

INTRODUCTION

A previous issue of this journal (*Dimensions of Rationality*, *Philosophica*, 14, 1974) concerned some problems in defining the concept of 'rationality' and discussed the question whether or not different (compatible or mutually) exclusive forms of rationality could be distinguished, e.g. ethical and practical rationality as distinct from cognitive rationality.

Most contributors to that issue approached the problem of rationality from the viewpoint of its relation to modern scientific thinking, or at least to some part or aspect of it. Is 'rational' synonymous with 'scientific' or does science only constitute one specific form of rationality? Or should it be held that the criteria for rationality are so vague, arbitrary or undefinable that even scientific thinking cannot otherwise be predicated as 'rational' than in a merely stipulative and hence tautological way? Or, still worse, might it not even be assumed — as is done by members of the School of Frankfurt and by 'critical theorists' — that present-day science is fundamentally 'irrational' because of its implicit or explicit practical orientations and applications?

As to the answers to these questions, the group of the Ghent University Philosophy Department that was concerned with this problem appeared to be deeply divided. After many discussions of the revealed disagreement the editor of the present issue got the strong impression that several points of disagreement were fundamental in nature and that they were based on differences in the basic evaluative convictions about modern scientific thinking and research. The main differences in definition and in appreciation of 'rationality' appeared to be linked with — and probably causally determined by — differences in normative evaluation of modern science or some parts or aspects of it. They pertain to questions about the rational as well as the ethico-political justifiability of all or of specific kinds of scientific thinking, research and applications, as they are actually practiced or as they are ideally conceived of.

Thus, the idea was suggested that we ought to render explicit our

basic convictions about the justification or justifiability of modern science (in its actual practice or in the ideal form in which we conceive of it). How do we conceive of science, of different types and aspects of modern scientific thinking and scientific research? How do we evaluate or appreciate it? And why do we conceive of it and appreciate it in the way we do? Do we have convincing arguments for validating our conception and appreciation apart from merely subjective and contingent preferences and professional preoccupations?

This means that the present issue has to be considered as a continuation and as a further elaboration of the topics and problems that were discussed in our previous issue on 'Rationality'. We hope that our own insight in and critical evaluation of our basic beliefs concerning science on the one hand and of our conceptions of rationality on the other hand will be furthered by rendering more explicit their interrelations and their mutual dependency.

For the reader this may be stimulating material for his own reflection on these matters.

Apart from these considerations, the choice of the topic of this issue has also been motivated by the wish of the contributors to cope honestly with the challenge which is nowadays burdened on scientists and philosophers of science by the increasing number and intensity of criticisms and attacks against modern science and its theoretical representatives.

The first contribution, written by Diderik BATENS, is an attempt by a logician and philosopher of science to defend the methods and procedures of modern science against the political, ideological and ethical attacks to which scientific thinking and scientific methodology have recently been exposed.

He starts his article "Some remarks on the relations between science and values" by an analysis of the different aspects in which science and technology can be said to be value-laden. Notwithstanding this value-ladenness, he defends scientific thinking and research against the recent antiscientific attacks as an indispensable instrument of rationality. He argues that scientific methodology is at the moment the best available one, if reliable knowledge is required, and he defines reliable knowledge as that knowledge which warrants usefulness for the understanding of reality and for application in human action. Because of this usefulness the reliance on the present scientific knowledge and the present practice of scientific thinking and research should provisionally be considered as rational.

He refutes the Marxist and Marcusean view that exact and positive

scientific research (especially in the human and social sciences) is intrinsically tied up with a conservative outlook on and reinforcement of the existing state of affairs in society, and he rejects a direct ideological control over descriptive scientific statements.

Marcuse's criticism of the empiristic, behavioristic and operationalistic requirements concerning methodology and concept definition, viz. requirements concerning exactness, quantification and measurability, is discussed at some length. Batens recognizes that the scientific translation of prescientific (everyday, ideological, metaphysical) problems leads automatically and inevitably to narrowing and partial problem formulations that may be felt as mutilations of the richness and complexity of the initial problems. But he argues that this disadvantage of scientific thinking and research may only be overcome by supplementary procedures that are perfectly consistent with the requirements of exact scientific thinking.

He concludes that we need indeed try to "improve" the present scientific knowledge and the present scientific methodology, but holds that this can only be done by relying, as far as factual knowledge is concerned, on the present scientific knowledge and methodology.

