially is directed by private initiative, does not proceed along lines of reciprocal interest. Thus it is possible for the achievements of research carried out by state-run establishments to be published, this bringing the scientific endeavour to its conclusion, while at the same time a related industrial project proceeds, with the same structures, the same resources and the same technology, without adapting in any way to the new and relevant achievement which has appeared. In other words, it is possible for the publication of a specific industrial improvement relating to product, method or resources to remain unknown to the relevant industry because of a permanent gap in communications, and for the industry to go on basing its production on obsolete data.

5. The lack of correctly structured links between state-run establishments and basic university research and teaching. To the same category of reasons belongs the incorrectly structured development and allocation of research between universities and state-run establishments, especially in the less developed Community countries. This results in the deficient training of scientists in specialised fields and, consequently, in the loss of a significant fraction of the country's available scientific potential, a break in the flow and supply of specialist scientists from the universities to state-run establishments and, of course, a lack of coordination between operators engaged in basic and applied research.

6. The failure to exploit the whole of the Community's scientific potential, especially its young scientists. It is typical that, as has recently been pointed out, the average age of scientists working in the various institutions in Community Member States is 45. At the same time, the rate at which new researchers are brought in is only 3%, which means that very soon the scientific potential 'in action' begins to age. So the falling renewal rate and the 'closed doors' of research establishments at both state and Community level are preventing young people from entering the research circuit, resulting not only in a failure to make use of young scientists' skills but also in the rapid escalation of a serious social problem, with the widespread unemployment among scientific personnel. It should be taken into account at this point that there is a movement of scientists from Europe to the USA. In the past, the phenomenon was on two levels, with a movement of high-level scientists from the scientifically advanced countries of Europe to America, and a second current of movement from the less to the more developed countries of Europe.

With the arrival of the 70s, though, things changed. The movement of high-level scientists to the USA has now stopped, while the flow of scientists from the less developed EEC countries to the USA has increased, and those who settle there continue their education and do creative work, but do not return to Europe, since it does not offer them better working conditions.

7. Deficiencies in mobility factors, so that scientific and technological research systems in certain Member States operate in virtual isolation, albeit on a limited scale. Various factors, of course, contribute to these deficiencies, factors which are undoubtedly related to any number of subjective causes such as family reasons, difficulties in settling in, obstacles to movement, economic circumstances and others.

There are, however, other factors as well which are purely objective and are connected with the fact that an appropriate climate has not been created within the Community in favour of such a movement of scientists, and not only high-level scientists but also a whole host of scientists undergoing training.

8. The channelling of research findings via multinational companies. Large industrial units find it worthwhile to finance research projects and the latest forms of technology, but in areas outside the Community. For this reason, or because of their multinational character, they either keep research findings to themselves or feed them back to their parent companies, which are often controlled from other centres outside the Community.

III. Measures to enhance the effectiveness of research

The upturn in European science and technology must start from an awareness by each Member State and by the Community of those factors which have a negative influence on the effectiveness of the research and development systems both of Member States and of the Community, from a knowledge of the possibilities and weaknesses of the scientific potential, and from an all-round analysis of, and the possibility of estimating on a permanent basis, existing economic and social requirements and those foreseen in the immediate future.

Thus, a proper result will be forthcoming if an effort is made, first of all, to reverse all the aforesaid factors which have led to backwardness in the research sector, and, secondly, to take steps to turn such factors into positive ones. Now, as far as the historical factors which have had a negative effect on Europe's technological development are concerned, the possibilities of influencing them today are clearly minimal. The difference of phase, for example, created between Europe and the USA at the close of the 2nd World War, cannot be expunged from history; it can only be cancelled out in stages, by making efforts, the same being true as regards reducing dependence and the lack of uniformity.

Where a direct effort can be made, however, is in balancing out technological development in Community Member States, because that is also the necessary path to balancing out their social and economic development.

If this aim is to be achieved, the development of scientific and technological activities in the national research centres of the less-developed Member States must be promoted, and state-run laboratories and establishments in those countries must be helped to develop the specific activities relevant to the specific geographical and climatic factors affecting them, so that there will finally be a two-way serving of interests: support from the Community for the less-developed Member States in furthering their development and making the best local use of their scientific potential, with the advantage in return of incorporating every result achieved into the overall framework of Community development.

