Address to the Plenary Session and to the Study Week on the Subject ‘The Use of Fertilisers and its Effect in Increasing Yield with Particular Attention to Quality and Economy’

The Pope confirms the nobility of the scientific endeavour and praises the positive achievements of technical advance, which should conform to wisdom. The study of nature reveals the wisdom of its creator. It can also provide solutions to major problems, such as that of world hunger, a subject of great importance to the Church. Much improvement in this area has been achieved through the application of science to agriculture. In conclusion, Paul VI says that ‘what started out as a talk of science ends up as a talk on man, on his spiritual and moral value, the condition of real progress for the person as well as for society: this is the entire justification of the deep interest the Church takes in scientific work’.

Mr. President. Members of the Academy, My Lord Cardinals, Mes-sieurs Ambassadors, and all of you who have kindly honoured us with your presence.

The noble words we have just heard have given us a brief but striking picture of the phases of the fruitful work of the Pontifical Academy of Sciences in the last years, and they would suffice in themselves to show the vitality of this institution. The awarding of the Pius XI Gold Medal to Professor György Némethy is also a sign of this vitality. It has become, as you know, a tradition to recognise in this way the merits of a scholar of international repute, in his specific field. Professor Némethy, a son of the noble Hungarian nation, has at present a chair at the Rockefeller University. He is, you know better than we do, a specialist in the physical chemistry of liquids and solutions, and we are happy to confer on him this mark of esteem and encouragement in the presence of

such a highly qualified audience as yours.

A tribute to science

Your presence here, Gentlemen, like our own, is intended as a tribute to science; and the immensity of the horizons that this word itself conjures up before the mind's eye, gives rise to almost infinite reflections.

When in 1936 our great Predecessor Pius XI set up the Pontifical Academy of Sciences, he indicated the aim he proposed for it as follows: 'Our wish and our hope is that, through this Institute, the "Pontifical Academicians" will contribute more and more and better and better to the progress of sciences. We do not task anything else of them: this noble intention, this brilliant labour, such is the service we expect from men enamoured of truth'.1

The disinterested search for truth, the tireless pursuit of the secrets of the universe are, in fact, among the highest values, the most enthralling ideals to which a man can devote his life, '*Intellectum valde ama*', St. Augustine said; and last century the geologist Pierre Termier (1859-1930) dedicated a book which perhaps you know, to 'The joy of knowing'. The scholar's joys are familiar to you, Gentlemen: suddenly to find the solution to problems after long study; after prolonged efforts, often painful, sometimes unavailing, to penetrate further into the secrets of nature; on the basis of ever more specialised researches, to construct suddenly a magnificent synthesis – sometimes seen in a flash – which gathers in a luminous theory a series of partial truths, apparently heterogeneous, and exclaim: 'I have found it'; you have known these moments of exaltation.

Joy of the intelligence, rewarded for its works; aesthetic enjoyment, in the presence of a fine result; moral elevation, through the emphasis of effort: in all these ways the scholar rises above himself. And in this way, too, he serves mankind. As generation follows generation, new researches prolong previous discoveries; civilisations mature; progress expands. People have rightly spoken of the acceleration of history: true, it is due to the achievements of technology. But these achievements would not have been possible, or would have remained ambivalent, if the disinterested seeker had not first preceded, then accompanied the technician.

The real scholar goes even further. He knows that all civilisation presupposes wisdom. 'The future of the world stands in peril', Vatican II says, 'unless wiser men are forthcoming'. And it adds: 'Many nations, poorer in economic goods, are quite rich in wisdom and can offer noteworthy advantages to others'.2

This wisdom is not opposed to culture of the mind: they condition and complete each other. For science is not pride; it leads thereto only if deflected from its purpose. It is a lesson in humility: only by obeying nature is it possible to conquer it. Nature appears to us first of all as an obstacle to be overcome, darkness to be illuminated. It conflicts with our dreams and our fancies. But as we submit to its demands, we discover its laws. And we can gradually utilise them, discern means of putting them at the service of man. Thus the wise man accompanies the scholar; nature, at first hostile, but improved and transformed by work, becomes an ally and a friend.

