Science and Religious Belief

George V. Coyne, S.J.

Vatican Observatory, Castelgandolfo, Italy

1. Introduction

Any dialogue between science and religion is a difficult one. The fundamental reason for this is that dialogue is expected to be an exercise of human reason and, while both science and religion have a fundamental basis in the objectivity expected of human reasoning processes, religion contains a larger measure of the subjective, of human experiences not totally verifiable by objective reasons. Such subjective experiences are not, of course, limited to religion. They are present in many areas of our lives. Nor need these experiences, religious or otherwise, necessarily conflict with reason. They simply are not limited to rational explanation. They go beyond what can be rationally justified.

A second fundamental reason for the difficulty of such a dialogue is that, for the natural sciences we have a rather acceptable idea of what we mean by science, the very notion of religion is ill-defined. Does it mean worship? Does it mean being a “good person?” Does it mean accepting certain moral dictates that go beyond what is commonly accepted as good and bad? Does it mean accepting those dictates out of personal conviction or out of loyalty to a certain tradition? Does it mean believing in certain doctrines? Does it mean accepting a certain authoritative and hierarchical structure, i.e. being affiliated with a certain Church? To most of us religion would imply more of an affirmative than a negative answer to all of the above. And yet the situation is further complicated by the multiplicity of religions which differ among themselves, have even warred among themselves, over the responses given to such questions as the above. Even today, if we look at some of the main religious traditions: Islam, Judaism, Christianity, Buddhism, etc., we see not only vast differences among them, but enormous divisions within any one of the traditions.

The only way, therefore, that dialogue as a rational experience can take place is that, on the part of religion, the dialogue be limited to the rational foundations for religious belief. (I assume that on the part of science a discussion of the rational foundations for scientific results is necessarily implied). Even then, the only way that any such dialogue could have universal significance is that we could assume that there existed common
rational foundations across all religious traditions and that is simply not the case. It seems, therefore, that any fruitful dialogue requires that the rational basis for certain specific religious beliefs in certain specific religious traditions be confronted with what is known from the natural sciences.

It is particularly important that we focus our attention in this way, since in this international atmosphere, after having shared in one or other of the past six Vatican Observatory Summer Schools, we come together from thirty-three different nations, each with its own culture and religious traditions. Our principal objective here is to share our scientific knowledge, and the development of scientific education in our respective countries. We have, however, as we did in the past Summer Schools, felt a desire to share more than our scientific knowledge and religion has become a topic of interest. This comes about rather naturally since the Vatican Observatory is an official institute of the Roman Catholic Church. However, it must be emphasized that the Observatory, in the organization of the Summer Schools and of this meeting, is acting purely as a scientific research institute and, in my opinion, any attempt to purposely and institutionally mix science and religion in the organization of such meetings as this can spell only disaster. In this respect, the Observatory must remain neutral. But when an interest in such questions does arise, it is surely worthwhile to open them to discussion.

So, in keeping with my conclusion that any fruitful dialogue requires addressing specific topics in specific traditions, I suggest two such topics, both drawn from my own religious tradition but certainly applicable to others: the evolution of the human person and the challenge to religious beliefs by the possibility of extra-terrestrial intelligent beings.

2. Evolution and Spirituality

When the message of John Paul II on evolution (1) was received by the members of the Pontifical Academy of Sciences on 22 October 1996 during the Plenary Session of the Academy being then held at the seat of the Academy in the shadow of St. Peter’s Basilica and was subsequently made public, it stirred a vast interest among both scientists and the public, an interest that went well beyond the usual attention paid to Papal statements. While the encyclical of Pope Pius XII in 1950, Humani Generis, considered the doctrine of evolution a serious hypothesis, worthy of investigation and in-depth study equal to that of the opposing hypotheses, John Paul II states in his message:

“Today, almost half a century after the publication of the encyclical [Humani Generis], new knowledge has led to the recognition that the theory of evolution is no longer a mere hypothesis.”
The sentences which follow this statement indicate that the “new knowledge” which the Pope refers to is for the most part scientific knowledge. The context in which the message occurs strongly supports this. As the specific theme for its plenary session, the Pontifical Academy of Sciences had chosen *The Origin and Evolution of Life*, and it had assembled some of the most active researchers in the life sciences to discuss topics which ranged from “Molecular Phylogeny as a Key to Understanding the Origin of Cellular Life” to “The Search for Intelligent Life in the Universe” and “Life as a Cosmic Imperative;” from, that is, detailed molecular chemistry to sweeping analyses of life in the context of the evolving universe.

