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\*\* The Commission of the European Communities asked four leading Community scientists to prepare a report on THE PART WHICH THE JOINT RESEARCH CENTRE SHOULD PLAY IN THE DEVELOPMENT OF SCIENTIFIC RESEARCH WITHIN THE COMMUNITY (see "Research and Technology" No. 49).

The "Four Wise Men" have now submitted an interim report which the Commission has forwarded to the Council of Ministers of the Community, and which is briefly analysed in ANNEX 1.

\*\* A FUEL WHICH IS PRACTICALLY INEXHAUSTIBLE AND EVENLY DISTRIBUTED THROUGHOUT THE PLANET, so that its use would eliminate all supply problems. A GREAT REDUCTION IN ENVIRONMENTAL POLLUTION by comparison with other energy-generating plants, and hence the possibility of producing energy near the cities in which it is consumed. Together with the prospect of an appreciable lowering of the cost per kWh, these are the two main advantages of the future FUSION REACTORS, which are forming the subject of a sustained research effort in all the major countries of the world.

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Within the Community this effort has hitherto been completely coordinated by Euratom: practically all the laboratories of the Six countries participating in thermonuclear fusion research are working without useless and expensive duplication of effort and with a fruitful exchange of information and experience:  
COMMUNITY RESEARCH IN THE MATTER OF FUSION IS A GENUINELY INTEGRATED PROJECT (see "Research and Technology" No. 50).

In order to preserve the coordinated nature of this work, the Commission of the European Communities has now obtained the approval of its Scientific and Technical Committee for a proposal for a five-year programme of THERMONUCLEAR RESEARCH, which is to be forwarded to the Council of Ministers. This programme will integrate almost all Community research in this sector and is intended to coordinate a budget totalling about 170 million u.a. during the period 1971-75, one third (57 million) being borne by the Community and the remainder by the Member States.

A survey of the present situation in this sector of Community research and a brief analysis of the Commission's proposals are given in ANNEX 2.

\*\* In addition to a proposal for a multiannual thermonuclear research programme (see above), the Scientific and Technical Committee of the Commission of the European Communities has just approved a proposal for a five-year programme on BIOLOGY AND HEALTH PROTECTION, which is now to be forwarded to the Council of Ministers. This proposal envisages a total budget of 38.82 million u.a. for the period 1971-75 on a research programme covering the following fields:

- the study of radiation hazards (radiation protection):  
contamination of man and his environment, short-term, long-term and hereditary effects, and dosimetry;
- the development of nuclear techniques with a view to their application to agricultural and medical research.

- \*\* The Commission of the European Communities recently proposed to the Council of Ministers that it should be authorized to exempt certain categories from the BAN ON INDUSTRIAL AGREEMENTS, particularly those concerning research, development and the exploitation of the results of research. In the same way all the agreements relating to joint R&D would be exempt from preliminary notification.
- \*\* The Ispra, Karlsruhe and Petten establishments of the Joint Research Centre may ANALYSE MOON ROCK SAMPLES brought back by forthcoming Apollo missions. At NASA's request, the Commission of the European Communities has forwarded proposals for scientific investigations of this kind, including measurements of the heat conduction and diffusion constants, determination of the rare earths, noble gases and actinides, activation analysis and high-temperature mass spectrometry.
- \*\* The Commission of the European Communities has drawn up and is to forward to the Council of Ministers a PROPOSAL FOR A SUPPLEMENTARY RESEARCH PROGRAMME FOR THE FINANCIAL YEAR 1970 totalling 1.95 million u.a. and directed mainly to the following aims:
- (a) to permit the full utilization of the installations of the Joint Research Centre by:
- commissioning a new multiple experimental loop ("MK5"), to be installed in the Essor test reactor of the Ispra establishment of the Joint Research Centre;
  - making better use of the facilities in the BR-2 reactor at Mol for the irradiation of high-temperature gas reactor fuels;
  - studying means of improving the Linac accelerator at the Central Bureau for Nuclear Measurements at Geel;

(b) to undertake the preliminary work on the construction of the SORA pulsed fast reactor: the first study of this design, which was a product of the Ispra establishment, goes back to 1965 and must be brought up to date with a view to a decision on construction, which it is hoped will be made quickly, if only in order not to deprive the Community of the lead which it enjoys in the design of this type of equipment for the study of matter. A reactor of this type is already under construction at the Institute of Physics at Dubna in the USSR.

\*\* The Commission of the European Communities is organizing a colloquium of NATURAL URANIUM PRODUCERS IN THE COMMUNITY on 18 and 19 June at the Ispra establishment of the Joint Research Centre.

\*\* An INFORMATION DESK to answer enquiries about the European Communities, and in particular the POTENTIAL OF THE JOINT RESEARCH CENTRE, will be set up in the grounds of the ACHEMA exhibition, to be held in Frankfurt, Germany from 17 to 24 June.

\*\* A scientific colloquium on physiopathology and the clinical treatment of CHRONIC RESPIRATORY DISORDERS, attended by about 100 experts, was held by the Commission of the European Communities at Wiesbaden, Germany, on 2-4 June.

ANNEX 1

FUTURE ROLE OF THE JOINT RESEARCH CENTRE IN DEVELOPING  
SCIENTIFIC RESEARCH IN THE COMMUNITY

(From a report by four leading scientists H. Casimir,  
P. Ailleret, H. Maier-Leibnitz and G. Ruffolo)

The Commission of the European Communities had asked four leading Community scientists to prepare a report on the part which the Joint Research Centre should henceforth play in developing scientific research in the Community (see "Research and Technology" No. 49). These "Four Wise Men" have now submitted an interim report which the Commission at once forwarded to the Community Council of Ministers.

In their report the experts propose some general guidelines and give their views on certain specific matters, including some of the large facilities installed or planned at the Joint Research Centre.

