

## CHAPTER 17

### THE SPECOLA, AN INSTRUMENT FOR DIALOGUE <sup>1</sup>

The thousands of visitors who come every year to Castelgandolfo to take part in the papal audiences in the courtyard of the Apostolic Palace cannot help but notice the domes of the Specola Vaticana situated on the top terrace of this ancient building and those half hidden amidst the trees in the Villa Barberini.

A visit to a modern observatory in such a setting causes one to reflect. Many questions are asked of the astronomers of the Specola. Why a papal observatory? What meaning is there in the fact that priests are employed full time in astronomical research. And why should they be Jesuits? Does it still make sense to keep up an observatory like this one, when larger and more powerful ones are always being constructed? How, to be concrete, do the individual Jesuits at today's Specola see their calling to this very special kind of apostolate?

We would like to present some thoughts which might help to approach an answer to these questions.

#### Unmasking the Prejudices

Above all we must remember that a century ago, at the time when the Specola was refounded, the dominant culture in Italy and abroad was such that no occasion was lost to throw weighty accusations at the Church of being obscurantist and closed to scientific progress.

It was precisely to neutralize these accusations that Pope Leo XIII wished to give new life to the Specola: so that ". . . everyone might see clearly that the Church and her pastors are not opposed to true and solid science, whether divine or human, but that they embrace it, encourage it, and promote it with the fullest possible dedication".<sup>2</sup>

We might draw attention to the fact that in the same year in which Pope Leo, with the encyclical *Rerum Novarum*, sought greater social justice for the world, he also felt it necessary to refound the Specola to obtain greater justice from the world towards the Church!

With his declaration just quoted, so comprehensive and decisive, Pope Leo shows that he wished to place himself and the Church at a level both far above the defensive polemics of the times and also beyond the maneuvers of a simple peaceful coexistence. His is the position from which the Church sees and accepts science as a constituent part of its heritage. In order to reestablish an effective dialogue between the Church and the world of science it was not enough to pronounce discourses, give encouragement, or even promote the glorious Pontifical Academy of the *Nuovi Lincei*. To win trust in this field and to undo the condemnation of Galileo concretely and unequivocally it was necessary to involve the Church in scientific research itself.

### **Astronomy, the Ancient Queen of the Sciences**

Now we ask once again: why precisely an astronomical observatory? Since he had, for practical reasons, to choose a very specific field of research, Pope Leo, in founding the Specola did nothing other than give new life to the glorious tradition of astronomical research long associated with the Holy See. This tradition, as we have mentioned at the beginning of this history, had reached its apex some ten years before at the Pontifical Roman College Observatory, thanks to the pioneering research of the Jesuit, Angelo Secchi.

Still more, among the various sciences, astronomy, because it is so comprehensive and has had such an interesting history, is the one science that has had a special role to play, both practical and symbolic, within the history of human thought, especially with respect to the relationship between science and religion.

For centuries, in fact, generations of philosophers and mathematicians, faithful to the ideas of Ptolemy, had considered astronomy to be the queen of the sciences. This tradition was still strong at the time of Galileo when his Jesuit friend Father Christoph Clavius, who was professor of mathematics at the Roman College and played a principal role in the reform of the calendar, wrote:

Astronomy uses geometrical and arithmetic demonstrations which, in agreement with the opinion of all philosophers, arrives at the first degree of certitude. Therefore, reasoning from the nobility of the subject matter

and from the certitude of demonstration, Ptolemy simply placed astronomy as the first among the other sciences.<sup>3</sup>

Christian culture had no trouble assimilating this tradition, as it found it in accord with the many Scriptural texts which lead us to think of the science of the heavenly bodies as the one which more than any other can reveal to man the glory of God.<sup>4</sup>

It is no wonder then that this tradition is taken up anew by Leo XIII himself in the founding *Motu Proprio* where he asserts:

Among all of these studies astronomy holds a preeminent position. It proposes to investigate those inanimate creatures which more than all others proclaim the glory of God and which gave marvelous delight to the wisest of persons, the one who exulted in his divinely inspired knowledge, especially of the yearly cycles and of the positions of the heavenly bodies (Wisdom VII.19).<sup>5</sup>

Furthermore, we should remember that a century ago, at the time of the Specola's refoundation, astronomy was already in a particularly vital stage of its development, so that it was positioned more and more at the crossroads of the other sciences. At the same time its independence from involvement with industry and politics and its international character fit very well with the Church's need to play a part in the world of science on a large scale and with the widest possible contacts. It was, in fact, precisely this need to participate by contact with the international scientific community that brought the Pope to the desire that the Specola would, right from the beginning, take up as a principal task collaboration with other observatories around the whole world in carrying out the *Carte du Ciel* (International Sky Mapping Program).