The mystery of nature

This meeting of the scholar with nature sets him on a new path. One discovery leads to another, which in turn leads to yet another, but the spirit is never completely satisfied. Is it a case of indefinite progress towards an inaccessible goal? But this would be the abdication of intelligence! Nature, gradually dominated, reveals a mystery greater than itself. And here the scholar is invited to become a philosopher. Either at the beginning or at the end of the enigmas he meets with on his way and which he works to solve, he is led to recognise, or at least to divine, the presence of a Wisdom of another order, unlimited, transcending space and time, which explains the presence of these laws, at first unyielding, but then mastered and utilised.

The spark of light of human intelligence, unequally distributed but present in each of us, appears to the scholar as a participation in this absolute Light, where there is no darkness. Each step forward we take, each synthesis we make, reveals to us something of the plan that presides over the universal order of beings, over the forward effort of man and mankind. Here we are 'in search of a new humanism which will enable modern man to find himself anew by embracing the higher values of love and friendship, of prayer and contemplation'.3

So the task of the scholar is a hard one, if he claims to conquer nature by obeying it, to progress by dominating it. But that calls for other specific virtues, which are familiar to you: obdurate effort, in spite of apparent or temporary failure, patience in spite of the slowness of results, creative imagination in order to discover new ways, the passion for research with the determination to succeed. Then, as you have guessed, out of this alliance of deep reflection, of questioning about oneself, about mankind and the universe, which unites the scholar and the philosopher, there is born the wise man.

The study week of the Pontifical Academy of Sciences

At it advances, science has become more complex and specialised. Even a genius could not master it alone, not even in his own field. Any study whatsoever presupposes a series of problems, premises, a line of research and its own logic. All that may differ, not only according to previous individual discoveries or results, but depending on the angle of view chosen. Working on the same problem, isolated scholars may arrive at opposite conclusions. Collaboration, confrontation, call for personal and sufficiently prolonged contacts between them, if not with the hope of immediately solving the controversies, at least with the certainty of understanding divergences better and taking advantage of them. Thus the progress of science will become all the more rapid.

That is why you are here. Almost from its foundation, the Pontifical Academy of Sciences has organised study weeks, the first in 1940. It invited some eminent scholars, specialised in a clearly defined question, not too numerous in order that the dialogue would be really fruitful among them all, and that they could examine together all the facts relating to the problem. In spite of the circumstances – the world was then at war – the success measured up to the hopes. When peace was restored, the study weeks were multiplied, as we have just been reminded: yours is the twelfth.

'The use of the fertilisers and their effect on the increase of crops, particularly with regard to quality and economy': this is your subject. It was with keen interest that we read the summaries

sent by each of you for the preparation of the work. Their technical aspect is not within our competence and belongs to you alone. But the subject dealt with involves such human interests that the Church, concerned as she is with the development of the whole man and of all men, anguished by the drama of hunger in the world, anxious about the gap which, far from closing, seems to be widening between industrial countries and countries considered as being still in a rural economy, the Church, we say, expects a great deal from your researches, to contribute to the solution of these problems.

The drama of hunger in the world

To make food resources proportionate to the growing population of the globe, to overcome malnutrition, and finally to enable less industrialised countries, the producers of agricultural goods, to enter world commerce in conditions that are not too inferior: all these ambitions are human in the first place, and aim at meeting in a more satisfactory way the requirements of social justice, either between sectors of production in regions of advanced industrial civilisation, or between the latter and populations that are mainly agrarian.

At least in the former unquestionable progress has been made, thanks to your work. The new rural generations are aware of the distance that still separates them from urban life, and the advantages that advanced technology offers the latter. If they do not benefit from them to the same extent, they receive the gleanings, and exploit them. Thanks to mechanisation, they have been able to cultivate wider areas. By using fertilisers, they have increased and sometimes doubled their yields. They have learned to have their soil analysed in order to know what it is best suited for. They aim at specialisation. Though their numbers are small, they are able to provide for the feeding of denser and more demanding populations. Agriculture, once traditional and following a customary pattern, gradually becomes expert and technical. The peasant is replaced by the rural cultivator.