However, as far as the objective obstacles which the Community is now required to face are concerned, there is no doubt that action could be effective and of short duration. This does, however, presuppose a pioneering approach and the conviction that only by overcoming such obstacles will it be able to enhance its effectiveness and competitiveness. Going further, it is also clear that research and development programmes must be boldly financed. What is required is:

1. A unified approach by the Community, in direct collaboration with the Member States, to the problem of altering structures in order successfully to carry out adjustments to technological advances, whether these result from European or international progress. Preparation for immediate acceptance of new situations is essential if the Community does not want to fall behind.

2. The creation of a central system to monitor scientific programmes in Community Member States, a system which will select and allocate activities by Member States by considering the peculiarities and capacities of each Member State and directing research towards the areas of advanced technology that present both a Community and a local interest.

This system will be capable of forestalling duplication of scientific research in such a way as to achieve as far as possible a rational use of financial resources and human potential. For this purpose, a fully and constantly updated data bank must be set up.

3. The forging of sound links between state research and industrial production, so that the latter is directly supplied with the results of research and these can be put to use at once in solving industrial problems regarding the improvement of products, the reduction of costs and the perfection of methods and in keeping researchers supplied with problems that crop up during production.

4. The fullest use to be made of scientific potential, especially young scientists. Efforts to be made to ensure that the Community's rich and considerable scientific potential, not just in the advanced but also in the less technologically developed member-countries, does not emigrate, creating an over-accumulation of scientists in certain Member States, but stays and works in its own countries to the advantage of the Member States themselves and of the Community; and this will mean creating the appropriate conditions for jobs in local, national or Community research and development centres.

5. Encouragement and stimulation of factors promoting the mobility of researchers, so that the exchange and acquisition of experience reduces scientific isolation and enhances the efficiency of researchers, and more particularly:

a) There must be funding for seminars on specific scientific programmes to ensure that advanced areas of science of undoubted interest are learned about and better known.

b) There must be funding for meetings of scientific experts at which they can exchange views, so that existing knowledge may be better disseminated and agreement reached on carrying out new programmes of common interest.

c) Research grants must be given to scientists who will make visits to foreign laboratories and apply new knowledge, or provide back-up to other teams, thus contributing to the creation of a 'critical mass'.

6. The safeguarding of scientific and technological findings which ensure competitiveness within Europe, and the removal of the non-European element from joint Community projects.

7. An increase in the Community budget appropriation for research and development to at least double the figure available to the Community at present.

IV. Criticism of the experimental action proposed by the Commission

In the texts issued by the Commission from time to time[1], no attempt is made to remedy the needs referred to above.

Although the Commission itself lists three contributory obstacles, namely: the weakness of encouragements to mobility, the lack of jobs for young graduates and the failure to adapt structures to advances in science and technology, to all intents and purposes it attempts to remedy only the 'mobility' factor, and even then not in any real sense, since it makes no attempt to strengthen the incentives linked to it, by making for example, the indispensable time and money available.

The proposed stimulation programme is a two-year one, covering 1983-84. However, failure to submit it and put it before the Committee on Energy and Research on time, at least 6 months before the scheduled starting date, means that what is proposed is in effect not a two-year programme, but one covering 15 to 18 months. It can be easily appreciated however, that research programmes such as that proposed by the Commission cannot produce results in such a short period of time. At the same time, the sum of 7 million ECU to cover 7 research programmes such as those proposed is clearly not enough if the desirable and indeed essential 'mobility' of suitable scientists is to be achieved. The sum is so small that it cannot help to make up for even a few of the deficiencies arising from the shortness of time. The Commission is therefore forced to press the Committee on Energy and Research, and subsequently Parliament, to go through the procedure of accepting its proposal and making a start on its work in the shortest possible time, a form of pressure hardly to be reconciled with the need for the Committee on Energy and Research and Parliament to subject such questions to a very thorough scrutiny.

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[1] COM(82)322 final, stimulating the Community's scientific and technical potential

COM(82)493 final, stimulating the Community's scientific and technical potential-experimental phase: 1983

COM(82)808 final, adopting an experimental community action to stimulate the efficacy of the European Economic Community's scientific and technical potential

Another matter which has to be raised is the Commission's premature Decision[1] on the creation of the Committee for the European Development of Science and Technology (CEDST). The decision on this committee already lays down the manner of its creation and the number of members it is to have, without Parliament being given the opportunity to state its view on the matter.

