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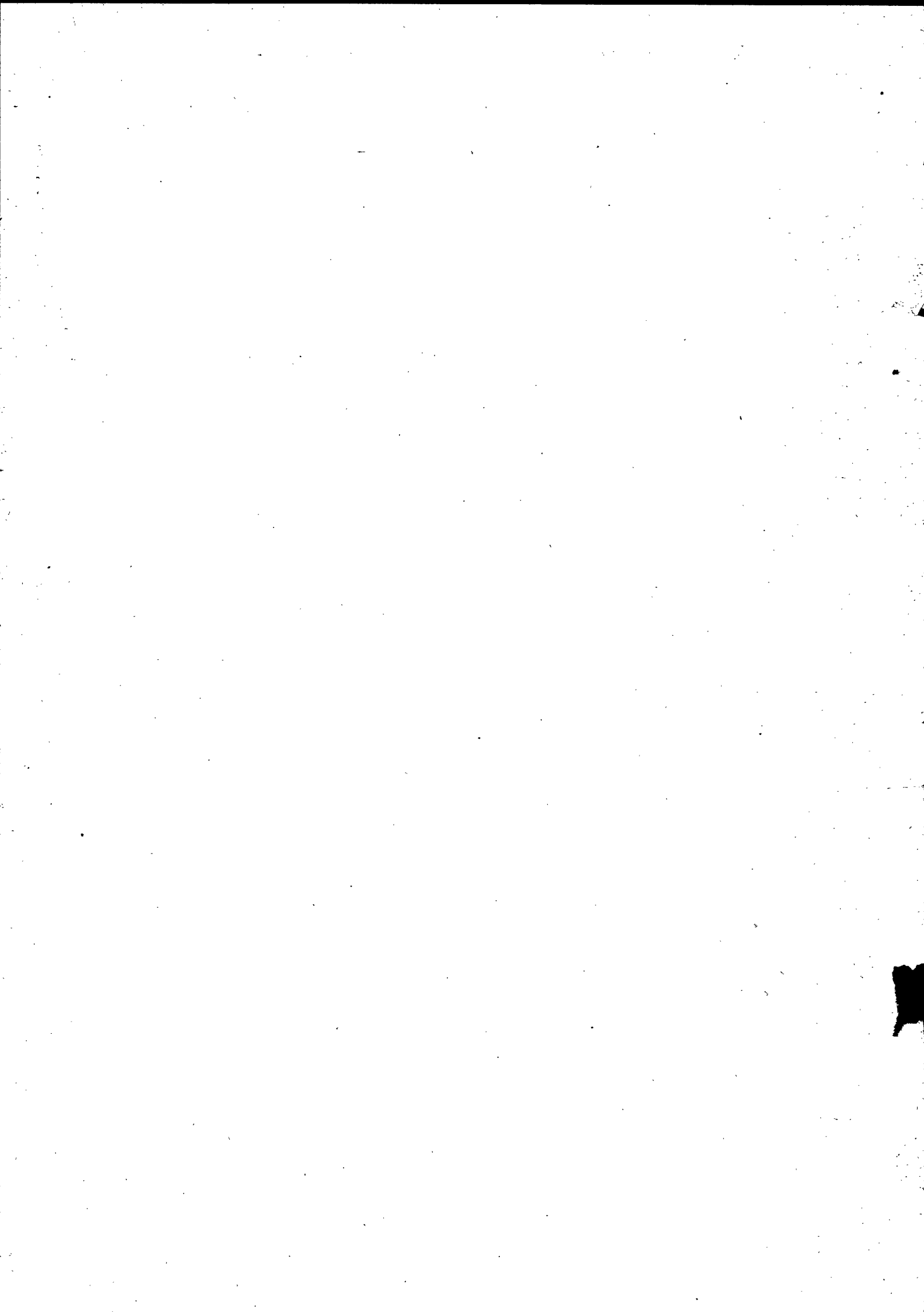
EUROPEAN COMMUNITIES

MEDIUM TERM ECONOMIC POLICY COMMITTEE

Scientific and technical cooperation between European countries :

possibilities in seven sectors

Report of the Working Party on
"Scientific and Technical Research Policy"
(set up in implementation of the resolutions
adopted by the Council of Ministers of the
Communities on
31 October 1967 and 10 December 1968)

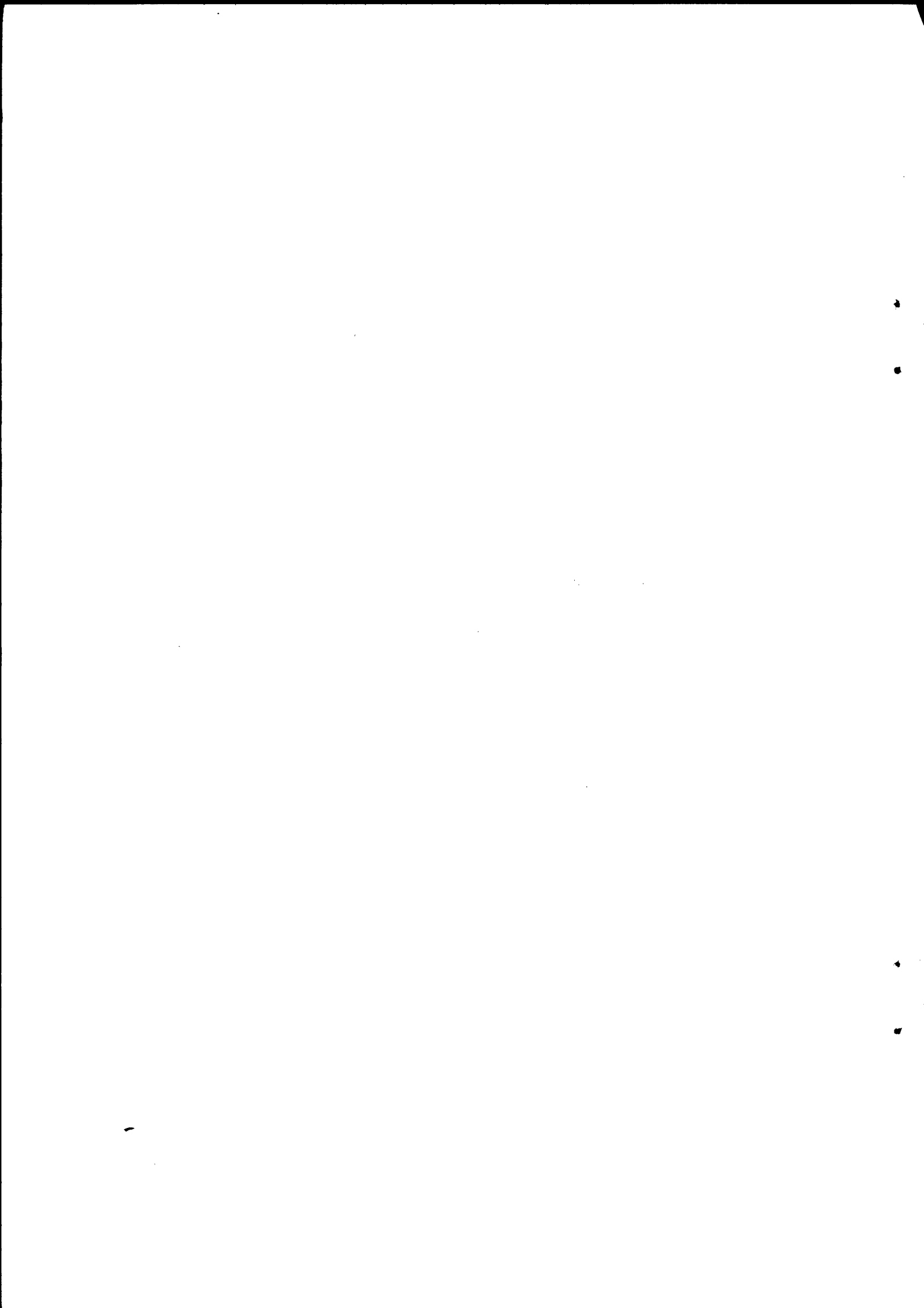


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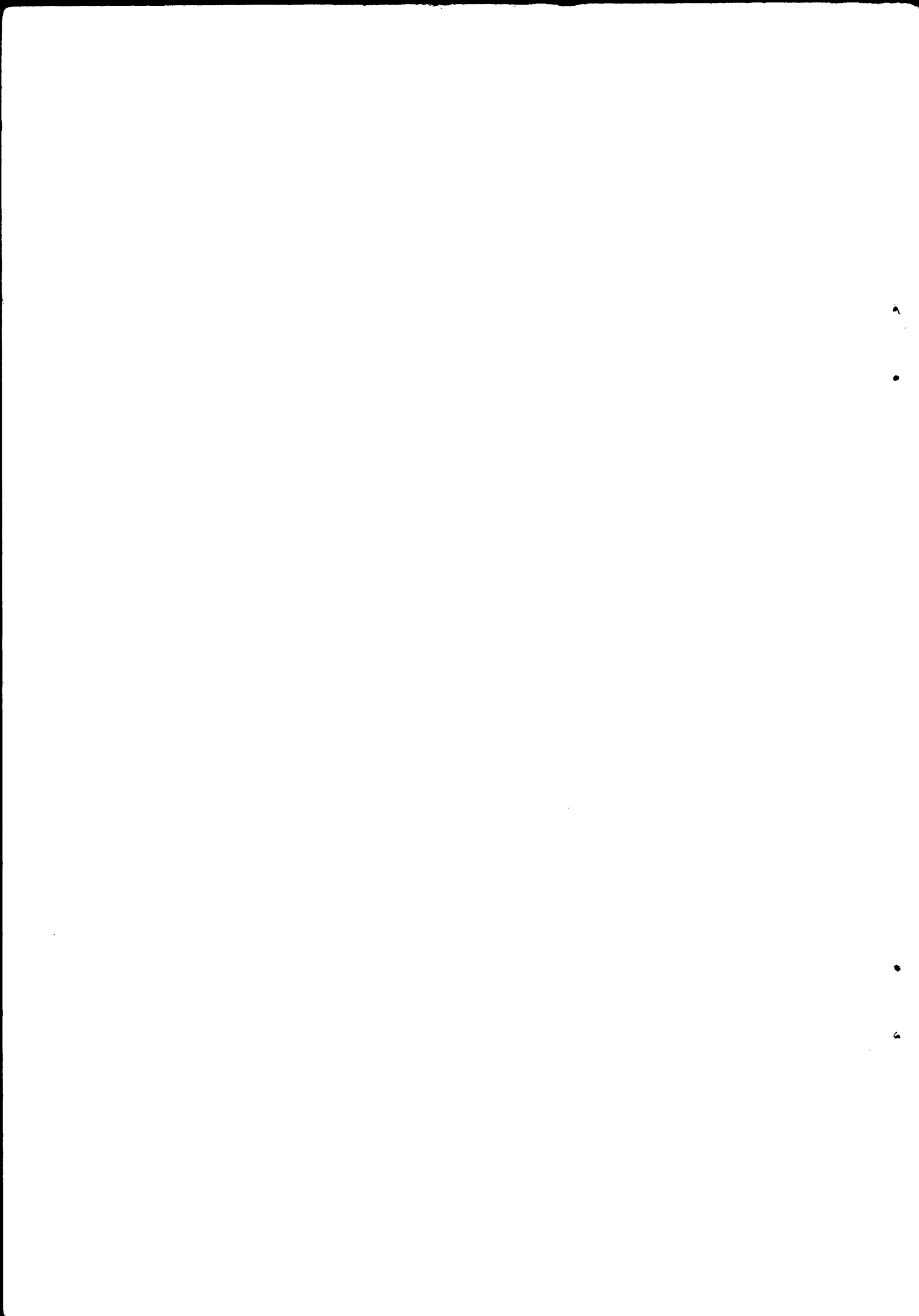
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INTRODUCTION

The Council of Ministers of the European Communities, at meetings on 31 October 1967 and on December 1968^(*), decided that the Working Party on Scientific and Technical Research Policy of the Medium Term Economic Policy Committee should be required to

- (i) "examine the possibilities for cooperation, starting with the six fields proposed (information science and telecommunications, new means of transport, oceanography, metallurgy, nuisances and meteorology)";
- (ii) "examine the inclusion of other fields for cooperation and to classify these fields appropriately".

Finally, the Working Party was asked to examine three other questions: the comparison of programmes, scientific and technical information, and the coordinated training of research workers and exchanges between scientists.

With regard to the first two terms of reference, the Working Party was required to make a report to the Council, through the Medium Term Economic Policy Committee, before 1 March 1969.

This report should take into consideration existing means of cooperation and look into means of encouraging the participation of other European States in the projects under consideration.

With regard to the latter point, the resolution of 10 December 1968 laid down that the document drawn up by the Working

(*) Cf in Annex I the texts of the two Council Resolutions

Party should be annexed to the proposals for cooperation which the Council "shall send to interested countries and in particular to those which have submitted an application to join the Community".

The setting out of the actions for cooperation which could be undertaken on a European scale and the appraisal of the interest which their achievement would offer form the essential part of this report, the methods of undertaking and the general conditions for the implementation of these projects, on the other hand, only being outlined. Only some special conditions for implementation - directly linked to the proposed projects - are dealt with slightly more fully at the end of Chapter III.

However, the Working Party felt that in certain cases additional information, concerning in particular the methods of carrying out the suggested projects, were necessary for the Council to be able to take a decision. This information will be sent to the Council before its meeting in July 1969.

Finally, the Working Party has not been able, in the time fixed, to go deeply enough into "the inclusion of other fields for cooperation and the appropriate classification of these fields". It is consequently proposed to take up this point again, with the other terms of reference, at the end of March 1969, along the general lines briefly covered in Section 2 of this Document.

1. SCIENTIFIC AND TECHNICAL COOPERATION

BETWEEN EUROPEAN COUNTRIES

Possibilities in seven sectors

I. ORIENTATION OF THE WORK UNDERTAKEN

In accordance with the Council's instructions, the Working Party on "Scientific and Technical Research Policy" had set up at the end of 1967 seven specialist groups: information science, telecommunications, new means of transport, oceanography, metallurgy, nuisances and meteorology.

All the work was started under the guidance of the Working Party on "Research Policy", taking into account two basic points.

1. The limits of the Council's terms of reference - the tight schedule

The terms of reference given by the Council did not specifically aim at launching a general study on the expediency and the advantage of a European research and development policy. The Working Party was only expressly requested to study the possibilities of cooperation among the Community countries, beginning with seven sectors and "to seek means to enable other European states to participate in the action and cooperation in those fields".

Furthermore, the time limits set for the carrying out of such studies were too short to define, priorities and procedures for cooperation, as would have been useful.

Similarly, the lack of time made it at times impossible to carry out complete studies by sector and a fortiori to define and adopt a systematic method of approach ensuring the necessary dovetailing of those studies.

These studies being done by sector and the time limits being strict, the Working Party on "Scientific and Technical Research Policy" selected a pragmatic approach. For the same reasons, the projects under study were limited in some cases to proposals of a preliminary nature representing only the first stages of efforts at cooperation which are considered desirable.

2. The extent to which proposals to be submitted to the Council should be in detail

It was necessary that the Council should have available all the information required to assess simultaneously the relative scope, the immediate advantage and the subsequent development of the projects under consideration. But it was nevertheless important not to go too much into the details of the proposed projects (programmes and procedure) in order to ensure that they might possibly be examined together with the interested countries without their being constricted by too advanced a preparation, which would have an undue influence on future negotiations.

Furthermore, when the cooperation projects were being studied by the Working Party, certain sources of difficulties which have arisen in carrying out development projects in the field of European technology were taken into consideration. In particular, the lack of agreement on the social, economic or political objectives aimed at by European countries in their attempts at scientific and technical cooperation was mentioned as being an important element of doubt which, experience had

shown, rendered this kind of project unstable or unsatisfactory.

In the light of the discussions on these various points, the Working Party on "Scientific and Technical Research Policy" sought to show, in each individual case, the advantage to the countries of the Community of carrying out together the proposed projects while temporarily putting aside a study in depth of the methods of cooperation and the conditions required to ensure the efficacy of each of the proposed projects.

II. PROPOSED ACTIONS FOR COOPERATION

The proposals set out hereunder are not all developed to a similar level. The Working Party has therefore classified them under two different categories, A and B:

- category A covers proposals which have progressed far enough to make it possible to submit them to the Council for its decision. No indication as to priority is given;
- category B covers proposals which require further study before the Council can take a decision.

This classification gives no indication of the relative importance of the proposed projects. As an example, the project for the development of a large computer - a subject of considerable importance for European scientific and technical cooperation - appears under category B. In respect of this particular project, as for certain other proposals classified under that category, the necessary back-up studies could be completed within the next few months. In other cases, classification under category B shows that the proposed projects require studies in depth or that they must be taken up again following new lines of approach.

Finally, the proposed projects are of fairly different kinds. They concern both preliminary studies - indispensable to put cooperative schemes on a firm footing - as well as research proper, work on the development and standardization of equipment, the development of new materials or components, industrial development and, finally, the setting up of joint centres or of services of public interest managed on a joint basis.

(In the following pages, where the proposals are covered sector by sector, the category under which each project is classified is given together with the reference number of the corresponding analytical note annexed to this report - of Annex II).

1. Information science

The following proposals aim either at strengthening the Community's capacity to produce competitive equipment or at enabling the economy as a whole to make the best possible use of existing facilities and to make rapid use of the technological possibilities afforded by the available equipment.

In respect of production, the main proposal concerns the design and manufacture of high-power data processing systems (Project 10).

Apart from commercial and technological considerations, there is also an industrial objective to this project which is to foster the creation, in a critical sector, of industrial structures better adapted to world competition.

Two forms of action which are not necessarily mutually exclusive are under consideration and must be further specified:

- the development of a machine which would be marketable around 1980 and would fulfil at one and the same time the requirements of the future market, the new technology and industrial promotion;
- the development of another machine, marketable around 1975 and consequently incorporating more of the existing technology.

It is only with the active help of manufacturers that it will be possible to be more specific about the form of such a project. Consequently it has provisionally been classified in category B in spite of its importance, especially for industrial cooperation within the framework of the Community and with non-member countries. In this respect, the Working Party hopes that the continuation of work and in particular negotiations between interested parties will be encouraged and speeded up.

The main European companies are at present in consultation; the results will be made available at the end of May 1969 and will enable the project to be outlined in greater detail.

In respect of utilisation, several projects are suggested:

- the foundation of a program library (Project 12) in the form of a system for gathering programs in the various fields of application, for organizing information in that field - in particular in the form of automatic documentation - and for giving technical assistance in the use of programs. The development of such a library could be gradual (category A);

- the setting up of standardization committees required to carry out software standardization with the participation of European manufacturers and to promote the application of those standards (Project 13, category A);
- the coordination of the production of user software in industry, science and administration. One could start with pilot schemes on subjects the selection of which is still under study by experts (Project 15, provisionally category B);
- a pilot scheme in respect of a data transmission network aimed at clarifying certain technical problems involved in the operation of such a network (Project 11, category A). This could serve for the study of a separate switched network, which is described below under Telecommunications and is to be looked into by the Postal and Telegraph authorities from the market angle in particular.

Finally, the need for a sufficient number of highly trained men capable of mastering and developing information processing techniques led to proposals for the foundation of a European Institute of Information Science and Technology (Project 14). This is classified under category B.

2. Telecommunications

For telecommunication services to make a full contribution to economic expansion and for the telecommunications equipment industry to maintain a leading position in certain products, it is necessary to spell out right now the direction in which

development will be particularly essential during the forthcoming years. For this, it is proposed that forward studies on the evolution of services and telecommunications requirements should be carried out (category A - Project 20). These studies will reveal the points where research is especially urgently needed and promises good results. A general study will cover the requirements to be met on a medium and long term basis. A special study would go into the possible setting up, by 1972-73, of a separate switched remote data processing system (data transmission).

Furthermore, certain proposals on matters the importance of which is undeniable may be introduced even at this stage. These would be:

- research work on the transmission, propagation and reception of very high frequency waves, with a view to improving knowledge of the possible working and to improve the use of hertzian beams and telecommunications by satellites (category A - Project 25).
- a series of projects on components of equal importance in telecommunications and information science. The first aims at the introduction of European Conformity Certificates, which would make it possible to limit technical obstacles to trade and hence, by improving market conditions, to increase the competitive power of the products concerned. This is a standardization operation of the classical type (category A - Project 21).

Other projects would concern research and development in the sphere of new types of components; this is a most important subject, likely to require a substantial outlay, but one on which not enough work is being done, so much so that it has had to be classified

under category B. However, studies are being actively pursued in order to try and make more specific proposals within the forthcoming weeks (Projects 22, 23 and 24).

3. New means of transport

The increasingly acute transport problems in urban areas and the competition of aircraft with inter-city land transport over medium distances have for some time been producing a plethora of new ideas, some of which have already been researched or have even led to industrial developments.

Although it is important that new ideas should come forth, it is equally necessary to avoid an excessive number of concrete developments which might mean a waste of efforts. This is especially true of cooperative projects.

Certain proposals tend to clarify the necessary choices, while others already concern research and development projects:

- the forward study of passenger transport between the large European agglomerations (category A - Project 33) would make it possible to indicate more precisely the ranges where the introduction of new techniques towards high-speed collective transport is necessary. This study should be carried out within the framework of the work carried out by the OECD in consultation with the European Conference of Transport Ministers;
- the development of electronic traffic aids on major roads would help to improve safety and the flow of traffic on them (category A - Project 30);

- three technical and economic studies of a preliminary nature concerning, respectively, electromagnetic "lift" (sustentation), a marine hovercraft of around 2,000 metric tons and the use of closed-circuit gas turbines for motorized rail vehicles (category A - Projects 31-32-34);
- four subjects were studied, but their examination is still in the preliminary stage and they appear in category B. These are the linear induction motor, the electric vehicle, the use of automation in shipping control and the determination of the direction of lanes of traffic in urban areas (Projects 35, 36, 37 and 38).

4. Oceanography

The realization of the enormous resources of the sea, which was assisted by intensive oil prospection near coastal areas and by the world's increased food requirements, is behind the increasing interest given to that field long looked upon as being the subject of only disinterested research.

The proposals made hereafter are nothing more than an initial answer to the problems which arise and which require first and foremost the development of a new technology. It will in fact only be possible to make detailed proposals when the specific objectives of cooperative action have been defined with a view to exploiting the natural resources, involving the need for preliminary work. It is, however, possible to suggest even now two groups of actions which will be necessary whatever the extent of subsequent decisions on exploiting natural resources, namely, these are the fight against pollution and improving the basic knowledge of marine phenomena.

In the field of protection against pollution of the sea, the projects in question aim at:

- improving information on the extent of pollution in estuaries, elaborating techniques for the fight against and continuous surveillance of pollution of the sea, fixing toxicity standards (category A - Project 40);
- developing, in support of the above-mentioned projects, two scientific devices which are essential for obtaining the data sought (category A - Projects 41 and 42).

On the other hand, the basic knowledge of marine phenomena is still too inadequate for a bold commitment to the exploitation of the seas. It is therefore proposed that:

- the creation of a measuring network in European waters, for both oceanography and meteorology, be considered. The first stage would be to develop an automatic measuring station at sea. This is classified under category A (Project 43), while the setting up of a measuring network requires an additional study and therefore comes under category B.

Finally, in the field of development of new instruments, two initial concrete proposals were made in this connection by the specialist group concerning the development of a probe for determining the chemical parameters of sea water and an instrument facilitating geological prospection of the sea bed. These proposals are classified under category B as they are not yet sufficiently advanced (Projects 44 and 45).

5. Metallurgy

The variety of possible actions in this field is amply demonstrated by the fact that an initial sounding-out of industrial undertakings revealed a wide measure of interest in theory and a large number of concrete suggestions.

In this field the Working Party is studying a general proposal on procedure, namely, the creation of a combined European project, which could if necessary be extended to other fields. It would be based on the allocation, on the recommendation of a joint European body, of national funds to national undertakings or laboratories^(*) (category A). This point is developed in Chapter III.

The projects shown below could serve as an example, or possibly as a basis, for drawing up the programme for this combined European undertaking:

- several projects regarding metals and alloys for gas turbines (Projects 50, 51 and 52). The market for these machines, both for the production of electrical energy and for propulsion purposes, is likely to develop considerably if the amount of exotic materials available is such as to enable the efficiency to be stepped up considerably;
- a project concerning metals and alloys necessary for the construction of plant for desalinating sea water (Project 53);

(*) This would be a preliminary basis for studies. The possibility of extending the payment of funds to other types of centre will have to be considered later.