1. In general

- (a) The Joint Research Centre's efforts must be firmly concentrated on tasks which there are serious grounds for carrying out jointly rather than separately (e.g., materials studies, activities in the safety and anti-pollution field, public service activities, etc.).
- (b) Naturally, a certain proportion of fundamental research must be added to these aims, in order to maintain and enhance the Joint Centre's scientific level.
- (c) The Joint Research Centre should not undertake large-scale industrial projects (e.g., the construction of a high power fast reactor); on the other hand, its theoretical knowledge, its experience and its own research in certain fields should be used to back up such activities in the Community.
- (d) The JRC should be even more active in arranging contacts with the national bodies in the principal research sectors, so that common opinions can emerge, to be followed by common policies.

- (d) The JRC should be allowed greater flexibility in the matter of programmes and budgets; in particular, a "free research" appropriation should be made available at each of the JRC establishments, to enable them to verify the value of a new idea before publicizing it.
- (e) Lastly, all thoughts of concentrating the four Joint Centre establishments at a single geographical site should be abandoned.

2. More specifically

- (a) The building and joint operation of the SORA high-flux pulsed reactor at Ispra would be a good thing in that it would once more give Ispra a major goal, and one likely to promote contact with the other research centres and the universities. The arguments for a decision on the construction of this reactor should therefore be marshalled as a matter of urgency, before time destroys the value of this project.
- (b) No time should be lost in exploiting the possibilities of adapting the Ispra Eссор reactor to other uses than fuel testing for heavy water reactors.
- (c) A "Materials Research Institute" should be set up at the Joint Centre: the means are available, whereas they are generally lacking elsewhere in Europe, and an Institute of this kind would render a service to industry;
- (d) One of the most urgent needs among the public service activities is Community-wide coordination of the activities concerning pollution and nuisances. In particular the general studies, which are absolutely necessary to identify the various forms of pollution and to measure their noxiousness objectively, would gain enormously by being conducted on a Community scale, as would the study on the efficacy and cost of the possible remedies.
- (e) The decision to undertake work for outside customers in the Joint Centre must be taken without delay, on the provisional basis of the marginal cost of the work.
- (f) The Ispra computer centre, indispensable to the Joint Centre establishments, ought to be free to study certain questions which are likely to add to its scientific competence. Its role in promoting the general development of data-processing should be carefully examined.

ANNEX 2

Thermonuclear Fusion in the Community:

A Fully Integrated Research Effort

Aimed at Exploiting a Practically Inexhaustible Fuel Supply

The main aim of the research into thermonuclear fusion now being conducted in the world is the production of electrical energy at competitive prices by using the fusion reactions between light atomic nuclei (essentially nuclei of deuterium or a mixture of deuterium and tritium).

Advantages of a fusion reactor

However, if sufficient fusion reactions are to occur and the electricity derived is to exceed the energy input and the energy lost through radiation, the fuel has to be raised to enormous temperatures (of the order of 100 million degrees Kelvin), at which it becomes an ionized gas, or plasma, which is very difficult to confine. The use of solid walls is ruled out owing to the temperatures attained and reliance has to be placed on magnetic or, more commonly, electromagnetic fields, which are difficult to work with. The physics and technological problems posed by the construction of a fusion reactor are still far from solved: the generation, heating and confinement of the plasma for a sufficient time are the subject of intense research, urged on by the benefits expected from this source of energy, namely:

- (a) no fuel supply problems, because there are sufficient quantities of deuterium in water everywhere and tritium is produced within the reactor itself, plus a breeder effect, which gives a considerably shorter fuel doubling time than is the case with fission breeder reactors;
- (b) the absence of any serious nuclear accident hazard for the environment because the quantity of fuel in a fusion reactor is limited and continually renewed;
- (c) much lower radioactive pollution hazards than with fission reactors, since fusion reactors do not produce any long-lived radioactive waste;

(d) a probable reduction in the cost per kWh produced.

The Community: in a sound position

In 1959 the breakdown of efforts in the fusion field was as follows: Community 7.5%; United Kingdom 8%; USA 36%; USSR 40%. Today the Community's effort, although still slightly smaller than the USA's, accounts for about 20% of the world total. This is because the Commission, by means of a number of contracts of association with the various national laboratories working in this field has been able to foster the research, ensure the necessary coordination of the work and allocate tasks in such a way as to preclude costly and unnecessary duplication.

After an initial phase of basic research, the laboratories are now entering a new stage of applied research requiring the construction of machines of increasing size and cost. Many avenues of research are possible and it is important that their exploration should be allocated to the various laboratories so as to avoid fragmentation of effort. This gives even greater importance to the Commission's coordinating role, but coordination alone is no longer enough to ensure that the Community is competitive in such a promising field: research must gradually prepare industry to play its part and gain a footing in the market.

Commission proposes an integrated research programme

With this in view the European Commission is submitting to the Council of Ministers a proposal for a five-year programme of fusion and plasma physics research which would integrate virtually the whole of the research conducted in the Community in this field and aims at coordinating all the funds to be earmarked for it.

The programme was framed jointly by the Commission and the Member States' laboratories. It covers five major areas:

- (a) research into general fundamental physics and theoretical work;
- (b) research into closed configurations, particularly using various types of machine (Stellarator, Tokomak, screw pinch, etc.);



- (c) research into open configurations (magnetic mirrors);
- (d) research into very-high-density plasmas (with very short confinement times);
- (e) research of a technological nature.

A total of some 170 million u.a. (1 u.a. = US \$1) would be spent in the Community in the period 1971-75. The Commission is asking for roughly a third of this sum (57 million) to be spent by the Community, to enable it to coordinate the work, the remainder being financed directly by the Member States' laboratories.