



Address to the Plenary Session and to the Study Week on the Subjects 'Agriculture and the Quality of Life', and 'The Principles of Design and Operation of the Brain'

The Supreme Pontiff refers to the grave problem of hunger and malnutrition in the world and adds that the question of development requires 'above all a political will and action of an ethical and cultural nature'. He goes on to say that in the study of the human brain scientists should work together with theologians and philosophers to study the 'relationship between the spirit and the cerebral apparatus'. The Church encourages scientific research but science is not exhaustive in the study of reality: there remains the 'world of the mind, of moral and spiritual values'. There must therefore be a 'patient reintegration of knowledge'. The Pope also calls on the Academy to engage in research projects with other institutions of the Holy See.

Mr. President,
Eminent Cardinals,
Excellencies,

1. I am happy to meet the Members of the Pontifical Academy of Sciences on the occasion of the plenary session which dealt with the subject of the responsibility of science. The importance of this meeting is underlined by the presence of the Cardinals and of the Heads of the Diplomatic Missions accredited to the Holy See. I thank them for their interest in the work of the Academy. This plenary meeting takes place following a study week in the course of which two groups of experts from all over the world discussed, on the one hand, 'agriculture and the quality of life', and on the other, 'the structure and function of the brain'.

On the question of agriculture, the experts were able to carry out a wide assessment where the scientific and technical aspects of the problem are finally catching up with the ethical aspects. On the one hand, scientific research has made possible a considerable increase of the world's food production. On a global scale, agricultural production today would be sufficient to satisfy the needs of the whole of humanity. This observation raises by contrast the dramatic problem of hunger and malnutrition in the world. Certainly, one must take into account the physical and material obstacles, such as the great difference in levels of fertility in the different regions. But the very unequal distribution of food resources has not yet given rise to an overall policy, nor to sufficiently effective projects to ensure that agricultural production benefits all peoples and all individuals. Once more, we must observe that the problem of development requires above all a political will and action of an ethical and cultural nature, as I said in the Encyclical *Sollicitudo Rei Socialis*. The key to all human development is to be found in a generous effort of solidarity among all groups

and all men and women of good will. With good reason did you stress that the necessary interventions with regard to this grave question should respect individuals and their own traditions, that is to say, they should go beyond the strictly economic and technical levels and take into consideration the principles of social justice and of the authentic development of the human person.

2. A second group of scholars evaluated the studies on the human brain and its marvellous functions. The results of research provide a better understanding today of the organic structures and processes which underlie the cognitive and affective operations of the human being. But beyond all empirical observation, there appears the mystery of the spirit, which cannot be reduced to the biological supports which come into play in the behaviour of the intelligent being open to transcendence. Confronted with what is now known about the brain, the believer cannot forget the words of the Book of Genesis: 'The Lord God formed man of dust from the ground, and breathed into his nostrils the breath of life'.¹ In anthropological terms, the ancient narrative of creation brings out very well the intimate bond that exists between the physical organ and the spirit in man. Thus it was opportune that scientists compare the results of their experimental studies with the reflections of philosophers and theologians on the relationship between the spirit and the cerebral apparatus. Niels Stensen, in his 'Discourse on the Anatomy of the Brain', had already said of the brain that it was 'the most beautiful masterpiece of nature'.

3. You desired to take part in the recent celebration of the beatification of Niels Stensen, that great scientist who sought, in his whole life and work, to reconcile the different orders of knowledge which constitute the grandeur of the human being. Your Academy, together with Denmark, desired that the memory of this event should endure and be commemorated by a plaque placed in its own offices. I must express my deep gratitude to the Danish nation and to the Academy for this gesture.

4. Today, having very much in mind the itinerary followed by Niels Stensen throughout his life, I would like to note here some elements which contribute to deepening the meaning, the value and the responsibility of science. This scientist explored the marvels of nature, particularly in the domains of anatomy, physiology and geology. While pursuing his studies of the natural phenomena, he never lost sight of that which transcends nature itself, and, while directing his attention to the infinitely minute and to measurable data, he always remained open to the grandeurs that surpass all measure.

For him, the synthesis of knowledge combines the data obtained thanks to experiments on nature and the values which, while inaccessible to experimentation perceptible to the senses, nevertheless form part of reality. Stensen was profoundly attracted by the beauty of the physical universe, but even more so by spiritual values and the nobility of human behaviour. He studied with care the certitudes of the mathematical order, but he was just as much drawn by other certitudes of the historical, moral and spiritual orders.