At the same time, however, one can but wonder when this committee is going to be given time to staff itself and then meet, to take decisions on the method of publishing the applications from the relevant laboratories and its selection and assessment of the relevant programmes and the scientists working on them, so that the best and soundest possible selection is made.

So while the Commission holds in abeyance the question of the staffing of the CEDST committee, it has in fact already selected 7 programmes, thereby making the committee redundant before it even starts, and taking away 50% of its work, without even mentioning who selected the programmes and on what criteria.

Finally, even with the remaining 50% of the work, i.e. evaluation of the manner in which the experimental stimulation action is implemented, the Commission virtually takes that right away from the CEDST committee and keeps it for itself.

We believe, therefore, that:

a) the Commission document is deficient and superficial, does not go to the root of the evil, and offers only a partial approach to one, not particularly important factor out of all the factors that contribute to diminishing the effectiveness of research in the Community, that is, 'mobility', while remaining indifferent to all the others which it, in its own document, considers also to be important contributors to that diminution;

b) it has already decided on areas of research, and these are clearly associated with particular laboratories, so that it is creating a ready-made solution for rubber-stamping;

c) having already wasted a large part of the period of time it itself proposed, it has created the first factor in the failure of the experiment.

Nevertheless, we believe that the Committee on Energy and Research, though well aware of the shortcomings in the Commission's proposal, should not stand in the way of this project, however superficial it may be, even with its obvious shortcomings and even though, from the point of view of time, it has been sabotaged by the Commission itself. The Committee on Energy and Research must act with all possible speed to make a report to Parliament recommending approval

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[1] OJ No L 350/1982, p.45

of these experimental measures, in the conviction that even the most imperfect measure the European Parliament adopts in the field of science and technology which has any likelihood at all of making research more effective will have a positive impact on the technological, industrial and, by extension, economic and social development of the Community and the Member States which constitute it.

It is proposed that the Commission's proposal on stimulating the efficacy of the scientific and technical potential of the Community be accepted by the Committee on Energy and Research, with the amendments shown in the motion for the present resolution, and that it be forwarded to Parliament.

ANNEX

SECTION I

BRANCH OF SCIENCE: PHARMACOBIOLOGY

Objective:

The development of composite chemotherapeutic drugs for improved treatment of some forms of cancer, as also of various infectious and parasitic diseases, through the application of the latest developments in cellular and molecular biology.

SCIENTIFIC ANALYSIS

The last 30 years have seen the discovery of a large number of drugs which inhibit the spread of cancer in man. Most of them operate at the cell-dividing stage and destroy the cell. Thus, cells with a high dividing rate, such as cancer cells, are more sensitive to drugs used in the chemotherapy of cancer than are normal cells. However, there are some normal cells in the human organism which also have a high dividing rate, such as the hematopoietic cells in bone marrow and the cells of the intestinal epithelium, so that no effective clear distinction is made between normal and malign cells. The conclusion is that the requisite dosage of chemotherapeutic drug for the complete extirpation of the cancerous growth cannot be administered.

Interest therefore centres on the development of such drugs as will display greater selectivity towards cancer cells and reduced toxic effects on healthy ones so that higher drug concentrations can be tolerated by the human organism.

The idea has, therefore, developed of targeting affected areas (cancerous growth, parasites, infections) by having the chemotherapeutic drug 'delivered' by a carrier which is selectively assimilated by the target-cells. The role of the carrier is to guide the drug to the target-cell, recognize it and release the drug; while on its way to the target, the drug is inactive on the rest of the organism.

The need for targeting anatomically restricted areas in this way is limited, firstly, by the different biological functions of cancer cells and, secondly, by the fact that the biochemical differences between malign and healthy cells are very slight and are often quantitative rather than qualitative. So the aim of continuing researches is to reduce the problems linked to these restrictions, by altering the distribution and method of taking a drug and improving the results obtained so that diseased areas are more effectively attacked than healthy ones. The methods applied are of two types: biophysical and biochemical.

a) Biophysical: applied to the placing of the drug in carrier-capsules made of various compounds, such as lactic acid polymers, phosphorolopoid polymers and albumin microspheres.

b) Biochemical: usually applied to the formation of temporary chemical compounds between the active drug and the molecules of the chemical carrier. Examples of carriers able to form temporary chemical bonds with a drug in this way are albumin, dextran, deoxyribonucleic acid, glycoproteins and immunoglobulins.