From an ethical point of view we can and should object to scientific theories and research that certainly or probably will be used for reprehensible ends, given the existing political, social and economic system.

On the other hand, he tries to demonstrate that the requirement of an ideological justification for concrete research projects would lead to the rejection of any research project and would indirectly interfere with one's possibilities to realize the ends that are contained in one's ideology. All we can do is engage ourselves in extra-scientific activities that further our ethical and political ideals and that possibly can create new situations in which a more positive use of scientific findings will be made.

Meanwhile, philosophers should promote logical and methodological meta-sciences, in order to get instruments for a critical evaluation of the justification-systems of the existing political and socio-economic order and of our own ideologies.

Karel BOULLART, metaphysician and historian of philosophy, appears less prone to defend modern scientific thinking and research as main representative and guarantee of (provisional) rationality. I do not think that he would contradict Batens's argument that scientific methodology is at the moment the best available basis for rationality in our understanding of the world and in the organization of our

actions but he analyses the problem of the justifiability of modern science from the viewpoint of its actual practice in the context of existing political and socioeconomic systems.

In this perspective he answers our question about the justifiability of present-day science in a clearly negative and pessimistic way. Modern science lost its reliance on the regulating values of objectivity, intellectual autonomy and human progress. Since the industrial revolution, science became so closely tied up with technology that it is almost exclusively directed towards supplying technologically applicable knowledge as an indispensable tool for efficient economic, social and political action.

Vested interest groups and established political decision makers dispose of this knowledge and determine its use to such a degree that it becomes restricted to one-sided, functional, technological knowledge without any reference to the values of objective truth or human well-being and progress. Scientists became intellectual workers in the service of organisations and interests, over which they have no control and which use scientific results for their own ends. These ends often conflict with the subjective intentions of the scientists which produced the results, as well as with acknowledged humanitarian interests of mankind.

On the other hand, politicians use science almost exclusively as a welcome instrument for ideological justification of their practices and for rendering these practices more efficient. As a consequence, science becomes limited to theories and research-projects that are apt to serve those purposes. It risks to develop into a mutilated, uncritical pseudoscience which destroys not only itself but which in the long run might as well be destructive for the political system and the political practices which are built upon it.

According to the author, the only way out of this self-destructive heteronomy of science would be a shift in the moral consciousness of scientists and politicians. Without such a shift, an ethical justification for present-day science cannot be given. However, the author expresses his fundamental pessimism as to the real chances of such an ethical reorientation, given the existing political and socioeconomic circumstances.

The contribution of Armand PHALET, logician, starts from a quite different angle of reflection. He doesn't discuss the problem of the rational or ethical justifiability of the modern sciences as they are practiced. Nor does he treat the question whether present scientific methodology is to be considered as the only or at least as the pre-eminent basis and instrument of theoretical and practical rationality, as is done in the contribution of Batens. The question he

tries to answer can be formulated as follows. Under which circumstances would scientific thinking be justifiable? This formulation of the problem implies implicitly that a great deal of actual scientific thinking is not justifiable, and shows that the author wants to put the question as concerning an ideal type of scientific thinking. Which is this ideal type? And why should it deserve the qualification "justified" or "justifiable"? The author argues that the justification of science necessarily refers to the concept of rationality.

A rational justification is characterised by the fact that it constitutes an explication and that it eliminates all arbitrariness. The arbitrariness of a procedure entails its irrationality. Hence, rationality requires the demonstration that a proposed explication is unique.

In view of this unicity requirement, rationality itself should be justified in a rational way. If the foundation of rationality proceeds on the basis of some (set of) values, or if such an (unjustified) value is incorporated in rationality, then rationality would become, at least in part, arbitrary, and hence unjustifiable and irrational. Hence, rationality itself is the only constant value that should be taken into account in a rational justification. A rational justification is only then a justified justification, if it is possible to show, by means of a unique explication, the unicity of rationality in its reflexivity.

With respect to certain problems rationality is unable to lead to a unique solution. Freedom then is constituted by the fact that the choice made in such cases is justified on the basis of a unique explication of this indeterminateness. The concept of freedom is acknowledged as the fundamental realisation of rationality. These theses are argued for by means of the results of formal logic, metamathematics, and the general theory of systems. The author defends the fundamental relevance of these results for the problem of rationality. In their mathematical formulation, the problems concerning rationality are intimately connected with the problems regarding potential and actual infinity.