### Priest-Scientists

So it was that the Vatican Observatory, the only case of a scientific research institute directly supported and administered by the Holy See, was

entrusted right from its beginning to priest-scientists, and for about 90 years it has been directed by Jesuit astronomers.

As to the reasons why the Specola was entrusted to men who were at the same time priests and astronomers, the *Motu Proprio* of Leo XIII is again of considerable help as it recalls the tradition which began at the time of the reform of the calendar. The reform had been expressly recommended to the Pope by the Council of Trent and, in so far as it involved the need to define accurately the date of Easter, it had required, by the very nature of the problem, the essential contribution of men who were experts at the same time in astronomy and theology.

On the other hand, since the accusation of obscurantism was directed principally at ecclesiastics, who could better testify to the contrary thesis than men of the Church, that is, priests who were also true scientists, who would have to gain recognition and appreciation exclusively through the quality of the scientific research which they carried out?

Other observatories draw their staffs from the universities with which they are associated. The Popes, with a view to the science-religion dialogue which the observatory was expected to carry on, had naturally looked first of all at the availability of scientific expertise already existing among those who, since they were also priests and religious and immediately, therefore, available to the Church, were also obviously suitable for the task of representing the Church. Their two-fold competency prepared them in a particular way for the role of interpreters, a role which the staff of the observatory should have been capable of carrying out as part of the dialogue to be established between the Church and the world of science.

And so it happened that the scientists to whom the Specola was entrusted were chosen from ecclesiastics and religious who, regardless of the religious order to which they belonged, from time to time turned out to be among those most esteemed and appreciated in Italy and abroad in the fields of astronomy and meteorology. As we have seen in the preceding chapters, there was the following succession of the first directors: Father Denza, Barnabite; Father Rodriguez, Augustinian; Father Hagen, Jesuit; all of them assisted by Father Lais, Oratorian.

### **Jesuit Astronomers**

We recalled in Chapter 6 that Pius XI, at the time that the Specola was refounded at Castelgandolfo, wished to have it entrusted permanently to the Society of Jesus and that from that time it has been the responsibility of

the General of the Society to propose a director to the Pope and to provide a staff of Jesuit scientists. This is a unique case of a group of Jesuit scientists who work, in the name of the Church and the Society, at the immediate service of the Holy See. For that reason, in 1966 the Thirty-first General Congregation of the Jesuits repeated that the Specola was to be counted among the works which the Holy See had assigned directly to the Society and, in 1970, Father General Aruppe recommended to all the major superiors of the Society that it was necessary to support the Specola by assigning capable and interested Jesuits to work there as researchers.<sup>6</sup>

To entrust the Specola to a religious order was simply the concrete way whereby the Pope wished to guarantee for the future the fulfillment of that condition which his predecessors had already considered essential for reaching the end for which it had been founded, namely the presence at the observatory of men who would be at the same time scientists and religious.

That the order chosen was that of the Jesuits can be attributed, in addition to the concrete situation whereby for thirty years a Jesuit had been head of the Specola, to both the special bond of availability which binds the Society of Jesus to the Supreme Pontiff and to the noteworthy potential and cultural diversity of its priest-scientists engaged in scientific research in colleges, universities, and astronomical and geophysical laboratories.

### The Science-Faith Dialogue

At the inauguration of the new headquarters at Castelgandolfo Pius XI did no more than reemphasize the ideas enunciated fifty years before by Leo XIII. He said that the purpose of the Specola was "to assure for the Faith and for Religion that implicit, rather explicit, support which shines forth and is more than ever persuasive each time that respect for the Faith is shown to be united in a fraternal embrace with the cultivation of science".<sup>7</sup>

The goal, therefore, was still to establish and facilitate the dialogue between science and faith, a goal which with each passing year has become ever more timely and vital in the Church's self-awareness.

In fact, from those times to today science as a whole, and in particular astronomy, have made spectacular progress and the importance of science in human society is ever increasing.

At the same time, the climate of renewal which has animated the Church since the Second Vatican Council and the most recent pontifical messages, from *Ecclesiam Suam* of Paul VI in 1964 to the Message of John Paul II to the Director of the Specola of 1 June 1988<sup>8</sup>, tell us that the Church

is untiring in her search for ever more efficient ways for dialogue with today's world.

