THE PONTIFICAL ACADEMY OF SCIENCES

EXTRA SERIES

36

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ADDRESS OF HIS HOLINESS BENEDICT XVI TO THE PARTICIPANTS IN THE 2010 PLENARY SESSION OF THE PONTIFICAL ACADEMY OF SCIENCES

Clementine Hall
Thursday, 28 October 2010

Your Excellencies,
Distinguished Ladies and Gentlemen,

I am pleased to greet all of you here present as the Pontifical Academy of Sciences gathers for its Plenary Session to reflect on 'The Scientific Legacy of the Twentieth Century'. I greet in particular Bishop Marcelo Sánchez Sorondo, Chancellor of the Academy. I also take this opportunity to recall with affection and gratitude Professor Nicola Cabibbo, your late president. With all of you, I prayerfully commend his noble soul to God the Father of mercies.

The history of science in the twentieth century is one of undoubted achievement and major advances. Unfortunately, the popular image of twentieth-century science is sometimes characterized otherwise, in two extreme ways. On the one hand, science is posited by some as a panacea, proven by its notable achievements in the last century. Its innumerable advances were in fact so encompassing and so rapid that they seemed to confirm the point of view that science might answer all the questions of man's existence, and even of his highest aspirations. On the other hand, there are those who fear science and who distance themselves from it, because of sobering developments such as the construction and terrifying use of nuclear weapons.

Science, of course, is not defined by either of these extremes. Its task was and remains a patient yet passionate search for the truth about the cosmos, about nature and about the constitution of the human being. In this search, there have been many successes and failures, triumphs

and setbacks. The developments of science have been both uplifting, as when the complexity of nature and its phenomena were discovered, exceeding our expectations, and humbling, as when some of the theories we thought might have explained those phenomena once and for all proved only partial. Nonetheless, even provisional results constitute a real contribution to unveiling the correspondence between the intellect and natural realities, on which later generations may build further.

The progress made in scientific knowledge in the twentieth century, in all its various disciplines, has led to a greatly improved awareness of the place that man and this planet occupy in the universe. In all sciences, the common denominator continues to be the notion of experimentation as an organized method for observing nature. In the last century, man certainly made more progress – if not always in his knowledge of himself and of God, then certainly in his knowledge of the macro- and microcosms – than in the entire previous history of humanity. Our meeting here today, dear friends, is a proof of the Church's esteem for ongoing scientific research and of her gratitude for scientific endeavour, which she both encourages and benefits from. In our own day, scientists themselves appreciate more and more the need to be open to philosophy if they are to discover the logical and epistemological foundation for their methodology and their conclusions. For her part, the Church is convinced that scientific activity ultimately benefits from the recognition of man's spiritual dimension and his quest for ultimate answers that allow for the acknowledgement of a world existing independently from us, which we do not fully understand and which we can only comprehend in so far as we grasp its inherent logic. Scientists do not create the world; they learn about it and attempt to imitate it, following the laws and intelligibility that nature manifests to us. The scientist's experience as a human being is therefore that of perceiving a constant, a law, a logos that he has not created but that he has instead observed: in fact, it leads us to admit the existence of an all-powerful Reason, which is other than that of man, and which sustains the world. This is the meeting point between the natural sciences and religion. As a result, science becomes a place of dialogue, a meeting between man and nature and, potentially, even between man and his Creator.

As we look to the twenty-first century, I would like to propose two thoughts for further reflection. First, as increasing accomplishments of the sciences deepen our wonder of the complexity of nature, the need for an interdisciplinary approach tied with philosophical reflection leading to a synthesis is more and more perceived. Secondly, scientific achievement in this new century should always be informed by the imperatives

of fraternity and peace, helping to solve the great problems of humanity, and directing everyone's efforts towards the true good of man and the integral development of the peoples of the world. The positive outcome of twenty-first century science will surely depend in large measure on the scientist's ability to search for truth and apply discoveries in a way that goes hand in hand with the search for what is just and good.

With these sentiments, I invite you to direct your gaze toward Christ, the uncreated Wisdom, and to recognize in His face, the Logos of the Creator of all things. Renewing my good wishes for your work, I willingly impart my Apostolic Blessing.

The Holy Father with the Pontifical Academicians at the end of the Audience.