- projects for supplying the chemical and petrochemical industries with equipment of ever-increasing size, such as large reaction tanks (54 and 55);
- a project dealing with high-performance materials - superconductors and semiconductors - for use in electrical and electronic engineering. This project would have to be studied in close connection with projects 22 and 23 concerning electronic components (Projects 56 and 57).

These projects will have to be re-examined by the body studying the combined venture.

6. Nuisances

The urgency of the fight against pollution has led the Working Party to submit ten projects immediately, all of which could be launched very quickly (category A).

- three projects aimed at combating air pollution, one by defining the overall danger level of atmospheric pollution and the others by studying the harmful effects of sulphur derivatives and the composition of fumes and dust from motor vehicles and domestic heating appliances and the methods for combating them (Projects 61, 62 and 63);
- three projects on problems of water: natural purification processes, purification processes for waste water, thermal pollution of water (Projects 64, 65 and 66);
- a project concerning the contamination of water by biocides (Project 67);

- development of sludge processing methods (Project 68);
- Study of acoustic nuisances (disturbing effects and techniques for reducing vehicle noise (Project 69)).

All these projects are directed both towards obtaining a better knowledge of the phenomenon of pollution and of the harmful effects of pollutants, so as to improve techniques for mitigating the pollution, and towards remedying those effects. This will make it easier to adopt uniform rules, necessary both for health purposes and to eliminate the hindrances to the Common Market often caused by lack of precision in these rules.

In this connection it is important to emphasize that in order to get a satisfactory answer the problem of nuisances will have to be tackled as a whole in a more systematic manner. To do this measures coordinating the various projects suggested above appear necessary.

On the other hand, as far as pharmaceutical products are concerned, it will be necessary to make an overall study both of the health aspects and of the economic and industrial aspects. The proposals submitted here are thus only the first steps in this direction.

7. Meteorology

In meteorology the proposals centre around two main points:

1. the major operations in new meteorology;
2. the "meteorological equipment" projects.

The first point requires full development by the Community countries of the new possibilities offered to meteorology by the techniques of information processing by computers and of the collection and transmission of information by satellites.

These possibilities open up in particular the possibility of longer range weather forecasts. The economic value of forecasts covering a longer period is particularly evident in agriculture, building, certain kinds of transport and the travel industry.

Because of the international nature of meteorology and the very considerable financial effort involved, it is suggested that this transition to a new dimension - Europe's own contribution to the World Weather Watch - should be made jointly;

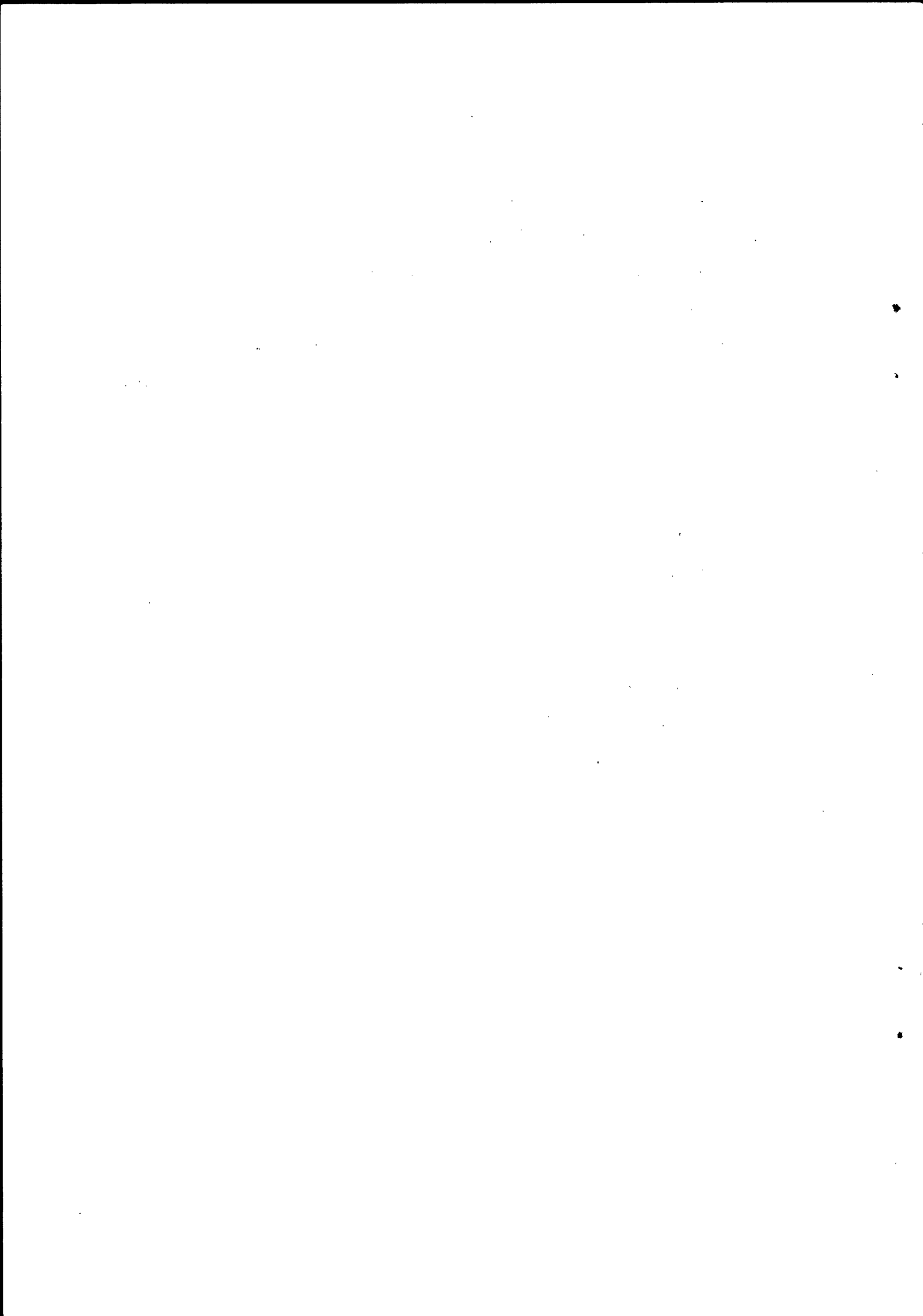
- on the one hand, by the setting up of a joint meteorological computation and research centre engaged mainly on weather forecasting, especially over periods of 5-15 days; this would be provided with sophisticated information processing hardware (category A - Project 70);
- on the other hand, by the joint development and operation, along lines still to be specified, of meteorological satellites (including the necessary ground stations). It would be advisable for the "meteorology" specialist group to study this project with ESRO, which could act as technical adviser.

The other procedures as regards construction and operation have still to be specified, which makes classification of the project in category B necessary (Project 71). This very important operation should be undertaken with the utmost urgency if it is decided to set up the joint meteorological centre.

The second point for cooperative action concerns the joint development, standardization and purchase of meteorological equipment whether that used on a large scale such as balloons and radiosondes, or complete plants such as automatic meteorological stations.

Such action would help to improve the existing equipment, promote standardization of observation systems and enable savings to be made. Moreover, the industrial importance of these projects is considerable (category A - Project 72).

Finally, it should be pointed out that the project to establish a measuring network in European waters incorporates some meteorological aspects.

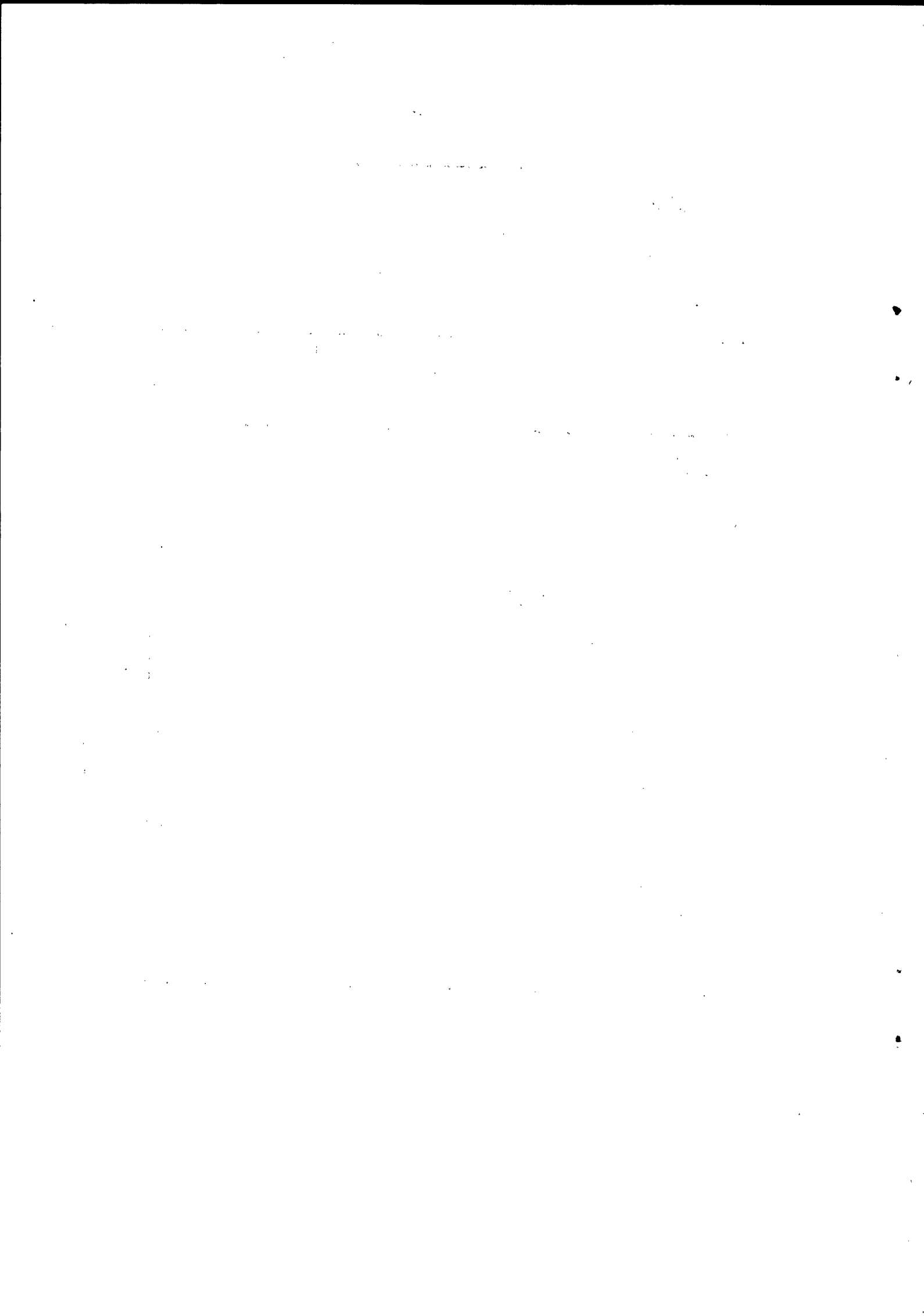


SUMMARY OF PROPOSALS

Code used:

- A I low cost, up to about 2 million u.a.
See text
B II medium cost, about 2 to 10 million u.a.
III high cost, considerably higher than 10 million u.a.

	Classi- fication	Total cost of project	Time required in years	Links with other projects	
1	<u>Field:</u> INFORMATION SCIENCE				
10	High-power data processing systems Phase 1	B	III	3	Links with No. 22 (23 and 57)
11	Data transmission networks between research centres Phase 1	A	I	2	Links with Nos. 20, 12
	Phase 2	A	II	2-3	(13, 15)
12	European program library	A	II	3	Links with No. 11 (13, 15, 20)
13	Software standardization committees	A	I		Links with No. 11 (12, 15, 20)
14	European Institute of Information Science	B	III	4	
15	User software in various sectors	B	II		Links with Nos. 11, 13 (20)



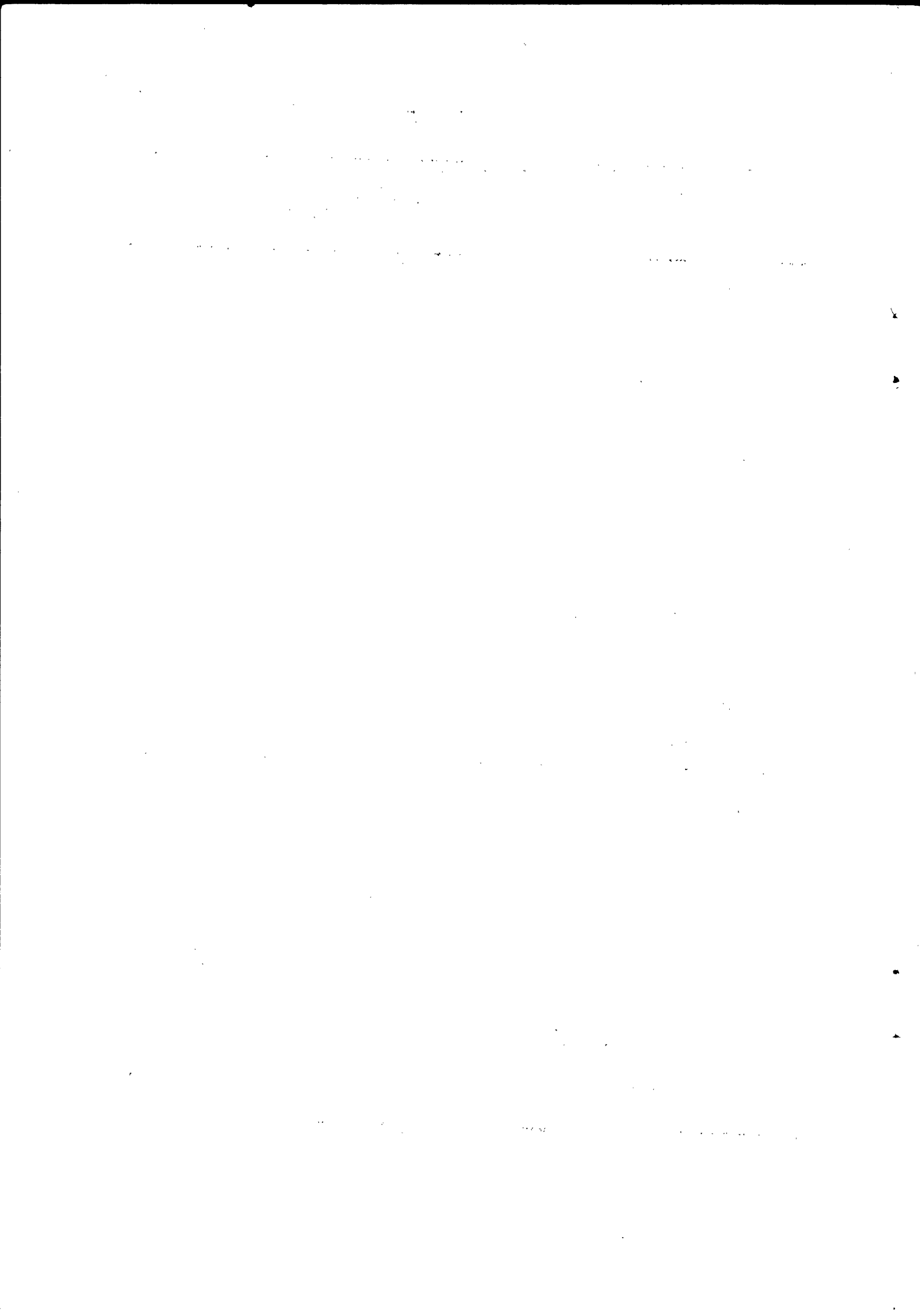
No.	Project	Classi- fication	Total cost of project	Time required in years	Links with other projects -
2	<u>Field:</u> TELECOMMUNICATIONS				
20	Forward studies of telecommunications service Study I Study II	A A	I I	2 2	Links with No. 11 (12, 13, 15)
21	European conformity certificates for electronic components	A	I		
22	New components for computers	B	III	2-3	Links with No. 10 (23, 57)
23	Basic research on the properties of semiconductors Phase 1	B	III	3-5	Links with No. 22 (10 and 57)
24	Solid state devices for hyperfrequency use	B	II	3	Links with No. 25
25	Basic research on the propagation of high frequency and very high frequency hertzian waves	A	II	3-5	Links with No. 24
3	<u>Field:</u> NEW MEANS OF TRANSPORT				
30	Devices for electronic traffic aids	A	I	5	Links with No. 37

No.	Projects	Classi- fication	Total cost of project	Time required in years	Links with other project
31	Study of the advantages of electromagnetic "lift" (sustentation)	A	I	1	
32	Study of the advantages of a marine hovercraft of about 2,000 metric tons	A	I	1	
33	Forward study of passenger transport between large conurbations	A	I	1	
34	Study of closed-circuit gas turbines for use on railways	A	I	2	
35	Research and development work on the linear induction motor	B	..	..
36	Automation of shipping control	B	..	..
37	Collection of the information required for the correct direction of lanes of traffic	B	..	..	Links with No. 30
38	Research on the use of electric vehicles in urban centres	B	..	..

No.	Project	Classi- fication	Total cost of project	Time required in years	Links with other projects
4	<u>Field:</u> OCEANOGRAPHY				
40	Fight against and surveillance of pollution of the sea Phase 1 Phase 2	A	I ..	1	Links with Nos. 41 and 42
41	Development of a device for measuring toxicity	A	I	3	Links with Nos. 40 and 42
42	Development of a device for toxico- logical and biological studies in the sea (undersea Ecostat)	A	I	3	Links with Nos. 40 and 41
43	Oceanographical measuring network in European waters Phases 1 and 2 Phase 3 Phase 4	A B B	I II	2 2	Links with Nos. 44, 71 and 72
44	Development of an oceanographical chemical sonde	B	..	..	Links with No. 43
45	Development of a sea-bed sampling apparatus	B	..	..
5	<u>Field:</u> METALLURGY	A	Combined projects on the following subjects, for example:		
50	Study of titanium alloys and super- alloys for gas turbines		II	5	Links with Nos. 51 and 52

No.	Project	Classi- fication	Total cost of project	Time required in years	Links with other projects
51	Development of fibre-reinforced materials for gas turbines		II	5	Links with Nos. 50 and 52
52	Development of refractory metals and other materials for gas turbines		II	5	Links with Nos. 50 and 51
53	Materials for the desalination of sea-water		II	5	
54	High-gauge steel tanks for the chemical industry		II	5	
55	The possibility of using noble metals for the chemical industry		II	5	
56	Development of industrial super-conducting materials		I	5	
57	Development of industrial semi-conducting materials		II	5	Links with No. 23
6	<u>Field:</u> NUISANCES				
61	Fight against atmospheric pollution by sulphur derivatives	A	I	3	
62	Development of biological indicators for determining the overall danger level of atmospheric pollutants	A	I	3	

No.	Project	Classi- fication	Total cost of project	Time required in years	Links with other projects
63	Study of fumes and dust from motor vehicles and domestic heating appliances	A	I	3	
64	Natural purification processes in polluted waters	A	I	3	
65	Purification processes for waste water	A	I	1/2	
	Phase 1		I	2 1/2	
	Phase 2		I		
66	Thermal pollution of surface waters	A	I	3	
67	Biological effect of the contamination of water by biocides	A	I	3	
68	Development of sludge processing methods	A	I	3	
69	Acoustic nuisances	A	I	3	
7	<u>Field:</u> METEOROLOGY				
70	Common Meteorological Computation and Research Centre	A	III	3	Links with Nos. 71, 43, 72
71	Joint development and use of European meteorological	B	III	5	Links with Nos. 70, 72 and 43
72	Joint development, standardization and purchase of meteorological equipment	A	I	min 1-2	Links with Nos. 70, 71 and 43



III. CONDITIONS FOR THE IMPLEMENTATION OF COOPERATIVE PROJECTS

1. General considerations

The measures proposed in the preceding pages are made up of a number of projects the implementation of which seems both feasible and desirable. However, the method of classification used to present them gives only a slight indication of the procedure to be adopted for implementing them. This procedure is quite as important as the definition and the selection proper of subjects for cooperation, since they determine the success or failure of the operations in question.

The Working Party therefore intends to complete the work entrusted to it by taking the various projects put forward in this report and attempting to present them in accordance with a more operational plan. A reclassification of the actions might, for example, be contemplated, the following categories being taken into account (if necessary these categories could be added to after analysis):

- (a) technological programmes which are beyond the scope of national budgets and companies; programmes meriting joint financing and possibly the creation of industrial consortiums and the coordination of government orders;
- (b) projects which are intended to be carried out wholly or partly in a joint centre and which will form the subject of joint financing;
- (c) projects to be carried out by national companies or centres but which involve the coordination of government orders;

(d) projects to be carried out, with national financing, by national centres or by undertakings which are not necessarily part of a group; the allocation of funds would, however, be made on the recommendation of a European body (see below "Combined European projects").

The Working Party will start work on this as soon as possible and inform the Medium Term Economic Policy Committee of the results before July 1969 for forwarding to the Council.

This operational classification is all the more useful in that the possibility of carrying out the proposed projects seem to be linked to the adoption of many and various methods of implementation.

Thus, as regards information, programming and management, it will be necessary to possess adequate means to plan, develop, direct, curb or, if need be, discontinue the projects decided upon. Also, whether the work involves standardization, specification of new equipment, the coordination of government orders or the supervision of the projects, it will be necessary to create executive bodies - often of a temporary nature - and, where necessary, administrative bodies. These bodies must in all cases be given the necessary responsibilities and powers to carry out effectively the projects in question. These bodies must create or maintain all the necessary relations with international organizations engaged in work in the fields chosen by the Council, while avoiding any duplication of their activities.

As regards financing, in respect of which the Working Party has not studied the legal procedures, the main point to be resolved is to decide whether the projects selected need to be financed jointly by the countries taking part or whether it will be sufficient to provide for national financing with means for the coordination and exchange of information. The problem of the respective contributions which the States and industrial companies should make towards research costs will also have to be examined with respect to industrial development contracts.

As for the dissemination of information, cooperative scientific or technical action should only be undertaken after agreement has been reached on the status of jointly acquired knowhow and on the regulations governing industrial property rights.

Finally, the participation of industry in the afore-mentioned joint projects is considered essential. The forms of association to be used will therefore need to be thoroughly examined. Regardless of whether they concern the relationships to be set up at the stage of the preparation of programmes or the participation of firms and industrial consortiums in the selection or implementation of projects, these various points should be discussed without delay.

It will therefore be necessary - over and above the general indications given in this report and in the promised operational classification - to pay special attention to these questions during the stage when the proposals for cooperation are analysed following the submission of this report. The weakness and frequent failures in the organization and management of science and technology in European countries have often been recognized as the fundamental cause of the technological gap between those countries and the United

States. It would be of no great advantage to countries and the Community to plan and set up on a European level machinery, regulations and management methods suffering from the same weaknesses.

For the reasons stated in the first pages of this report the Working Party confines itself here to mentioning these problems.

Examination of the actual possibilities for cooperation and the classification of the projects suggested by the specialist groups in the seven sectors, however, led the Working Party to discuss more thoroughly certain conditions of implementation directly connected with the proposed measures.

2. Some questions to be resolved in the seven sectors in question

These are grouped here under four headings: information and documentation, training, combined European projects and the joint specification production and purchase of equipment.

(a) Information and documentation

In several of the sectors examined obvious gaps and inadequacies in information and documentation were noted.

Low-cost projects (the creation of learned societies or the expansion of their activities, the systematic exchange of information and the organization of periodic discussions) could appreciably increase the value of the studies developed or proposed, especially in respect of oceanography and meteorology.

Similarly, on the subject of transport, telecommunications and nuisances, exchanges of information, which have progressed well

as regards the results of research carried out within the various countries, could usefully be extended to projects and programmes now being drawn up. This would greatly facilitate the planning of new cooperative projects and eliminate useless duplications.

(b) Training of research workers - general coordination of research

The question of the training of research workers and the general coordination of national research programmes has been brought up in several sectors. These problems could not always be examined in depth. The proposal of the specialist group on "Information Science" suggesting the creation of a European Institute of Information Science and Technology, for example, had to be listed under category B.

