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# **Two Visions of “Science in Society”**

**delivered during the evening reception  
at the Musée des arts et métiers**



**WELCOME BY CHIEF EDUCATION  
OFFICER CHRISTIAN FORESTIER,  
Administrator General  
of the Conservatoire national  
des arts et métiers (CNAM)**

Ladies and gentlemen, colleagues and friends, we would like to thank Jean-Pierre and chairman Jouzel for asking us to host this seminar.

I am of course flattered by your choice, because the nature of the CNAM is consubstantial with the topic chosen for your two-day conference. For those who are unfamiliar with this institution, the CNAM is over two hundred years old. It was created during the French Revolution by abbot Grégoire. I actually took charge of the CNAM just over two months ago but I have known the institution for nearly forty years. The CNAM has been in these premises from the outset. It is the only major French higher education institution to remain in its original premises in the centre of Paris.

With over 100,000 affiliated students per year, the CNAM more than fulfils its main mission of life-long education. Our affiliated students are mainly adults – mostly young

adults – but they are not students in the strict sense of the term. They are scattered across the globe as the CNAM has bases throughout France, including overseas territories. This enabled one of my predecessors, the Chief Education Officer Mr Saurel, to claim that: « The sun never sets on the CNAM ». Approximately 10,000 people teach at the CNAM every year for varying amounts of time. We have a consolidated budget of over 150 million euros. For a long time it was almost entirely devoted to engineering. Today, as a sign of the times, 40% are devoted to engineering and 60% to human, social, economic and management sciences. Like all higher education institutions, we have a mission to undertake research projects. Our actual projects demonstrate a strong bias towards technological research with regard to industry and business. Last but not least, we have a mission to raise awareness of scientific and technological culture focused on this magnificent part of the Conservatoire – its museum. This museum is one of the distinctive characteristics of the Conservatoire. We might even be tempted to think that the CNAM, a fully itemized comparison notwithstanding, is almost without equal in the world on account of its three-fold mission of education, research and popularization of scientific and technical culture.

Your topic for these two days goes right to the heart of our mission here. Just consider this: a few weeks ago, Professor Jouzel and I opened the exhibition on climate-related issues which you have just seen. A few days before, there was a major conference on the future of nuclear energy...

Thank you all for coming. I am very honoured and very pleased to be taking part in this event, which I hope will be a great success.

governed in many ways by technology and scientific knowledge.

As someone who specializes in belief, which I assume is why I have been invited, I will try to explain the feeling of wariness which is felt towards science, a symptom of which is the decline in the number of people opting to work in science. I think that it is necessary to make an initial observation: we are no longer dealing with a confrontation between science on the one hand and belief systems on the other with cosmologies and explanations of the world which would be antagonistic to and in conflict with science which tries to debunk them. This conflict between belief and science has been extremely prominent and has served to fuel suspicion of science in the past. We have moved beyond that – if only because science has emerged victorious. It has called into question the claims of major religions to speak the truth about the world, its history, its future and its origins. This does not, however, mean that science has solved all our problems and I shall come to this shortly. However, we have moved beyond the great conflicts and major debates between belief and science. You might think this strange at a time when much is being said about creationism. However, as far as I am concerned, as a sociologist of religions, I feel that we are on the tail of a comet which does not really involve the secularization of the world in which we live. A number of believers on the fringes whose aim, amongst other things, is to question the autonomy of the

134

Two  
Visions of  
Science  
in Society



**DANIÈLE HERVIEU-LÉGER**

The choice of speakers is probably linked to our setting since we are welcoming under our roof a physicist, a hard scientist, and a sociologist of religion. There is, therefore, certain logic to this. What is the object of the exercise? I suggest that the question being asked here is why science is perhaps not really popular, or at the very least arouses suspicion, in contemporary societies

modern world on every front starting with politics, have indeed taken up this theme, but this is not the source of the suspicion we are experiencing today.

My second point is that this suspicion does not, in my opinion, stem from arrogance on the part of science which would now claim to have the answer to every question. We are no longer part of the 19th century optic in which science, which bore the weight of a great deal of belief in science, dreamed of unifying all knowledge and providing a global answer to all of man's questions. On the contrary, we are faced with a science which is perfectly aware that it is reducing the number of questions and forcing people to frame new questions, whilst realizing the limitations of its own theories which are in fact being continuously challenged by new advances. We are no longer, therefore, looking at an arrogant science claiming to have the last word or the final say on the meaning of human existence. What we have, on the contrary, are SEVERAL sciences, which are conscious of the unique nature of their view of reality and which are well aware that they create uncertainty, even as they shed light on the darkness of the other world.

This is perhaps the issue that is of interest to us. Therefore, this science, which operates whilst having in a sense abandoned the scientific outlook of dispensing with broad metaphysical issues, and which has limited its own scope not in terms of knowledge but by promoting the idea that

there are several ways of accessing reality, is a science which simultaneously presents itself as being extremely powerful and capable of progress, whilst remaining very modest insofar as it recognizes and deals with the limitations of its own arguments. This does not mean that all scientific truths are relative. It means that they are located in a particular range of experiments. Because science has achieved this extraordinary level of development, it can step back from itself, which clearly distinguishes it from certain scientific visions of the last century. This is the very reason for which suspicion arises. For those observing extraordinary scientific developments, there is the feeling that in fact science, which is advancing and giving us greater mastery over the world, is beginning to create uncertainty and is forcing us to consider this uncertainty as a given fact of our condition. The fundamental problem is that when science itself demonstrates that it is creating as much uncertainty as certainty, then this approach to science does not simply try to identify gaps in our knowledge, but also considers uncertainty to be a dimension of reality in itself. Therefore, it instils in us deep uncertainty about our ability to raise issues and, in particular, to find answers. This is the uncertain position in which we find ourselves, and I think that this goes a long way towards explaining what I would call the ambivalence rather than the suspicion of society towards science. Ambivalence, which oscillates between fascination on the one hand, and fear of what science produces on the other, forces us to

contemplate the implacable nature of uncertainty. This is the ambivalence, which as a sociologist of religions, I observe in those new religious movements so obsessed by the issue of science and by the hope of stabilising their vision of the world once and for all through science.