Generally speaking, these methods increase the concentration of active drug in the malignant area while reducing its concentration in active form in healthy tissue.

Successful applications include:

1) Inhibition of type L1210 leucaemia in mice using DMR (Dannorubicin) combined with the molecular carrier albumin;
2) Increase in the survival rate of mice affected by malaria (after administration of protozoum plasmodium berghei) using Primaquine combined with the molecular carrier succinylasialotetium.

Situation in the Community

The situation in Europe could be described as privileged, but the privilege is a transitory one. In the USA new techniques are being developed and more and more work is being done.

A new non-toxic carrier has recently been introduced in positioning drugs in *vivo*. This involves the magnetic response of small carrier-spheres of albumin which convey the drug and are introduced via the arteries; they are then positioned in specific target areas by applying appropriate magnetic fields.

At the same time, active research is going on into the problem of the body's immune responses, because many of the carriers used provoke reactions which tend to destroy them. To conclude, techniques based on a combination of biophysical and biochemical procedures have been put forward as the solution to many problems.

SECTION II

BRANCH OF SCIENCE: SOLID STATE PHYSICS

OBJECTIVE:

The application of new technologies to the construction of composites in laminate form.

SCIENTIFIC ANALYSIS

The science of the structure of composites has undergone important developments in recent years. A great many 'synthetic' materials have been known for a long time. Nevertheless, the advances there have been in certain areas of basic knowledge, and the secondary needs arising from new technologies (nuclear technology, space research and informatics), have recently led to a need for the construction of new composite materials suited to the requisite applications.

Such materials have various physical, chemical, mechanical and physiochemical properties, which must be examined if their quality is to be determined and a use assigned to them and if, in general, they are to be adapted for particular applications.

A huge amount of interest has therefore sprung up in examining these properties and, by extension, in the composites themselves. One of the many difficulties which science faces in this sphere is the fact that research into manufacturing composites involves many branches of science, such as mathematics, the physics and chemistry of solids, thermodynamics, solid mechanics and so on, so that it is of the greatest possible urgency that joint research programmes should be worked out.

Science has been obliged to classify the various composites according to shared characteristics or common uses. One of the most important categories is composite laminates, which may be metal alloys, oxides or sulphur compounds and are made up out of metallic compounds by a variety of methods; they have various properties, whether mechanical (resistance to attraction, torsion or compression), physicochemical (surface absorbency conducive to catalysis), electrical (conductivity) etc.

Because of these varied properties, then, they can be used in various technological fields, such as multi-layer condensers, catalysts in breaking down water and producing hydrogen, or in all other cases requiring the use of multi-layer materials, either to increase the surface area or to make use of certain mechanical properties.

Moreover, techniques applied in industry (for example, in depositing laminates in layers) could take in alterations and improvements if theoretical knowledge relative to forecasting procedures were so highly developed that we knew in advance what types of composite laminates would emerge from the various procedures used in manufacturing them, for example, oxidation, reactions between solids (dispersion), controlled cooling of superfused alloys, and others.

So if the theory of such phenomena were fully worked out and experimentally verified, it would be possible to apply reliable, sure and economical technologies to the manufacture of composite laminates with predetermined, selected and standardized characteristics.

The situation in the Community

The situation in Europe at the moment may be viewed as satisfactory, the potential for experimental studies is well advanced and serious attempts at theorectical study have been undertaken.

Noteworthy efforts are, of course, being made in the USA, Canada and Japan.

SECTION III

BRANCH OF SCIENCE: OPITCS

OBJECTIVE:

Setting up a programme to develop optical binary switches with which to devise and manufacture computers, robots etc. which would no longer be electronic but photonic, in other words a completley new type of computer.

SCIENTIFIC ANALYSIS

Modern opitcs is based on two areas: the study and application of optical bistability (OB) systems, and the study and application of laser beams.

The term optical bistability is applied to a category of optical systems that have two stable functioning states characterized by two different transmitted light intensity values, the other control parameters remaining constant; that is to say, there is hysteresis of intensity in function of the control parameter.

