



JEAN-GABRIEL GANASCIA

Summary of the Morning Session

Thank you Mr chairman, ladies and gentlemen. We have had a very full opening session and this augurs well for the future of this symposium dedicated to scientific responsibility. It now falls to me to summarize it in ten minutes. It is a great honour and I would like to thank M.U.R.S. I am aware of the difficulty of this because of the density and great variety of the presentations which have been given. At the risk of grossly oversimplifying what has been said, I am going to limit myself to four main points which summarize four important but not consecutive stages. I will sum them up. The first is what could be termed not original sin, but the original ambition of science, which is connected to the notion of images and metaphors mentioned by Heinz Wismann and also by Ulrike Felt. The second, following on from this original ambition, is akin to the Fall, or at least the disappointment which comes after this ambition. The third point is certainly the starting point for thinking about science and society, i.e. the power of scientific knowledge and its effectiveness. Finally, because of this effectiveness, there is the role played

by scientists in social choices and in the dialogue leading to decision-making.

Let us start with the first point. Heinz Wismann reminded us that there is always ambition at the root of scientific work, sometimes to an excessive degree, which also includes the desire for knowledge. He quoted the metaphor of the legible world, according to which we would like the world to express itself in a language which is perfectly intelligible and in parallel with this we want to transform the world and make it submit to our needs. Researchers' intellectual activity always leads to these sorts of imaginary horizons and slightly wild ideas. It has been mentioned and I think that it is absolutely critical to understand it. A physicist would like to read the mathematical equation which summarizes the great book of the world. We could find other similar horizons in other disciplines such as biology and medicine. At the same time, when faced with this rather infinite horizon, a scientist, who is a precise and modest being, who is well aware of the division of labour, often scales down this desire for infinite knowledge into a project which he wants to master completely. I will take as an example the somewhat imaginary archetype of the scientist described with great humour and intelligence by the great European novelist, Italo Calvino. This scientist was called Mr Palomar. You are undoubtedly familiar with him. His desire to control nature led him to focus his attention on specific objects which he wanted to know perfectly. The first object was a wave.

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Mr Palomar wanted to look at a wave. In the course of this exercise, Mr Palomar did not merely want to contemplate a wave – he does not have anything against contemplation – he just wants to understand what a wave is. He does not want to see waves as a whole. He wants to isolate one wave from the rest of the ocean, to grasp its “waveness” and then extend his knowledge from one wave to waves in general and then from waves in general to the whole universe. The wave is a sort of summary of the whole world. This plunges him into deep thought.

It is at this stage in the meditation that the second point which I termed the Fall, or disappointment at the very least, occurs. According to Italo Calvino, the effort of trying to isolate a clear definition of the wave made Mr Palomar jumpy. He ran out of patience, abandoned observing the wave and left the beach. Unlike Mr Palomar, contemporary scientists do not leave the beach or the focus of their studies. However if the original project motivating them is no longer accessible then they resign themselves to giving it up. This does not mean that their activity is futile. Quite the reverse. Even if it does not live up to their original ambitions, it can still prove to be very useful for society. This usefulness is undoubtedly of a practical nature. We all know that sciences and their applications are the source of the power of nations and the wealth of the contemporary world. However, the usefulness of science cannot be reduced to this practical aspect. Initial ambitions were not useless even

though they had to be abandoned because they were impossible to achieve. I think that this is crucial and that we must bear this in mind. This impossibility which is often the source of our motivation, is also the source of potential and achievements.

Even if scientific activity does not manage to achieve its initial aims, the desire to understand fully what is going on in the world brings untold satisfaction to those who master scientific knowledge. They assess, or at least they believe that they assess, the impact of choices better than their fellow men because they anticipate the consequences of their actions. This corresponds to the third important phase which I mentioned earlier. This constitutes both the power of the scientist and the fact that scientists shed light on choices and help us to control them. Simultaneously, it increases our collective power and it undeniably brings intelligence, discernment and unprecedented efficiency. Scientific knowledge does not allow those who possess it, i.e. scientists, to make these collective choices. More specifically, the complex nature of contemporary challenges means that scientists as individuals no longer dominate the impact of choices.

I think that this represents a considerable change over the last 50 to 100 years. Two factors have brought about this limitation. The first is based on cognitive factors – people individually have limited abilities.

The extent of knowledge accumulated by science is such that a single individual can only master one discipline at most, and even then only a small part of a discipline. Complex subjects, such as the climate and energy, require collaboration between several disciplines. The first limitation is cognitive. The second limitation is the one which has been mentioned here – the need to communicate with all the stakeholders involved. Innovation, risk and education have all been discussed and dialogue is absolutely essential in society for decision-making. Science alone cannot provide a solution. Science does not determine choices, despite the relative clarity which it provides, it merely informs stakeholders so that they are able to make better choices.

