

'Euratom's Joint Research Centre is working on plans for a new electricity-generating reactor' from Le Monde (23 December 1961)

Caption: On 23 December 1961, the French daily newspaper Le Monde focuses on the nuclear projects under way at the Joint Research Centre (JRC) in Ispra, Italy.

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At Ispra, on Lake Maggiore

Euratom's Joint Research Centre is working on plans for a new electricity-generating reactor

Ispra, 22 December. – **Nuclear power stations are very similar to each other. Accordingly, the installations which can be seen on a visit to Ispra are the same as everywhere and nowhere else: laboratories and administrative buildings scattered over an enormous wooded terrain, a small reactor (of American origin) set in the centre of a large hall, the obligatory swimming pool reactor which is never in service; finally, the inevitable foundations which are always shown with pride, because it is there that in two, three or four years equipment from which miracles are expected will be set up ... It is only the imposing architecture of the premises where the electronic calculators are housed that gives us the idea that this Centre is located in Italy.**

From our special envoy Nicolas Vichney

What is more, if the December mist had cleared, Lake Maggiore could have been seen to be very close by.

However, Italian no longer rules in Ispra. It is a Tower of Babel: French tends to be the main language – it is described as the ‘vehicular language’ – but German and Dutch are also spoken and, when two continentals do not understand one another, English. This is because Ispra, yesterday a simple collection of laboratories belonging to the *Comitato Nazionale per le Ricerche Nucleari* (National Nuclear Research Committee), has been promoted to the level of Joint Research Centre for the six Member States of the European Atomic Community. An agreement concluded in July 1959 between the Italian Government and Euratom gave Euratom the key to the installations; today, only three laboratories still belong to the CNRN, and, in February 1969, Euratom will be the sole master of the premises. What will it do there?

Physicists from five countries

Firstly, it will carry out there an experiment which even now promises to culminate in encouraging conclusions: joint research projects will be undertaken in three laboratories – in Mol, Belgium, in Petten, Holland and in Karlsruhe, Germany – but Ispra will be the first Centre in the world where one thousand five hundred specialists of five different nationalities will be called upon to cooperate closely with one another.

The Centre's Director, Mr Ritter, who was previously Director of the Nuclear Research Institute in Karlsruhe, and his colleagues who are already on board agree that, for the time being – although the full staff complement has not yet been attained – the diversity of origins is not an impediment: ‘Were it not for the language difference, which we eventually get used to, we would not notice’, stressed Mr Ritter, ‘that our physicists and technicians come from different countries.’ But nobody would admit that this diversity was enriching: it therefore will be neither an obstacle nor an advantage.

This observation also goes for the Centre's equipment, which will clearly have to be selected on the basis of tender issues to manufacturers in the Community's Member States. In theory, this obligation should enable the installations to use the cheapest state-of-the-art equipment, but questions of standardisation have been raised, in addition to the difficulty of issuing invitations to tender in several countries simultaneously.

Finally, in relation to the central administration of Euratom, the Centre has limited autonomy. People in Ispra have, therefore, become impatient with the embarrassing nature of a system which, from the point of view of Brussels, appears indispensable for compliance with the principles upon which the Community is founded and for the coordination of contributions which have been allocated among several countries.

Of course, neither workers nor equipment would have any reason to exist had not a study programme been offered to the Centre, and Euratom has already undertaken to complete the study of a new ‘reactor line’, – the Orgel line (organic heavy water) – which may result in a new type of electricity-generating reactor being devised. Concentrating all their efforts on one well-defined topic was doubtless indispensable in order to

ensure the cohesion of a very mixed group. But simply getting together all the men and machinery required to carry out this task would not have been enough to give the Centre this 'critical' size without which a research body cannot produce results. Accordingly, several other studies will be undertaken which will largely exceed the boundaries of the Orgel project. For example, the Centre for the processing of scientific information has been set up at Ispra, whose powerful analogue and digital calculators will allow 'advanced' studies. Will fundamental physics projects also be carried out there? It is said that a physicist who recently received the Nobel Prize is thinking about coming to work there, and that would give the Centre a lot of prestige. But it seems that the French have not looked benevolently on the undertaking.

