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for development

An essay on the origin
and organization of national
science policies

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with the collaboration of
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and Jacques Wautrequin

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Preface

A major objective of the Unesco science policy programme is to promote more active intellectual co-operation among decision-makers and specialists concerned with the symbiosis science-government, for what hangs upon this symbiosis, in the world of today, is not merely social and economic progress, but indeed the very security of nations. This Unesco programme also seeks to help Member States, at their request, to set in motion and to promote throughout the national economy a process of endogenous development, innovative in character, based on the application of modern science and technology.

In this essay—written by a team of specialists under the direction of Jacques Spaey, Secretary General of the Prime Minister's Department for the programming of science policy in Belgium—the authors analyse the currents of thought and action which characterize national science policies among the European States, and outline many of the pressing problems currently facing those responsible for governmental development policies based on science. The essay was published in its original French version in 1969.

The opinions expressed by the authors commit no one but themselves. Unesco feels that the world-wide dimension which the authors have given to their argument, and the positive form in which they advance it, will earn them attentive readers among all those working for the cause of co-operation between the nations.

Dr. Jacques Spaey, leader of the team of authors responsible for the present publication, died shortly before the appearance of this English edition.

Throughout the international community, Dr. Spaey was held in high esteem for the skill and imagination with which he sought to harness science and technology to man's well-being, and for his constant efforts to further the principles of co-operation between the nations.

The Secretariat of Unesco pays tribute to his memory.

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Introduction

This essay is, in the full sense of the word, the work of a team. It was conceived and carried out by a group of which the authors are the spokesmen but not the only artisans. Each member of the team has, on his own account, devised, nurtured and sustained the flow of ideas which has led the team to a common approach.

Together they have overcome the obstacles which their activity encountered, for every effort towards progress necessarily entails change or new orientations of existing institutions or accepted ideas. Participation in the shaping of the authors' views has extended to different circles interested in the promotion of science and technology. Their advice and their criticism have given scope for a confrontation of current ideas with the realities of today and tomorrow.

Furthermore, the studies which lie at the basis of this essay have been debated on the international plane. The exchange of views carried out in international organizations, more particularly in Unesco and OECD, on the science policy of governments, has made it possible to apprehend many ways in which science and technology contribute to the development of human society. Such confrontations of experience and ideas, originating in different countries, have made it possible to generalize some of the conclusions and to identify methods applicable in a large number of countries.

A firm hope of progress, and the will to overcome the present constraints on development, have inspired our activity as much as our thinking. Thus our initial assumption was that science, while drawing its inspiration from men's curiosity, has become at the same time an essential factor in development and progress.

In countries where the promotion of science remains but marginal to economic and social development policies, the rhythm and quality of progress suffers, just as its dissemination does, from serious delays. Conversely, in the highly developed nations, it is the systematic application of scientific knowledge which has spurred on technological innovation, with its far-reaching consequences for economic and social progress. The fact that the systematic use of science has often been concentrated on military or political objectives

should not lead us to underestimate its potentialities for application to peaceful ends.

A number of observations highlighted in this essay suggest that the incursion of science and technology into all human activities imparts new dimensions and higher rates of occurrence to the problems raised by the development of societies. It will soon be possible to test this hypothesis, since many countries are embarking on a process of systematic organization of their scientific and technological activities. Experience thus gained will allow for adjustments to be made in the interpretations and approaches which are proposed in this essay.

Our purpose has been to stress the above-mentioned observations and, if one prefers to look at it in another way, to support the underlying working hypothesis. In the final reckoning the essay deals with a theory of *development based on science,* whose conditions and limits we shall delineate as they appear today.

Thus we hope to make a contribution to some essential aspects of 'science policy' and to provide those who assume the responsibility for it in their respective countries with arguments and methods for undertaking vigorous action in this field, where the progress of each nation depends on the comparison of experiences and the co-operation of all.

As we have said, this essay is the work of a team; it is therefore difficult to give a name to each individual contribution. However, it must be emphasized that Professor J. Ladrière has brought us an original contribution on the meaning of scientific and technological change in the thought and organization of contemporary society. Mr. J. Defay has devoted himself more particularly to defining the place of scientific activities in the economic and social context and, at the same time, to the part played by science in development. Mr. A. Stenmans has applied himself to the definition of the functions of scientific policy on the political and administrative plane. Mr. J. Wautrequin has described the birth and evolution of the organized planning of science policy in different countries, the machinery for promoting research, and the problems of scientific co-operation in the international field.

Finally our thanks go to those who, without having shared directly in the drafting of the different chapters of this work, have contributed to it in various ways. Mr. J. De Meulder and Mr. J. Sommeryns have made a summary of the survey techniques and budgetary analysis which are at the basis of a science policy. Miss G. Dehoux, who is in control of administration, has co-ordinated the groundwork which made this publication possible.

The plan of this essay has been conceived in such a way as to give to the reader an alternation between concrete and theoretical information, which allows him to become progressively familiar with a somewhat abstruse subject.

First part. The first chapter summarizes the objectives that are usually associated with a national policy of economic and social development. It enlarges a little on economic growth, which clearly occupies a central place in the objectives of such a policy. However, it gives these concerns their proper place among the more general purposes which form the aims of

civilization. The second chapter deals with scientific and technological change, and the demands of rationality and logic which are its distinguishing features. It describes the scientific mutation of societies as a voluntary action of a new kind, in which man sets the final goals of his activities.

Second part. The third chapter describes the actual state of affairs which constitutes the given data and therefore defines the point of departure of government action. National situations are infinitely variable. An attempt at classification has therefore been made with the object of identifying them according to the state of development already reached by the nation at the moment when the programme of development based on science is conceived, decided upon and put into operation.

We are fully conscious of the arbitrary nature of any kind of classification, and our only aim in this chapter has been to propose a method of analysis of a country's situation. The results of such an analysis allow the identification and subsequent choice of certain objectives of national development.

In the fourth chapter we come into contact with certain realities of scale. By enabling us to appreciate the extent of the size and scope of the scientific revolution in the world of today, they reveal the imbalances which must be faced if the world's evolution is not to take a disruptive course. At the same time they show the range of the key parameters and variables of which the specialist in scientific programming must take account and avail himself.

The fifth chapter summarizes the methods and organizations of the past for the promotion of research, and shows how today's science policies have gradually taken shape and substance. This historical survey ends the examination of the essential facts which must be taken account of in the formulation of a development policy based on science.

Third part. The sixth chapter gives science policy its place as part of governmental policy, while the seventh chapter attempts a definition of its functions and machinery.

Lastly, the eighth chapter deals with scientific and technical co-operation between the nations.

Jacques Spaey

Part one

The role and dynamics of science in contemporary society