

# Chapter Five

## A,B,C, Infinity: Learning to Read the Story of the Universe

### A. Galileo and the Two Books

In the last chapter we learned about Galileo Galilei and his great insights into the world. But we should also recognize that many of his insights were not merely scientific. Galileo did not just understand science, he also understood how to “read” scientific discoveries in relation to the great interconnected dramas of human life and God’s Revelation. He saw that the universe was like a book which could be read at different levels; he also realized these levels supported and enriched each other.<sup>1</sup>

The Father of Modern Science believed that the details of the world and the universe uncovered by science were only understood when one comes to the question of meaning and value. To read the universe is to collect facts about it for the sake of a deeper understanding of the ultimate meaning of reality. And this ultimate meaning brings into play another book: the Bible. Galileo knew that the Book of Nature and the Book of Scripture have the same author:

If I ask who created the Sun, the Moon, the Earth, the stars, their positions and movements, I think the response will be that they are the *work* of God; and asking who dictated the Holy Scriptures, I know the answer will be the Holy Spirit, that is likewise of God. The world, therefore, is the work and the Scriptures are the *word* of the same God.<sup>2</sup>

Galileo’s idea of the universe as a book gives us a fantastic analogy for our investigation of the relationship between faith and science. One can approach a book at many levels. Its words and the way they are used are one level. Its storyline and plots are another. Ultimately, its themes and the values and truths they reveal form its deepest level.



“THE REASON... IT IS FINITE.  
IT MUST PROCEED THROUGH  
A MULTIPLICITY OF SEPARATE  
BRANCHES OF KNOWLEDGE... ALSO  
PHILOSOPHY AND THEOLOGY ARE,  
AS SCIENCES, LIMITED ATTEMPTS  
WHICH CAN REPRESENT THE  
COMPLEX UNITY OF TRUTH ONLY  
IN DIVERSITY, THAT IS, WITHIN AN  
OPEN SYSTEM OF COMPLEMENTARY  
ITEMS OF KNOWLEDGE.”

JOHN PAUL II TO TEACHERS AND  
UNIVERSITY STUDENTS IN COLOGNE  
CATHEDRAL, NOVEMBER 15, 1980

Each “reading level”<sup>3</sup> of a great book has fascinating details, and each level must be grasped, at least basically, for its deeper levels to be understood. The key is to see the harmony between all of the levels, and how they enrich and reveal each other. This is how we must look at the universe – its details help us understand its deepest structure and history, which helps us to grasp its meaning.

To understand this better, let us start by looking at a certain set of books almost everyone is already familiar with.

### BOOK LEARNING: THE “MAGIC” OF READING THE UNIVERSE

For many years, elementary and high-school teachers have complained that their students do not read as well or as often as they should. The major difficulty and challenge was helping students to see reading as more than an assignment—as something better and greater than book-learning. Real reading is not book-learning; it is “learning a book” – becoming familiar with the details of a story for the sake of encountering its deepest levels. When this occurs, the reader comes to love the book’s characters and to learn their lessons – and this, every great English teacher knows, is the “magic” that transforms a student from a non-reader into a reader-for-life.

Coincidentally, it was magic that turned out to be the answer – the magic of *Harry Potter*, J.K. Rowling’s series of adventure stories about a young wizard hero and his friends. Rowling’s books have sold millions of copies, and the enthusiasm over the books has astounded reading professionals, who watched with amazement as children flocked to bookstores to buy the latest installment in the series. *Harry Potter* has turned millions of children, teenagers, and adults into “readers-for-life.”

And in doing so, the *Harry Potter* series has some great lessons to teach about rediscovering faith on the frontiers of science, about reading the book of the universe.

### A LESSON FROM HOGWARTS

For those who have read any of the *Harry Potter* books, it is not hard to understand their great popularity. They are filled with amazing details about a mysterious world in which every detail of our own world is present – teachers, school, sports, politics, crime, even plants and animals. And yet these familiar details have become amazing and fascinating through the presence of magical characteristics that they do not possess in our own world. Teachers teach spells and potions, school is a magical fortress filled with secrets and marvels, and athletics involves Quidditch, which is nothing less than high-flying broomstick mania. Every detail of the



real world has been taken up and transformed through the amazing mind of J.K. Rowling, the genius behind *Harry Potter*.