Only months before the plenary session of the Academy, the renowned journal *Science* had published a research paper announcing the discovery that in the past there may have existed primitive life forms on the planet Mars. Furthermore within the previous two years a number of publications had appeared announcing the discovery of extra-solar planets. This ferment in scientific research not only made the plenary session theme very timely, but it also set the concrete scene for the Papal message. Most of the scientific results cited were very tentative and very much disputed, but they were very exciting and provocative. Only three months after the plenary session the Pope would receive in private audience a group of scientists from Germany, Italy and the United States who were responsible for the high-resolution observations being made by the satellite, Galileo, of the Jovian planets and their satellites. Within a few months of that audience NASA would announce the discovery of a huge ocean on Europa, a satellite of Jupiter.

The Pope wished to recognize the great strides being made in our scientific knowledge of life and the implications that may result for a religious view of the human person; but at the same time he had to struggle with the tentative nature of those results and their consequences, especially with respect to revealed, religious truths. In other words an openness in dialogue appeared to be the most honest posture to take. The crux of the dialogue is the struggle between the opposing theories of evolutionism and creationism as to the origins of the human person.

The dialogue proceeds in the following way. The Catholic Church holds certain revealed truths concerning the human person. Science has discovered certain facts about the origins of the human person. Any theory based upon those facts which contradicts revealed truths cannot be correct. Note the antecedent and primary role given to revealed truths in this dialogue; and yet one senses the struggle to remain open to a correct theory based upon the scientific facts. In the traditional manner of Papal statements the main content of the teaching of previous Popes on the matter at hand is reevaluated. And so the teaching of Pius XII in *Humani Generis* that, if the human body takes its origins from pre-existing living matter, the spiritual soul is immediately created by God. And so, is the dialogue resolved by embracing evolutionism as to the body and creationism as to
the soul? Note that the word “soul” does not reappear in the remainder of the dialogue. Rather the message moves to speak of “spirit” and “the spiritual.”

If we consider the revealed, religious truth about the human being, then we have an “ontological leap,” or an ontological discontinuity in the evolutionary chain at the emergence of the human being. Is this not irrec­

oncilable, wonders the Pope, with the continuity in the evolutionary chain seen by science? An attempt to resolve this critical issue is given by stating that:

“The moment of transition to the spiritual cannot be the object of this kind of [scientific] observation, which nevertheless can discover at the experimental level a series of very valuable signs indicating what is specific to the human being.”

The suggestion is being made, it appears, that the ontological discontinuity may be explained by an epistemological discontinuity. Is this adequate or must the dialogue continue? Is a creationist theory required to explain the origins of the spiritual dimension of the human being? Are we forced by revealed, religious truth to accept a dualistic view of the origins of the human person, evolutionist with respect to the material dimension, creationist with respect to the spiritual dimension? The dialogue must remain open with respect to these questions.

3. The Possibility of Extraterrestrial Intelligence

Now let us go to the second topic. Does it make sense to think that there might be other intelligent beings in the observable universe, other than the few we meet on the surface of the Earth? Yes, if we emphasize the word might, then it makes eminent sense to think of extraterrestrial intelligent life (ETs). In fact, it would be nonsense from a scientific point of view to deny the possibility of ETs. So let us muse about what a religious person thinks about God when she/he knows very well that there could be other persons on other planets about other stars also thinking about God. Again, I beg your indulgence if we speak in the context of Christianity, although our musings will be common to all monotheistic religions, with some, at least at this stage of our thinking, insignificant differences.