The Church is well aware of the unity and the interconnection of all truth, a unity founded in God, the author of all truth. Under the influence of materialism and skepticism modern man has, now more than ever, lost for the most part this sense of unity. Faced with the rapid growth and the obvious power of science, he tends to find in the scientific method an alternative to the Christian philosophy of life. Even where there is no intentional opposition or conscious prejudice, the barriers of a different cultural substratum and also of a peculiar technical language isolate an ever growing part of mankind from the message of the Church, with the danger that the Church herself remains in turn isolated from what science has to say.

In this regard it is important to note that John Paul II, in repeating how necessary the science-faith dialogue is, also puts the emphasis, more so than any of his predecessors had done, on the fact that the dialogue cannot exist as a one way street. If it is true that science must be open when theology seeks to approach it, it is no less true that theology must be open and attentive to progress in science.

It must be said, to be truthful, that modern cosmology, that part of astronomy which has undergone huge developments in the past decade as it explores the physical origins and evolution of the universe, offers today an altogether new and special opportunity for the exchanges which the science-faith dialogue imply.

Cosmology, in fact, more than any other branch of science, brings the scientist to deal with problems and formulate conclusions which, as they touch upon interdisciplinary matters, lead in a natural way to ultimate questions which are no longer only about physics but rather about metaphysics, and not infrequently about theology. And so today scientists on the one hand and philosophers and theologians on the other find themselves being challenged anew to mutual exchanges where they each set out to meet the other knowing that they must together both give and receive.

John Paul II had expressed himself in this fashion on various occasions, but he did so in a very special way in the Message we spoke of above to the Director of the Specola Vaticana. Speaking of the new data which science acquires, he asserts:

. . . As these findings become part of the intellectual culture of our time, however, theologians must understand them and test their value in bringing out from Christian belief some of the possibilities which have not yet been realized.

If theologians paid a greater attention to the results of science this

... would prevent them from making uncritical and overhasty use for apologetic purposes of such recent theories as that of the *Big Bang* cosmology. Yet it would equally keep them from discounting altogether the potential relevance of such theories to the deepening understanding in traditional areas of theological inquiry.

Each of the disciplines involved in the dialogue must contribute

... to enrich, nourish and challenge the other to be more fully what it can be and to contribute to our vision of who we are and we are becoming.<sup>9</sup>

In this perspective, the way in which the Specola sees its mission in today's world becomes clear. The first object is to become a part of the intellectual life and the ongoing development of modern astronomy in a clear productive manner. It is not a matter of creating an image which gives the appearance that the Church is interested in science, but rather to do science in the fullest sense of the word. Through this work one hopes to instill in the modern world, Catholic and otherwise, an exact evaluation of the place of science in Christian life and thought and to help colleagues in science to recognize the value, no longer only physical, but philosophical and theological, of the ultimate questions to which they, more and more naturally, are led by their research in physics and, in particular, in cosmology.

### **Competition or Collaboration?**

But - another question - how can the Specola pretend today to be up to doing serious and competitive scientific work when there are an always increasing number of institutes who rely for their research on space telescopes or on the new observatories being constructed around the world which are equipped with instruments enormously more powerful and costly than those of the Specola.

We should remember in this regard that modern astronomy covers a vast variety of research programs and each of them has need of instruments with special characteristics, of which size is but one, and not always a necessary or sufficient one. The most powerful telescopes must carry out research at the very limits of their great potential and they can only do this well if they have at their side smaller telescopes fitted for research which is

equally fundamental and fascinating and for which the large telescopes would be poorly employed.

The same holds for space telescopes. Besides the fact that they are in themselves extremely costly and run the high risk of becoming an excessive financial burden when they fail to function properly, as has happened in the case of Hipparchus and Hubble, they are especially helpful when employed in the infrared and ultraviolet, which can only be partially studied by ground-based telescopes, not to speak of X rays and gamma rays. And then, as far as the perturbations due to atmospheric turbulence from which space telescopes are completely immune, it must be said that large ground-based telescopes are by now competitive with those in space, because of the new developments in active optics.

The relationship, therefore, between large and small observatories is such that they complement rather than compete with one another.

It is worth the trouble, in this regard, to remember how totally valid today are the words which Father Treanor wrote in 1973 with respect to the challenge facing the Specola due to the enormous development of astronomy in recent decades:

It would be an illusion for us to put ourselves on an equal footing with the large institutes which have almost unlimited technical and economic resources. The world offers us many other examples of Observatories, relatively small but good, whose contribution to scientific progress exceeded by a large measure their physical dimensions.