The Working Party will devote further work to these questions.

(c) Combined European projects

As has already been noted, examination of proposals for cooperation in the field of metallurgy led the Working Party to suggest that the implementation of combined European action in this field be studied. Such combined action could be based on the allocation of national funds to national laboratories or companies on the recommendation of a European committee made up of representatives of the countries taking part.

The Working Party will study this project more thoroughly forthwith so that the Council will receive the necessary information on the subject before the end of June 1969. This study will take the activities and responsibilities of the Commission into

consideration.

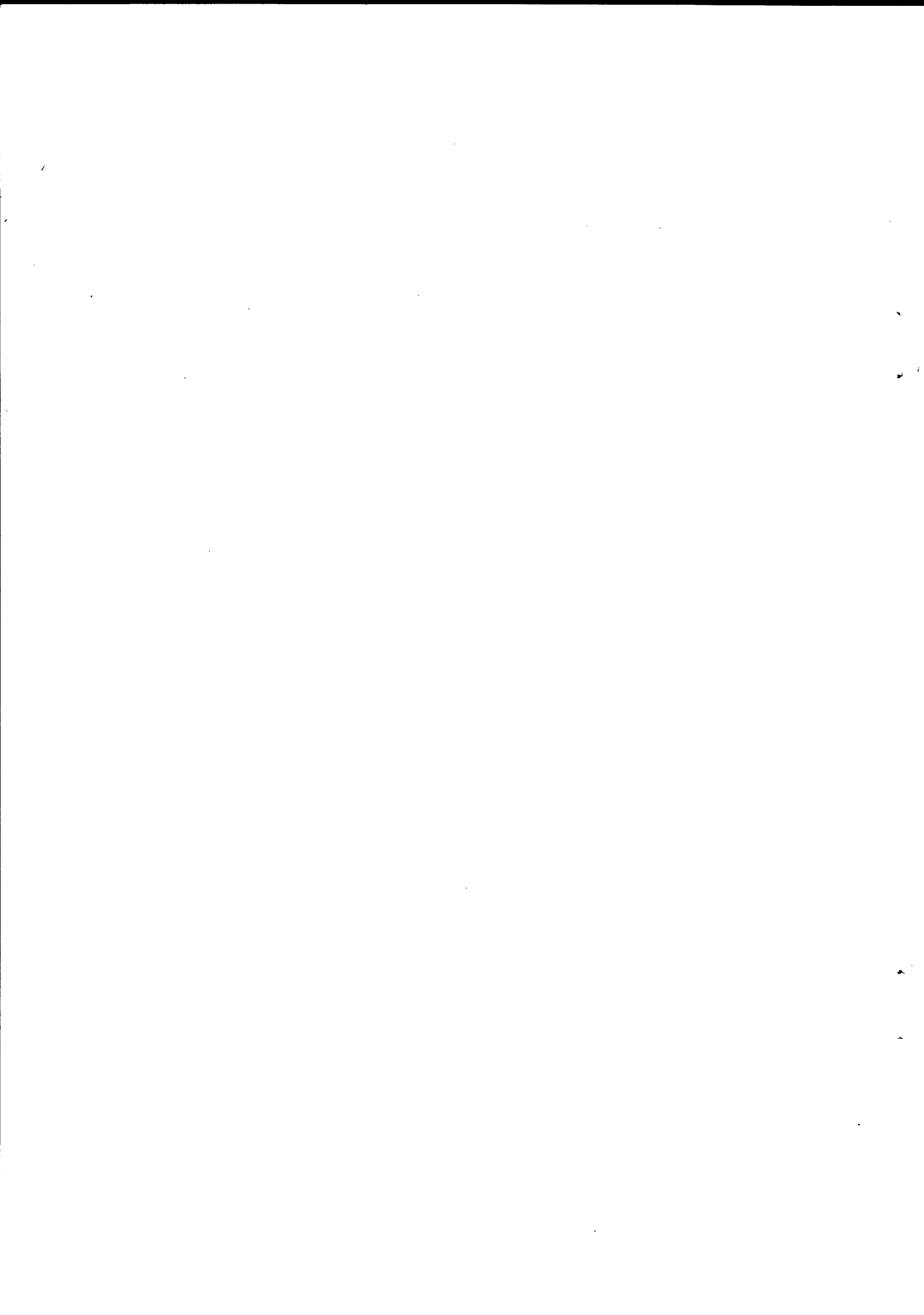
The Working Party intends also - in the light of this study - to examine the suitability of undertaking similar combined action in other fields, taking account, of course, of the peculiar ties of each field. In this way, for example, they might consider the advantage of action of this kind in respect of programmes in the field of telecommunications.

(d) Joint specification, production and purchase of equipment

Finally, in many cases there arose the problem of drawing up European agreements on the specification and production of apparatus and equipment. Of varied nature and importance, these materials concern many sectors: information science (high-power data processing system, components), transport (electronic traffic aids), oceanography (apparatus to measure toxicity, undersea Ecostat), meteorology (automatic stations, miscellaneous equipment).

Joint specification of the characteristics and performance of such equipment has obvious advantages. Cooperating countries would have at their disposal a range of standardized or compatible instruments, adapted to the needs of European consumers. Whether they concern measuring apparatus - a field in which Europe on technology is obviously far behind, public service equipment or, more generally, any equipment the production of which is considered desirable on a European scale for economic or technological reasons, decisions on them should not be taken without at the same time the conditions for the production of such equipment being examined and fixed (industrial consortiums, method of choosing the producer or producers, consumer associations, etc.).

Finally, the coordination of government orders in respect of materials developed jointly will in general be a necessary condition for the success of the proposed projects. Such coordination, even when limited to the sectors considered in this report, raises difficult and complex problems (the definition of what is meant by government orders, the balancing of industrial spin-off which determines the stability of cooperative projects etc). These various problems must first be studied in greater depth by the Working Party and then with all the countries taking part.



2. NATIONAL SCIENTIFIC POLICIES AND EUROPEAN PROGRAMMES

A. COMPARISON OF METHODS, PLANS, PROGRAMMES AND BUDGETS CONCERNING RESEARCH AND PROCEDURE FOR THE SELECTION OF NEW FIELDS FOR COOPERATION

The Working Party on "Scientific and Technical Research Policy" has judged that the definition of new fields of cooperation, so requested by the Council, would be facilitated by a comparison of national plans, programmes and budgets. It is agreed to take up this double question again after submission of this report, the necessary studies and investigations having to be spread over several months.

In the light of the results of that exercise it should be possible, on the basis of national objectives and programmes, to outline a joint conception of scientific and technical cooperation and to point out sectors in which work would be carried out at the national, European and world-wide levels respectively.

The Working Party contemplates developing its activities along three lines.

First, the Working Party would consider whether and to what extent it would be necessary to foster forward studies applicable to both technological needs and possibilities. Various national centres are already engaged on work of this kind but it seems appropriate to investigate the scope and extent of such studies in order to define more precisely the effort that should be undertaken at the European level.

The Working Party also proposes to carry out:

- an investigation of options and of national scientific and technical objectives;
- a comparison of the budgets and programmes of member countries.

In this respect, the OECD is already in a favourable position as a centre for comparisons. It will be necessary to study the best possible use to be made of it, without ruling out closer coordination between European countries, if only to accelerate and intensify the comparisons and exchanges in those fields.

B. SCIENTIFIC AND TECHNICAL INFORMATION AND DOCUMENTATION

Problems raised by the creation of a joint system for the processing and dissemination of scientific and technical information or the coordination of national information systems are very complex and it has not been possible to deal with them fully so far.

1. The problem of the dissemination of scientific and technical information is mainly that of keeping up to date bibliographic and documentary records (tables of scientific and technical constants, results of measurements or tests, industrial and economic data, etc.) and of consulting those records through a computer, possibly from a distance.

Such records will be more and more indispensable to all scientific research workers and to industry as they grapple with a volume of publications which are becoming increasingly difficult to handle by conventional means.

International cooperation would produce substantial gains in time and money, since a document would only have to be identified and indexed once.

2. Such records already exist at Euratom and ESRO. Those systems, and their connections with national documentation centres, should be developed with a view to improving the services rendered and testing certain new techniques in the field of information.

Several other records under sector headings are maintained by national organizations within the jurisdiction of Member States, other European countries or the United States. Finally, several national systems each covering several subjects are in the process of being formed.

Attention should be given to the possibility of gradually setting up a general European system which would take into account cooperation with the United States and would be achieved through a functional grouping of records under sector headings and national systems, each interchanging communication with the others. Such a system could undoubtedly be extended step by step to all disciplines.

3: The development of cooperation between the countries participating in the general European system postulates coordination in the whole field of scientific and technical information, even in

sectors which are not the subject of joint or combined action. Such coordination, the procedural arrangements for which would have to be worked out, would also include the definition of a common attitude towards countries and international organizations which do not participate in the system.

4. In addition to the nuclear and space sectors already mentioned, the following sectors are considered to be suitable for cooperation on a European basis: aeronautics, agriculture, chemistry, economic statistics, information science, medicine, metallurgy, meteorology, nuisances, oceanography, telecommunications, transport; among the afore-mentioned sectors, agriculture and metallurgy should be given priority with a view to launching studies for defining the systems to be put into effect.

5. In all assumptions it has so far been accepted that certain functions should be undertaken at a European level, in particular:

- development of a multilingual "linguistic tool";
- standardization (of magnetic tapes, software, bibliographic references, abstracts, etc.);
- harmonization of training of specialists;
- up-dating of documentation on the structure of networks.

6. Because of industry's interest in it, the application of automatic documentation techniques to patents is considered important and should be studied in the near future.

C. TRAINING OF RESEARCH WORKERS AND EXCHANGES BETWEEN SCIENTISTS

These problems, which are as wide-ranging as they are important, have been studied taking three factors into account:

- the Working Party aims at drawing up a scientific and technical research policy in accordance with the needs of the economy;
- the reforms in the field of higher education at present taking place but it would appear to be difficult to achieve in the near future owing to the very fluidity of the international situation;
- various international organizations already have the explicit task of dealing with questions of education and training.

In view of these factors, it seemed to the Working Party that two special subjects should be selected as matters of priority for study:

- the elimination of obstacles to exchange between scientists in order to ensure greater mobility at the Community level, together with classification of possibilities for exchanges;
- the possibilities and need for European countries to organize post-graduate training.

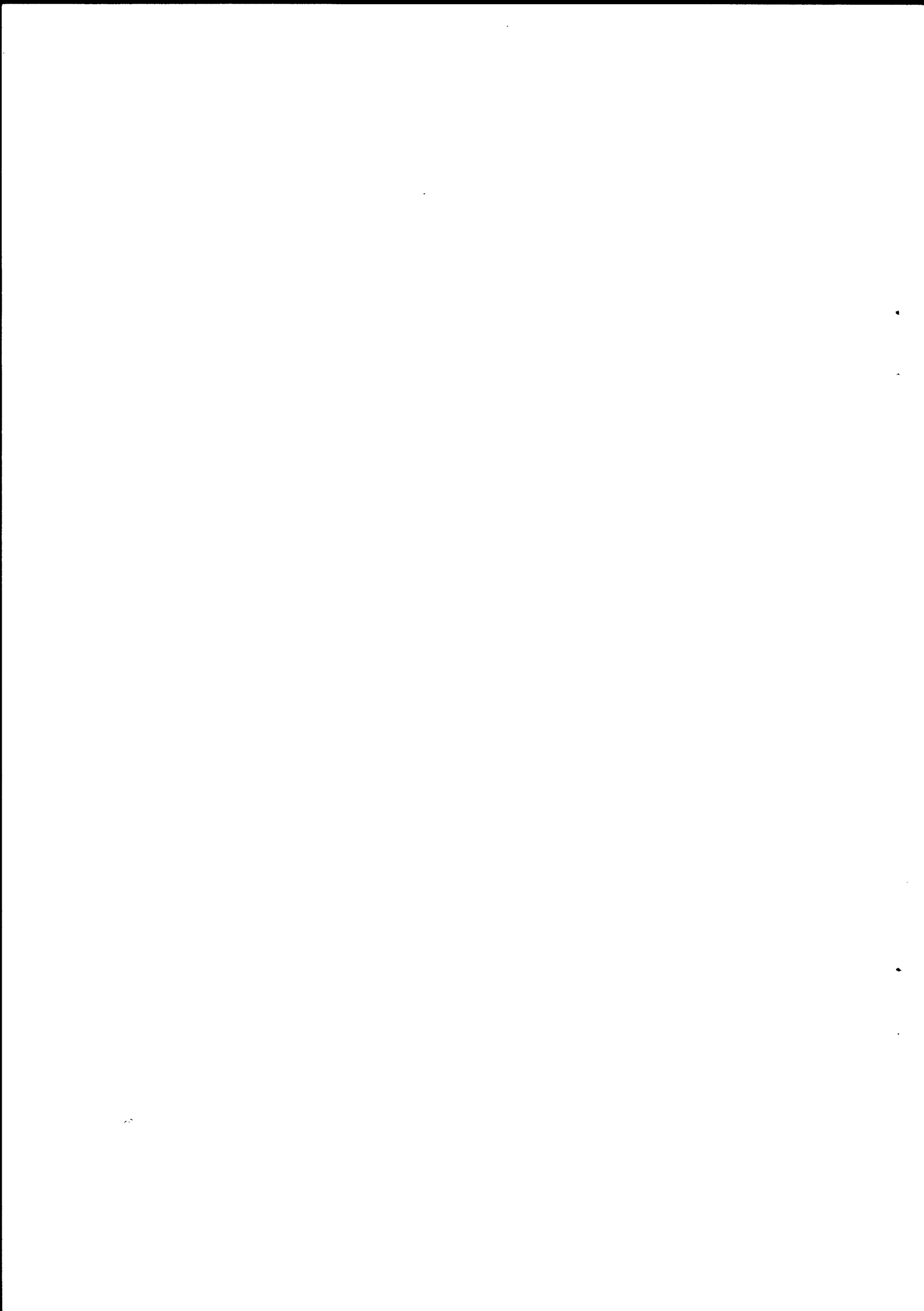
In this respect, various projects have already been studied or are being carried out elsewhere. Thus, for example, the scheme for the creation of a European Institute of Information Science and Technology submitted by the specialist group on "Information Science"

has many points in common with two other schemes at present being studied, one at CECD (International Institute of Technology) and the other at NATO (International Institute of Information Processing).

It is thus important to consider this particular question and the general problems which arise in connection with it by an overall approach so as to be able to define combined attitudes and, if possible, a common policy.

The work on these two subjects will be started forthwith by the Working Party on the aspects coming within its terms of reference.

ANNEXES



ANNEX I

TEXT OF THE RESOLUTION ADOPTED BY THE COUNCIL AT ITS

MEETING ON 31 OCTOBER 1967

Scientific and technical research problems within the Communities

1. The Council, the representatives of the Member States meeting within the Council and the Commission

whereas

- progress in scientific and technical matters is a fundamental factor affecting the economic growth and general development of the Member States of the Communities and in particular their competitive capability;
- the achievements of European countries in the field of scientific and technical matters and their industrial applications have not been as rapid during the last few years as those recorded outside Europe, notably in the United States, in a certain number of branches essential to the development of modern industrial economies; and whereas the fact that Europe is so far behind in this field creates a serious risk to its medium and long term economic and social development;

have expressed

their desire to implement, in connection with the medium term

economic development programme of the Community and taking into

account the new developments in the field of research, an energetic

programme to correct this state of affairs and to promote scientific and technical research and the introduction of new developments in industry.

2. For this purpose, the Council has decided (the representatives of the Member States meeting within the Council have decided)

- (a) actively to pursue the work which, undertaken within the framework of economic integration, is likely to improve and harmonize the general conditions favouring the promotion of research and the introduction of new developments (in particular, European company status, European patent, fiscal harmonization); these legal and fiscal measures must favour the setting up of more effective industrial structures;
- (b) to require the Working Party on "Scientific and Technical Research Policy" of the Medium Term Economic Policy Committee:
 - (i) to examine the opportunities for cooperation, beginning with the six proposed fields (information science and telecommunications, development of new means of transport, oceanography, metallurgy, nuisances, meteorology);
 - (ii) to examine the inclusion of other fields for cooperation and to classify these fields appropriately.

The Working Party shall, before 1 March 1968, report through the Medium Term Economic Policy Committee to the Council (to the representatives of the Member States meeting within the Council), who shall require the Committee of Permanent Representatives to submit their conclusions to the Council (the representatives of the Member States meeting within the Council) before 1 June 1968. The Committee of Permanent Representatives shall be assisted by a

group made up of senior officials in scientific research. The Commission shall be closely associated with this work at all its stages and shall be invited to make any suitable proposals and suggestions;

(c) furthermore, to instruct the Working Party on "Scientific and Technical Research Policy" of the Medium Term Economic Policy Committee:

(aa) to pursue the comparison of national methods, plans, programmes and budgets concerned with research;

(bb) to examine the means for creating a Community system for the processing and dissemination of technical information or for the coordination of national information systems;

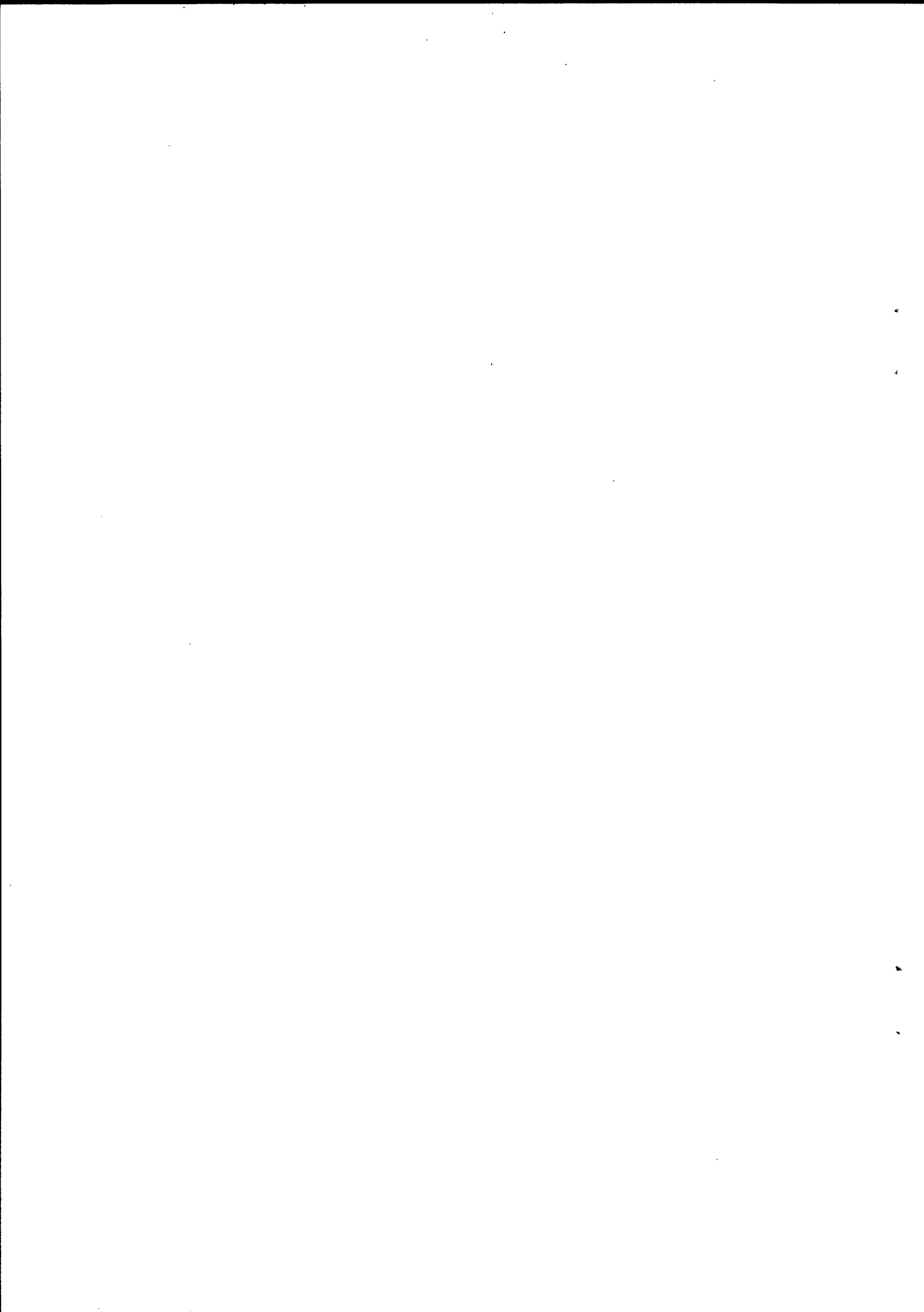
(cc) to examine the means for ensuring coordinated training and more extensive exchanges between scientists.

(d) The reports^(*) shall take into consideration the cooperation existing at the present time, particularly in other international organizations, and shall seek means to enable other European states to participate in such projects and in cooperation in the above-mentioned fields.

4. The Council hopes that industrial undertakings will be consulted on the working out of a policy on scientific and technical matters and on measures arising therefrom.

5. At the time of these discussions on scientific and technical research, the Council shall reaffirm the importance which it attaches to constructive decisions being made in the near future on the future activities of Euratom research.

(*) These reports shall be submitted to the Council through the Medium Term Economic Policy Committee.



TEXT OF THE RESOLUTION ADOPTED BY THE COUNCIL

AT ITS MEETING ON 10 DECEMBER 1968

Cooperation in the field of scientific and technical research

1. The Council, the Governments of the Member States and the Commission shall, before 1 July 1969, implement the provisions of the Resolution of the Council passed at Luxembourg on 31 October 1967 on cooperation in the field of scientific and technical research.
2. To this end, the Working Party on "Scientific and Technical Research Policy" of the Medium Term Economic Policy Committee shall, before 1 March 1969, submit, under the conditions laid down in this Resolution, the report which it was required to draw up and which will take into consideration the possibilities of cooperation with European non-member countries, in accordance with the terms of reference given to it on 31 October 1967.
3. The Council shall study the report of the Working Party on "Scientific and Technical Research Policy" and draw the initial conclusions from it, in particular the concrete action to be taken. In the light of those conclusions it shall address proposals for cooperation to the other European countries interested and particularly to those which have asked to join the Community, and it will attach the Working Party's report as an annex to its proposals.
4. The Council shall, through the appropriate channels, obtain the opinion of the non-member states concerned on the proposals forwarded to them. The Council shall discuss the replies received and any suggestions submitted by the non-member states.

The Council and the non-member states interested shall convene meetings of experts with a view to studying the technical, financial and other problems raised by carrying out the projects decided on. Experts from the Commission shall attend these meetings.

5. The object of this study is to prepare for the discussions between, on the one hand, the ministers responsible for technology in the Six countries and the other countries concerned and, on the other hand, the representatives of the Commission, with a view to taking the necessary decisions on the projects which it is proposed to carry out.

