

STATEMENT ON THE CULTURAL VALUES OF SCIENCE BY PROF. ANTONINO ZICHICHI

The discovery of Modern Science represents one of the greatest achievements of mankind in the immanent sphere of our existence. This achievement was made possible thanks to Galileo Galilei, two millennia after the study of Nature by ancient Greeks, as a selfless form of research for truth. Galilei realised, and said openly, that God is more intelligent than us all. Consequently, if we want to discover the logic of Nature there is only one way: to pose, in a rigorous manner, the question to the Creator and this means performing an experiment. If we seek the correct answer, the result of the experiment must be reproducible. The rigour is granted by mathematics, the correctness is ascertained by reproducibility. This is how Galilei discovered the first fundamental laws of nature, which brought him to formulate the principle of relativity and to invent the 'Gedanken Experiments'.

The values of Modern Science have their roots in the act of faith towards the Creator, as expressed by Galilei when he explained the reason for which he was using stones and 'vulgar' matter, as the footprints of God were also to be found in vulgar matter, not only in the stars. History tells us this is how *Modern Science* was discovered. Even nowadays, in the most advanced laboratories worldwide, the Galilei teaching is the only one which allows us to further our knowledge of the logic of Nature.

It is our duty to ensure that *the world* be made aware of the role played by John Paul II in defining the meaning of Science, its clear distinction from Technology and the need for a Third Millennium culture which would be in harmony rather than in conflict with Faith.

STATEMENT ON THE CULTURAL VALUES OF THE NATURAL SCIENCES

At its Plenary Session of 8-11 November 2002, the Pontifical Academy of Sciences discussed the various contributions made by scientific activity and education to the culture of humankind. Seeing 'culture' as a set of free and responsible learned ways of acting, behaving and taking decisions, as opposed to inherited patterns of behaviour and instincts, the Pontifical Academy of Sciences wishes to issue the following Statement.

If by science we mean the sophisticated arts of mathematics, aesthetics, architecture and metallurgy, it is possible to describe ancient Egypt, China and Mesopotamia as the first homes of science. The knowledge base built up by studies in the natural sciences beginning with the theoretical practice of the ancient Greeks as a selfless form of the search for truth, and then developed by the method of Galileo and his heirs, constitutes a fundamental dimension of human culture. Since that time, this dimension has shaped human history and is now an irreversible part of one's destiny. It is a value in itself which provides both a science-based view of the world and people and extensive opportunities to improve living conditions through applications in such areas as health, life expectancy, food security, sustainable growth, energy and water resources, information and communication, and the preservation of the environment. In the context of these applications, a worldview where science and its values play their role in the quest for truth, together with the ethical wisdom developed down the centuries, can be of great help in assessing policies and technology so as to reduce the possible risks that accompany many such applications. Thus, a global awareness of the need to engage in a responsible evaluation of human impact can lead to the implementation of sustainable developments which guarantee good for all people. Many national and regional Academies of Science, as well as international scientific unions and inter-academy organ-

isations, are ready to help political and cultural leaders, governments and companies in a careful and prudent assessment of the new technologies.

The rigorous standards generally applied in scientific research with regard to data collection and interpretation and experimental design, and the ethical rules that govern scientific practice, impart intrinsic cultural value to scientific work. Similarly, the steadily enriched scientific knowledge base, sharing the values and contents of science, represents a force of great value for education and can act to improve the conditions of human lives. For these reasons, the broad knowledge base of the natural sciences constitutes a dynamic and open trans-disciplinary foundation that is of relevance to all human beings at all levels of education. In order to benefit fully from this knowledge base, societies should develop scientific education, starting from primary school, and ensure that their scientists responsibly take care that the progress of science and technology goes to the advantage of all men and women.

Successful scientific research strongly depends on originality, creativity and invention. These requirements are similar to those of other cultural activities in the various fields of the arts and in the social and human sciences. All of these fields make their specific contributions to the heritage of human culture; they are complementary and cannot replace each other. Today, more than ever before, what is required is a new humanism which takes into account all aspects of human culture, and where human, social and natural sciences can work together as partners. This will greatly contribute to improving the overall knowledge of our world and our place in it, to increasing the respect for future generations, to promoting what is human in people, to safeguarding the environment, and to fostering sustainable growth and development. In this way, science will help to unite minds and hearts, and encourage dialogue not only between individual researchers and political and cultural leaders, but also between nations and cultures, making a priceless contribution to peace and harmony amongst the peoples of the world. Science, so much appreciated in the teaching of John Paul II, when it is in harmony with faith can fully participate in this new humanism. The members of the Pontifical Academy of Sciences make an appeal to the readers of this Statement to fully recognise the valuable contribution made by the natural sciences to human culture.