How are we proceeding today to confront this challenge? We have already commented on the conviction of astronomers that we still need classical observatories, even those not very large. We have inherited from Father Secchi a tradition which has carried the Specola's interests toward ever deeper studies of our stellar system, that is, the Galaxy. It is a field in which our astronomers are already known for their expertise and for which our instrumentation (thanks to a strategic up-dating initiated during the last decades) is particularly suitable. Above all it is a field of astronomy in rapid growth where observatories, even those with limited resources, can make a notable



contribution, also to technical developments, that is, to the observational techniques and interpretation, on which all progress in astronomy is ultimately based.<sup>10</sup>

With the installation of the new advanced technology telescope on Mount Graham in Arizona, the Specola will soon bring its instrumentation up to today's standards, thus taking a place among those observatories equipped with instruments of modest power, the larger number by far in the world.

### **The Protagonists Speak**

As to the question of the last paragraph, here are the responses which the Jesuits of the Specola have on more than one occasion given to those who interviewed them to obtain their personal views.<sup>11</sup>

- Father Richard Boyle: "One of the ways I can express motivation in doing astronomy and observational astronomy is related to that perennial question that man has had: where are we? what time is it? and also where have we come from, where are we going?"

- Father George Coyne: "Our kind of research is a very humiliating experience objectively speaking - out there, not just in here. Namely, the more we know about the universe the more we know we don't know. The universe - it's not just the vastness of it quantitatively, but it's the secrets of it, inside the universe, that we never come to a full understanding of. We're always groping to understand more; and that very groping for an understanding of the mystery of the universe opens us to God giving himself to us. God is mystery. He's mystery not because we don't understand Him; He's mystery because he is the thing that explains everything."

- Father Martin McCarthy: "That epitomizes for me the vocation that we have - to share in the exploration of the wonders of God's created universe and to push forward in a little way some branch of that research ourselves. And we all do different things in science but we are all just like people who are making a great jigsaw puzzle, putting a little bit of the mosaic in and at the end we hope that it will lead to recognition of God our creator and Lord, and to let other people share in that excitement."

- Father Christopher Corbally: "In the Christian tradition the sound old ideas still ring true. We have God's participation in the universe that he's

created. He made it, he saw it and found that it was good. It's in that 'finding it was good' that the contemplation of astronomy enters in. It's the astronomer discovering how that universe runs, how it works, how it all fits together, the fascination of that universe. And then himself finding it was good. And sharing then in God's own delight in the universe he created."

- Father Christopher Moss: "I think the goal of the Vatican Observatory is really a presence of the Church in the world of science. But I would go further. I would say it's an activity which is deeply consonant with the Christian faith. Many theologians would point to the seminal influence of medieval theology. It provided at least a part of the intellectual conditions for the rise of modern science. And understanding how the universe works adds a quality to life, just as music does, or painting. I think there is no great antagonism between science and religion among research scientists in general. My experience, if anything, has been the contrary. I do think the theoretical level provides a challenge to theology, a very healthy challenge. A scientist is like a contemplative. But rather than a life of prayer exploring an inner world, the scientist explores the world of the universe which reflects God's glory, which reflects the nature of God. The tools astronomers use are these magnificent telescopes and the electronic equipment and the rest, but they're still engaged in a work of contemplation. The scientific community is extremely important, what we do together as a whole . . ."

- Father William Stoeger: "I wanted to do both things; I wanted to be involved in scientific research, not just as an individual but with groups, and I also wanted to, felt a call to, be a priest and religious and sort of integrate the different areas of knowledge: the scientific area, the religious area, the philosophical area, as being several parts of one whole - complementary areas of research."

## **A Two-fold Mission**

We think that what has been said so far is also an adequate response to another question that the astronomers of the Specola hear addressed to them especially by priests and fellow Jesuits engaged in pastoral work. Is it right that the Church and the Society of Jesus should continue to dedicate a certain number of qualified priests to this kind of work when the vocations crisis makes ever more urgent the need for pastors of souls?

John XXIII, speaking in a leisurely way one day with Father McCarthy, S.J. with his familiar humor and simplicity, gave this synthesis of

the mission and the meaning of the full-time work of the Jesuits of the Specola:

You have two works to do. One is to explain the world of science to the Catholic Church. The other is to explain the Catholic Church to your fellow scientists. I think you do the second much better.