ANNEX II

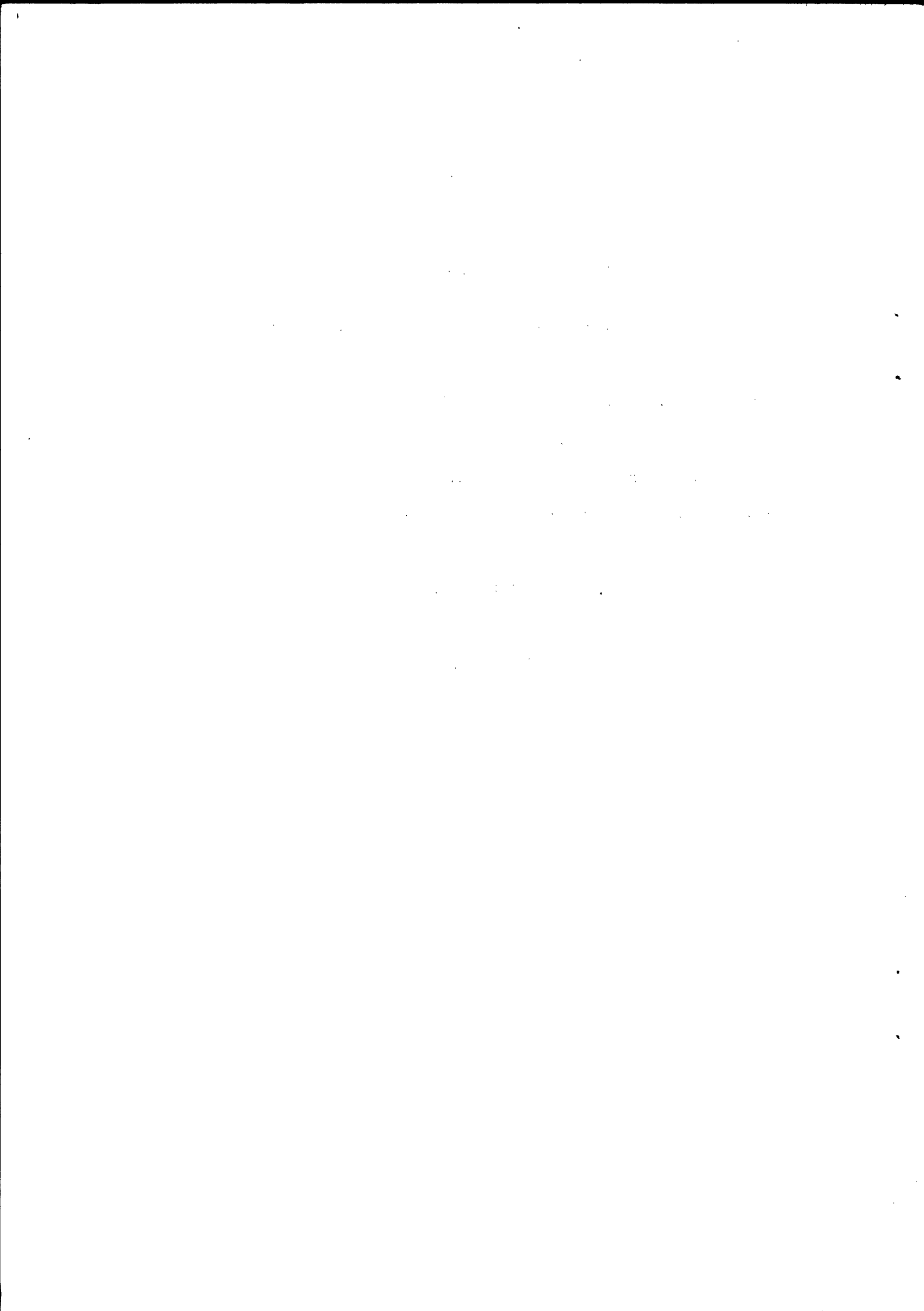
DETAILED DESCRIPTIONS OF THE PROPOSALS

(Introductory notes and specifications)

This annex contains 47 notes describing the proposals submitted to the Council. Each note briefly states the nature, objectives, grounds for cooperation and methods of carrying out the proposed project.

The notes are classified in the order of the seven fields, the first figure showing the field in accordance with the order of the resolution of 31 October.

In addition, for each field there is a brief note setting out the main problems at present and showing how and to what extent the proposed projects provide an initial solution to these problems.



1. INFORMATION SCIENCE

The problems which Europe has to face up to in the field of information science concern both the production of the equipment and its utilisation.

With regard to production, the situation is marked by the fact that the market is dominated by subsidiaries of American companies. Even if this has not so far prevented customers from being provided with the most modern or powerful machines, it nevertheless has several drawbacks. The European economy always runs the risk of receiving the most modern hardware and software with some delay and it is deprived of considerable export opportunities. These consequences are all the more serious as information science tends to occupy a strategic place in all economic activities: the absence of a genuine European production and technology in this field risks having severe repercussions on the technology, and hence the competitiveness, of all the other industries.

The efforts to encourage the development of an information processing industry independent of the American giants cannot be completely successful if they remain on a national basis since they would require frequently prohibitive financial backing and would founder on the limited nature of the national market.

The need for cooperation in this field is thus obvious.

Consequently, the aim as regards hardware is the formation of an industrial unit (undertaking or group of undertakings) which would be technically and commercially capable of gradually covering a considerable part of the European market. For this it is necessary to have a sufficiently wide range of products, a well-organized

marketing network and an avant-garde technology. Project 10 aims at these various targets simultaneously. The high-power system available by about 1975 and compatible with other products of the same period would provide the necessary "top end of the range", and the system to be produced by about 1980 would make use of a revolutionary technology. The procedure to be adopted for this project have still to be fixed in order to verify whether the desired objectives could be reached in this way. Research in this new technology would also be supplemented by a project devoted to components, and in particular to the development of new memories (Project 22). Finally it is to be hoped that the major project described above will have a generally favourable effect on increasing the compatibility of the machines.

As regards the utilization of information processing, the general problem is to enable the whole economy to make the best use of the existing facilities and to exploit quickly the technological potential opened up to the available equipment. Three priority items seem to be: preparation of software, data transmission and manpower training.

Often, insufficient use is made of the possibilities for employing computers owing to the lack of the necessary programs. It would therefore be valuable to undertake a wide-ranging scheme to encourage the preparation of software for industrial, scientific or administrative uses. Pilot schemes have been proposed under Project 15.

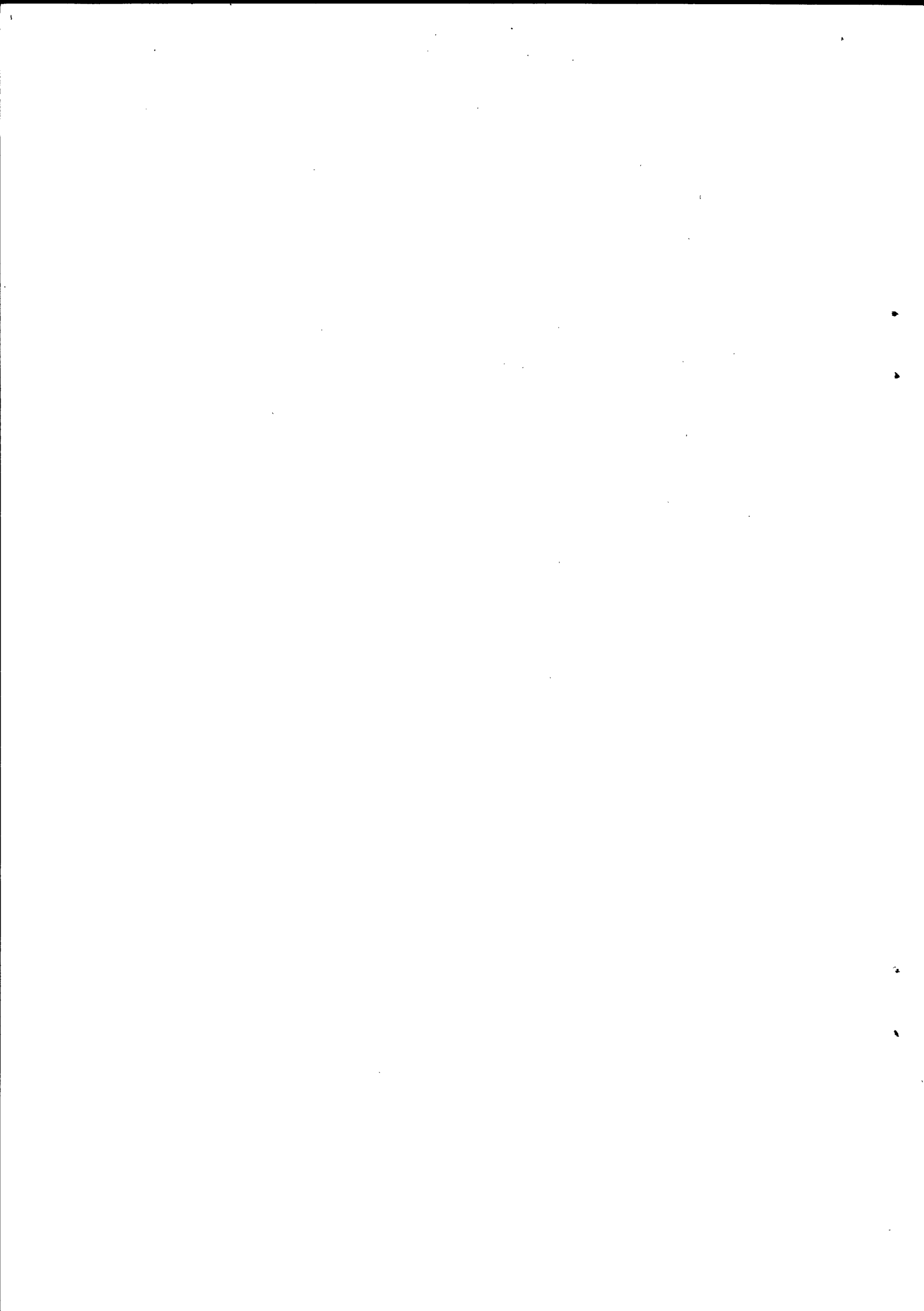
It is as yet too early to know if an attempt should be made to set up a large software undertaking capable of supplying not only European customers, but also of exporting on a large scale

to non-member countries, or whether more decentralized methods should be aimed at, use being made of public undertakings or public laboratories already in existence. This development of software would be propitiously backed up by Project 12, the program library, which aims at enabling better use to be made of existing software by providing potential users with greater information on the existence of proven software, and by Project 13, which is directed towards a certain amount of standardization.

The existence of a satisfactory data transmission network, on the other hand, will become more and more important in the future and this has given rise to two proposals, (11 and 20).

Finally, the possibilities opened up by information science will only be fully exploited if the people likely to use them receive adequate training (Project 14).

Even if these various projects are technically independent, they should in fact be considered as a whole in which the separate items support each other.



Field: Information processing

Project 10: HIGH-POWER DATA PROCESSING SYSTEMS

1. Nature of project

Design and construction of a high-power data processing and storage system leading to the marketing:

- on a medium term basis, of a competitive European system forming a kind of "top-end of the range";
- on a long term basis, of a European system along completely original lines which would be competitive on a world-wide scale.

2. Objectives

The joint construction of a high-power data processing system should allow the following three objectives to be reached:

- the first, of a commercial nature: to meet the demand which will arise on the European commercial market in the years to come and will otherwise be met by non-European products;
- the second, of a technological nature: to encourage the creation of a highly advanced European technology affecting the whole field of information processing and leading to the training of an independent European output potential;
- the third, of an industrial nature: to facilitate the structural transformation of the European information processing industry and the setting up of an industry of sufficient scope to compete on a world scale. The industrial

Project 10

structures which Europe needs will not develop of their own accord if an objective is not assigned to them and if the various States do not provide financial backing.

3. Advantage of cooperation

- To open up a market wide enough to warrant the development of a large system.
- To group together financial efforts relating to projects which cannot be undertaken by individual manufacturers.
- To encourage the creation of new industrial structures on a European scale.
- To reduce and finally to close the gap which exists between Europe and the United States in the field of information science.

4. Methods of operation

- Meetings between manufacturers within the next two months in order to lay down the main features of the project, the procedure for carrying it out, and cost and time scale, at least for the first phase.

The other methods will have to be determined later in the light of the manufacturers' initial report, which will be available at the end of May 1969.

On the basis of this report, it will be possible in particular to see to what extent the medium and long term projects may be separate from or complementary to one another.

Project 10

5. Cost and time scale

- For the medium term project, it is expected that a prototype will be ready in 1972-73, to be put on the market by about 1975.

- For the long term project, marketing may be expected by about 1980.

An initial phase of three years for the long term project, taken up by the design of the system and the construction of certain parts of the prototype, could be estimated very approximately at 20 million u.a.

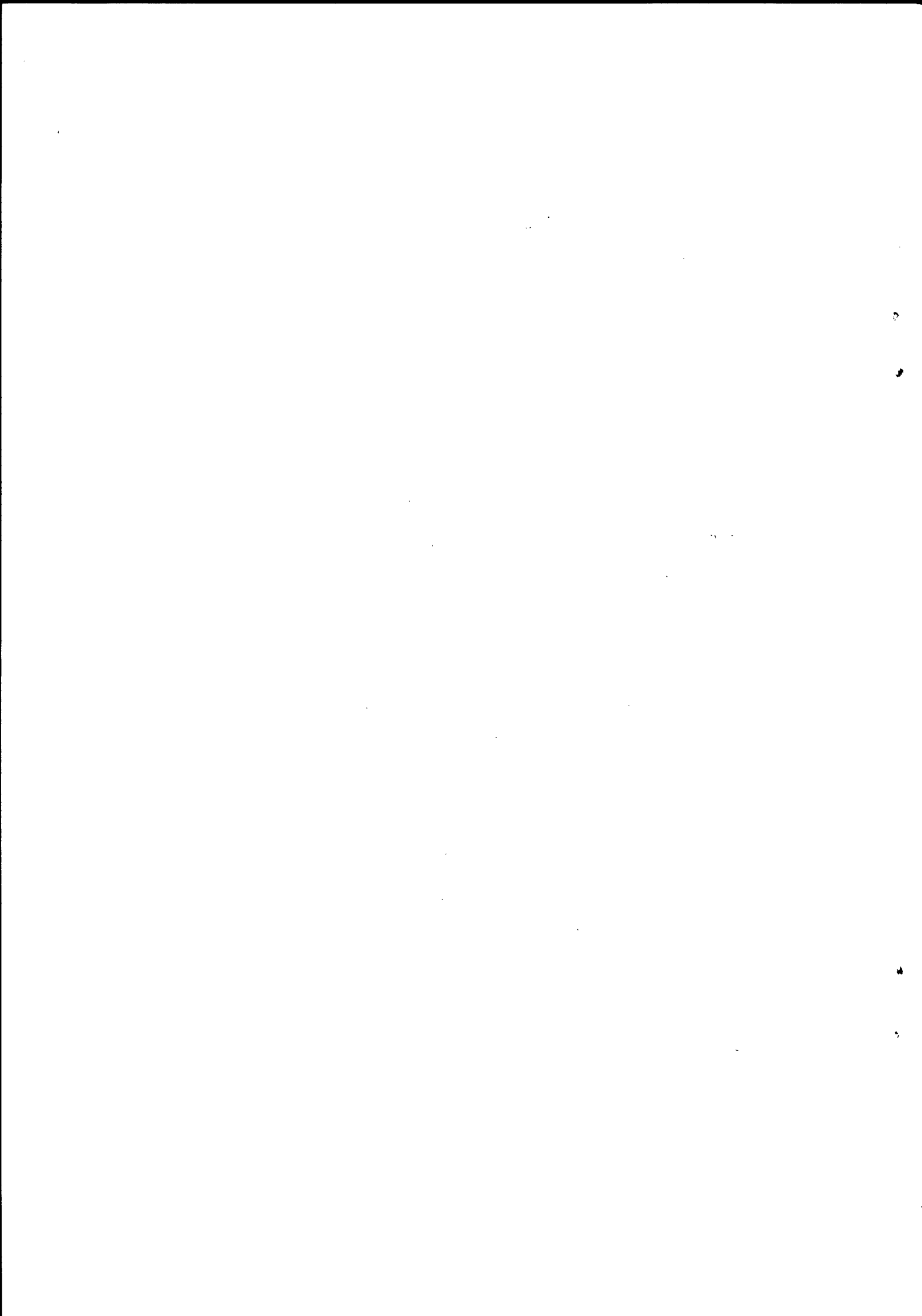
6. Participation of non-member countries

Desirable

7. Classification, additional remarks and links with other projects

- Links with other projects:

This project requires close cooperation in the carrying out of advanced studies in all related fields such as components (in particular large-scale integrated circuits, memories), peripheral equipment, software and data transmission. These projects will be "ordered" by the large system project itself; their cost will have to be taken into consideration when working out the cost of the "large system" project from which they can not be separated.



Field: Information processing

Project 11: INFORMATION PROCESSING NETWORKS

1. Nature of project

Project aimed at setting up information processing networks linking European and national research centres.

2. Objectives

This project aims at promoting a public service activity and developing a technical facility enabling use to be made of services such as program libraries, data banks, etc.

More specifically, the first stage would be a pilot project allowing an experimental link to be established between existing centres by using the normal telephone lines in order to pinpoint the organizational problems arising from the introduction of an inter-computer network and to ascertain the quality of the service from a technical and a tariff point of view.

This first stage should therefore include a period for studying the interface problems posed by connecting up computers which have to be linked together. Then, in the second stage, a mesh data transmission network could be set up, possibly including special line high-speed sections. This project could include the development of certain new equipments (see note No. 20 of the Telecommunications specialist group).

Project 11

3. Advantage of cooperation

International cooperation is necessary from the point of view of the standards to be adopted in respect of transmission procedures as well as the characteristics of the equipment used.

4. Methods of operation

This pilot project could be based on the link between the central program library and certain national centres.

5. Cost and time scale

- First stage:

- Cost: personnel: there should be a team of 15-20 people to be responsible for coordination and the design of the system - 0.5 million u.a.
- cost of equipment and hire of lines - 0.5 million u.a.
- cost to the states in terms of staff in the event of an interconnection between six national centres may be estimated (three persons per centre) at 0.7 million u.a. for the first stage (two years).
- Time required: the first stage could stretch over a period of two years.

- Second stage:

- Cost: to be determined on the basis of the results of the first stage.
- Time required: two to three years, on the basis of the results of the first stage.

6. Participation of non-member countries

Desirable

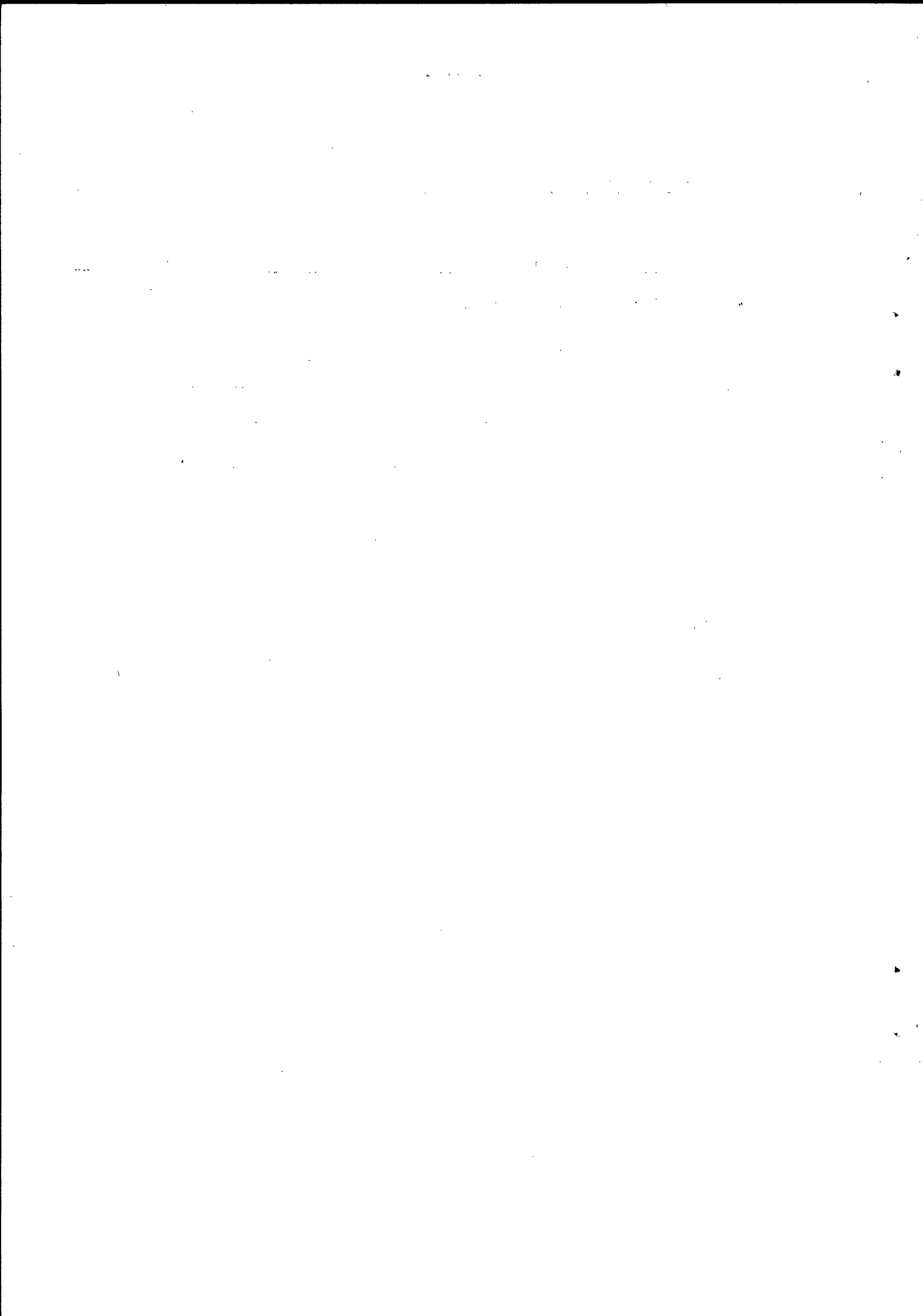
7. Classification, additional remarks and links with other project

- Classification: category A.

- Link with other projects:

This project should be considered as being linked with the one concerning the setting up of a European program library (see note No. 12) and with those planned in the field of user software (note No. 15), as well as with the project for European standardization committees (see note No. 13).

It must be stressed, moreover, that the solution of the problems relating to the high-speed mesh network would be likely to encourage the development of high-power systems.



Field: Information processing

Project 12: EUROPEAN PROGRAM LIBRARY

1. Nature of project

The setting up of a body consisting of a central institute and a union of national centres.

2. Objectives

Automated documentation on program descriptions to serve all European users.

Collection of programs in the various fields of application, followed by the possible specialization of the various centres.

Threefold purpose of the project as a whole: information, collection/distribution, technical assistance, insofar as that does not apply to the work of specialist advisory bodies.

3. Advantage of cooperation

Direct information on request on the existing store leading to a considerable reduction in duplication.

Access by users to programs concerned with their activity; delineation of advisers' responsibilities.

4. Methods of operation

- Pilot project: automated documentation system for programs.

Project 12

- Public service: collection, testing, technical assistance by national centres for programs of national origin, by the central institute for other communications and information through the central institute.

A coordination committee responsible for the operation of the project (*).

5. Cost and time scale

Cost: total cost: 4.8 million u.a. to be divided between:

- joint budget: 2.4 million u.a.
- budget to participating states: 2.4 million u.a.

Time required: pilot project and setting up of coordinated structures: three years.

6. Participation of non-member countries

Desirable

7. Classification, additional remarks and links with other projects

Classification: category A.

Link with other projects: this project should be considered as being linked with that concerning the setting up of information processing networks between research centres (see note 11).

(*) NB. Setting up of a remote information processing network between centres. See note No. 11, "Networks", 1st phase.

Field: Information processing

Project 13: STANDARDIZATION COMMITTEES

1. Nature of project

The setting up of European standardization committees.

The standardization project should initially be mainly concerned with software.

It should be developed in three fields:

- programming languages;
- interfaces (data transmission procedures);
- structure of supports (card indexes).

2. Objectives

- To standardize software with the participation of the representatives of European manufacturers, within a period of time compatible with its general application.
- To encourage its application by selecting it for use in computer installations dependent on the public sector.

3. Advantage of cooperation

The lack of standardization of computers at all levels can only be overcome gradually; as there are not many manufacturers, action on a national scale would have little effect. Action should therefore be undertaken in all cases within a Community framework and if possible on an even wider scale.

Project 13

4. Methods of operation

Setting up of three permanent committees, one for each subject (see 2), composed of government representatives, in particular the national representatives at the ISO and the technical advisers seconded by the European manufacturers.

5. Cost and time scale

At the rate of six meetings per year, each lasting a week, for each committee, annual budget of about 0.1 million u.a. Permanent activity.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification: category A.

Link with other projects: this should be considered as being linked with the project concerning the setting up of information processing networks (see note No. 11).

Field: Information processing

Project 14: EUROPEAN INSTITUTE OF INFORMATION SCIENCE AND
TECHNOLOGY

1. Nature of project

Training and research

- Setting up of a European institute of information science and technology.

2. Objectives

The European institute shall carry out the following three objectives:

- training
- research
- coordination.

Training: - post-graduate training subdivided into five sections:

- management training
- training of engineers
- training of analysts
- advanced theory training
- teacher training.

Research: - in information processing:

- software
- hardware

Coordination: - of training and instruction programmes in the field of information processing

- of research and development programmes in information processing.