In Phalet's approach the concept of 'justification' pertains thus to a kind of logical or abstract-theoretical procedure consisting in the demonstration that a specific mode of scientific thinking produces a unique explication and solution of a problem or of a set of problems. The mode of thinking which demonstrably fulfills this requirement is *justified* because demonstrable unique explication is the essence of rationality, and rationality is – according to the author – justified in itself. Rationality is the mode of thinking which produces its own justification.

The careful reader will have noticed that this conception of

self-justifying rationality as justification of modern science (or at least of the better part of it) is precisely the conception which is attacked and rejected by many recent criticisms on science and scientific thinking. Pragmatists, marxists, 'critical theorists' (Marcuse, School of Francfort) and some representatives of phenomenology and transcendentalist philosophy object against the idea of a specific mode of scientific thinking as the only and the self-justifying form of rationality.

Especially the idea that a mode of thinking could be sufficiently justified and validated by pointing to its own, intrinsic cognitive (conceptual, epistemological, methodological, theoretical) characteristics and to characteristics of its cognitive results (e.g. logical consistency, verifiability, falsifiability, uniqueness of explanation or explication, etc.) has severely been criticized from ideological, political and ethical points of view. Scientific thinking as one mode of cognitive rationality — or as its only mode —, it is said, cannot possibly justify itself, because it is only one component of a complex structure of human actions, and it cannot be justified without reference to the other action components with which it is structurally linked. Within this structure scientific thinking and research are connected with technological applications and with economic, social, political and ideological practices, preferences, values and ends.

Consequently, a justification of science and scientific rationality cannot be given in isolation from a justification of those applications, preferences, values and ends. Scientific rationality needs an ethico-political justification as well as an epistemological and methodological one, if it is to be really justified.

Some aspects of this problem are discussed at some length in the contributions of F. Verbruggen and myself.

Freddy VERBRUGGEN, social philosopher and historian of science, discusses the criticisms of Marcuse and Habermas on the rationality concept that modern science and technology implicitly contain. He points to some parallels or analogies between these criticisms on the one hand and the critique of 'bourgeois' culture by the belgian ethical-socialist Hendrik De Man and by some representatives of marxist anti-psychiatry on the other hand. He treats those critiques of bourgeois culture and of modern science as philosophically divergent expressions of one and the same basic ethical motive, viz. a thorough moral indignation and a revolt against science and technology because of their applications.

The indignation and revolt are clearly products of western bourgeois culture itself. The critics are basically motivated by values,

ideals and aspirations which generated in them out of the internalization of a morality which has for centuries been deeply imbedded in western cultural and moral tradition, and which they mobilize intellectually against the civil society which nowadays is disavowing its own proclaimed justification.

The author agrees with the counter-criticism that these critics of science and technology express themselves in a philosophically vague and abstruse manner and that they fail to offer a workable alternative, but he considers their indignation and revolt as basically justified from an ethical point of view. He shares their discomfort with the evolution of modern science and technology. He is aware, however, that the only remedy for this situation would consist in the elaboration of a rational, generally acceptable and widespread accepted humanitarian morality, and he doubts seriously whether such a morality is theoretically possible, and — if so — whether the hope for its widespread acceptance is a realistic one.

Meanwhile, scientists and philosophers have no other choice than deciding and acting according to their personal moral indignations and their social philosophy. The fact that such indignations and philosophies are at the moment inevitably subjective in nature is in the opinion of the author no decisive argument against their justification, because he considers the choice for scientific standards and ends to be a matter of subjectivity as well.

The article by Hugo VAN DEN ENDEN, moral philosopher, consists of two parts. The first part gives an overview of the main criticism of the Frankfurter Schule on the present-day empirical social and human sciences: the ideal of factual knowledge and the implicit concept of a fact lead to a mutilated view of reality; the reduced scientific language too results in a reduced view on reality; "Reason" too is reduced in positivist scientific thinking; positivist science is intrinsically conservative; it is political-technological in nature, in that it favors an inhuman manipulation and exploitation of man and nature; the associated conceptions of rationality, objectivity and neutrality with respect to values are highly objectionable; the autonomous universal knowing subject is a myth.