Facing up to this situation lies not only in making science attractive, accessible, and appealing. The issue before us is essentially one of educating and socialising ourselves and socialising the younger generation to accept a position of uncertainty which includes the expectations which we have of science. This is a position of uncertainty which implies, for example, knowing how to accommodate the way in which knowledge is constructed. In other words, the issue with scientific education is not only showing what science is doing in order to make it attractive, but it is as much about incorporating the history of knowledge into our intellectual training. This is not just about events, although museums and science fairs are important. The real issue, I believe, is to establish a proper relationship with science for the very reason that it can both change our world and our lives and leave us to contemplate our uncertainty without leading us by the hand. This could form the basis of a scientific education, a daily task which must be enshrined in the way in which science is taught in schools. I believe that the only way to ward off the possible resurgence of obscurantism which turns this uncertainty to its advantage is to take into account the

historical dimension of science, the History of science.



**ETIENNE KLEIN**

I am going to attempt to talk to you not as a sociologist but as a physicist who has spent several years trying to take part in what is called the propagation of science and technology according to the received terminology, which I find rather cold. I would like to share a few thoughts with you drawn from this work which could be termed education and popularisation. The reason I undertook this work was that as a student I quickly became fascinated by the efficiency of mathematics in physics. Physics has been using the language of mathematics since Galileo, and the result of this epistemological break which consists of saying that nature is described in mathematical terms, means that several centuries later we can recount in a fairly detailed manner and with

great accuracy the last 13.7 billion years of our planet. This science - physics - to which I shall restrict myself, is now able to predict the existence of new types of physical objects not from observation, but from arguments which have mathematics as their starting point, and which, when projected onto the world, enable us to predict the existence of objects which are as strange, at least initially, as intermediary bosons or antimatter. Mathematics in physics act as an ontological winch. Moreover, physics, especially in the twentieth century, has shown itself capable of producing results which some have called negative philosophical discoveries. This does not mean that physics is challenging philosophy or aiming to dethrone it, but that it presents arguments on certain philosophical issues which point towards possible answers, or even contest some of them. As a result, knowledge achieved by such means also has its own intrinsic value, which has nothing to do with the applications which can be derived from it. For example, the theory of relativity or quantum physics would have had the same value as today as tools for knowledge, even if they had not had any technological by-products. This is far from being the case, as lasers, Satnav, and transistors are applications of this research. However, their main value lies in the fact that they altered our knowledge of reality or of time and space.

It seemed to me that this message should be shared with the majority of people not in a spirit of democracy, but because I felt

that people were not interested in these issues as they had never had the opportunity to meet people able to discuss them with them. This is what set me off on a fairly long period of popularisation which brought me into contact with different audiences, not just students. I realized that there was indeed a problem with science, that things were sticking, and that relationships were not fluid. I realized that they could be violent, tense, or even cruel, and that at the end of the day each individual has their own issue with science. It is not society which has a problem with science, but the individual. Some people find it too complex and incomprehensible. Others think that it is a selection criterion for studies rather than something which teaches us something about our world. Other people think that it is dangerous, and others claim that nobody is guiding it and that it is creating a world in which the future is completely uncertain and runs the risk of ending in disaster. Others think that it does not shed any light on meaning and at the end of the day only provides answers to questions which fall within its scope - i.e. scientific questions - leaving aside those which are most important for us, i.e. those relating to values, to what helps us to live together as community, how to establish justice and to view freedom, etc.

I think that the theme of science and society which is bringing us together over these two days is a means of marking the existence of the issue. Giving the problem a name does not resolve it but it enables

us to progress towards analysing it. Science or the sciences are intrinsically complicated. What is science? What are the criteria which set the limits of it and its ends? These are already all very complicated questions. What is society? That is also very complicated. Are we dealing with society as we see it or as our political representatives depict it? Are we dealing with the society that we see in the daily opinion polls which we take? Or is society what is expressed by minority groups such as those fighting the use of GM crops, the campaign for the return of the Latin mass, or who knows what else. What is society in this context? The paradoxical element of this theme is that whenever we take two complex words – society on the one hand and science on the other – we are always hopeful that we can make them interact and that through some miracle of anti-destructive interference bringing two problems together will yield one simple problem. I do not think this is the case – the problem is even more complicated than knowing what science and society are. It seems to me that the point of the seminar is to try to understand what we are setting against each other when we bring these two terms together. For

example, is the aim of this sort of thinking to understand and define scientists' responsibilities in the face of the potential or consequences of their work? On the contrary, or in addition, is it a question of working to make scientific and technological developments more socially acceptable? Is it a case of putting science into culture? Is it a case of thinking of how to promote, communicate and teach it? My particular interest is this question of science teaching and education and I get the impression that we still have a long way to go. It seems to me that teaching science at every level - primary, secondary and university - is becoming an increasingly difficult task. This is not because science has become more difficult than before – this is not the case – but because young people today have a very different set of references from those teaching them and because there is a cultural difference which makes transmission of information even more difficult. If this type of seminar could help us to understand the most appropriate way of talking about science, i.e. by acknowledging the death of scientism and by trying to combat relativism in its more extreme forms, then I feel that we will have made progress.