Project 14

3. Advantage of cooperation

- To concentrate scattered efforts and avoid duplication in research and development.
- To create a European training scheme of a high standard and independent of the solutions submitted by computer manufacturers.
- To facilitate exchanges of information at all levels.

4. Methods of operation

- Institute	<u>1st year</u>	<u>2nd year</u>	<u>3rd year</u>	<u>4th year</u>
Administrative personnel	20	25	30	35
Research and training personnel	40	70	100	130
Coordination service	20	25	30	35
<u>Total</u>	<u>80</u>	<u>120</u>	<u>160</u>	<u>200</u>

5. Cost and time scale

- The setting up the European institute should be spread out gradually over a period of three years. From the fourth year onward, the programmes should operate regularly.
- The cost should be shared out as follows:
 - 1st year: 3,000,000 u.a.
 - 2nd year: 4,500,000 u.a.
 - 3rd year: 6,000,000 u.a.
 - 4th year: 7,500,000 u.a.

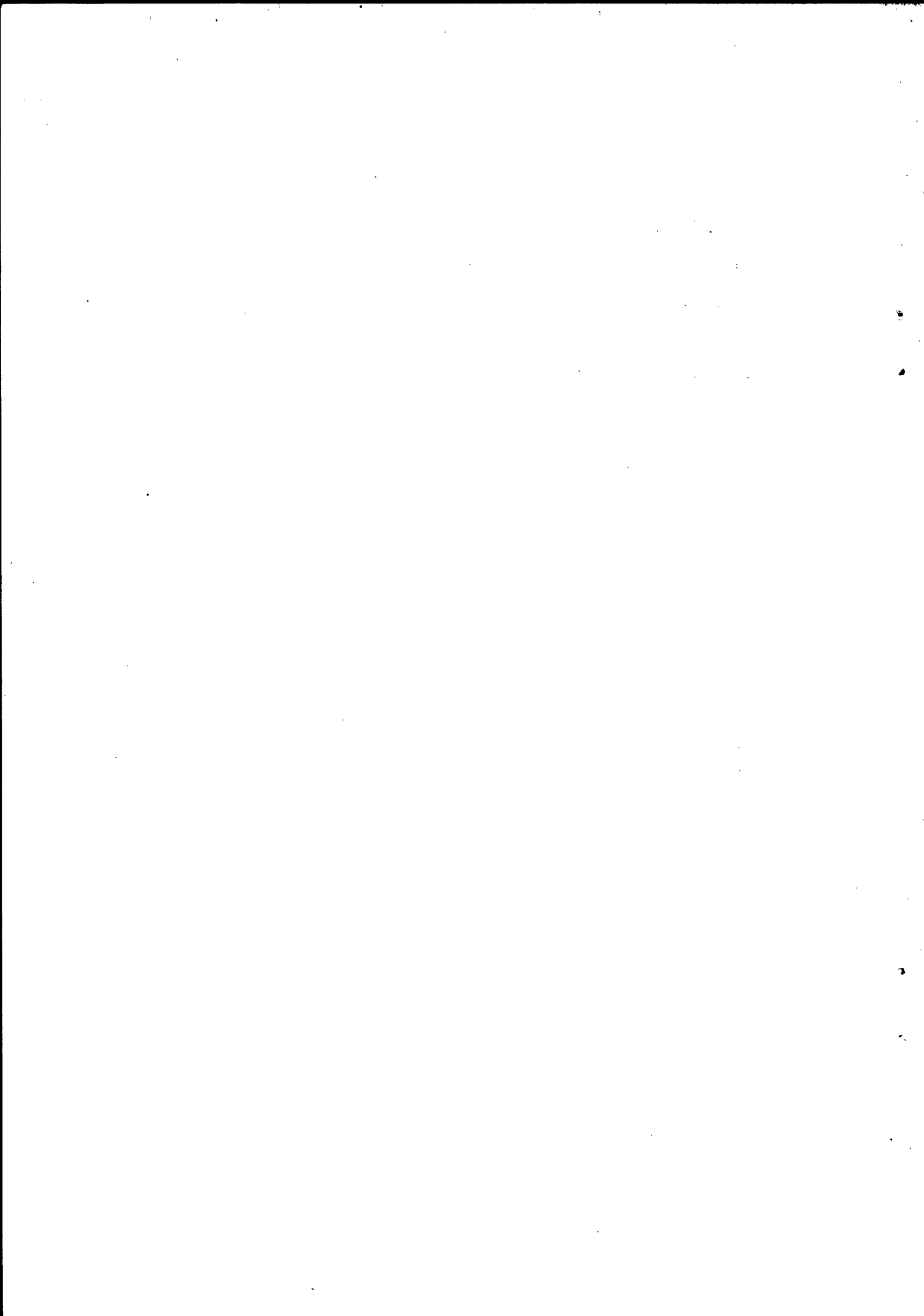
Project 14

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification: category B.



Field: Information processing

Project 15, 16 and 17: USER SOFTWARE

1. Nature of project

The development of user software for industrial, scientific and administrative purposes.

In the first stage, carrying out certain pilot projects.

2. Objectives

Substantial savings possible by coordination of the long and costly software establishment studies. Establishment of system and software prototypes for general and special application.

3. Advantage of cooperation

- Coordination of work with a view to satisfying a wide range of requirements not dependent on any particular type of computer.
- Unification of procedures.
- Elimination of duplication.

4. Methods of operation

To be determined (a "user software" specialist group will supply the details of certain pilot projects and the methods of operation within two months).

Projects 15, 16 and 17

5. Cost and time scale

To be determined.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification: category B.

2. TELECOMMUNICATIONS

The immediate problem which the telecommunications administrations have to face arises from the almost explosive character of the increase in demand in all forms of transmission, especially in the field of telephony. In spite of the number of methods in use, deficiencies in both the quality and the quantity of the services provided have been observed in most of the countries of the Community. These deficiencies are not due to factors of a technical nature but are essentially financial in origin.

The present acute needs in classical telecommunications in Europe leads to the possibility of new requirements being pushed into the background, especially in the field of data and picture transmission. Such an attitude would be extremely dangerous, since the periods of time which inevitably elapse between the beginning of research and the large-scale satisfaction of new requirements are always considerable.

The phenomena of economic and social transformation, such as the increasing concentration of populations in towns, the extension and transformation of large urban centres and the increasing mobility of people and goods within each country and within the Common Market will continue to necessitate extensions and adaptations to telecommunication systems which cannot be carried out on a short term basis. It is therefore essential to anticipate these developments, not only to define their implications for telecommunications and to provide for them, but also to avoid allowing to continue over a number of years a situation where the provision of telecommunications services is following

demand instead of anticipating it and therefore does not make the greatest possible contribution to social and economic development. It is only on the basis of such a forward-looking view of new requirements and their repercussions in terms of research and development that an overall programme of cooperative projects could be worked out into which could be fitted certain research and development plans in various countries in the Community.

From a technical point of view, telecommunications systems are not lagging behind. The equipment supply industries are also not lagging behind, and the industrial companies of the Community have considerably increased their share of world exports. But this has only been possible with the help, at least in part, of American technology, especially in the field of components, which are assuming increasing importance in the systems used by telecommunications administrations. Owing to the present easy access to this source of supply, this situation does not have repercussions on the quality of the systems in operation. But it has obvious implications at the level of economic and industrial development in the Community: the European component industry is suffering from restriction, by the compartmentalization and lack of organization of national markets as well as from the prohibitive cost of research carried out exclusively on a national basis.

It is thus possible to lay down a few lines of approach along which scientific and technical cooperation in the field of telecommunications could be tackled:

(a) A forward study of requirements, which would constitute the

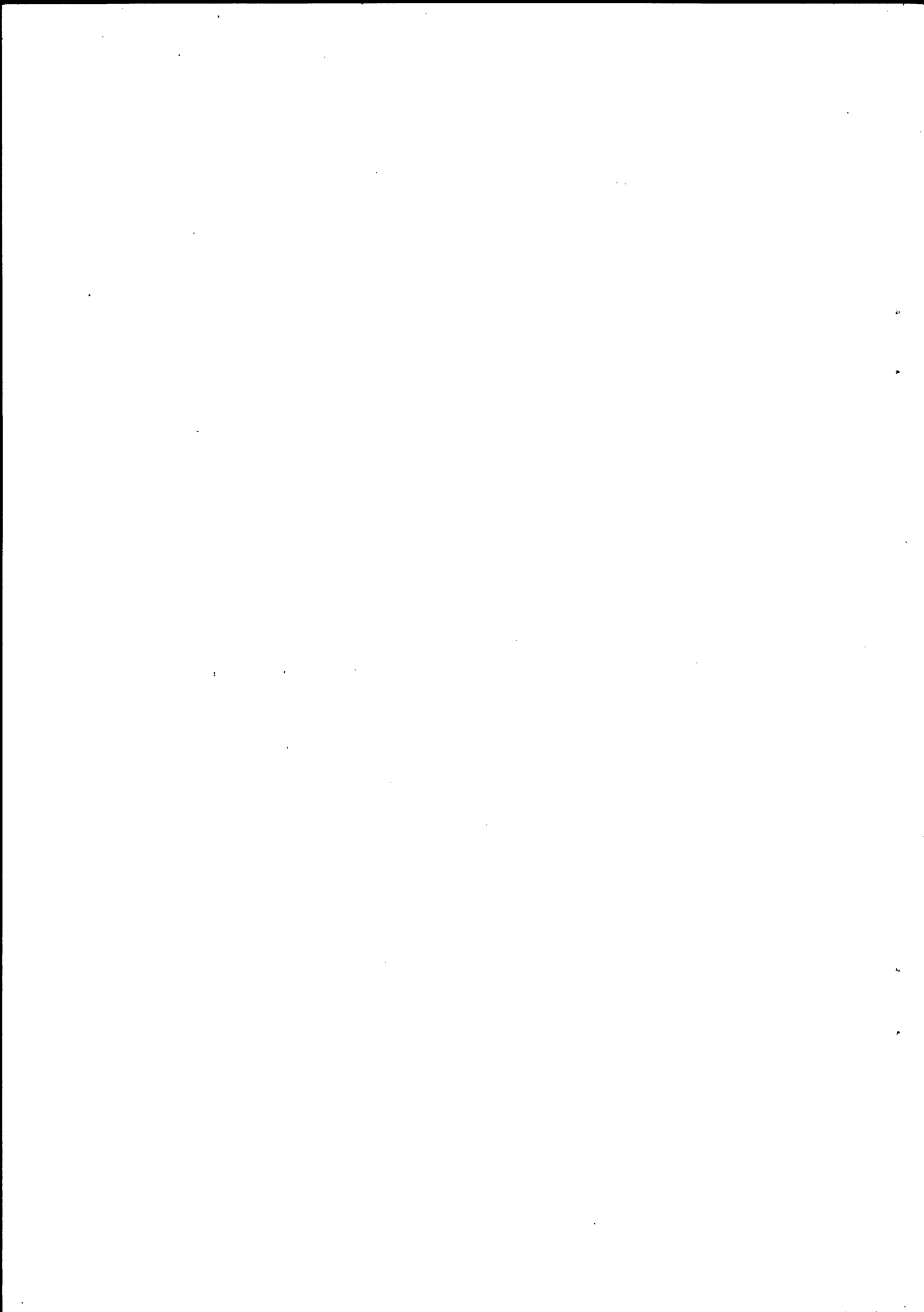
overall framework for the definition of cooperative projects, especially the setting up of international networks, and would enable certain plans of the administrations to be coordinated;

(b) Projects in connection with the supply industries, and particularly the supply of components. These projects can be either at the standardization level or at the research and development level;

(c) Cooperative projects in the field of research and development on transmission, propagation and reception phenomena, such projects being already recognized as having priority.

The proposals submitted attempt a first step in each of the three directions indicated (respectively 20, 21-23, 24-25).

If these proposals are at present limited to the working out of an overall framework and to five immediate projects, this is due to the desire to draw up a detailed procedure for examining an overall programme of cooperative projects, which it has not been possible to do within the time available, whilst at the same time ensuring a quick start for projects whose feasibility is already sufficiently established.



Field: Telecommunications

Project 20: FORWARD STUDIES OF TELECOMMUNICATIONS SERVICES

1. Nature of project

Two forward studies of telecommunications requirements:

Study I: General study of services to be provided in the field of telecommunications. Evaluation of the nature and volume of services to be provided by 1985, as well as the possibilities of these requirements being met by existing and new techniques.

Study II: Special study of services to be provided by 1972-73 in the field of teleprocessing of information.

2. Objectives

Study I: Definition of the directions in which, from the point of view of long term requirements, research efforts are particularly urgently required and promising. The preparation of the choice of new cooperative research and development projects on this basis, as well as the coordination of certain projects drawn up by the postal and telegraph authorities.

Study II: The preparation of decisions on the possible setting up by 1972-73 of a separate data transmission network and the determination of its characteristics.

3. Advantage of cooperation

The choice of research and development projects and the coordination of certain projects must be based on common viewpoints regarding the provision of services in a field where international connections are important.

Project 20

4. Methods of operating

In carrying out these studies, the opportunities offered by the existing international structures (OECD, ITU, CEPT) must be used to the maximum.

Study I: To be carried out by institutes. An initial exploratory study is being carried out by the Federation of Telecommunications Engineers in the European Community (FITCE). In this way it will be possible to define the lines along which the forward study should be pursued and possibly to produce even at this stage some proposals for cooperative action.

Study II: Will be carried out directly by the national administrations with a comparison of records and joint preparation of decisions.

5. Cost and time scale

Study I: total cost: 30,000 u.a.

time required and phases: total time required: two years

first phase: six months

Study II: cost: negligible

time required: total: two years

first phase: 10 months

second phase (possible): about one year.

Project 20

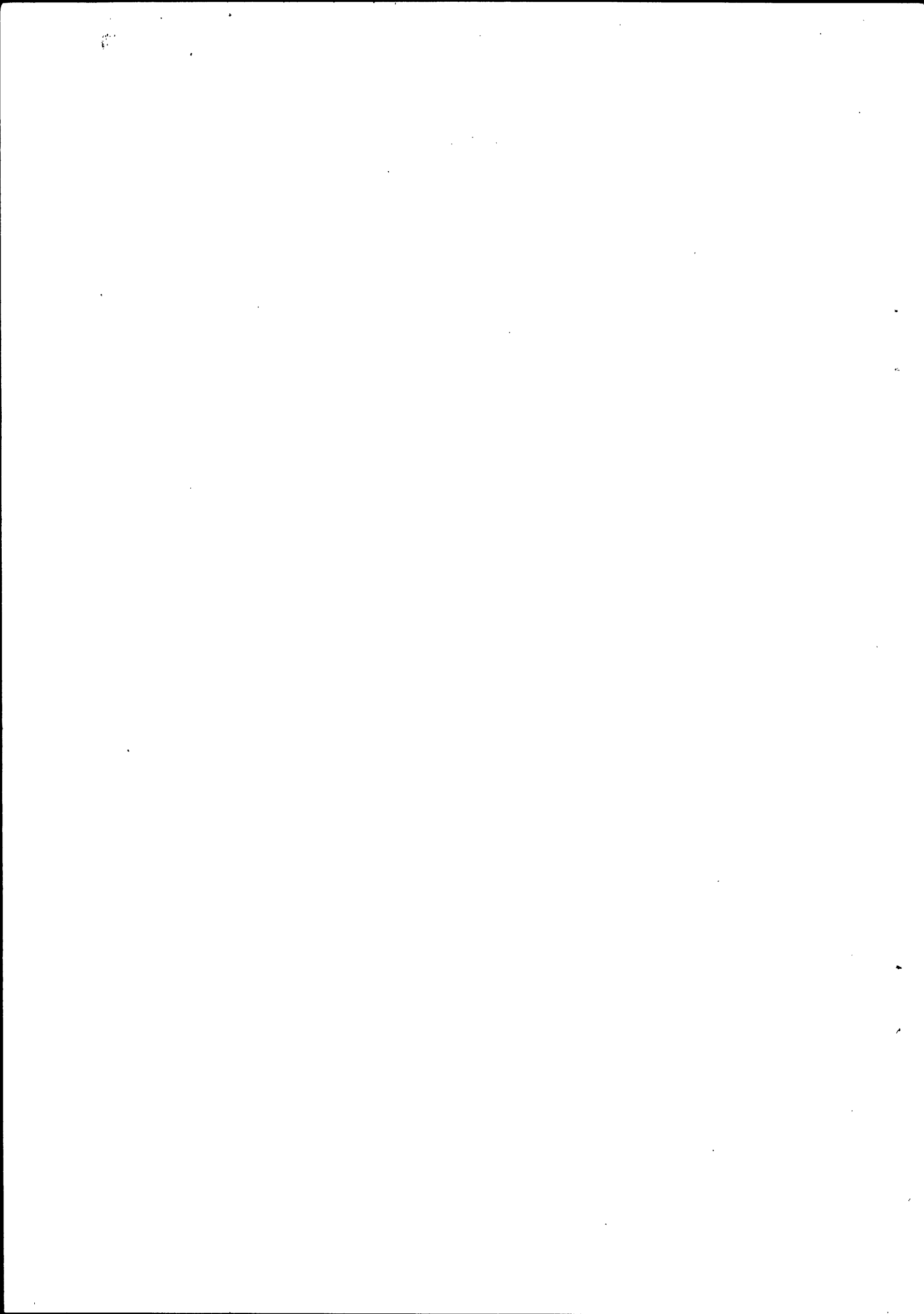
6. Participation of non-member countries

Desirable.

7. Classification, preliminary remarks and links with other projects

Classification A.

Link with other projects: Study II on teleprocessing of information is an essential part of the second phase of Project 11, relating to data transmission between research centres.



Field: Telecommunications

Project 21: CREATION OF EUROPEAN CONFORMITY CERTIFICATES FOR
ELECTRONIC COMPONENTS

1. Nature of project

Establishment of common standards and rules for approval certificates for electronic components.

2. Objectives

By reducing the compartmentalization of national markets, standardization and the introduction of approval certificates would enable the best European undertakings to increase their outlets and to cut costs. The telecommunications services would gain considerably from this.

A European component classification system would, moreover, permit the coordination of tests on component reliability, such research being very difficult to undertake on a national scale for special components of very high reliability owing to the cost involved.

The necessary structures should therefore be developed within and between European countries.

3. Advantage of cooperation

Essential in view of the objectives.

4. Methods of operation

These should be defined, two points being borne in mind:

Project 21

- these problems are being studied within a tripartite committee composed of representatives of France, Germany and the UK;
- this action essentially concern the industrial companies which must be closely associated with it.

Each country would create its own organization capable of applying the procedures worked out.

A coordination body, of fairly loose structure, would establish a system for the classification of components on the basis of their reliability characteristics determined in close collaboration with industry.

5. Cost and time scale

It is at present difficult to estimate the cost and time involved in setting up the necessary structures. At the Community level, coordination only represents a very modest outlay.

6. Participation of non-member countries

The UK is already taking part in the work being undertaken in this direction; extension to other West European countries is desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Project of equal interest to information science.

Field: Telecommunications

Project 22: NEW COMPONENTS FOR COMPUTERS

1. Nature of project

Design and development of new features intended to improve the performance of computers:

- comparative examination of new techniques which now appear promising;
- development of appropriate technologies;
- production of prototypes for the evaluation of industrial performance which is of interest (especially in the case of memories).

2. Objectives

Two subjects for research have been proposed:

- Development of high-speed memories for computers

The characteristics of present memories will limit, within the near future, the operational speed of electronic computers. New solutions should be developed which will allow cycle times of about 100 nanoseconds.

- Study of opto-electronic elements

Opto-electronic elements today seem to offer very interesting possibilities for the development of logical functions and interconnections with high decoupling. Their technique, compatible with present technologies for the production of microcircuits and integrated circuits, should be developed.

Project 22

3. Advantage of cooperation

Cooperation will avoid duplication of haphazard and costly research.

4. Methods of operation

To be determined.

5. Cost and time scale

The approximate total expenditure which would be required for these studies has been estimated as: for studies on high-speed memories - 8 million u.s.a.; for studies on opto-electronic elements - 10 million u.s.a. This research should last 2-3 years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks, and links with other projects

Classification B. Project of equal interest to information science.

- It will be undertaken if Project 10 is launched.

- In case of Project 10 being rejected, this project will be reconsidered as an independent scheme.

Field: Telecommunications

Project 23: BASIC RESEARCH ON SEMICONDUCTORS

1. Nature of project

Basic research aimed at improving the properties of semiconductors.

2. Objectives.

This concerns two types of completely different studies:

(a) Research on diagnostic techniques using semiconducting materials

This concerns the study of the correlation between the crystalline structure of the semiconductor and the electrical and physical characteristics of the devices. When a diagnostic technique is developed, it will allow the quality of the starting material to be checked and will thus give information enabling the manufacturing processes for this material and these devices to be ignored.

(b) Doping of semiconductors by ion bombardment

This avant-garde technique is not yet being used, although numerous laboratories have in recent years shown very great interest on it, the advantages anticipated are as follows:

- introducing of predetermined concentrations of elements, possibility of obtaining very rigid functions (hence production of faster devices), limitation of the phenomena of rediffusion and diffusion of impurities, development of integrated circuits with "vertical structure" and high component density.

Project 23

3. Advantage of cooperation

The basic research, the result of which may revolutionize present manufacturing techniques for materials and equipment and lead to patents of considerable importance, carries a fairly large risk which it would seem reasonable to spread over the whole Community.

4. Methods of operation

To be determined.

5. Cost and time scale

The following figures can be given, but it should be noted that they are of an approximate nature owing to the haphazard nature of the research:

(a) Diagnostic technique for materials:

Cost: 4 million u.a.; time: three years.

(b) Doping of semiconductors by ion bombardment:

Cost: 10 million u.a.; time: five years.

6. Participation of non-member countries

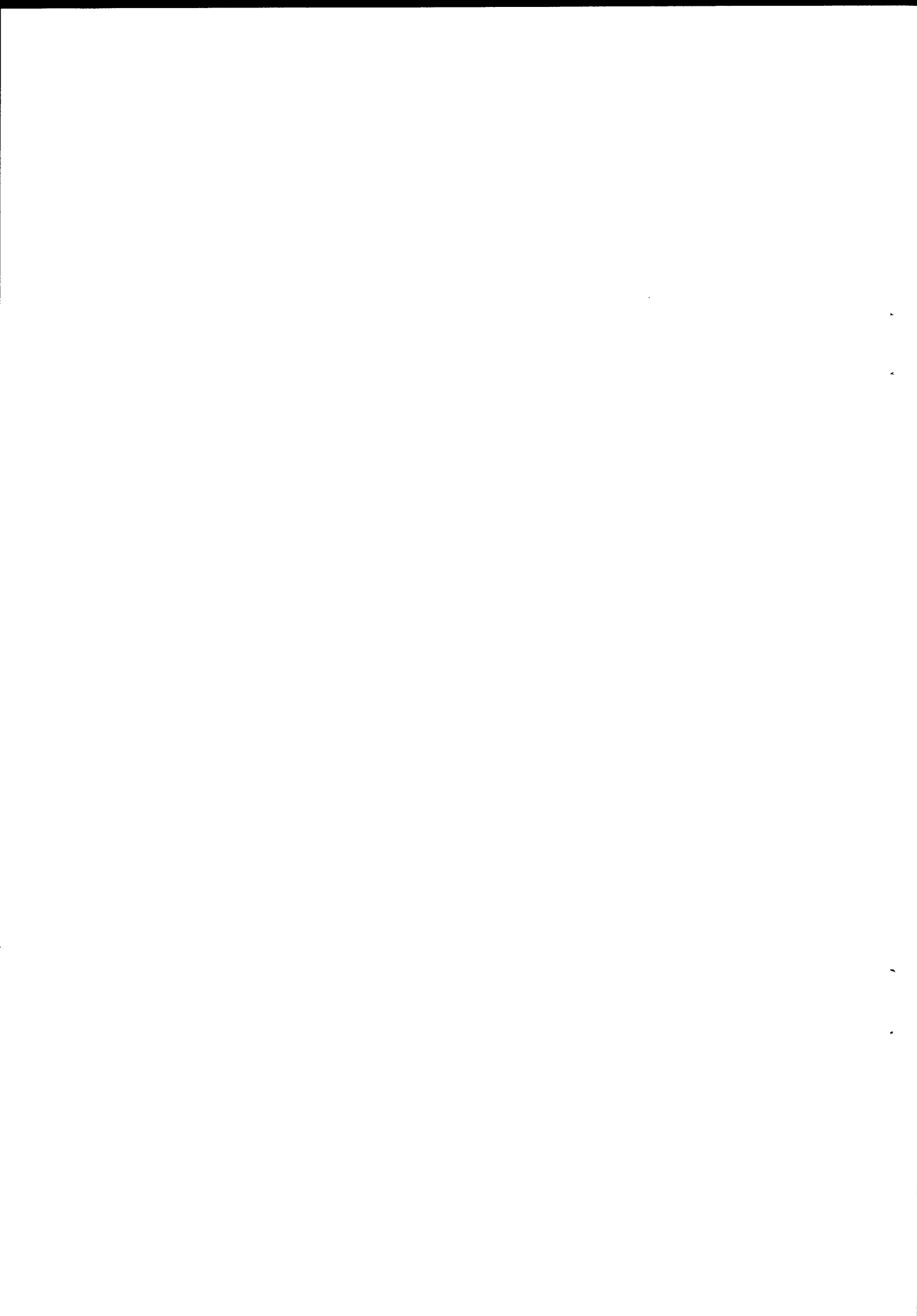
Desirable.