It remains true that the Orgel project is the first large-scale enterprise which Euratom has undertaken on its own initiative. Completed at the first research centre financed by all the Member States, it duly deserves to be called 'European', but this characteristic is singularly reinforced, it seems, by the considerations which presided at its inception. The main thrust of Euratom's directors was actually to open up a new route which would enable nuclear energy to generate electricity under competitive conditions. In order to achieve this, taking over projects already under way in the Member States had to be avoided; instead, efforts had to be concentrated on studies which had hitherto been ignored.

What the Orgel reactor will be

The only possible fuel was natural uranium. In Europe, there are no installations that enable enriched uranium to be produced for civil purposes. It was, therefore, necessary to use it in its carbide form: uranium-molybdenum alloys are the subject of advanced studies in France, and a study contract has already been signed between Euratom and Canada for the study of oxides of uranium. For the moderator, it was impossible to use graphite, with which the French and the English were already very familiar: there only remained heavy water. As a refrigerant neither carbonic gas – also the subject of advanced studies in France and in Great Britain – nor heavy water – the use of which is familiar to the Canadians – or even a solution that is still new, pulverised heavy water, entered into the equation because a research contract in this area has been signed as part of the agreement concluded between Euratom and the United States. It was therefore necessary to turn to organic substances ... Only the last of the fundamental characteristics had not been entirely determined: the choice of metal from which the casings surrounding the fuel were to be made; certainly, zirconium, magnesium and beryllium, already well known and much studied, were to be proscribed, but the senior staff in the metallurgy service were able to choose aluminium rather than stainless steel, and even to innovate by deciding to use it in a sintered form.

Can such a reactor, using natural uranium, heavy water and organic substances, defined not so much by what would be desirable than on the basis of what was possible to undertake, produce results? The calculations are very encouraging, but we still do not know if the polyphosphes which are intended to be used will be able to resist irradiation, and whether it will, in fact, be possible to make do with natural uranium.

That is to say that it is impossible to begin immediately with the construction of the reactor. Long and intricate preliminary studies are necessary in order to perfect each of the new devices. Many teams are already working on this, in particular the metallurgists under the supervision of Mr Moranville who, unable to find premises at Ispra, has had to find provisional quarters 60 kilometres away from the Centre, in Sallugia.

To want to demand a reactor at once would, furthermore, have been contrary to the philosophy of the enterprise.

Two 'critical' experiments

The objective that Euratom is pursuing is not so much to give Europe another reactor than to provide the European institutions or European companies interested in electricity generation with technical specifications which will enable them to exploit this new 'family' without incurring research costs and to guarantee the technical and economic value of the procedure.

Accordingly, the first task of the Ispra specialists will be to construct, under the direction of a Frenchman, Mr Leny, a 'critical' assembly that will, by varying the configuration of the fuel elements, allow the best cooling device to be selected: this will be the Eco reactor (Orgel Critical Experiment), already under construction. Eco will in theory be succeeded by a second 'preparatory' reactor Essor, which will entail an exact reproduction of one of the ducts with which reactors of the Orgel type should be equipped and will constitute, as such, a sort of prototype. If the decision to build it has been taken, as is hoped in Ispra, by next autumn, Essor could come on stream in 1965. Two and a half years of testing will then be necessary in order to test this duct. Will the conclusion then be reached that it is possible to go ahead, and will the construction of a full-size Orgel reactor then be undertaken? The new 'family', together with the other types of reactors would then be at the competitive stage which should, in the opinion of all the specialists, be reached around 1970.

Will all these tasks be carried through to a successful conclusion? The specialists, as is only natural, have faith in their ability and believe in the value of the project. The hypothesis that the project might be abandoned does not discourage them: even if it were not completed, they say, the Orgel project will have served to train a team which might be used on other projects. But, however capable they are of mastering technical issues, they sometimes stumble over political problems: seeing the institution for which they have been working being constantly disparaged, some of them – the best ones – might begin to feel disheartened.