With these words Pope John clearly shows that he is thinking no longer in the predominantly apologetic perspective of Leo XIII, but in the conciliatory spirit of dialogue. According to this perspective it is still proper today more than ever that there be scientist-theologians in the Church. John Paul II says this clearly in the Message we have referred to, when, after having clearly established by a series of questions the need for a healthy osmosis between theology and science, he affirms:

Questions of this kind can be suggested in abundance. Pursuing them further would require the sort of intense dialogue with contemporary science that has, on the whole, been lacking among those engaged in theological research and teaching. It would entail that some theologians, at least, should be sufficiently well-versed in the sciences to make authentic and creative use of the resources that the best-established theories may offer them.

[ . . . ]

In this process of mutual learning, those members of the Church who are themselves either active scientists or, in some special cases, both scientists and theologians could serve as a key resource. They can also provide a much-needed ministry to others struggling to integrate the worlds of science and religion in their own intellectual and spiritual lives, as well as to those who face difficult moral decisions in matters of technological research and application. Such bridging ministries must be nurtured and encouraged.<sup>12</sup>

So today as in the past the Jesuits of the Specola, through the activities they carry on at the direct service of the Holy See, devote their energies to fulfilling a two-fold mission: on the one hand, to continue to assure that the Catholic clergy, most of whom are engaged in pastoral work, are not as a group left cut off from the methods and the language of modern science at the research level; on the other hand, they see in their work one of the ways to respond to the specific mission entrusted to the Society by the most recent Popes to confront the many forms of contemporary atheism.

This is a mission which is still today clearly expressed by the words of Pius XI inscribed on marble in full view on the wall of the double astrograph building: *Deum Creatorem Venite Adoremus* (Come Let Us Adore God the Creator).

It is a mission which the astronomers of the Specola carry out with full devotion to the cause of God and his Gospel knowing full well that the results cannot be measured in concrete terms, but also certain that God, in his own time and way, will be able to produce the fruits which he desires.

### Notes

1. See P. Treanor, S.J., *La Specola strumento di dialogo, L'Osservatore Romano*, 17 December 1965.
2. Leo XIII, *Motu Proprio, Ut Mysticam*, see Chapter 18, 207-210.
3. C. Clavius, *Commentarius in Sphaeram Johannis a Sacrobosco*, Rome 1570, Preface.
4. Father A. Secchi, in the Introduction to the booklet: *L'Astronomia in Roma nel pontificato di Pio IX* (Astronomy in Rome in the Pontificate of Pius IX), which can be considered his scientific testament, writes:

If there is a study capable of raising the spirit of man towards his creator, it is surely the science of the heavenly bodies: *Coeli narrant gloriam Dei!* (The heavens declare the glory of God). Therefore, it is no wonder that many persons consecrated to the divine service have taken up this study with great devotion and success.

And after having prepared a list of ecclesiastics who are distinguished in the history of astronomy, he concludes:

It was natural that such a culturally sensitive pontiff as Pius IX should protect this science, which, in addition to the

aesthetic aspect, is so useful for the progress of philosophical studies in general and presents special advantages for the service and worship of the Divinity.

As for the fact that today, for many men of science, the Universe is more a shield than a help to the discovery of God, see Mario Viganò: *I Cieli cantano ancora la gloria di Dio?* (Do the heavens still declare the glory of God?), in *Civiltà Cattolica*, 1979, I, 450.

5. Leo XIII, op. cit.

6. Cur. Gen. 70/9, *De nostrorum labore in Specula Vaticana* (On the work of Ours at the Vatican Observatory), 20 March 1970. See also Chapter 15, 170, note 1.

7. See *Inaugurandosi in Castelgandolfo la Specola astronomica Vaticana, XXIX settembre MCMXXXV* (The Inauguration of the Vatican Astronomical Observatory at Castelgandolfo, 29 September 1935), *Tip. Pol. Vat.*(1935) 11.

8. See Chapter 18, 211-224.

9. Ibid.

10. P. Treanor, *La Specola Vaticana di fronte all'Astronomia moderna* (The Vatican Observatory faces modern astronomy), *L'Osservatore Romano*, 18 January 1973.

11. The responses of those interviewed have been taken from the telefilm on the Specola: *People with Long Eyes* and from the article: *The Vatican's Arizona Astronomers* in *St. Anthony Messenger*, December 1985.

12. See Chapter 18, 211-224.

It is worth remembering also that every international congress provides a way for the Specola astronomers to become aware of how their condition of being priests and delegates of the Vatican makes them readily acceptable to their colleagues. As priests and men of the Vatican they belong to no particular country. Their position above party politics puts them in quite a special position with respect to carrying on their mission of dialogue. One day a Russian astronomer said to Father McCarthy: "You practice true communism. You don't have your own money nor anything else of your own, but you go to all the meetings!"