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## ◆ UDIENZA AI PARTECIPANTI ALLA SESSIONE PLENARIA DELLA PONTIFICIA ACCADEMIA DELLE SCIENZE

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Alle ore 11.45 di questa mattina, nella Sala Clementina del Palazzo Apostolico, il Santo Padre Benedetto XVI riceve in Udienza i partecipanti alla Plenaria della Pontificia Accademia delle Scienze, che si è svolta nei giorni scorsi (5-7 novembre) presso la Casina Pio IV in Vaticano, sul tema: *Complexity and Analogy in Science: Theoretical, Methodological and Epistemological Aspects*.

Pubblichiamo di seguito il discorso che il Papa rivolge ai presenti:

### ● DISCORSO DEL SANTO PADRE

Your Excellencies,  
Distinguished Ladies and Gentlemen,

I greet the members of the Pontifical Academy of Sciences on the occasion of this Plenary Assembly, and I express my gratitude to your President, Professor Werner Arber, for his kind words of greeting in your name. I am also pleased to salute Bishop Marcelo Sánchez Sorondo, your Chancellor, and to thank him for his important work on your behalf.

The present plenary session, on "Complexity and Analogy in Science: Theoretical, Methodological and Epistemological Aspects", touches on an important subject which opens up a variety of perspectives pointing

towards a new vision of the unity of the sciences. Indeed, the significant discoveries and advances of recent years invite us to consider the great analogy of physics and biology which is clearly manifested every time that we achieve a deeper understanding of the natural order. If it is true that some of the new notions obtained in this way can also allow us to draw conclusions about processes of earlier times, this extrapolation points further to the great unity of nature in the complex structure of the cosmos and to the mystery of man's place within it. The complexity and greatness of contemporary science in all that it enables man to know about nature has direct repercussions for human beings. Only man can constantly expand his knowledge of truth and order it wisely for his good and that of his environment.

In your discussions, you have sought to examine, on the one hand, the ongoing dialectic of the constant expansion of scientific research, methods and specializations and, on the other, the quest for a comprehensive vision of this universe in which human beings, endowed with intelligence and freedom, are called to understand, love, live and work. In our time the availability of powerful instruments of research and the potential for highly complicated and precise experiments have enabled the natural sciences to approach the very foundations of corporeal reality as such, even if they do not manage to understand completely its unifying structure and ultimate unity. The unending succession and the patient integration of various theories, where results once achieved serve in turn as the presuppositions for new research, testify both to the unity of the scientific process and to the constant impetus of scientists towards a more appropriate understanding of the truth of nature and a more inclusive vision of it. We may think here, for example, of the efforts of science and technology to reduce the various forms of energy to one elementary fundamental force, which now seems to be better expressed in the emerging approach of complexity as a basis for explanatory models. If this fundamental force no longer seems so simple, this challenges researchers to elaborate a broader formulation capable of embracing both the simplest and the most complex systems.

Such an interdisciplinary approach to complexity also shows too that the sciences are not intellectual worlds disconnected from one another and from reality but rather that they are interconnected and directed to the study of nature as a unified, intelligible and harmonious reality in its undoubted complexity. Such a vision has fruitful points of contact with the view of the universe taken by Christian philosophy and theology, with its notion of participated being, in which each individual creature, possessed of its proper perfection, also shares in a specific nature and this within an ordered cosmos originating in God's creative Word. It is precisely this inbuilt "logical" and "analogical" organization of nature that encourages scientific research and draws the human mind to discover the horizontal co-participation between beings and the transcendental participation by the First Being. The universe is not chaos or the result of chaos, rather, it appears ever more clearly as an ordered complexity which allows us to rise, through comparative analysis and analogy, from specialization towards a more universalizing viewpoint and vice versa. While the very first moments of the cosmos and life still elude scientific observation, science nonetheless finds itself pondering a vast set of processes which reveals an order of evident constants and correspondences and serves as essential components of permanent creation.

It is within this broader context that I would note how fruitful the use of analogy has proved for philosophy and theology, not simply as a tool of horizontal analysis of nature's realities, but also as a stimulus to creative thinking on a higher transcendental plane. Precisely because of the notion of creation, Christian thought has employed analogy not only for the investigation of worldly realities, but also as a means of rising from the created order to the contemplation of its Creator, with due regard for the principle that God's transcendence implies that every similarity with his creatures necessarily entails a greater dissimilarity: whereas the structure of the creature is that of being a being by participation, that of God is that of being a being by essence, or *Esse subsistens*. In the great human enterprise of striving to unlock the mysteries of man and the universe, I am convinced of the urgent need for continued dialogue and cooperation between the worlds of science and of faith in the building of a culture of respect for man, for human dignity and freedom, for the future of our human family and for the long-term sustainable development of our planet. Without this necessary interplay, the great questions of humanity leave the domain of reason and truth, and are abandoned to the irrational, to myth, or to indifference, with great damage to humanity itself, to world peace and to our ultimate destiny.

Dear friends, as I conclude these reflections, I would like to draw your attention to the Year of Faith which the Church is celebrating in commemoration of the fiftieth anniversary of the Second Vatican Council. In thanking you for the Academy's specific contribution to strengthening the relationship between reason and faith, I assure

you of my close interest in your activities and my prayers for you and your families. Upon all of you I invoke Almighty God's blessings of wisdom, joy and peace.

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