Project 23

7. Classification, additional remarks and links with other projects

Classification B.

This project would be of equal interest to information science. It is linked with Project 57, submitted for metallurgy.



Field: Telecommunications

Project 24: STUDY OF SOLID STATE DEVICES FOR HYPERFREQUENCY USE

1. Nature of project

Development of devices for generating, amplifying and converting hyperfrequency signals.

2. Objectives

Creation of hyperfrequency telecommunications systems which would be of considerable use to ground and satellite communications because of the great number of channels which can be used and of the small size of the aerials required. Solid state elements are proving indispensable for applications which require small bulk, low voltage, high output and high reliability.

3. Advantage of cooperation

Cooperation would avoid the loss of time and money due to the duplication of costly studies. Coordination of national programmes would be essential in this field.

4. Methods of operation

To be determined.

Project 24

5. Cost and time scale

The approximate cost of this research is estimated at 11 million u.a., spread over a period of three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B.

This action is complementary to the studies on the propagation of hyperfrequency waves outlined in note No. 25.

Field: Telecommunications

Project 25: RESEARCH ON THE PROPAGATION OF HERTZIAN WAVES

1. Nature of project

Basic research on high frequency and very high frequency waves from the point of view of:

- aerials used for these frequencies;
- propagation in the troposphere;
- propagation in the ionosphere.

This research is connected with the following seven subjects:

1. Aerial networks with phase control;
2. Aerials with reduced side lobes for ground stations with satellite links;
3. Reflector aerials with high surface yield and low noise temperature;
4. Influence of absorption by hydrometeors and maximum usable gain in aerials for frequencies above 10 GHz;
5. Determination of optimum emission of the aerial beam in point-to-point links;
6. Transhorizon propagation curves for non-temperate climates;
7. Improvement of methods for short term ionospheric forecasting.

Project 25

2. Objectives

To create new and better conditions for the use of hertzian beams on the ground and by satellite through an increase in the number and capacity of usable frequency bands, a better knowledge of propagation conditions and an improvement of aeriels from the point of view of cost, bulk and performance.

3. Advantage of cooperation

This concerns basic research of general interest. Only by breaking up the cost and coordinating the work will it be possible for these to be undertaken simultaneously and the results compared.

4. Methods of operation

To be determined.

5. Cost and time scale

Total cost: approximately 5.3 million u.a., divided up as follows:

- Research No. 1: 700,000 u.a.
- Research No. 2: 650,000 u.a.
- Research No. 3: 650,000 u.a.
- Research No. 4: 1,800,000 u.a.
- Research No. 5: 300,000 u.a.
- Research No. 6: 1,000,000 u.a.
- Research No. 7: 220,000 u.a.

Project 25

Time required: certain results could be obtained after a year of experiments (Research No. 4 and 6) but most of the investigations would take 3-5 years.

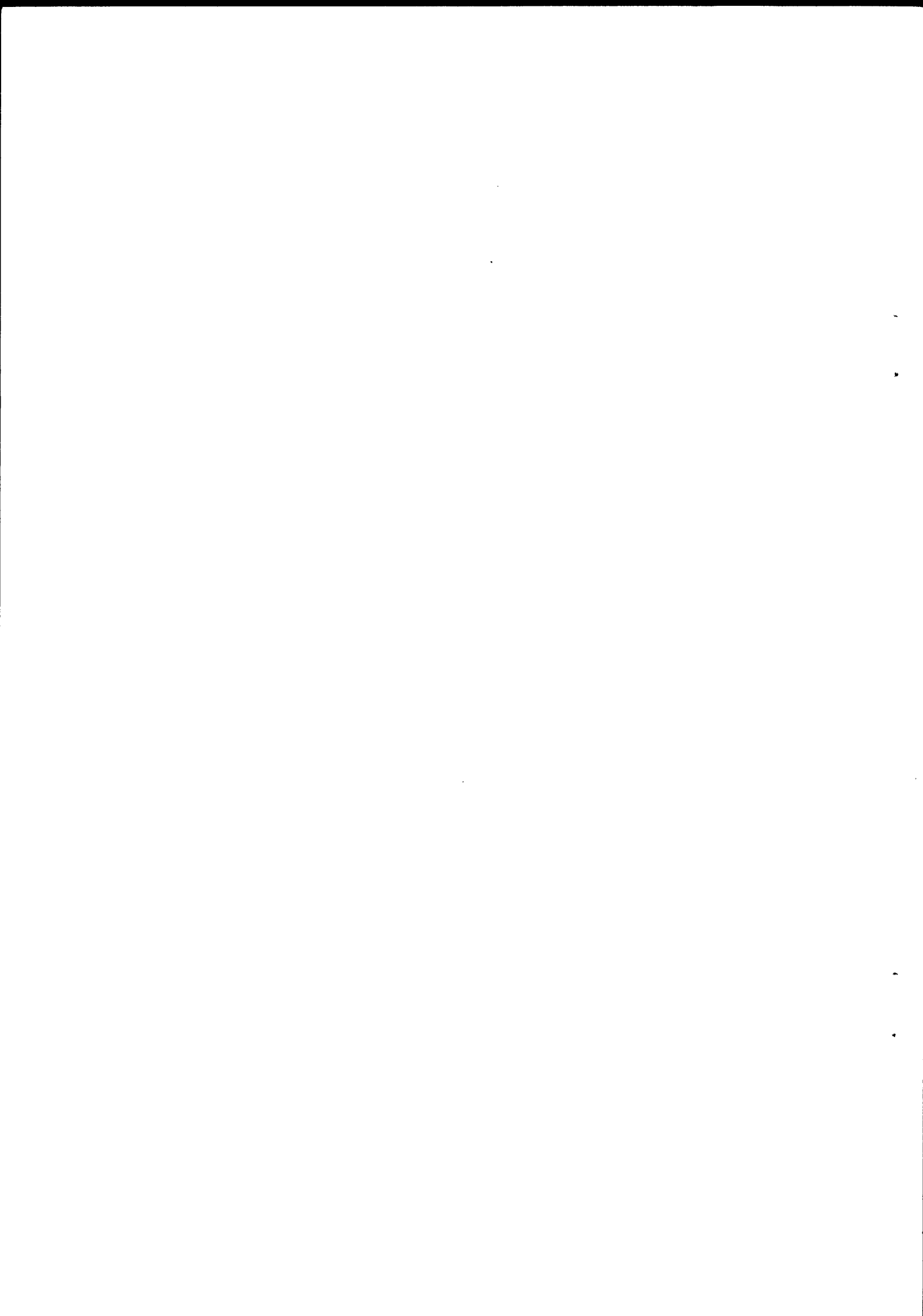
6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Links with other projects: Project 24 "Study of solid state devices for hyperfrequency use" is complementary to this research project.



3. NEW MEANS OF TRANSPORT

The development of industrial societies entails increasingly varied, complex and numerous transport requirements and the meeting of such requirements is in itself a sizeable factor of development. Europe is in this respect faced with considerable problems which will continue to increase in the years to come under the effects of population growth, changes in production and distribution circuits, the need for land development, the consequences of urbanization, improvement in the standard of living and, of course, more intensive trade brought about by the disappearance of frontiers.

European countries will therefore have to make rapid and difficult choices in creating new infrastructures, new equipment and new systems. This will mainly affect transport requirements in urban areas, where the situation is frequently very serious already. But it will also concern links between large conurbations, where traffic flow, speed and comfort not only need to be increased on the most crowded routes, but also account must be taken of the desirable development of certain economic centres.

Faced with these new requirements, the existing transport facilities present numerous inadequacies and deficiencies or are beset by serious problems. It is thus essential to resort to new methods, either by improving present transport facilities or by developing new facilities to replace or supplement existing ones.

Research and new developments seem therefore of major importance, particularly since the state of technological

knowledge indicates a wide range of possibilities in respect of several basic principles: suspension (air cushion, magnetic fields, perpendicular suspension), propulsion (turbines, linear induction), energy sources (fuel battery), control of missiles (intervention of radar, sonar, infrared rays; use of electronics).

Although it is extremely desirable that new ideas should come forth, it is equally necessary to avoid an excessive number of concrete developments which might bring about a waste of efforts and an increased number of results for which there would only be inadequate outlets.

This explains the relatively limited scope of the proposals made, four of which relate to preliminary studies. One of these concerns the expected evolution of passenger transport between the major European conurbations, while the other three cover concrete points. Four other suggestions are also put forward but have so far only been gone into very summarily.

While the proposed projects do indeed satisfy urgent needs, they only cover some of the present problems in the field of European transport. Urban transport, for instance, merely forms the subject of suggestions to be looked into at a later date while problems which must be solved are critical in all European countries, the need for cooperation having been shown with regard to several aspects of this question.

It therefore seems essential that the work started should be continued, so that cooperation may be organized every time it proves necessary or even only useful.

Field: New Means of Transport

Project 30: ELECTRONIC TRAFFIC AIDS ON MAJOR ROADS

1. Nature of project

Two developments to be carried out simultaneously:

- I. Development of a vehicle-mounted device to regulate the gap between vehicles, in particular on the most widely used sections of motorways.
- II. Development of a system for aiding and checking traffic on motorways by gathering, processing and distributing the appropriate information.

2. Objectives

- I. Improvements of road safety, the majority of accidents on the motorways occurring as a result of collisions by vehicles travelling in the same direction.

I. and

II. Improvement in the smooth flow of traffic.

II. General improvements in safety, smooth flow of traffic and the use of motorways.

3. Advantage of cooperation

- Similar situation and similar problems to be resolved in the various countries.
- Interpenetration of road traffic from one country to another.

Project 30

- No solution possible without standardization.
- Need to offer equipment as cheaply as possible through mass production.
- Research already carried out in certain member countries on some particular aspects of the project.

4. Methods of operation

To be defined.

5. Cost and time scale

About 1.7 million u.a. to be spent over five years:

- I. 700,000 u.a. (three or four years);
- II. 1 million u.a. (four or five years).

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Link with other projects: Project 37 can be complementary to Project 30.

Field: New Means of Transport

Project 31: STUDY OF ELECTROMAGNETIC "LIFT" TECHNOLOGY
FOR GUIDED MEANS OF TRANSPORT

1. Nature of project

Assessment of the possibilities of electromagnetic "lift" (sustentation) for guided means of transport.

2. Objectives

Electromagnetic "lift" may be a technical component permitting high speeds over long distances and offering numerous advantages for urban transport (comfort, no nuisances).

Since none of the Member States has gone far enough with work on this principle, the proposed project aims at determining the advantage, the nature and the extent of the research and development required.

3. Advantage of cooperation

- The investigation of this principle being something new, cooperation would enable research to be fully effective.
- Cooperation starting at this preliminary stage would facilitate the subsequent selection of the best techniques to be adopted for high speeds and for collective urban transport.
- Certain non-European countries are conducting extensive research on this principle (Japan in particular).

Project 31

4. Methods of operation

Project to be organized, financed and carried out jointly.

The work will be entrusted to a main national centre (or institute), in association with other centres (or institutes).

5. Cost and time scale

45,000 u.a. over one year.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: New Means of Transport

Project 32: STUDY ON A MARINE HOVERCRAFT OF
BETWEEN 1000 and 2000 METRIC TONS

1. Nature of project

Preparatory technical and economic study of a research and development project of one or several prototypes of marine hovercraft of between 1000 and 2000 metric tons. The proposed study must define the advantage to be gained from undertaking this project.

2. Objectives

The advantage of using marine hovercraft for ferry traffic is considerable in view of the speeds to be expected and the present-day and future traffic between the islands and the Continent of Europe. For this traffic, however, craft in the region of 2000 metric tons are necessary and present techniques involving the air cushion cannot be used beyond 300 metric tons.

3. Advantage of cooperation

- Very substantial traffic needs between islands and the Continent.
- Techniques already developed for hovercraft under 300 metric tons, but could be stretched to higher tonnages.
- Research already undertaken in the United States on hovercraft of 2000-4000 metric tons and consequently danger of non-European competition in future.
- Concentration of the necessary means, with due allowance for the scope of the final project.

Project 32

4. Methods of operation

Programme to be organized, financed and carried out jointly.

Work entrusted to a main national centre (or institute), possibly in association with other centres (or institutes).

5. Cost and timescale

120,000 u.a. over one year.

6. Participation of non-member countries

Desirable, in particular in respect of Great Britain, which has developed a marine hovercraft of up to 300 metric tons.

7. Classification, additional remarks and links with other projects

Classification A.

Field: New Means of Transport

Project 33: FORWARD STUDY OF PASSENGER TRANSPORT
BETWEEN LARGE CONURBATIONS

1. Nature of project

This will consist of an analysis of the requirements with a view to defining the possible uses of new methods and techniques for high-speed collective transport between large European conurbations.

2. Objectives

On the basis of an analysis of the demand likely in 1985 and 2000 and with due allowance for developments in the field of transport, determination of:

- possible techniques;
- possibilities for R. & D;
- desirable trends at Community level.

Final objective: the drawing up of a Community R & D policy in respect of the new techniques in the field of transport applied to links between large conurbations.

3. Advantage of cooperation

- Links between large conurbations can only be studied on a multinational scale (international links at least as important as those existing within a national framework).

Project 33

- The conclusions drawn in the proposed study must make it possible to map out the course of research and the choice of techniques appropriate for European networks.

4. Methods of operation

Study to be carried out by the OECD. Subsequent procedure to be defined.

5. Cost and timescale

- 200,000 u.a.;
- two or three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: New Means of Transport

Project 34: STUDY OF CLOSED-CIRCUIT GAS TURBINES
FOR USE ON RAILWAYS

1. Nature of project

Technical and economic feasibility study (in particular comparison with the open-circuit gas turbine).

2. Objectives

Research on turbotrains has until now been restricted to the use of open-circuit turbines (aeronautics). The closed-circuit gas turbine (helium) would offer the following advantages over them:

- elimination of air pollution and reduction of noise;
- improved performance;
- reduced maintenance costs and longer service life;
- high reliability;

3. Advantage of cooperation

- This is research into something which is new to all European countries, since only the open-circuit gas turbine has been developed until now.
- In view of the high cost of development, cooperation makes it possible to concentrate the available means and spread the risk.
- All railway companies are aiming at high speeds and would therefore be interested in the results obtained.

Project 34

4. Methods of operation

To be defined.

5. Cost and timescale

50,000 u.a. over two years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: New Means of Transport

Project 35: RESEARCH AND DEVELOPMENT WORK ON THE
LINEAR INDUCTION MOTOR

1. Nature of project

The question of the linear induction motor is an important one and its examination must be taken up again subsequently with a view to determining whether cooperative action is desirable.

2. Objectives

The linear induction motor constitutes a means of propulsion possessing remarkable advantages:

- outstanding acceleration and braking power;
- ability to propel vehicles whilst retaining perfect grip;
- very high reliability (no moving parts);
- no nuisances (silent);

However, certain aspects need to be better known so as to improve the performance and power. Also, it has so far been used for relatively low speeds (urban transport, travelling cranes); the use of the linear motor for high speeds should therefore be studied.

3. Advantage of cooperation

- Research carried out in several European countries on various aspects.

Project 35

- Similar advantages in improving collective urban transport along the lines made possible by the linear motor.
- Concentration of the available means to utilize this new principle and an easier selection of the most interesting practical results.
- Possibility of obtaining cheaper material through the mass production made possible by a vast market.

4. Methods of operation

To be defined.

5. Cost and timescale

To be defined.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B.

Field: New Means of Transport

Project 36: AUTOMATION OF OPERATION OF SHIPPING

1. Nature of project

Research on full automation in the control of ships and shipping, carried out by means of apparatus on board and infrastructure on land.

2. Objectives

- Rational distribution of ships, taking into account the density and conditions of traffic in busy areas (improved safety).
- Direct management of ships by their companies (increased profitability).
- . Improvement of working conditions on board and of crew's productivity.

3. Advantage of cooperation

- Increased competitive power for European shipping companies and shipyards.
- Introduction of one system only and most economical production of equipment.

4. Methods of operation

To be defined.

Project 36

5. Cost and timescale

To be defined.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B.

Field: New Means of Transport

Project 37: COLLECTION OF THE INFORMATION NECESSARY
FOR DETERMINING THE ADEQUATE DIRECTION
OF LANES OF ROAD TRAFFIC

1. Nature of project

Development of instruments capable of measuring the length, density and intended direction of lanes of road traffic.

2. Objectives

Traffic flow in urban areas would be considerably improved if traffic lights could be regulated depending on requirements. By means of instruments for collecting data on the volume of traffic and on the main directions in which it should move, it would be possible to introduce such a regulating process and to direct traffic rationally.

Such instruments could also be used in the open country on congested main roads.

3. Advantage of cooperation

- Similarity of the problems to be solved.
- Interpenetration of traffic between countries which renders harmonization and agreement between systems essential (guidance by means of equipment installed in the vehicle).

Project 37

- Mass production encouraged by a vast market makes it possible to reduce costs and to make the equipment available to the greatest number of users.
- Research has already been started in some countries and multiplicity and diversity of systems should be avoided. Experiments already carried out would make it possible to develop a more complete system sooner.

4. Methods of operation

To be defined.

5. Cost and timescale

To be defined.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B. Links with other projects: this action may be complementary to Project 30.

Field: New Means of Transport

Project 38: RESEARCH ON THE USE OF ELECTRIC VEHICLES
IN URBAN AREAS

1. Nature of project

Systematic analysis of the conditions for the introduction of electric vehicles in urban areas.

2. Objectives

At first, electric vehicles could only be used in urban areas, their range of action - on the basis of an accumulator as a source of energy - being very limited. The problems presented by nuisances and congestion requiring urgent solution in urban areas, the use of electric vehicles in cities should be assessed and encouraged.

3. Advantage of cooperation

- Similarity and urgency of the problems to be solved in member countries.
- Research and development work already undertaken by several industrial companies in the member countries enable the chances of introducing an electric vehicle to be evaluated.
- The need for coordinated regulations to encourage the widespread use of electric vehicles.

4. Methods of operation

To be defined.

Project 38

5. Cost and timescale

To be defined.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B.

4. OCEANOGRAPHY

Oceanography is a field in full process of development. After a long time during which this discipline was considered as being scientific research of purely academic interest, providing at most a few results which might be of use to fisheries and maritime navigation, attention is now being concentrated on the immense resources to be found in the ocean. This increased awareness, promoted by intensive prospection for oil in the neighbourhood of coasts, and by the world's growing need for food, has led many countries to become more and more interested in this field.

The United States, and to a lesser degree the USSR, have adopted increasing sums to oceanography during recent years, and have decided to increase these sums substantially in the years to come. In comparison with these two countries, and particularly with the former, European efforts in this respect are still very modest. Thus for 1968 it can be estimated that Europe's expenditure was of the order of 50 million dollars, compared with 500 million dollars for the United States. Several Community countries have in fact taken account of this disparity in drawing up medium-term orientation programmes.

Inasmuch as the sector concerned is relatively new and work is on a geographical terrain open to all nations, it certainly seems that this field is a favoured one for international cooperation. Furthermore, international bodies concerned with oceanography are fairly numerous, but real joint projects are still on a very small scale, being mainly limited to scientific research.

It may be felt that the final objective is reasonable exploitation of the ocean's resources. The aim of this exploitation should be to procure, under economically satisfactory conditions, the natural

resources which we are in need of, but exploitation should be of a reasonable kind in order to avoid careless waste of resources which are not renewable (petroleum, mineral ores, etc.) or of which natural renewal runs the risk of being seriously disturbed, or even halted, by unfortunate measures (destruction of marine fauna and flora by pollutants).

Essential lines of action may be as follows:

- actions of general interest, aimed at a better basic knowledge of marine phenomena and protection against pollution;
- technological actions in preparation for exploitation of natural resources, by the development of equipment, instruments and techniques.

The two types of action must go together. Although oceanographical research is already of long standing, the field to be explored is so wide and the difficulties involved in this exploration so great that the basic knowledge is still not nearly sufficient to allow full-scale exploitation of the oceans to be undertaken. On the other hand, even before exploitation of oceanic resources is undertaken, it is absolutely essential to avoid disturbing, perhaps irreversibly, the conditions of life in the oceans. It would be ridiculous to wait for some great catastrophe before deciding upon action which can only really be effective if it is undertaken by as large a number of countries as possible. But these projects of general interest will only be fully effective if they do in fact open the way to a programme of exploitation of resources, this programme being on a sufficiently large scale to justify its being launched on a cooperative basis. The exploitation of marine resources will necessitate the development of new equipment. The

of new equipment. The development of information science and new sources of energy will lay open very wide technological possibilities in this respect, but at the same time very substantial expenditure will be called for.

In this respect, the present proposals in no way provide a satisfactory reply. We have limited ourselves to a few proposals for action of general interest, but this is because it will only be possible to put forward projects of a technological nature when the precise objectives of exploitation of natural resources have been defined. This means that work must continue in the coming months in order to be able, in a few months' time, to put forward a programme of oceanographical action which is appropriate to the possibilities opened in this field and to what has already been done by various foreign countries.

Field: Oceanography

Project 40: ESTABLISHMENT OF SCIENTIFIC AND TECHNICAL
BASES FOR CUMMUNITY MEASURES IN THE FIGHT
AGAINST POLLUTION OF THE SEAS

1. Nature of project

(a) During one year, regular taking of samples (water, sediment, particles in suspension, test organisms) in estuaries of European rivers (strategic points of marine pollution) and analysis of these samples.

(b) Drawing up of continuous measures to combat and control pollution of the seas: information on the sources of pollution and of the legal provisions in force, fixing of acceptable levels of toxicity, studies on measures of control.

2. Objectives

Establishment of the bases for standard legislation in the fight against pollution of the seas, provision of safety measures to be taken in the event of a disaster.

3. Advantage of cooperation

Advantage of standard legislation. Better use of the personnel and facilities available by division of labour.

Project 40

4. Methods of operation

(a) Taking of samples and analysis according to the different criteria in the national institutes and at Euratom's Joint Research Centre.

(b) To be determined.

5. Cost and timescale

(a) Total cost of the sampling and analysis carried out during one year: about 600,000 u.a.

(b) The cost of technical measures and control can only be evaluated when the methods of operation have been fixed.

6. Participation of non-member countries

In view of the alluvial deposits of the Thames, the cooperation of British bodies is desirable.

7. Classification, additional remarks and links with other projects

Classification A

Additional remarks:

Links with other projects: the proposed measures are supplemented by Projects 41 and 42.

Field: Oceanography

Project 41: DEVELOPMENT OF A DEVICE FOR STUDYING THE
DEGREE OF TOXICITY OF DIFFERENT POLLUTANTS
ON DIFFERENT ORGANISMS

1. Nature of project

Joint development of a device for studying in vitro the degree of toxicity of different substances on different organisms. Joint purchase of the device by laboratories (immediate requirement 15-20 of these devices).

2. Objectives

Creation of the conditions necessary for acquiring fundamental knowledge of the effect of toxic substances on organisms. Promotion of technology.

3. Advantage of cooperation

Allows uniform measurements which might be used in establishing uniform standards. High cost of development.

4. Methods of operation

Joint fixing of specifications, development of a laboratory prototype (in a national institute), development contract placed with industry, construction contract placed with industry.

