



Chair:

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Workshops Conclusions: Themes and Questions for Dialogue

JEAN-PIERRE ALIX

First, the floor will be given to the « rapporteurs » of the workshops for a summary report. Then, four eminent personalities will

comment on the reports. Finally, questions from the audience will be answered either by the rapporteurs or the personalities.

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Themes
and
Questions for
Dialogue



Knowledge, a Value in Itself?

ETIENNE KLEIN AND MARC LACHIÈZE-REY, RAPPORTEURS

Session 1: what is the Value of Knowledge?

Rapporteur:

- Etienne Klein, Director, Laboratoire de recherche sur les sciences de la matière, CEA (France)

Speakers:

- Pierre-Henri Gouyon, Deputy Director, Department for Teaching and Research in Biology, Muséum national d'histoire naturelle (France)

"Biology: the temptation of Daedalus"

- Pierre Léna, Head of Education and Training, Académie des sciences (France)

"Knowledge and acknowledgement: how are they Being Born?"

Discussant:

- Roland Lehoucq, Research Director, CEA (France)

Session 2: Is there any European Specificity in Science?

Rapporteur:

- Marc Lachièze-Rey, Astrophysicist, Research Director, CEA and CNRS (France)

Speaker:

- Helga Nowotny, Vice-President, European Research Council (EC), Chair of the Scientific Advisory Board, University of Vienna (Austria), Emeritus Professor of Social Studies, ETH Zurich (Switzerland)

"Is there any European Specificity in Science?"

Discussant:

- Michel Spiro, Director, Institut national de physique nucléaire et de physique des particules, CNRS (France)

REPORT ON "WHAT IS THE VALUE OF KNOWLEDGE?"

The aim of this workshop, with over 70 participants, was to discuss the value which we place on scientific knowledge today based on the following observation: In less than half a century we have moved from a system where science and technology were connected but distinct, to a huge technoscientific empire, i.e. a system in which both areas are losing their autonomy. The effectiveness of this technoscience is beyond dispute. It has even become the driving force behind power in all its forms – economic, political and military. But do we see this fundamental trend having a profound impact on the use and ends of scientific activity? Now it is a case either of demonstrating that research being carried out will yield useful results, or promising that they may be useful one day. The main question is no longer "Is it true?" but "What purpose does it serve?" Thus the idea has become accepted that the value of newly acquired knowledge can only be measured against the yardstick of its possible concrete applications. Is the practical aspect of science in the process of gaining the upper hand over its speculative skills? Do we place undue emphasis on the technical side, which enables us to bring nature into line? Our spectacular enthusiasm for scientific applications stands in sharp contrast to our lack of interest or even indifference towards its principles, method and content. The spirit of science passes

us by completely. Moreover, even the most elementary scientific knowledge is still not part of our general knowledge. *We have not achieved a knowledge society but a society based on the use of technology.* Condorcet was right in one respect: "the mechanical growth of knowledge" is not sufficient to promote that knowledge within societies which contain it.

Two speakers spoke in succession.

The first speaker, Pierre-Henri Gouyon, denounced the "headlong rush" which he observes in the technoscientific field. He recalls the myth of Daedalus, a prime example of blind endeavour, "where the technique itself raises technical problems which attempts are made to resolve with even more technology". He believes that people must try take their destiny in hand and stop thinking that letting competition between people, business and states rule the future of mankind and the planet is a good thing, in the belief that this "laissez-faire" approach will ensure the maximum amount of progress. *He blames scientists in particular, who all too often get carried away in technological and scientific endeavours controlled by large companies which they should not endorse.*

Pierre Léna then painted a rather gloomy picture of science teaching worldwide, especially in primary schools and in the 11-15 age group. Of course, one can criticize science, which has become technoscience, for having transformed itself into "knowledge as power" and for actively taking part in

the global merchandising, without disputing that it is a quite remarkable force for understanding and is therefore very valuable.