These details make the stories intensely interesting and exciting. Yet they are just the surface of the *Harry Potter* saga.

As one reads on, and reads more deeply, the real themes and values shine through – the drama of good versus evil, the nature of love and friendship, and the question of what really matters in life. Even the magical details become less of a motivation to keep reading, although they never cease to be fascinating. They become a backdrop to the real story, which is about finding happiness and real meaning in life in a world threatened by terrifying evil and filled with beauty and danger, joy and tragedy.

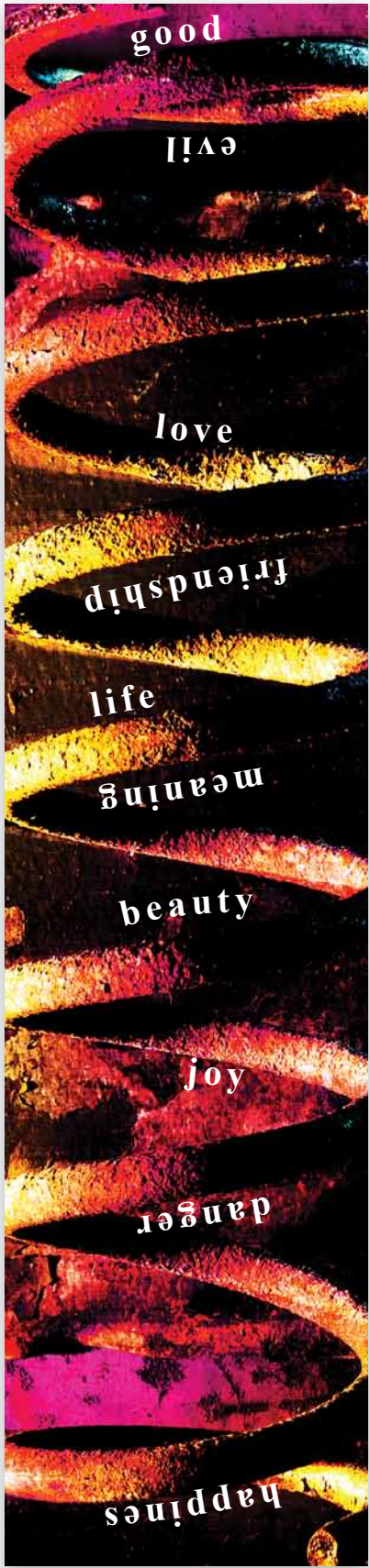
The Potter stories could not happen without the magical details, and the magic is somehow mysteriously at the heart of the deepest meaning of the story. But the story cannot be reduced to spells and potions – ultimately, the *Harry Potter* saga is about the nature of love and happiness, about what it means to live.

*Harry Potter* is an ongoing work by its author, and each new addition has succeeded in bringing these ongoing themes to a new and more intense level. Rowling gives every indication that she has the creative power to create a fulfilling ending to the story<sup>4</sup> – an ending that will bring to completion all of the questions and loose ends that have emerged, and reveal the meaning behind all of the struggles of Harry and his friends, even those who have died in their battle against evil.

If Rowling has had the basic plot in mind since she began the series, she might even be able to create a great ending for the *Harry Potter* saga – an ending that reveals a union with the story’s beginning. In keeping with the mystery-adventure style she has adopted, readers would realize that the end of the story was given in the beginning in a hidden way, and that all of the storylines and themes which developed out of the original book will return and be fulfilled in the end.

At this point, you may be wondering whether I have forgotten the subject of my own book and have begun sending coded messages to J.K. Rowling! Actually, I have been sending a coded message to you. If you go back several paragraphs and replace a few words, you have the message of this chapter, given here in the beginning:

- Take out every reference to “magic” and “magical details,” and substitute “science” and “scientific details”;
- Take out every reference to the author and J.K. Rowling, and substitute “the Trinity” or “God”;
- Take out every reference to the *Harry Potter* saga and the story, and substitute “history and the universe”;



GOD GIVES EVERY INDICATION THAT HE HAS THE CREATIVE POWER TO CREATE A FULFILLING ENDING TO THE STORY.