Project 41

5. Cost and timescale

Development of prototype

- 1st year: 200,000 u.a.;
- 2nd year: 200,000 u.a.;
- 3rd year: 100,000 u.a.;

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A

Additional remarks:-

Links with other projects: development of this device is closely linked with Project 40.

Field: Oceanography

Project 42: DEVELOPMENT OF AN APPARATUS FOR TOXICOLOGICAL
AND BIOLOGICAL STUDIES IN THE SEA (UNDERSEA
ECOSTAT)

1. Nature of project

Development of a device for continuous measuring in situ of chemical and biological parameters (at the bottom of estuaries and on a platform). Immediate requirement 15-20 of these devices.

This device is to be used:

- for toxicological examination under conditions close to natural ones;
- for studies of the accumulation of toxic substances in the biological food chain;
- for telemetric investigation of the present saprobiological situation in the sea.

2. Objectives

To acquire fundamental knowledge of pollution of the sea.
Promotion of technology.

3. Advantage of cooperation

Allows uniform measurements which might be used in establishing uniform standards. High cost of development.

Project 42

4. Methods of operation

Joint fixing of specifications, development of a laboratory prototype (in a national institute), development contract placed with industry, construction contract placed with industry.

5. Cost and timescale

Development of prototype: about three years; cost: about 500,000 u.a.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A

Additional remarks:

Links with other projects: development of this device is closely linked with Project 40 and forms part of Project 43.

Field: Oceanography

Project 43: SETTING UP OF AN OCEANOGRAPHICAL AND
METEOROLOGICAL MEASURING NETWORK IN
EUROPEAN WATERS

1. Nature of project

- (a) Joint development of a complete automatic measuring station for the making and transmission of oceanographical and meteorological observations along the coasts and in the open sea.
- (b) Setting up of an oceanographical and meteorological measuring network in European waters and organization of the appropriate land services. This measuring network is to use the jointly developed automatic measuring station.

2. Objectives

- the measuring station is to be used later on a large scale in connection with the setting up of a measuring network.
- purpose of the measuring network: acquiring more thorough oceanographical knowledge with a view to improving meteorological forecasting, safety in navigation and protection of the coasts, the fight against pollution of the sea and fisheries research.

3. Advantage of cooperation

(a) Measuring station

- reduction of the cost of development through elimination of duplication;

Project 43

- reduction of purchasing cost through large-scale ordering.

(b) Measuring network

- a single national measuring network cannot provide the necessary information;

- possible Community participation in the setting up of a world measuring network within the framework of IGOSS.

4. Methods of operation

1st stage: fixing of technical specifications for the automatic measuring station by a Working Party composed of oceanographers and meteorologists;

2nd stage: development and construction of a prototype automatic measuring station;

3rd stage: on completion of study of questions of an organizational and technical nature involved in the measuring system, the setting up of an experimental network;

4th stage: setting up of an operational measuring network.

5. Cost and timescale

1st stage: for one year, mainly administration costs (low);

2nd stage: two years, about 0.5 million u.a.;

3rd stage: two years, 2 million u.a. (not including maintenance costs);

4th stage: high costs determined on the basis of experience acquired during the 3rd stage.

Project 43

6. Participation of non-member countries

Desirable.

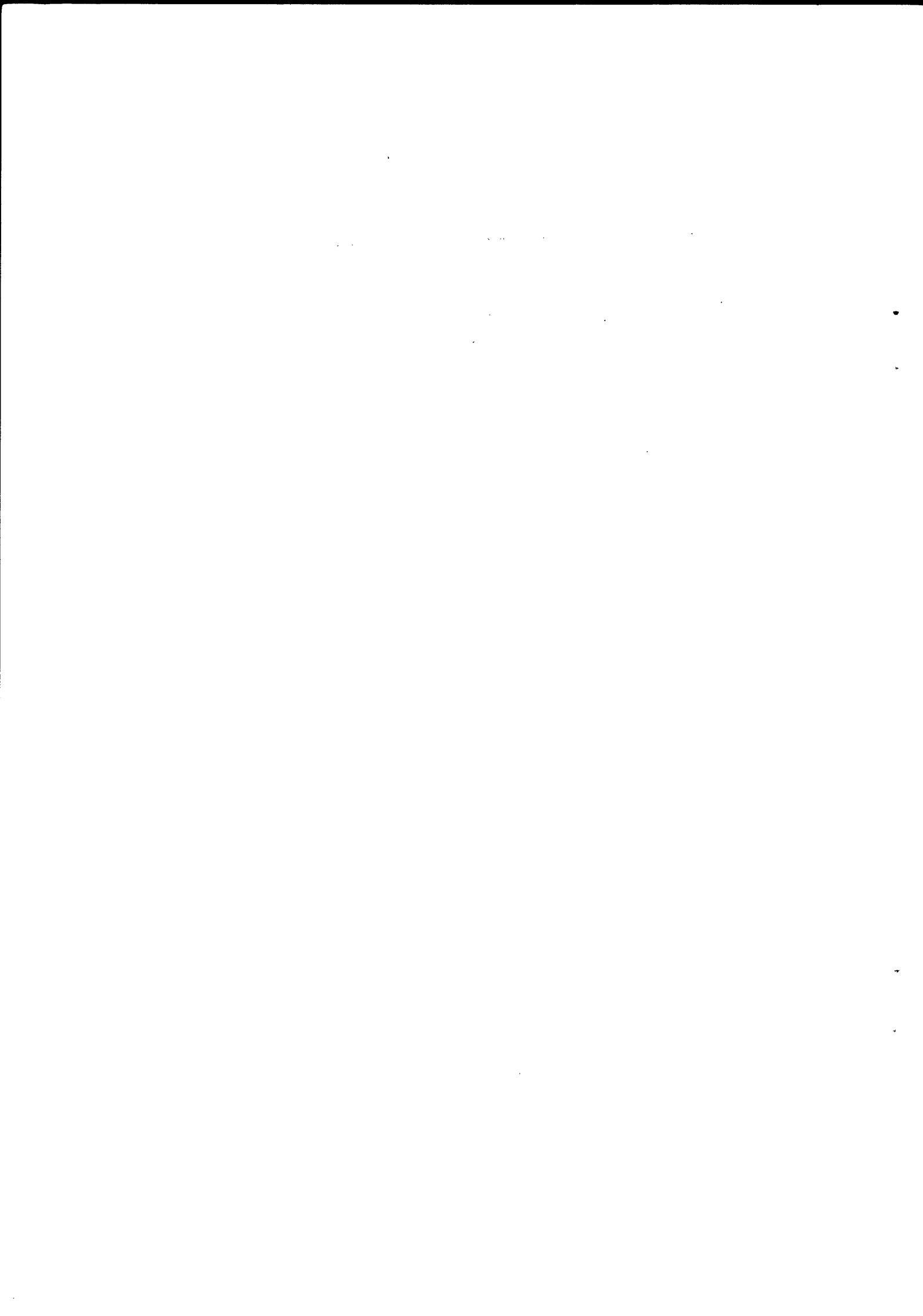
7. Classification, additional remarks and links with other projects

Classification: 1st and 2nd stages: A

3rd and 4th stages: B

Additional remarks:

Links with other projects: possible links later on with Project
71 (meteorological satellites: question of satellite measuring
stations).



Field: Oceanography

Project 44: DEVELOPMENT OF AN OCEANOGRAPHICAL CHEMICAL
SONDE

1. Nature of the project

Development of a sonde for determining the chemical parameters of sea water.

2. Objectives

To improve knowledge of the importance of dissolved organic substances for vital processes in the sea. Promotion of technology.

3. Advantage of cooperation

Allows uniform measures. High cost of development.

4. Methods of operation

Not yet fixed.

5. Cost and timescale

Not yet fixed.

6. Participation of non-member countries

Not yet discussed.

Project 44

7. Classification, additional remarks and links with other projects

Classification B

Additional remarks:

Links with other projects: this sonde may be used in the oceanographical measuring network (Project 43).

Field: Oceanography

Project 45: DEVELOPMENT OF AN APPARATUS FOR JOINT
SAMPLING OF THE SEA BED

1. Nature of project

Development of an apparatus for the joint sampling of marine soil.

2. Objectives

To improve the possibilities for geological prospection of the sea bed.

3. Advantage of cooperation

High cost of development.

4. Methods of operation

Not yet fixed.

5. Cost and timescale

Not yet fixed.

6. Participation of non-member countries

Not yet discussed.

Project 45

7. Classification, additional remarks and links with other projects

Classification B

Additional remarks: The development of this apparatus is linked with projects to be proposed later in the field of techniques for exploiting the sea.

Links with other projects:

5. METALLURGY

The availability at economic prices of materials with a sufficient level of certain physical, chemical, mechanical, electrical, etc., properties is an essential condition in the development of advanced technology. But in studying subjects for research which would be worth selecting in the field of metallurgy, the Working Party came up against a double difficulty in the sense that their terms of reference did not include the broad nuclear and spatial fields nor iron and steel making, and that until now the prospects for technological and industrial development have not been fully studied on a Community level.

This did not, however, prevent an attempt being made to pick out possible subjects for research within certain broad outlines which seem to meet consumers' requirements fairly rapidly. From the time that the work was begun effective participation was sought from industry. As a result of proper handling of problems relating to the protection of industrial property rights and procedures for cooperation, industrial concerns showed a lively interest in the cooperative projects and submitted more than 80 concrete proposals within a few weeks. Some declared themselves ready to cooperate even further provided that the overall project evolved favourably.

To overcome the difficulties raised by the procedures for carrying out such cooperative projects, the Working Party has considered it advisable to submit a general proposal in this field, aimed at the setting up of a "combined European project"; work has already begun on this. The mainspring of this project would be the allocation, on

the recommendation of a joint European body, of national funds to national undertakings or laboratories.

The projects listed below, the carrying out of which is urgently required and for which it seems that cooperation can easily be organized, could therefore serve as a basis or example for drawing up the programme for the combined European scheme:

- metals and alloys for gas turbines. The market for these machines for use in the production of electrical energy and for propulsion purposes, both in the Community and outside, could be considerably expanded if advanced materials were available to enable their performance to be improved considerably.
- metals and alloys used in the construction of sea water desalination plant. Meeting the demand for fresh water for human, agricultural and industrial needs is already a vital problem in certain regions of the Community and in many developing countries;
- materials for use in the manufacture of large items of equipment (reaction tanks, etc.) used in the chemical and petrochemical industry;
- high performance materials for electric and electronic engineering.

The limitation of the proposals to these four broad outlines is the result, as has been stated, of the desire to submit only projects which are of indisputable interest. But the first investigation on which has already been carried out with the help of industry and which disclosed a large number of other subjects shows that it would be possible to submit many other proposals in respect of metallurgy.

Field: Metallurgy

Project 50: TECHNOLOGICAL STUDY AND DEVELOPMENT OF
TITANIUM ALLOYS AND SUPERALLOYS FOR GAS
TURBINES

1. Nature of project

- Technological studies aiming at:

- (a) increasing the insufficient reliability of the best Ni and Co alloys recently developed;
- (b) improving alloys by developing production and shaping processes.

- Development of new alloys of the "superalloy" type: dispersion-strengthened alloys with oriented structure and pseudo-fibrous texture.

- Development of titanium alloys and shaping processes.

2. Objectives

Gas turbines constitute a means of producing energy which is characterized by a high power/mass ratio and is therefore suitable for mobile use, e.g., in aeronautics, ships, trains, commercial road vehicles. The ease with which they can be started up also makes them particularly suitable for supplying peak demands for electrical energy. Their output, however, which is linked with the temperature of the heat source, which is at present only 850°C, could be improved by about 50% by raising the operating temperature to 1,400°C.

Project 50

The field of application of gas turbines would then be extended considerably to include all types of energy-producing machines, including large electric power stations.

This progress is entirely dependent on materials whose characteristics are at present insufficient for the operating temperatures contemplated. The major part of the research and development on this subject is being done by countries outside the Community, in particular the USA and, on a smaller scale, Britain. Europe cannot depend on outside countries in such a vital field, nor can it avoid a problem which is so important to its industrial and economic future. Superalloys, for this purpose, can be used at up to 1,000-1,100°C for long periods.

3. Advantages of cooperation

All European countries are devoting a certain amount of research to these advanced materials. The small size of the national markets is such that it is impossible even to conduct enough research to prevent the gap between each of these countries and the technologically advanced outside countries, from where almost all innovations in this field have come, from widening even further. These various studies have the further disadvantage that they partly overlap one another.

European cooperation, with the work being spread out over several countries, is the only means of improving the return on the outlay on research in each country and of accelerating technological developments in the Community.

Project 50

The long-duration high-temperature trials required far exceed the capacity of the largest laboratories; in order to make rapid advances the work must be divided up between several countries and the results pooled.

4. Methods of operation

To be specified within the framework of combined European action. The work is to be undertaken mainly by industry, possibly backed up by the research centres and universities.

5. Cost and timescale

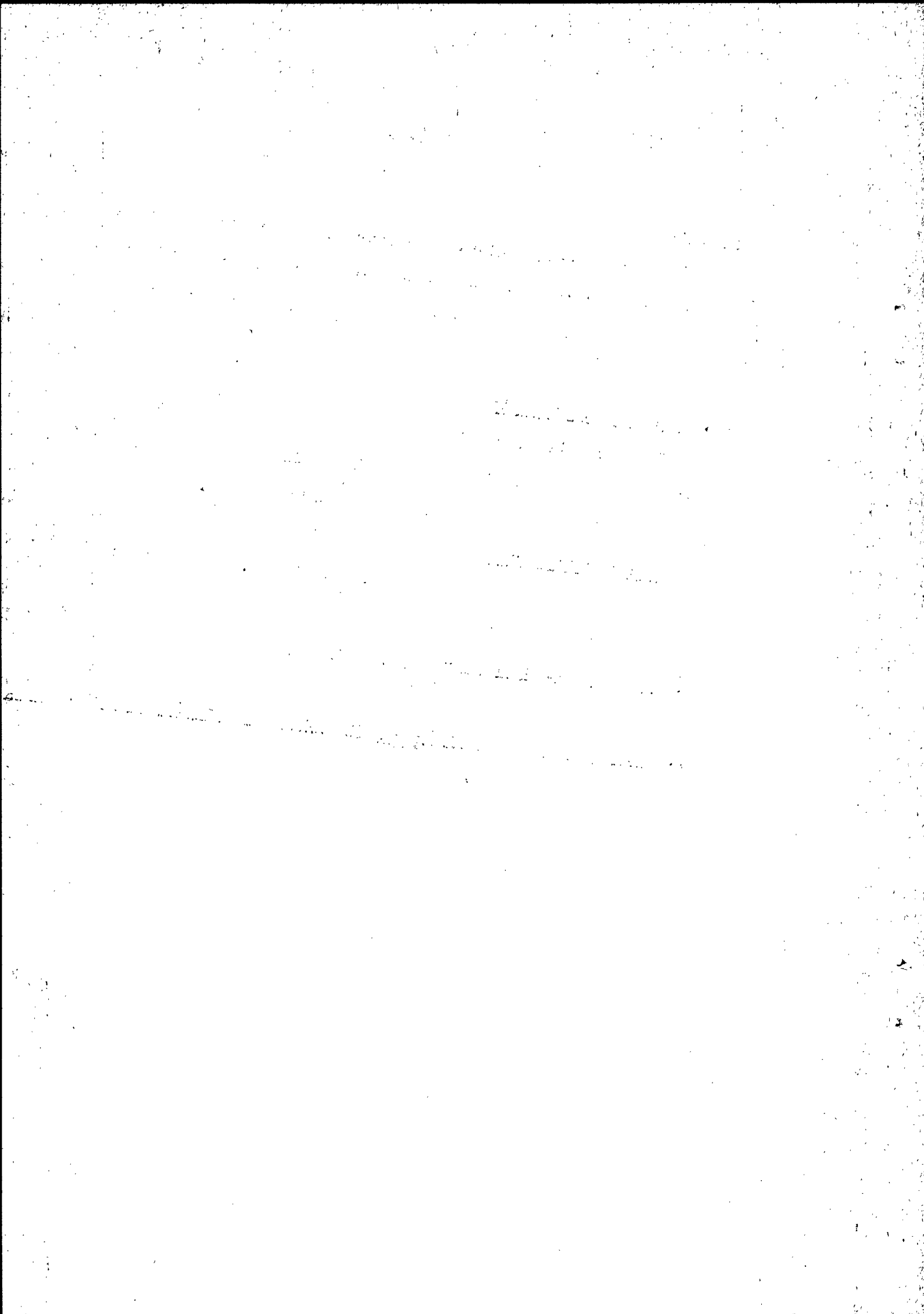
An amount of the order of 12,000,000 u.a. seems reasonable for a five year programme.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.



Field: Metallurgy

Project 51: DEVELOPMENT OF FIBRE-REINFORCED MATERIALS
FOR GAS TURBINES

1. Nature of project

- Development of fibres with a high melting point.
- Study of the binding of fibres with the matrix and their compatibility with it.
- Development of reliable composite materials capable of functioning continuously in gas turbines at temperatures of the order of 1,200°C.

2. Objectives

Cf. Project 50.

Fibre-reinforced materials combine the remarkable mechanical properties of fibres, single crystals or whiskers with the characteristics of the matrix in which they are distributed. In a different field, the use of these materials may offer the same advantages as those gained from the change-over from simple mortar and concrete to reinforced and subsequently prestressed concrete.

Being a new family of products, fibre-reinforced materials are intended for use over a very wide range of temperatures.

Project 51

3. Advantage of cooperation

Cf. Project 50.

Little work has been done on these materials in Community countries. A few brilliant successes by outside countries - plastics reinforced with glass or carbon fibres - have caused several research centres to become interested in the problem. Before proceeding to the industrial applications of materials for use at high temperatures, many fundamental questions on the problems of fibre production, compatibility and interface must be dealt with and solved. Active international cooperation is particularly desirable in this first phase.

4. Methods of operation

To be specified within the framework of combined European action.

During the first fundamental phase work must be carried out in close cooperation with universities, research centres and development departments in industrial companies.

5. Cost and timescale

An amount of the order of 2,000,000 u.a. is envisaged for a period of five years, the programme being revised after three years. If this first stage is a success, larger amounts would be required for technological trials.

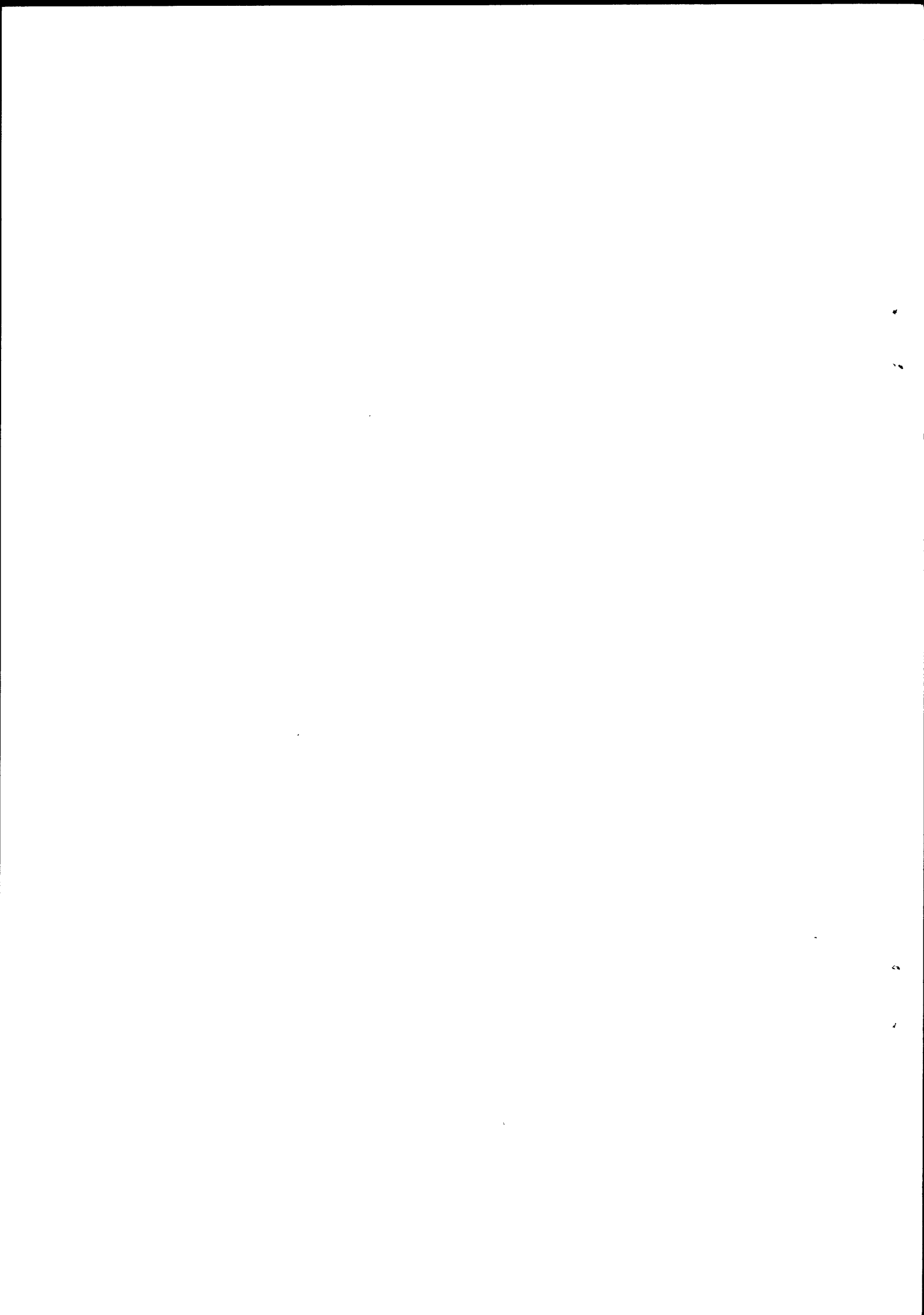
Project 51

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.



Field: Metallurgy

Project 53: DEVELOPMENT OF REFRACTORY METALS AND OTHER
MATERIALS (CEMENT, CERAMICS) FOR GAS TURBINES

1. Nature of project

- Technological development of refractory metals and alloys, in particular based on niobium and chromium, with regard to shaping, mechanical properties and their behaviour in oxidizing atmospheres.
- Study of protective coatings.
- Shaping and properties of ceramic materials, and in particular silicon nitride.

2. Objectives

Cf. Project 50.

The field of utilization of refractory metals and alloys is above $1,100^{\circ}\text{C}$, which is the upper limit for the use of superalloys over long periods. Their principal limitation comes from their intrinsic low resistance to oxidation. A study should therefore be made of how they may be provided with protective coatings which are compatible with the basic material and continue to provide satisfactory protection when damaged. The industrial stage is not envisaged for some time. These materials are particularly well suited to turbines using helium.

Project 52

Certain ceramics, such as silicon nitride, seem capable of long-time use in this temperature range above 1,100°C. The problems of shaping and mechanical behaviour have still to be studied. Their use is envisaged in the not too distant future.

3. Advantage of cooperation

Cf. Projects 50 and 51.

4. Methods of operation

To be specified within the framework of combined European action.

During the first fundamental stage work must be carried out in close cooperation with universities, research centres and development departments in industrial companies.

5. Cost and timescale

An amount of 3,000,000 u.a. is envisaged for a period of five years, the programme being revised after three years. If the first stage is a success, larger amounts would be required for technological trials.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Metallurgy

Project 53: MATERIALS FOR THE DESALINATION OF SEA WATER

1. Nature of project

Development of low-cost materials for the desalination of sea water. Studies of materials, corrosion studies, development of manufacturing technologies, prototype testing.

2. Objectives

Exchanger tubes account for about 30% of the cost of a desalination plant. There are major advantages in developing materials which are not only highly resistant to corrosion by hot sea water, but are also cheap.

There are two objectives:

- Reduction in cost of tubes for desalination plant operating by distillation at 120° max.;
- Raising of the operating temperature with a view to reducing the price of desalinated water.

The development of desalination materials enjoys considerable support in the United States. European manufacturers are therefore facing stiff competition.

Project 53

All Community countries are very interested in the desalination of sea water, either through the need for fresh water or because of the export possibilities that will be opened up by the development of this technology (in particular to the emerging countries).