How can there be ETs? After all God sent his only son, Jesus Christ, true God and true man to this Earth. He was born in Bethlehem, he lived in Nazareth, and he as crucified on Calvary, outside Jerusalem. And God had only one Son. Now how could God send his only Son, who is truly a man, to other planets. Can a man exist on many different planets? But maybe Jesus did not have to arrive on other planets even though there are people with “souls” there. From these musings let us try to piece together the following sequence of hypotheses about the religious consequences of the existence of ETs.
Human beings have bodies which came forth after about 12 billion years in an evolving universe. Those bodies are very complex totalities, but most of all, the human brain is the most complex organism we know. As a consequence human beings are intelligent, they can know themselves knowing and so they have a “soul,” a spiritual reality, and as such they were made by God. Are there other such beings, made by God, on other planets? We come to our first hypothesis. Yes, we accept, at least for the sake of argument, that there are and we will call them by their traditional name of ETs.

At the very beginning human beings did something bad. They revolted against the God who had made them. Theologians call this “original sin.” Even if we do not accept the Scripture story of Adam and Eve as historically true, original sin is an essential element in the religious person’s view of the relationship of humans to God. Did our ETs sin in this way? We come to our second hypothesis and, in order to keep the discussion going, we of course answer “yes, they sinned.” Note that our second hypothesis is very different than the first. That we sinned is an historical fact and, therefore, quite contingent. It might not have happened. Whereas, ETs existing at all is not quite so contingent. In fact, many scientists maintain that, if life came to be at all, it must have come to be prolifically spread through this universe. There is a kind of necessity, although not absolute, about there being ETs.

God freely chose to redeem human beings from their sin. Did he also do this for ETs? Now we are getting ever more hypothetical, since we are determining what God, who is absolutely free, would freely choose to do. In fact, there are serious theological implications here for our understanding of God. Any religious person senses that God is good and passionate, and so the answer is “yes, God did save them.” How could he be God and leave ETs in their sin? After all he was good to us. Why should he not be good to them? We are struggling to justify our hypothesis, but we accept it not realizing that matters are going to get more difficult as we proceed.

God chose a very specific way to redeem human beings. He sent his only Son, Jesus, to them and Jesus gave up his life so that human beings would be saved from their sin. Did God do this for ETs? Or did he chose another way to redeem ETs? The theological implications about God are getting ever more serious. Surely God is completely free to chose his methods. He certainly did not have to send his Son to us. But once he chose to do so, did he have to chose to redeem ETs in the same way. There is deeply embedded in Christian theology, throughout the Old and New Testament but especially in St. Paul and in St. John the Evangelist, the notion of the universality of God’s redemption and even the notion that all of creation, even the inanimate, participates in some way in his redemption. So, if God is truly the God we know from how he revealed himself to us, then “yes, he sent his only Son to redeem ETs.”
After this whole sequence of hypotheses, increasingly more difficult to justify, we come to a serious responsibility to rethink some fundamental realities within the context of religious belief. What is the human being? Could Jesus Christ, fully a human being, exist on more than one planet at more than one time? We are obviously very limited today in our ability to answer such questions. We cannot rely, even theologically, solely upon God’s revelation to us in the Scriptures and in the Churches, since that revelation was to us and was received, therefore, in a very anthropocentric sense. Again, the dialogue must continue and we must learn from the best of science, both the life sciences and the physical sciences, how to approach the religious implications of the possible existence of ETs.

4. Unifying Knowledge

In a dialogue on any such topics as the two discussed there is an implicit assumption that the unification of our knowledge is a criterion for the truth value of our knowledge. This criterion appears to extend the epistemological nature of the natural sciences towards the realm of other disciplines, such as philosophy and theology. The problem arises with the application of this criterion. When is the unification not truly unifying but rather an adulteration of knowledge obtained by one discipline with the presuppositions inherent in another discipline? History is full of examples of such adulterations. It is for this reason that scientists have always hesitated to make use of this criterion. And yet, if applied cautiously, it appears to me to be a most creative one for the advancement of our knowledge.