One way of achieving this is to direct a beam of light (the incident beam) into a passive laser cavity. This generates a second beam (the transmitted beam) out of the cavity, and the relationship between their respective intensities is studied; this, at certain values which it can have under certain conditions, can produce optical bistability.

This optical bistability can be put to use in creating binary optical switches and opto-electronic circuits with further applications in computer miniaturization and the construction of new types of data storage and robotization devices. The advantages of this kind of binary switch with photonic instead of electronic elements are, firstly, that response time is much shorter because the electromagnetic wave (the photon) travels much faster than the electron and, secondly, that a binary switch of this type can be used to build photonic apparatuses which are much smaller than electronic ones.

The situation in the Community

Europe has pioneered in the field of experimental research, since optical bistability systems were discovered at the Philips laboratories in Eindhoven.

The Community has made a substantial and valuable contribution in this field.

At the same time, however, a great deal of research activity is being carried out in the USA and Japan, aimed at building suitable small-scale optical or opto-electronic circuits.

SECTION IV

BRANCH OF SCIENCE: COMBUSTION TECHNOLOGY

OBJECTIVE:

A thorough study of the dynamics of ignition, to improve the performance of certain combustible materials or find solutions to storage problems in respect of fuels liable to explode.

SCIENTIFIC ANALYSIS

The term combustion in the classic sense is applied to any instance of rapid oxidation in certain materials, such as the various forms of carbon (wood, coal), various hydrocarbons, hydrogen and others.

According to the thermodynamics at work in the various combustion reactions, and the chemical composition of the burning substances, a varied range of violent reactions may be observed during combustion: what characterizes them is their capacity to release energy in the form of heat, either gradually, in which case it is evenly absorbed by the environment, or abruptly, in which case there is a sudden rise in temperature, normally accompanied by a sudden change in volume (explosion).

Despite the importance of, and the impressive advances in, research, the phenomenon of combustion is still very little understood. The reason is that even in its simplest form it is accompanied by a number of complex phenomena, such as instability at the stationary stage, semi-inconsistent response to very small changes in the conditions under which it occurs, a tendency to flare up or die down suddenly, swirling motions, etc.

It is, therefore, natural that fresh efforts should be made to interpret the phenomena surrounding combustion, in the light of the advances made in this sphere in recent years. It would be useful if activities were undertaken to find an answer to some specific questions of importance. One of these, and a particularly sensitive one, has to do with ignition. Because of its violence, the phenomenon often has unforeseen features such as delayed or premature occurrence, formation of shock waves and so on.

A full investigation of the phenomenon of ignition is expected to furnish important knowledge as to the use of certain materials for combustion and the necessary development of machines in which such substances can be burned for specific purposes.

The situation in the Community

The centre of gravity at the moment is in the United States, on the theoretical as on the experimental level. In Europe at the moment there is dissipation of effort.

SECTION V

BRANCH OF SCIENCE: PHOTO-ACOUSTIC SPECTROSCOPY

OBJECTIVE:

To develop and use photo-acoustic spectroscopy so that it can be applied in the non-destructive analysis of certain materials.

SCIENTIFIC ANALYSIS

It is well known that when various methods of analysis using either X-rays or gamma-rays (generated by radio-isotopes) to study certain materials are applied, the rays themselves have an effect on the molecules in the materials (a classic example is the way they attack tissue during the examination of biological material). Consequently, non-destructive methods of analysis often have to be applied. One such method is that known as photo-acoustic spectroscopy. In this method, light directed at and absorbed by a specimen is converted into sound, which is then picked up by a microphone. In this way a spectrum is obtained identical to that obtained by light absorption spectroscopy on any type of solid or semi-solid material.

Relying as it does, therefore, on measurements of direct absorption and not of retransmission, this technique has many applications in the examination of materials without destroying them.

There are important areas of application in biology and medicine, in studying changes in the skin of cancer patients, identifying bacteria, determining type and relative concentration during transformations undergone by various organisms, in measuring the effectiveness of various lubricants and sun-barrier creams, studying pigments used in painting pictures or in weavable fibres in various textiles, and in heterogeneous catalysis.

SITUATION IN THE COMMUNITY

This is virtually a new research field, and the work being done today is on the theoretical level, without, however, the essential coordination which its importance would warrant.