3. Advantage of cooperation

- Reduction of total expenditure on research and development.
- Increase in the efficiency of research carried out on a national scale.
- Accelerated development of materials so that European firms constructing or exporting sea water desalination plant are quickly placed in a favourable competitive position.

4. Methods of operation

To be specified within the framework of combined European action. The work is to be undertaken mainly by industry, possibly backed up by research centres and universities.

5. Cost and timescale

6,000,000 u.a. over five years.

6. Participation of non-member countries

Not particularly desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Metallurgy

Project 54: HIGH-GAUGE STEEL TANKS FOR THE CHEMICAL AND
PETROCHEMICAL INDUSTRY

1. Nature of project

- Study of the heterogeneity of the properties of heavy-gauge metal and remedies therefor.
- Development of techniques in shaping, welding and heat treatment to achieve optimum properties.
- Behaviour under multiaxial stress.
- Study of the safety of thick-walled apparatus with regard to brittle fracture.
- Propagation of cracks; technological qualification test.
- Study of the phenomena of embrittlement and prevention thereof, in particular hydrogen embrittlement.

2. Objectives

The development of the chemical industry is hampered by the dimensions of the tanks which can be built nowadays. In order to increase their size and in accordance with the tendency towards an increase in the unit capacity of production plant, use must be made of higher strength steels with a tensile strength of 60 kg/mm^2 in place of those of 40 kg/mm^2 currently employed. The saving in weight achieved by decreasing the thickness of the walls would enable the diameter of the tanks to be increased, thus leading to a reduction in the number of parallel units and a saving in production costs.

Project 54

The outlets for engineering companies are not only on internal markets but also on export markets in a branch of industry which is rapidly expanding.

3. Advantage of cooperation

Cooperation in this particular field is necessary in order to reduce the high cost of research and to speed up developments. Furthermore, it is obvious that sooner or later the available knowhow must be exploited jointly. Coordination of effort can only facilitate contacts at the level of the supervisory bodies empowered to approve installations.

4. Methods of operation

To be specified within the framework of a combined European action. Work is to be undertaken mainly by industry, possibly backed up by research centres and universities.

5. Cost and timescale

5,000,000 u.a. over five years

6. Participation of non-member countries

Not particularly desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Metallurgy

Project 55: METALS FOR THE CHEMICAL INDUSTRY

1. Nature of project

To determine the possibilities of using noble metals in the manufacture of equipment for the chemical industry.

2. Objectives

The problem of resisting corrosion by the particularly aggressive substances used in the chemical industry may be solved by coating the steel with materials such as lead, tantalum or platinum.

Other noble metals which are cheaper than tantalum or platinum, such as titanium, zirconium and niobium, show great chemical inertia against certain highly aggressive substances. These metals or their alloys already lend themselves to the construction of entire pieces of equipment, including large chemical reaction tanks. Their appropriate use could lead to substantial savings in the construction and maintenance of installations.

3. Advantage of cooperation

The cooperation of metallurgists and customers in the chemical industry could lead to a rapid increase in the use of these noble metals and at the same time bring about a fall in their price, thus widening their use for other applications, such as aeronautics, mechanics, etc.

Project 55

4. Methods of operation

To be specified in the framework of a combined European action.
The work is to be undertaken mainly by industry, possibly backed up
by research centres and universities.

5. Cost and timescale

2,000,000 u.a. over five years.

6. Participation of non-member countries

Not particularly desirable.

7. Classification, additional remarks, links with other projects

Classification A.

Field: Metallurgy

Project 56: SUPERCONDUCTORS

1. Nature of project

Development of industrial superconducting materials.

2. Objectives

The development of superconducting materials is limited in the Community to applications in physics apparatus and instruments and has been government subsidized.

The industrial prospects of superconductors do not appear to have been explored in the Community, although they have aroused great interest in Britain.

The technology for manufacturing superconducting wires, in particular for alternating current use, poses many problems the solution of which would enable prices to be brought down and would facilitate future developments in the electrical industry.

3. Advantage of cooperation

To increase the efficiency of the limited research carried out on a national scale. Opinions on the advisability of cooperation are divided.

Project 56

4. Methods of operation

To be specified in the framework of a combined European action.
The work is to be undertaken mainly by industry, possibly backed up by research centres and universities.

5. Cost and timescale

1,000,000 u.a. over five years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Metallurgy

Project 57: SEMICONDUCTORS

1. Nature of project

Development of semiconductors of the gallium arsenide and gallium phosphide type for hyperfrequencies.

2. Objectives

- To guarantee Community laboratories a supply of high quality products.
- To accelerate research in this field by making better use of the scientific facilities available in the Community.

3. Advantage of cooperation

To reduce the total cost of research, which is at present uncoordinated, and especially to make this research easier by joint use of high performance scientific material.

Opinions on the advisability of cooperation are divided.

4. Methods of operation

To be specified in the framework of a combined European action. The work is to be undertaken mainly by industry, possibly backed up by research centres and universities.

Project 57

5. Cost and timescale

3,000,000 u.a. over five years.

6. Participation of non-member countries

Not particularly desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Link with other projects: to be linked with Project 23 in the telecommunications field.

6. NUISANCES

Judging in particular from the plethora of statements and action by international bodies in this respect, the need to step up the fight against pollution requires no emphasizing. Nevertheless, what has been achieved so far is quite inadequate to cope with the problem, which becomes more acute every day owing to the exponential increase of noxious matters introduced in what is known as the "biosphere".

Two kinds of actions are needed to reduce nuisances:

- the definition of guide values, quality criteria or danger levels on the basis of which public authorities could introduce standards to be complied with and set up control systems;
- preparatory study and development of effective technical methods and equipment costing as little as possible, with a view to preventing pollution and to remedying its effects.

What has been achieved so far in Europe at both these levels is insufficient and has been done only by approaching the matter empirically and without an adequate scientific and technological basis.

In order to make further valid progress, scientific and technological research is essential. Improved knowledge of what pollution involves and of the harmful effects of pollutants must be obtained to enable quality criteria to be defined; processes must be improved and new techniques developed to prevent pollution or remedy its effects.

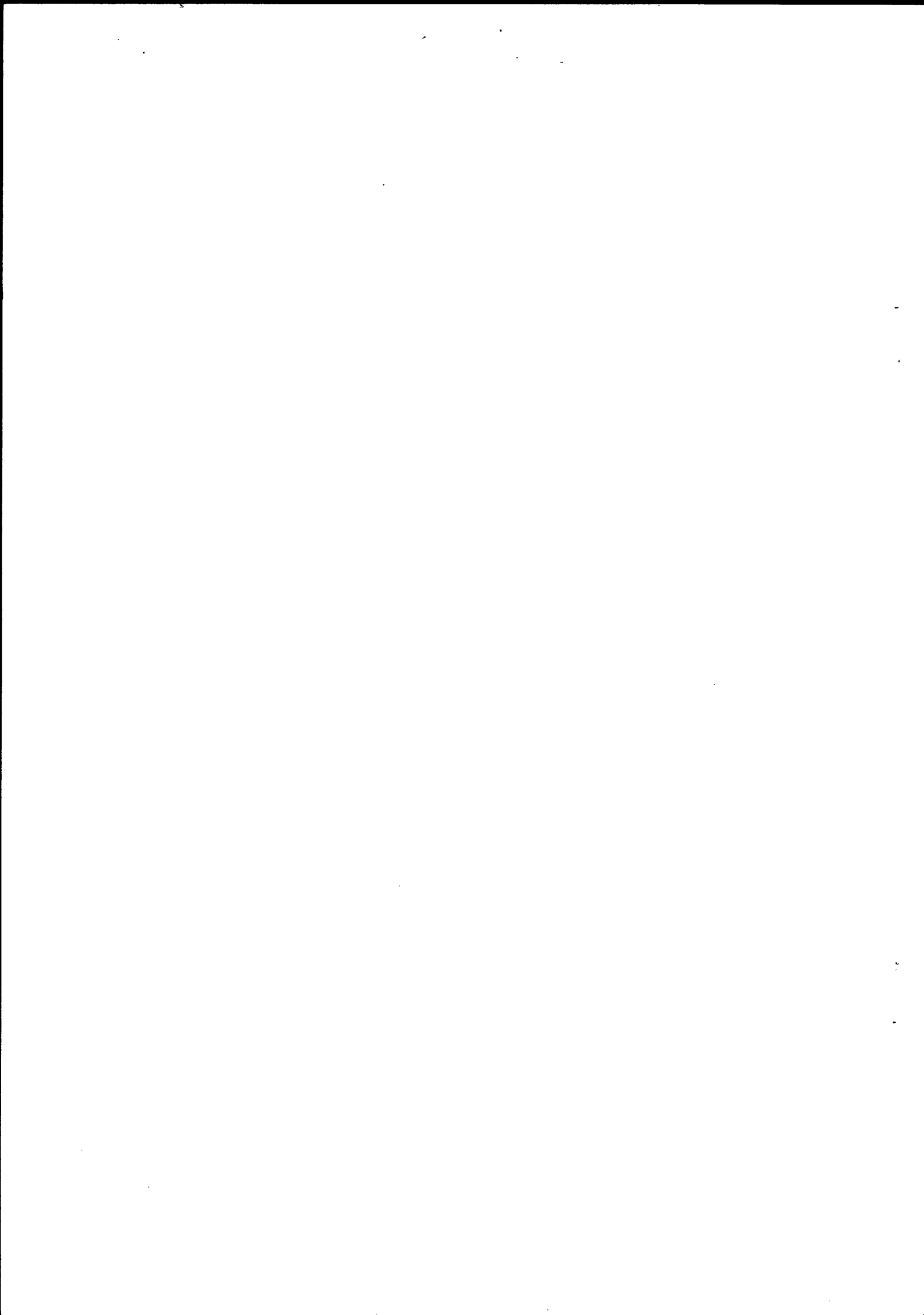
Putting aside Projects 62 and 67, which fulfill only the first of these two objectives, all the projects proposed by the specialist group aim at both the objectives mentioned above, whether in respect of atmospheric pollution, water pollution or acoustic nuisances.

All the proposed schemes have a definite "health" aspect, i.e., they would reduce the harmful effects of pollutants to man and his surroundings. All have therefore an obvious economic advantage, but some of them have a more clearly marked economic significance, owing to either the economic consequences of the pollution in question (e.g., desulphuration, sludge processing) or the economic consequences of the regulations and methods to be used in order to decrease pollution (e.g., gaseous effluents, thermal pollution, industrial waste water).

Whatever their connection with the objectives indicated above, the proposed projects cannot be graded according to priority and urgency, for each of them deals with a specific problem of undeniable importance.

The proposals made are only first steps. At a later stage of the work the problem of nuisances will require a more systematic and overall approach. There will first have to be a complete review of all the knowledge acquired and of the projects carried out, initiated or planned by countries or international organizations; then a survey of what is to be done will have to be made, and from there a real European anti-nuisance programme will have to be drawn up, which will no longer be limited to air, water and noise, but

will also include other nuisances such as pharmaceutical products, the polluting effects of which are constantly increasing and are often more harmful because of their insidious nature.



Field: Nuisances

Project 61: FIGHT AGAINST ATMOSPHERIC POLLUTION BY
SULPHUR DERIVATIVES

1. Nature of project

- (a) Research on the physicochemical behaviour of these derivatives in gaseous effluents (with particular attention to the effects of the associated pollutants).
- (b) Research on improved characterization of the harmful effects of sulphur derivatives.
- (c) Basic research contribution to the development of desulphuration processes.

2. Objectives

- Determination of maximum permissible concentrations with a view to establishing standards.
- Development of methods making it possible to detect and reduce the content of sulphur compounds in the atmosphere.

3. Advantage of cooperation

- Saving of resources by avoiding duplication and waste of effort.
- Geographically widespread effects of atmospheric pollution.

Project 61

- Need for harmonized standards on a European scale (thereby preventing obstacles to trade).

4. Methods of operation

To be defined.

5. Cost and timescale

840,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 62: DEVELOPMENT OF BIOLOGICAL INDICATORS FOR
DETERMINING THE OVERALL DANGER LEVEL OF
ATMOSPHERIC POLLUTANTS

1. Nature of project

The research is aimed at defining the overall danger level of atmospheric pollutants by means of biological indicators incorporating the harmful action of pollutants:

- search for biological indicators in the vegetable and micro-biological fields;
- research into the action of atmospheric pollutants on tissue cell cultures.

2. Objectives

To determine criteria of biological quality, making it possible to undertake a comparative study of the quality of atmospheres at various points within the Community, and giving to public authorities the necessary basis for improving standards as well as for introducing more effective measures to detect and fight pollution.

3. Advantage of cooperation

- Saving of resources by avoiding duplication and waste of effort.
- Geographically widespread effects of atmospheric pollution.

Project 62

- Need for harmonized standards on a European scale (thereby preventing obstacles to trade).

4. Methods of operation

To be defined.

5. Cost and timescale

1,200,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 63: STUDY OF FUMES AND DUST FROM MOTOR VEHICLES
AND DOMESTIC HEATING APPLIANCES

1. Nature of project

The research must cover motor vehicle fumes (in particular nitrogen oxides) and liquid or solid aerosols produced by combustion engines, with a view to determining the role played by such products in smog formation under various conditions of operation. This research will also have to investigate fumes from domestic heating appliances burning mineral oil under different conditions; it will include preliminary theoretical work with a view to the development of prototypes of continuous burners.

2. Objectives

- To make it possible to establish improved standards for the fight against atmospheric pollution on the basis of more extensive scientific knowledge.
- By widely spreading the results obtained, to provide industry with the means of improving the design of engines, motors and appliances with a view to avoiding pollution.
- To develop improved and standardized analysis instruments.

3. Advantage of cooperation

- Saving of resources by avoiding duplication and waste of effort.

Project 63

- Geographically widespread effects of atmospheric pollution.
- Need for harmonized standards on a European scale (thereby preventing obstacles to trade).

4. Methods of operation

To be defined.

5. Cost and timescale

1,440,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 64: RESEARCH INTO NATURAL PURIFICATION PROCESSES
IN POLLUTED WATERS

1. Nature of project

The research should lead to improved knowledge of the natural purification process, and in particular of the behaviour of organic polluting substances in their natural environment (sedimentation, chemical or biological mineralization, effects of inorganic pollutants, biocides, toxic substances and thermal pollution). Work will include:

- (a) in situ study of several hydrological systems;
- (b) certain model tests.

2. Objectives

- to preserve and forecast water resources from the point of view of quality;
- to standardize quality criteria in order to protect people and improve economic efficiency;
- to reach bases for the assessment of measures to be taken with regard to the purification of effluents in order to improve the natural purification process.

3. Advantage of cooperation

- saving of resources by avoiding waste of effort;
- need for harmonized quality criteria in respect of water.

Project 64

4. Methods of operation

To be defined.

5. Cost and timescale

360,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 65: RESEARCH AND DEVELOPMENT OF METHODS
OF PURIFICATION OF WASTE WATERS

1. Nature of project

Fight against water pollution by carrying out research and development on methods of purifying waste waters (application to certain individual industries).

The first stage of this action must include preliminary studies and the selection of industries producing effluents with a high content of organic products, metal and toxic substances.

The second stage will include, in respect of the industries under consideration, the pooling of the experience acquires and research and development work on new purification methods which are both effective and economically viable.

2. Objectives

- protection of water resources;
- development of new methods and apparatus;
- definition of basic scientific and technical foundations for regulations concerning the discharge of effluents.

3. Advantage of cooperation

- Harmonization of the criteria to be applied will enable one of the causes of unfair competition between industries in the Member States to be eliminated.

Project 65

- Saving of resources by avoiding waste of effort.

4. Methods of operation

To be defined.

5. Cost and timescale

1st stage: 10,000 u.a. over six months

2nd stage: 400,000 u.a. over 2 1/2 years

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 66: RESEARCH ON THERMAL POLLUTION OF SURFACE
WATERS

1. Nature of project

This research, which does not include sea water, relates to the following three subjects:-

- (a) natural cooling of waterdays (in situ studies and mathematical models);
- (b) action of water temperature on its environment (biological study);
- (c) economic and technical study on means of prevention, including the possible use of residual thermal energy.

2. Objectives

- preservation of biological resources in water environments;
- definition of siting of power stations along waterways;
- definition of technical bases for fixing the temperature level which industrial waste must not exceed;
- development of preventive methods and apparatus, and possibly methods and apparatus making use of residual thermal energy.

3. Advantage of cooperation

- saving of resources;
- desirability of harmonized criteria.

Project 66

4. Methods of operation

To be defined.

5. Cost and timescale

720,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 67: BIOLOGICAL EFFECTS OF BIOCIDES IN SURFACE
AND UNDERGROUND WATERS

1. Nature of project

The research should cover the following subjects:

- analytical methods for determining contamination of water by biocides;
- studies with a view to establishing an acceptable level of contamination.

2. Objectives

- preservation of water resources;
- protection of man and his surroundings through the fixing of quality criteria for water and measures concerning the use or production of biocides (replacing pollutants by other substances which are less toxic or less persistent);
- orientation of industry in respect of biocide production.

3. Advantage of cooperation

- international nature of biocide pollution;
- saving of resources;
- desirability of harmonized criteria (freedom of movement for products and normal competition between producers).

Project 67

4. Methods of operation

To be defined.

5. Cost and timescale

600,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 68: DEVELOPMENT OF SLUDGE PROCESSING METHODS

1. Nature of project

Development of methods for economically processing sludge from purification plants, taking into account its sanitary aspects (drying, digestion, disinfection, irradiation), with a view to using it.

2. Objectives

- to solve problems presented by sludge accumulation, particularly in highly populated areas;
- to find economical uses for sludge by processing it.

3. Advantage of cooperation

- most countries have a sludge problem;
- saving of resources.

4. Methods of operation

To be defined.

5. Cost and timescale

240,000 u.a. over three years.

Project 68

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Field: Nuisances

Project 69: RESEARCH CONCERNING ACOUSTIC NUISANCES

1. Nature of project

Two subjects for research are under consideration:

- (i) the gathering of information on the importance of infrasonic and ultrasonic components in noises, and experiments on the effects of these components;
- (ii) research on the technical means which can be used to reduce vehicle noise, taking into account its economic consequences.

2. Objectives

- (i) determination of criteria and standards for the protection of man;
- (ii) orientation of industries towards criteria to be complied with in the manufacture of noise-producing apparatus and vehicles.

3. Advantage of cooperation

- (i)
and Saving of resources.
- (ii)
- (ii) Harmonization of criteria and standards (in particular with a view to trade between countries).

4. Methods of operation

To be defined.

Project 69

5. Cost and timescale

I. 100,000 u.a. over three years.

II. 500,000 u.a. over three years.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

7. METEOROLOGY

Meteorology is at a turning point in its development. The possibilities for collecting and transmitting information by satellite and for information processing by computers provide tremendous scope for new methods. In particular, the use of synoptic charts involving the use of a large number of factors which take account of the dynamics of the atmosphere should result in an improvement in forecasting as carried out at present, and in particular in forecasts covering a considerably longer period. The economic advantage of such long-range forecasts is considerable, particularly with regard to agriculture, the construction industry, and, to a lesser degree, certain kinds of transport.

It is thus extremely important for the meteorological services to benefit as soon as possible and on a very wide scale from the new possibilities offered to them to make a greater contribution to the economic efficiency of their countries. But at the same time it should be realized that the introduction of these new techniques requires a very considerable financial effort, which is practically impossible for individual national European meteorological services. Cooperation is thus essential, not only in order to avoid duplication of expenditure of the same type, but also to reinforce the effective use of the new techniques. It would be no exaggeration to say that joint action is a sine qua non if European meteorology is really to commit itself to the necessary changes.

The proposals which have been made primarily involve two fairly wide-ranging projects, which would result in commitment to such changes: firstly, the establishment of a large single centre for computation and research (project 70) and, secondly, the launching of a European

meteorological satellite and the setting up of the necessary ground stations (project 71).

As well as these large-scale operations, more modest proposals have also been put forward, referring in particular to the development of single prototypes for certain types of apparatus, with a view to encouraging concentration of industrial production on a few series which would have a considerable market as a result of coordination of government contracts (project 72).

Field: Meteorology

Project 70: EUROPEAN COMPUTATION CENTRE FOR METEOROLOGICAL
EXPLOITATION AND RESEARCH

1. Nature of project

The setting up of a common meteorological centre for computation and research.

2. Objectives

Improvement in medium and long-range weather forecasting, offering considerable economic and social advantages (agriculture, building, transport, travel, etc.).

3. Advantage of cooperation

In order to establish longer range forecast than is possible at the present time, charts of increasing complexity must be used, which can only be solved numerically with the aid of high power computers. The interpretation of available observations using these charts would result in considerable progress being made.

The financing on a purely national level of the necessary data processing installations would prove impossible for the meteorological services of small Member States and, at the very least, problematical for the larger Member States.

Project 70

4. Methods of operation

The project includes the acquisition of a high power data processing installation as well as the setting up of an institute which would employ 25-50 research workers in the installation. Joint organization and operation as well as public financing would be essential to the successful completion of the project.

5. Cost and time scale

- Cost of investment (computer and building) : 10-12 million u.a.
- Running costs per year : 0.5 - 1 million u.a.
- Time required for putting the installation into service : 3 years
- Trial period before the establishment of systematic medium-term forecasts : 2-3 years

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Links with otehr projects: this project could with advantage be linked with that relating to satellites (No. 71) and automatic meteorological stations (Nos. 43 and 72).

Field: Meteorology

Project 71: EUROPEAN METEOROLOGICAL SATELLITES

1. Nature of project

Development of meteorological satellites, together with measuring instruments, scanning and telecommunication systems.

2. Objectives

Use of satellites for measuring and transmitting data of particular interest to European meteorological services, within the context of a network of meteorological satellites on a world scale.

3. Advantage of cooperation

By pooling the knowledge acquired in this field in Europe, it would be possible to develop European satellites under favourable cost conditions (possibly with American launchers as long as European rockets are not available).

4. Methods of operation

Development of satellites under the direction of ESRO, launching within the context of a world system (GARP, World Weather Watch). Some details remain to be studied.

Project 71

5. Cost and time scale

The cost depends on the type of satellite. This remains to be specified. A European satellite could be put into orbit in five years from now.

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification B.

Additional remarks: the project is an important one and details should therefore be specified quickly.

Links with other projects: possibility of improving meteorological forecasts, in connection with the planned computation and research centre (project 70).

Field: Meteorology

Project 72: DEVELOPMENT AND STANDARDIZATION OF
METEOROLOGICAL EQUIPMENT

1. Nature of project

Standardization and joint development of 11 types of meteorological equipment:

1. balloons;
2. radio-sondes;
3. ozone sondes;
4. automatic ground station;
5. devices for measuring changes in wind direction at ground level;
6. three-component wind measuring devices;
7. radiometric methods for determining radiation balance and for measuring temperature at a distance;
8. measuring devices and rockets for probing the atmosphere;
9. visibility measuring devices;
10. devices for measuring the cloud base;
11. devices for detecting and measuring precipitation by radar.

Purchase of standardized equipment.

Project 72

2. Objectives

Improvement of meteorological forecasts as a result of more precise, supplementary or new measures. Increase in air safety with regard to take-off and landing (in particular devices Nos. 5, 9 and 10 in paragraph 1).

3. Advantage of cooperation

Reduction of expenditure through

- the elimination of duplication by joint development;
- the purchase of standardized equipment.

4. Methods of operation

Execution in several stages:

- stage A: joint fixing of required characteristics;
- stage B: joint development of experimental models* in cases where these are not already in existence;
- stage C: development contracts with industry.

* In point 8, only the section on "measuring devices" has been taken into consideration. Work on self-destroying rockets comes entirely under the auspices of industry.

Project 72

5. Cost and time scale

The programmes of the meteorological services of the Member States already include estimates of expenditure, at least for some of the equipment mentioned. Considering that the objective of the proposed collaboration is to bring about savings (cf paragraph 3), no estimates of cost have been produced.

Time required: extremely variable from one item of equipment to another (1-2 years in the case of balloons, several years for technologically complex devices).

6. Participation of non-member countries

Desirable.

7. Classification, additional remarks and links with other projects

Classification A.

Links with other projects: the methods included in point 7 in paragraph 1 ("radiation balance and measuring of temperature at a distance") may be of interest for the "meteorological satellite project"(No. 71).