RECENT ACTIVITIES OF THE PONTIFICAL ACADEMY OF SCIENCES

Statement of the 2010 Plenary Session on "The Scientific Legacy of the 20th Century"

Jürgen Mittelstrass, Werner Arber, Marcelo Sánchez Sorondo

The 20th century was an important century in the history of the sciences. It generated entirely novel insights in all areas of research – often thanks to the introduction of novel research methods – and it established an intimate connection between science and technology. With this connection, science is dealing now with the complexity of the real world. In fact, it was in the 20th century that the human being landed for the first time on a heavenly body, the Moon, different from Planet Earth, this marvellous cradle that the cosmos, in its long and patient development, almost seems to have prepared for our existence. By leaving his habitat, man seems to have stepped on the threshold of infinity.

The members of the Pontifical Academy of Sciences were deeply involved in this development. In this year's Plenary Session with its subject "The Scientific Legacy of the 20th Century" they gave proof of the revolutionary changes in many areas of the sciences – in particular in physics and biology, but also in astronomy, in chemistry, in the neurosciences and in the earth and environmental sciences – and how they contributed to these changes. In this respect the Academy proved itself again to be the mirror of science and its development.

This is particularly true with respect to epistemological and methodological questions as well as to interdisciplinary aspects which become ever more important in scientific research. The Academy deals with these questions and aspects not only in the context of its plenary sessions, for example on predictability in science (2006) or on the evolution

of the universe and of life (2008), but also in smaller conferences, workshops and study weeks, for example on the educated brain (2003) and on astrobiology (2009). As it was also shown in the meeting on paths of discovery (2004), the common denominator of the sciences is the notion of discovery, and discovery is an organised mode of observing nature. These meetings put the Academy right in the middle of the ongoing scientific research, especially in relation to the realities of nature, of the human body and of the human brain.

From the point of view of cosmology, the results of these meetings demonstrate that 20th century cosmology greatly improved our knowledge of the place that man and his planet occupy in the universe. The "wonder" that Plato and Aristotle put at the origin of thought, today extends to science itself. Questions now arise on the origin and on the whole, also thanks to the reflection of those who study the physical universe, its history and its laws. Physics has enabled us to understand the basic components of matter and we are well on the way to an ever more consistent and unitary understanding of the entire structure of natural reality, which we discover as being made up not only of matter and energy but also of information and forms. The latest developments in astrophysics are also particularly surprising: they further confirm the great unity of physics that manifests itself clearly at each new stage of the understanding of reality. Biology too, with the discovery of DNA and the development of genetics, allows us to penetrate the fundamental processes of life and to intervene in the gene pool of certain organisms by imitating some of these natural mechanisms. Information technology and the digital processing of information have transformed our lifestyle and our way of communicating in the space of very few decades. The 20th century has seen medicine find a cure for many life-threatening diseases and the beginning of organ transplants. It is impossible to list the many other discoveries and results that have broadened our knowledge and influenced our world outlook: from progress in computational logic to the chemistry of materials, from the neurosciences to robotics.

The Academy, however, is not only the mirror of science and research as well as a place where science deals with its problems and insights. It also engages in questions of the institutional role of science in society and issues of great social importance. Scientific research not only gives expression to the strength of rationality in explaining the world and the way in which this is done. The application of scientific knowledge can induce changes of environmental and thus living conditions. It is these aspects, the interrelations between scientific progress

and social development, which together with insights into the epistemological structure and the ethical implications of science play an important role in the life and the work of the Academy. Recent meetings on science for man and man for science (1999), on the cultural values of science (2002), on the signs of death (2005) and on transgenic plants for food security in the context of development (2009) testify to this persistent engagement. Also in this respect, the Academy is unique in its structure, in its membership, in its aim, and in its efforts which are always directed at promoting the progress of the mathematical, physical and natural sciences, the study of epistemological and ethical questions and issues, the participation in the benefits of science and technology by the greatest number of people as well as at the interaction between faith and reason, encouraging the dialogue between science and spiritual, cultural, philosophical and religious questions. The plenary session on the scientific legacy of the 20th century demonstrated afresh the strengths of these objectives and of the way the Pontifical Academy of Sciences in its constitution and activities is realizing them.

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BENEDICT XVI, Address to the Participants in the 2010 Plenary Session.