SECTION VI

BRANCH OF SCIENCE: Physical chemistry of surfaces

OBJECTIVE:

Study and full understanding of interface phenomena, so that theoretical knowledge can be expanded side by side with experimental techniques, in order to develop related sectors (biomembranology, chemical engineering) and promote relevant applications in various technologies (emulsification, adhesion techniques etc.).

Scientific analysis

This sector is related to the science of composite systems, whose development is of particular interest. Its applications, though, are different, and may be of interest in many different industrial activities, such as chemical engineering, membranology or surface-bonding, which touch on the latest developments in industry, but also in the traditional industries, such as chemical dyestuffs, metal-coating of plastics, etc.

The discipline is mainly concerned with instability in surfaces, which arises in all areas in many types of application, such as electrochemical reactions, exchanges along membranes, adhesion techniques and automatic emulsification.

The study of interface phenomena is particularly important for the understanding of phenomena related to catalysis, exchange via surfaces and bonding polymers to metals. It will also make possible the development of the technology for manufacturing artificial biological organs intended to be in contact with living organic systems.

SITUATION IN THE COMMUNITY

Many laboratories are currently doing remarkable work in this field, but there is no central coordination and a great deal of duplication.

SECTION VII

BRANCH OF SCIENCE: Climatology

OBJECTIVE:

To study and understand climatic phenomena with the aim of devising special systematic forecasting models. To study the micro-structure of turbulence in boundary layers of the atmosphere and use them in various applications.

SCIENTIFIC ANALYSIS

Studying the stability of climatic phenomena and acquiring skill in forecasting them is an onerous task which contemporary society has to face. At a time of great population growth and profound changes in research into sources of energy, problems such as soil productivity, desertification, flood forecasting and erosion demand the greatest possible scientific attention. The importance of such problems increases still further if account is taken of the occasional appearance of unexpected phenomena and of the fact that the atmosphere and our geological environment display changeability at virtually all times.

It has become clear in the last two decades that many physical, chemical or biological systems are unstable and changeable.

New methods of coping with such problems have been developed, using concepts and techniques from stable-system thermodynamics, non-linear mathematics and probability theory. The conclusion that emerges from these researches is that the complex behaviour of climatic phenomena can be understood by following the lines of the theory of non-linear dynamic systems which are not in equilibrium.

Closely linked to climate is one dramatic instance of change in the environment: desertification. Its special feature is that it is due to the combined effect of a variety of factors of different origin, such as local climate (precipitation, fluctuations in radiation, atmospheric movement), changes in terrain (linked to chemical action by silicates) and human activities.

Another climatic phenomenon is constituted by the turbulence in the boundary layers of the atmosphere. The parameters of the boundary layers circumscribe the microstructure of such turbulence as regards wind temperature and speed, humidity and pressure. An understanding of these parameters is useful in the following applications:

a) Boundary layer physics (energy equalization).
b) Propagation of microwaves and radiation in the visible part of the spectrum.
c) Air navigation safety.
d) Energy purposes.
e) Atmospheric pollution (the atmosphere's capacity for dispersion).
f) Agricultural meteorology.

SITUATION IN THE COMMUNITY

Climatology is a continuously evolving sector, chiefly owing to the constant development of other sciences and techniques.

Thus, it is in a very dynamic state, requiring the greatest possible coordination and prioritization of effort.

OPINION OF THE COMMITTEE ON BUDGETS

Letter from the chairman to Mrs Hanna WALZ,
chairman of the Committee on Energy and Research

Luxembourg, 29 April 1983

Subject: Proposal from the Commission of the European Communities to the Council for a decision adopting an experimental Community action to stimulate the efficacy of the European Economic Community's scientific and technical potential (Doc. 1-1096/82)

Dear Mrs Walz,

The Committee on Budgets considered the above Commission proposal at its meeting of 20/21 April 1983.

According to the Commission's financial statement, a total appropriation of 7 million ECU and a staff of three (2A and 1C) are necessary to implement the proposed programme for a period of two years. The resources requested for 1983 are included in the 1983 budget of the European Communities.

The committee therefore had no objections to the Commission's proposal.

Yours sincerely,

(sgd.) Erwin LANGE

The following took part in the vote: Mr Lange, chairman; Mrs Barbarella, vice-chairman; Mr Adonnino, Mr Arndt, Mrs Hoff, Mr Kellett-Bowman, Mr Langes, Mr Price, Mrs Scrivener and Mr Simmonet.