In the second part of the article these objections are discussed. The claim made by the FS that these sciences play a conservative role is an unjustifiable generalization because it does not apply to most theoretical results and because not all applications of these sciences are to be considered as conservative. The rejection of all positivist science as well as the search for alternative positivist sciences that are not hit by the aforementioned disadvantages are unjustifiable. The solution of the problem lies in the change in the political and social

structure of present-day societies. Shouting that the present-day social and human sciences are hit by disadvantages wouldn't help. The claim that these sciences involve a mutilated and restricted rationality is rejected for two main reasons. First of all, several methodological restrictions are necessary in view of the efficiency and applicability of science. Next, it does not make sense to reproach science that it is but science and to require that it also be philosophy, ethics, and ideology.

The fact that positivist science involves a static world-view is largely acknowledged. It is true, of course, that all sorts of ideologies require scientific factual knowledge, and it is also true that the ideological interpretation and deformation to which science leads is greatly dependent on the ideology and psychology of the interpreting subject, rather than on intrinsic properties of science. Nevertheless, there is a need to distinguish between immutable nomological relations and ideologically fixated but historical and contingent relations. It is granted that the defence of a value-free science may be used as a theoretical legitimation of amorality (the reduction of values to subjective preferences) but it is rejected that this should be the case or always was the case. Such a defence is to be evaluated positively if it is directed against such theories as Lysenko's biology or against the conservative value patterns as involved in present-day psychiatry. The direct link between present-day scientific thinking and the consciousness of the middle-class bourgeoisie is rejected as a dubious sociological conception. Nevertheless, it should be admitted that scientists are nowadays in the service of decision-makers and power-groups, and that the fact that they have interiorized the value-neutrality required by this dependence prevents them from functioning as autonomous and critical persons.

Irrational glorification of science has to be rejected. Science is neither "the" instrument for nor "the" touchstone of progress, humanization and welfare. Science is an instrumental value, not an autonomous value. Hence the need for a clear definition of the function of science. The Frankfurter Schule is right in claiming that the scientific praxis is a form of social alienation. Specialization has alienated and isolated the scientist from a unifying scientific project as well as from his general man-critical and society-critical function and from the global social praxis. This problem, however, is not typical for science. The alienation of the scientist is a consequence of the alienation of man in our presentday society. The article ends with a series of questions concerning this alienation.

Etienne VERMEERSCH, philosophical anthropologist, criticizes the view that scientific knowledge under all circumstances should be considered valuable in itself. Science for sciences sake is no justifiable ideal. Further, he points to the fact that the optimistic belief of the Enlightenment and of early positivism and scientism in science as the pre-eminent instrument of human progress and wellbeing has been refuted by the evolution of the sciences and their technological applications. Science continues the production of ever more techniques and tools for control and domination of nature and man, but without any socially acknowledged ethical reference system concerning the direction and the ends of their practical uses. This chaotic, non-directed accumulation of scientific findings and techniques appears to be a dangerous evolution, rather than an intrinsic good. It reinforces a process whereby a flux of techniques and apparatuses is produced that will live their own lives in practical applications beyond any control by their producers and without reliance on humanitarian-ethical criteria.

Consequently, the traditional ideal of complete freedom of scientific investigation and production has to be rejected. The crucial problem, however, is the choice of an alternative. A strict and direct planning of science on the basis of a pragmatic morality of urgent humanitarian needs satisfaction would probably miss its mark and would certainly go at the expense of scientific productivity, even in fields where that productivity would appear to be desirable or indispensable from the point of view of the ideology or morality that inspired the proposed planning of science.

As a workable solution the author suggests that scientific research should be submitted to an evaluation by the following criteria. Firstly, in cases wherein highly probable predictions can be made about the relation between scientific research on the one hand and the furthering or endangering of the ethically acknowledged general good and well-being on the other hand, the decisions in favor of or against the research should be taken from an ethical viewpoint. On this first level science should be directly controlled by ethical criteria, in the negative as well as in the positive sense.

Secondly, in cases wherein scientific research has no demonstrable relation to needs of well-being and general good in society, it should be restricted as much as possible to basic research, viz. research which is desirable or indispensable for a unified, reductionist science of nature and man. The author's main argument for this position is the consideration that the continuous accumulation of scientific knowledge of all sorts of contingent objects and states of affairs (especially in the psychological and social sciences) is to a high

degree superfluous from the point of view of a humanitarian morality of well-being as well as from the point of view of the construction of a basic scientific understanding of nature and man.

This issue contains also a report by Magda MICHELSSENS of a congress on topics related to the ones discussed in the preceding articles.

Hugo Van den Enden

I am gratefully indebted to D. Batens for the help he gave me in finishing this introduction in a period in which I was prevented from working by illness.