5. Experimental science arouses a legitimate admiration, and the Church willingly encourages the research of scientists who help us to understand the enigmas of the physical and biological universe. Yet experimental science does not exhaust the whole knowledge of reality. Beyond the visible and sensible, there exists another dimension of reality, attested to by our most profound experience: this is the world of the mind, of moral and spiritual values. Above all, there is the order of charity, which binds us to each other and to God whose name is Love and Truth.

Even with the frailty of his condition as creature, man still maintains the imprint of the original divine unity in which all perfections are united without confusion. In the visible world, these perfections appear dispersed and diminished, but they no less effectively recall, particularly in man, the image of the true unity of the Creator. This image is that of the Truth itself.

Such are the characteristics of the overall synthesis which establishes the unity of knowledge and which inspires, by way of consequence, a unity and consistency of behaviour. It is a question here of a unity constantly to be built, according to the dynamic characteristics of life.

6. My predecessor, Pope Pius XI, in one of the first speeches which he addressed to the Pontifical Academy of Sciences after its reconstitution, developed at length the theme of truth. He said that it is important to conceive and to affirm the truth, but that it is still more important to recall that 'he who *does* what is true comes to the light'.² This is the fundamental rule of thought and of action which transforms every work into a visible reflection of the truth. It was this ideal that inspired Pius XI when, in 1936, he named the first seventy members of the restored Academy, inviting them to take part in it in view of the importance of their original scientific studies and their high moral quality, without any ethnic or religious discrimination. This is still expressed in your statutes and it is in the same spirit that I invite you to pursue your work and your research.

7. The Pope still today asks your Academy to contribute to 'doing the truth', that is to say, to seek the unity of knowledge in international scientific solidarity, in human solidarity, in openness to all values, for the good of humanity.

Undoubtedly, as scholars, you must rigorously apply the rules proper to each of your disciplines so as to arrive at conclusions that will be valid and verifiable by every other specialist in your fields. Yet, while respecting the necessity for methodological abstraction and the autonomy of each discipline, you are invited to examine the results of your research in the light of the other sciences. Every scholar is called on today to participate in a patient reintegration of human knowledge. Nothing less than the future of man and of culture is at stake.

Your Academy, which is international, presents a peculiar characteristic: on the one hand, it has the duty of working in close connection with the international scientific community and, on the other hand, it is called to collaborate with the departments of the Church so as to supply them with elements useful in the fields of their competences.

It is in this spirit that I would like to renew to the illustrious Members of the Academy the request I made during the audience for the fiftieth anniversary, urging them to promote concrete proposals which would favour interdisciplinary collaboration at all levels. While continuing your specialised programmes, it would also be useful that you develop joint research projects, in close consultation

with other cultural, scientific and university organisms of the Holy See. The Church needs your research to deepen her knowledge of man and of the universe. She likewise counts on your studies to confront the grave technical, cultural and spiritual problems which concern the future of human society. I thank you in advance for your indispensable contribution to our common effort to understand in greater depth the enigma of man and of his destiny, in the order of creation and in the order of salvation.

8. Before concluding, I would like very specially to greet Professor Carlos Chagas who, at the end of sixteen years of presidency, is now relinquishing the responsibilities which he has discharged with such distinction, generosity and selflessness. I must pay him a very special tribute by noting the considerable work accomplished under his leadership. Thanks to him, the Academy has seen an important development in the number of its members and in the diversity of the countries from which they come: one could speak now of universal representation. Under his impulse, the Academy has become a centre of continual activity, making contact with other Academies and with scholars of numerous countries, taking up important subjects in the realm of the historical sciences, for example, the studies on Galileo and Albert Einstein; in the domain of the fundamental sciences, such as research on cosmology, astronomy, the microsciences, the structure of matter, the origin of life, biological processes; or again in the field of the sciences applied to the problems of the modern world, notably in matters pertaining to peace and disarmament. One could say that the important concerns of today's world have not escaped its attention. Today, the Holy See thanks Professor Chagas for the vitality he has communicated to the Academy, for the radiance he has given to it, for his highly appreciated activity which has made it possible for the Church to become much more present to the world of science. And I am personally grateful to him for being willing to continue to place his outstanding talents at the service of the Church.

I have asked Professor Giovanni Battista Marini-Bettòlo to succeed Professor Chagas. He has collaborated actively in the work of the Academy for over twenty years; in his new responsibilities, I wish him a fruitful period of work. I am confident that, with the help of the members of the Academy, he will continue the work undertaken by his predecessors.

While renewing the expression of my esteem for the work of the Academy and of my gratitude for the service it renders to the Holy See, I invoke upon you the Blessing of God.

1 *Gn* 2:7.

2 *Jn* 3:21.