In conclusion, I think that there are two important points.

The first is that scientists must take part in public debate on major choices in society. They have a role to play and should not shirk it - it is their responsibility. Admittedly, their knowledge alone and their individual knowledge are not sufficient as a basis for taking decisions. However, no decision can be taken seriously without consulting scientists. It is the responsibility of scientists, therefore, to make their voices known and heard in these social choices and in the dialogue which governs them. It is not their responsibility just to make their voices heard, but also to be receptive to the different parties involved in order to participate in these choices. In short, and this is the

fourth point which I would like to emphasize, they must become aware of this responsibility and accept it, but they cannot take on this role alone.

The agenda for this conference was designed to help specify the exact role of scientists. In order to do this, we decided to focus on five distinct sectors which seem to be crucial to current challenges in society. These sectors do not correspond to disciplines in the academic sense, but to vast areas of inquiry to which science, i.e. all sciences, provides answers. What is the future of the planet? How will we cure ourselves? How will we feed ourselves? What is the future of theoretical science and does it still have a role to play? Finally, what role will be played by new information and communication technologies? The titles speak for themselves: energy and climate, health, agronomy, fundamental sciences and information and communication technologies. We will divide up into these five parallel workshops over the next two days. Each workshop will tackle one of the five themes mentioned previously. We have tried to establish a sort of progression in each one: we will start by taking stock and creating an inventory of the issues raised and then we will try to see if science can stay neutral or if it must inevitably take a side in the answer which it offers. We will then look at how scientists try to overcome these difficulties and whether they are in a position to offer new and original solutions. Finally, we will turn to political issues: what choices are

available and how do scientists intervene in these choices? We will also have ten workshops devoted to various initiatives, especially those concerning young people and scientific culture. You will find all the details in your conference documentation.

But before we go to the different workshops and to lunch, I would like to pay a final tribute to Mr. Palomar who has helped me with my summary. Mr. Palomar is a short gentleman, about 1.71 metres tall. He gets his name from a little mountain, Mount Palomar, which is 1,000 times taller than he is and on whose summit there is an observatory about 1,730 m above sea level. For various reasons that I will not elaborate on now, astronomical observatories benefit from being on mountains. Is this the same for intelligence? Do individual, regional or national peculiarities still have a part to play in science and in the current world? We have just discussed this and have seen the role of culture. This question has been a thread running through the organization of this conference. We have taken the title of an essay written by the *New York Times* columnist Thomas L. Friedman - "*The World is Flat*" - and asked whether the world of knowledge is flat too. What are the consequences of this lack of relief for Europe today? What will Europe's role in this knowledge society be? If knowledge becomes a source of wealth in this knowledge society will Europe which originates the knowledge being exchanged, still able to entitled to benefit from it in the future? This is not a new question - I have

taken a passage from a man who formulated it several years ago and which you may recognize: "Knowledge, which was a consumer value is now becoming an exchange value. The usefulness of knowledge makes it a foodstuff which is desired not just by a few distinguished enthusiasts, but by all. Therefore, this foodstuff will be prepared in ever more manageable and edible forms and distributed to an increasingly wide number of people, becoming a mass-produced version which can be imitated and produced just about everywhere. The result is that the inequalities which used to exist between the world's regions in terms of mechanics, applied sciences, and the scientific methods for war and peace, on which European dominance was built, are gradually starting to disappear. The way in which habitable regions of the world are being classified is such that crude physical size, statistical elements, numbers, population, surface area and raw materials exclusively determine the rankings attributed to these compartments of the globe". This quotation is taken from a work written by Paul Valéry in 1919, entitled *La Crise de l'esprit* [*The Crisis of the Spirit*]. The context at that time was admittedly very different from today. Europe has undoubtedly made a lot of progress and learned lessons from its painful history. Nevertheless, these lines provide an excellent summary of our position today. I do not dare add anything other than to offer you the end of this passage by way of a conclusion: "Should the phenomenon of exploitation of the resources of the planet, the

levelling effect of technology and the phenomenon of democracy which imply the future *capitis diminutio* [loss of status] of Europe be viewed as absolute decisions of fate? Or do we have some freedom in the face of this threatening vision of things?" I will end on Paul Valéry's question.

JEAN JOUZEL

Thank you very much, Jean-Gabriel. Now I would like to invite you to break for lunch.

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