

UMBERTO COLOMBO (*)

Introductory Remarks(**)

I should like to welcome you all, and particularly those of you who come from abroad, on behalf of both the European Communities and ENEA.

Prof. Paolo Fasella, the Director General for Research and Development of the Commission of the European Communities, was scheduled to be here for the opening session, and in fact he was in Rome yesterday, but was obliged to fly back to Brussels last night because of an urgent task. He asked me, in my position of Chairman of the Committee for the European Development of Science and Technology, to greet you all on his behalf. The Communities are engaged in an extensive research and development programme, a major component of which is a set of Research Action Programmes aiming at the protection of the environment, the management of resources, the improvement of agricultural practice through science and technology, the fight against desertification. Obviously, these activities are extremely relevant for the developing countries, and there is a link therefore between these research programmes and the policy of cooperation with the developing countries followed by the Communities.

You may ask yourselves why amongst the sponsors of this meeting there is ENEA, the Italian National Agency for Nuclear and Alternative Energy Sources. The subject matter of this meeting seems to be rather remote from nuclear and alternative energies. It is not so, however. Since the 1950s, when the Agency was created, first as a branch of the National Research Council, then as an independent body, a scientific activity in agricultural research was started.

The idea was to investigate the effects of radiation on agricultural products, and the possibility of using ionizing radiations to provoke genetic mutations eventually leading to crop improvements. Rather than starting this activity on

(*) Fellow of the Academy; Chairman of ENEA, Rome, Italy.

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purely empirical bases, it was very wise that the scientists who supervised this area in our Agency decided to set up a laboratory devoted to basic agricultural genetics, and other areas of rather fundamental research. Radiations were considered as one of the several factors that could induce genetic mutations, but they were not the only area of research. Through the years, our Agency has developed in its agricultural laboratories a set of new varieties of crops, and of hybrid varieties, which enjoyed a great success in the Italian market and abroad. The Cresò variety of durum wheat, for example, covers now about one third of the Italian market.

In addition, the use of atomic radiations to sterilize insects and thus fight their propagation through diffusion of sterilized males in the atmosphere, was vigorously pursued by our agricultural research experts.

A few years ago the scope of the Agency, which at the beginning was only nuclear, was extended to new and renewable energy sources, to energy conservation and to research on the environment. This led us to extend the area of our interests in the agricultural sector.

Because agrochemical fertilizers and pesticides are energy-intensive products, and have severe environmental effects, it was natural to study ways and means to reduce their consumption by the introduction of alternative technologies and practices. Obviously, biotechnologies are at the centre of the stage here.

A better understanding of the mechanisms of fertilization may lead to the progressive elimination of nitrogen fertilizers, if the nitrogen-fixing genes could be cloned in the chromosomes of useful agricultural crops or if it were possible to realize conditions of symbiosis of a nitrogen-fixing bacterium such as *rhizobium*, at the roots of, let us say, wheat, corn or rice.

But a deeper understanding of the mechanisms of fertilization might also lead to the reduction in the use of potassium and phosphate fertilizers, as well as to appreciating the function of critical oligoelements in the plant life.

All of us know how much agricultural production owes to pesticides. Our Chairman, Prof. Marini-Bettòlo, is going to touch on this subject in his address and will mention the ill effects of chemical pesticides. We at ENEA are quite conscious of this problem area, and are investigating integrated pest control technologies, based on a combination of chemical and biological agents.

These are problems that concern all the world, including the North. But they are particularly grave in the developing countries, where agricultural as well as environmental protection infrastructures have not been adequately developed, where the need for increased agricultural production is more acute owing to population pressure, and where climatic conditions make agriculture more exposed to the danger of pests.

Here I wish to call attention to the primary importance of agricultural extension services, which are the indispensable link between the research laboratories and the farmer, who is the final user of research.

Well, I realize that my words of welcome, aiming at illustrating briefly why the European Communities and ENEA are interested in the subject matter of this meeting, must not become the pretext for a speech. I therefore would like to close by wishing all of you a happy stay in Rome, and a happy return home after what promises to be a most interesting and productive meeting.

Scientific Research and the Challenge of Technology in the Tropics

The first point in this speech is to set out the main lines of scientific research in the tropics. It is not the intention here to discuss the subject in detail, but to give an overview of the state of the art of a scientific research of technology in the tropics and to show the need for a scientific research of technology in the tropics.

The second point is to show that the scientific research of technology in the tropics is not only a scientific research of technology in the tropics, but also a scientific research of technology in the tropics.

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