The urge to understand the world, that inner desire which we all share which could be termed the “spirit of scientific enquiry” is what needs reviving in primary, junior and senior schools and everywhere else. What we are observing, however, is the opposite trend. The education system no longer conveys the idea of science as a human adventure, as the exercise of reason and the liberation of thought and many pupils say that the difficulty which they have mastering is akin to an assault. They think that “science is not for me”. For them, it simply embodies a tool for selection which oppresses and worries them. Moreover, it can be observed that fewer children are choosing to pursue scientific studies in nearly all developed countries.

How has science managed to lose its appeal and prestige so quickly? Has the sacred flame deserted us? Or is it that instead of presenting science as a genuine intellectual adventure with its history, heroes, problems and methods, it is taught as pure knowledge, a bland series of exercises to be solved, a wasteland grazed by soulless equations? Why is our teaching silent about the history of great discoveries? Why does it not explore the way in which different representations offered by science are formed? Why does it not explore how the process of inventing draws on the resources of the imagination and uses metaphors and analogies?

The perspectives which such approaches open up would prevent us from being able to reduce scientific method to establishing a clear and immediate correspondence between facts and a logical template. Digressions, wrong turns and dead ends would then reveal themselves, dispelling the false impression of obviousness from the image which we create of thought in action. Scientific culture would then be stimulated, promoted and *desired*. This path is rarely followed, therefore it is hardly surprising that students, who are disappointed by the stereotyped and technical image of science offered to them, choose other paths.

Pierre Léna therefore calls for a revolution in science teaching. He also calls for us to recognize that science and technology are embedded in culture, full stop. He views the challenge as a critical one: can we use the universality of science to our advantage to create successful European scientific education?

REPORT ON “IS THERE ANY EUROPEAN SPECIFICITY IN SCIENCE?”

Born in Europe, science was initially a European construct. Does this imply that it is European in essence? In other words, that science is a fundamentally European currency which can be exported, like the rights of man, perhaps. The dissemination of science

could then be seen as one aspect of Europe's influence. This is what is suggested by Michel Spiro, illustrated by the example of the SESAME project¹ [Synchrotron-light for Experimental Science and Applications in the Middle East].

Science has transcended European boundaries and has become international. Looking back through history reveals, for example:

The distinctive early 20th century French trait of rigorous science close to mathematics and connected to philosophy;

Also, in the early 20th century in the area of cosmology, we can contrast the results of American observations facilitated by the construction of powerful telescopes due to the development of technology with theoretical advances in the old world of Europe (notably by Einstein). Thanks to the contribution of Georges Lemaître, these two sources came together to give birth to modern cosmology, which is still developing today in what has become a wholly international context.

However, as history moves forward, it becomes increasingly difficult to recognize these specificities. From this perspective, the key event for the true internationalization of science would seem to be the "Manhattan project", which defines the organization of contemporary scientific research.

The question remains: is there any European specificity in science today? There is

also the related question of whether such specificity is desirable? It should be noted that the term European can be contrasted with "global" as well as with "national".

Michel Spiro's response is to link European science with an aptitude for collaboration which he illustrates with the CERN and ITER projects, as well as with SESAME. These different institutions disseminate science throughout the world, which he suggests is a European value.

Helga Novotny, by contrast, offers a different response by citing the European Community's ERC (European Research Council) programme. According to her, by taking excellence as its main criterion it is reconnecting with a truly fundamental, humanist, European scientific tradition, which is the basis of culture (*Wissenschaft*).

As the opposite of globalization detached from culture and tradition, it has the merit, amongst others, of allowing us to fight more effectively against fundamentalism whose current growth - as demonstrated by these discussions - is a providing wholehearted cause for concern.

This European trait also allows us to counterbalance specific national characteristics - neglect of fundamental aspects of research, a tendency to manage research through programmes - which are also current concerns.

¹ Cf. <http://www.sesame.org.jo/>

European specificity in science, which is well-established historically, would still seem to be alive and well. It would seem to be an asset to preserve and maintain in

order to counterbalance possible excesses both on a worldwide level (globalization) and on a national level.