This being so, a deeply human task awaits you. You are and will to an increasing extent be the educators of this rural cultivator; he expects a great deal from your teachings. You will teach him to seek quality more than quantity, for it is a question of the food of mankind; to make a well balanced use of his fertilisers, in order not to exhaust his land by demanding from it more than it can give; not to contribute to the pollution of waters by an illegitimate use of uncontrolled pesticides. It is a highly moral problem. You will teach him that if the desire for a more just remuneration for his work and the aspiration for a more dignified human life are legitimate, he has also the noble mission of bringing men wholesome foodstuffs, not contaminated by unhealthy articles that serve only to hasten an abundant quantitative production.

But as you know, our concern goes first and foremost to the poorest, who, owing to their economic weakness, remain in a condition of inferiority in the field of international trade. That is why we rejoice to find in your programme identical concerns: the correct use of fertilisers in humid tropical and sub-tropical regions, the importance of soil fertility in tropical Latin America, the role of fertilisers in African agriculture. Here again you will be indispensable educators, the only ones perhaps, capable of awakening to new horizons a population too much attached to its routines.

The activity of FAO

A great deal has already been undertaken. For over twenty years, FAO has been studying these problems, not without difficulties, but not without results. Thanks to the use of more suitable fertilisers, to better seed selection, to less backward techniques, countries that seemed condemned to endemic famine have considerably improved the yield of their soil and increased their production. But there remains a great deal to be done. You will have to carry out, in the first place, a work of persuasion, by means of varied, but conclusive experimentation. For the peasant, even if uneducated, or even illiterate, believes in what he has seen. Your researches will teach him not to exhaust a soil that is already too poor, by exploiting it excessively or in too primitive a way, to balance the rotation of his crops in order to be less the victim of climatic uncertainties, to adapt the use of fertilisers to the conditions of the land and the climate. One thing is certain: too large a part of the earth is not rationally exploited. The first act of the struggle against hunger consists in getting the soil to produce everything it can: this is part of your competence.

If you succeed in convincing not only the farmer stooped over his desolate land, but first of all those in charge of the national economy, a great step forward will have been taken. Having improved his conditions of material life, the Indian, African, South American peasant will at least be able to acquire more fully the goods of the spirit to which he aspires, a culture that is not copied from others but is specifically his, which will allow him, too, to rise above himself and become more of a man.

May your researches, sometimes obscure but efficient, lead to a common effort of all men of goodwill to use the immense resources of brain and brawn to fertilise the land.4 Is not that, after all, the conclusion of one of you: ‘Technical means’, Professor Baade writes, ‘better plant food, the use of commercial fertilisers, we have known all that for a hundred and fifty years. But the utilisation of these technical means depends on progress in the field of human morality; and the real progress of peoples, which is determinant, consists in this’.5

The interest of the Church in scientific research

So, as you see, Gentlemen, what started out as a talk on science ends up as a talk on man, on his spiritual and moral value, the condition of real progress for the person as well as for society: this is the entire justification of the deep interest the Church takes in scientific work.

There remains for us, at the end of this talk, only to express to you once more our congratulations and best wishes. We do so wholeheartedly, invoking the abundance of divine blessing on the activities of your Academy and the happy continuation of your work, on yourselves, your families and all those who have kindly wished to emphasise the solemnity of this audience with their presence.

1 *In Multis Solaciis*, *AAS* 28 (1936), p. 424.

2 *Gaudium et Spes*, n. 15, § 3.

3 *Populorum Progressio*, n. 20.

4 Cf. ‘Address of 16 November 1970 to F.A.O.’, in *AAS* 62 (1970), p. 837.

5 Prof. Dr. F. Baade, Kiel, Germany: programme of the study week on the use of fertilisers: ‘A century of crop increase, thanks to the use of commercial fertilisers; looking back to the year 1900 and forward to the 2000’, p. 135.

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