The supposition is that there is a universal basis for our understanding and, since that basis cannot be self-contradictory, the understanding we have from one discipline should complement that which we have from all other disciplines. One is most faithful to one’s own discipline, be it the natural sciences, the social sciences, philosophy, literature, theology, etc., if one accepts this universal basis. This means in practice that, while remaining faithful to the strict truth criteria of one’s own discipline, we are open to accept the truth value of the conclusions of other disciplines. And this acceptance must not only be passive, in the sense that we do not deny those conclusions, but also active, in the sense that we seek to integrate those conclusions into the conclusions derived from one’s own proper discipline. This, of course, does not mean that there will be no conflict, even contradictions, between conclusions reached by various disciplines. But if one truly accepts the universal basis I have spoken of above, then those conflicts and contradictions must be seen as temporary and apparent. They themselves can serve as a spur to further knowledge, since the attempt to resolve the differences will undoubtedly bring us to a richer unified understanding.

The above discussion particularly applies when we are addressing fundamental and ultimate questions, such as those that arise in cosmology.
How did the Universe begin? Is the Universe finite in space, or in time? Is our intelligent civilization unique in the Universe? Does the existence of intelligent beings in the Universe have a significance for understanding the Universe as a whole? Does our knowledge of God depend on our understanding of the Universe? In fact, a very strong piece of evidence that there is a universal basis for understanding is the very clear drive of the human being for meaning in such questions as these. This is seen clearly from the very dawn of human history where, with even a very primitive collection of data, our ancestors sought meaning in the physical Universe, as well as in the events of their personal lives and those of society in general.

There are many risks involved, both for religion and for science, in the attempt to unify our knowledge. It is not unusual, for instance, for cosmologists to speak of the “Mind of God.” In most cases, it appears, this is taken to mean a kind of ideal Platonic mathematical structure from which the shadow world we live in came to be. We would have a unified theory and thus an understanding of all physical laws and the initial conditions under which they work. Would we also fundamentally understand life? As I understand it there is no intentionality associated with the “Mind of God” of the cosmologists. Can life be understood without that intentionality? These are, I accept, pretentious questions which go beyond what a scientist would usually accept as a rational approach to questions about the world in which we live.

When scientists in their enthusiasm speak about the “Theory of Everything” many people take the everything seriously and see the scientists as inevitably trying to quantify what is not quantifiable: selflessness, graciousness, harmony, etc. Musical scales can be carefully analyzed by mathematics; the beauty of a Mozart nocturne cannot. This is, of course, not to minimalize science, nor, as a matter of fact, any of the other ways of knowing. It is simply to realize what a given discipline can or cannot do. That is precisely why our knowledge must be unifying. There will, of course, always be a tension between science and theology because of the transcendental (beyond reason) character of the latter, but considering the somewhat Platonic quest for the “Mind of God” by some cosmologists, that very tension could be the source of a quite creative dialogue.

In our age, perhaps more than at any other time, the scientific view of the world has been the principal spur to a more unified view of the world. It has opened our minds to the vast richness of the universe which cannot be appropriated by any one discipline alone. Science invites us to that vision. It also cautions us not to absolutize scientific results. We must beware of a serious temptation of the cosmologists. Within their culture God is essentially, if not exclusively, seen as an explanation and not as a person. God is the ideal mathematical structure, the theory of everything. God is Mind. It must remain a firm tenet of the reflecting religious person that God is more than that and that God’s revelation of himself in time is more than a communication of information. Even if we discover the “Mind...
of God,” the religious person may still claim that we will not have thereby necessarily found God. Dialogue requires that we accept these diverse ways of viewing our experiences.

Notes: 1. An English translation of original French text of the Papal message on evolution was first published in the weekly English Edition of L’Osservatore Romano for 30 October 1996. It is more generally available as reprinted in “Evolutionary and Molecular Biology,” eds. R.J. Russell, W.R. Stoeger, and F. Ayala (Vatican Observatory Publications: Vatican City, 1998), distributed by the University of Notre Dame Press, Notre Dame, Indiana.