- Take out every reference to “*Harry Potter*” and “his friends,” and substitute “humanity.”

Here is what you get:  
History and the universe are filled with amazing scientific details. These scientific details make history and the universe intensely interesting and exciting. Yet they are just the surface of history and of the universe.

As one reads on, and reads more deeply, the real themes and values shine through – the drama of good versus evil, the nature of love and friendship, and the question of what really matters in life. Even the scientific details become less of a motivation to keep reading, although they never cease to be fascinating. They become a backdrop to history and the universe, which are ultimately about finding happiness and real meaning in life in a world threatened by terrifying evil and filled with beauty and danger, joy and tragedy.

History and the universe could not happen without the scientific details, and scientific details are somehow mysteriously at the heart of the deepest meaning of history and the universe. But understanding history and the universe cannot be reduced to science – ultimately, they are about the nature of love and happiness, about what it means to live.

History and the universe are an ongoing work of the Trinity, and each new addition has succeeded in bringing these ongoing themes to a new and more intense level. God gives every indication that he has the creative power to create a fulfilling ending to the story – an ending that will bring to completion all of the questions and loose ends that have emerged, and reveal the meaning behind all of the struggles of humanity, even of those humans who have died in their battle against evil.

God has had the basic plot in mind since he began history and the universe, so he will create a great ending for the saga of humanity – an ending that reveals a union with the beginning. In keeping with the mystery-adventure style the Trinity has adopted, readers will realize that the end of the story was given in the beginning in a hidden way, and that all of the storylines and themes which developed out of the origins of history and the universe will return and be fulfilled in the end.

Here we see how similar the universe is to a book – it has an Author, it has a purpose, a beginning and an end. And it has great lessons to teach us when we go deep into its details and through them, to its meaning.

There are also some very important differences between *Harry Potter* and the universe. For one thing, J.K. Rowling has never published a guide for how to read her story. Readers are left to pick through it and decide which details are the really important ones and how to best interpret them. But the Author of the universe has not left us guessing



about such things. He has given us a guide to reading the universe at all of its levels, a guide indicating which of the many details are the most important at getting the whole story – Sacred Scripture is the word of God about the universe and ultimately, about himself. It is indispensable for really understanding history and the universe.

Also, while the saga of *Harry Potter* is completely dependent on Rowling, as history and the universe are upon God, Rowling is not part of her story. Yet the Author of the universe has not created a story that does not involve him. In fact, the climax of history is the moment when he enters the universe, when God becomes man in Jesus Christ. And the fulfillment of history will be when he returns in glory. Like the story of Harry Potter, the book of the universe is an unfinished one – for both Harry and humanity, the last drama has yet to occur.

The final difference is also significant – the characters in the Harry Potter series do not have the ability to read their own story. In fact, they only think, feel, and act in imagination – when the story is not being written or read or at least thought about, they do not exist as anything but ink on a page.

But the amazing characters in our story – human beings – do have the ability to read their own story. We can both participate in the drama of the universe, but can also read that drama through reflection. We are in the story but not entirely of the story – we can both live it and know it.

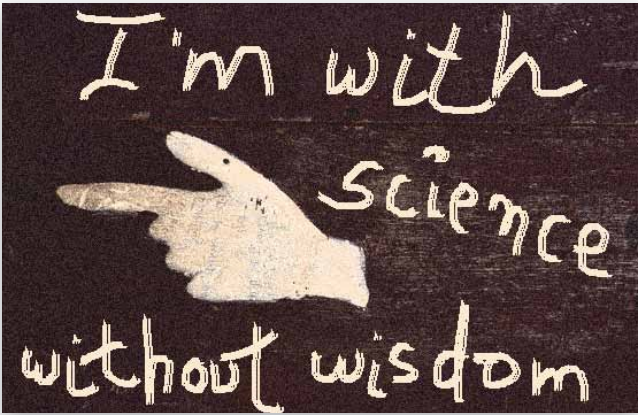
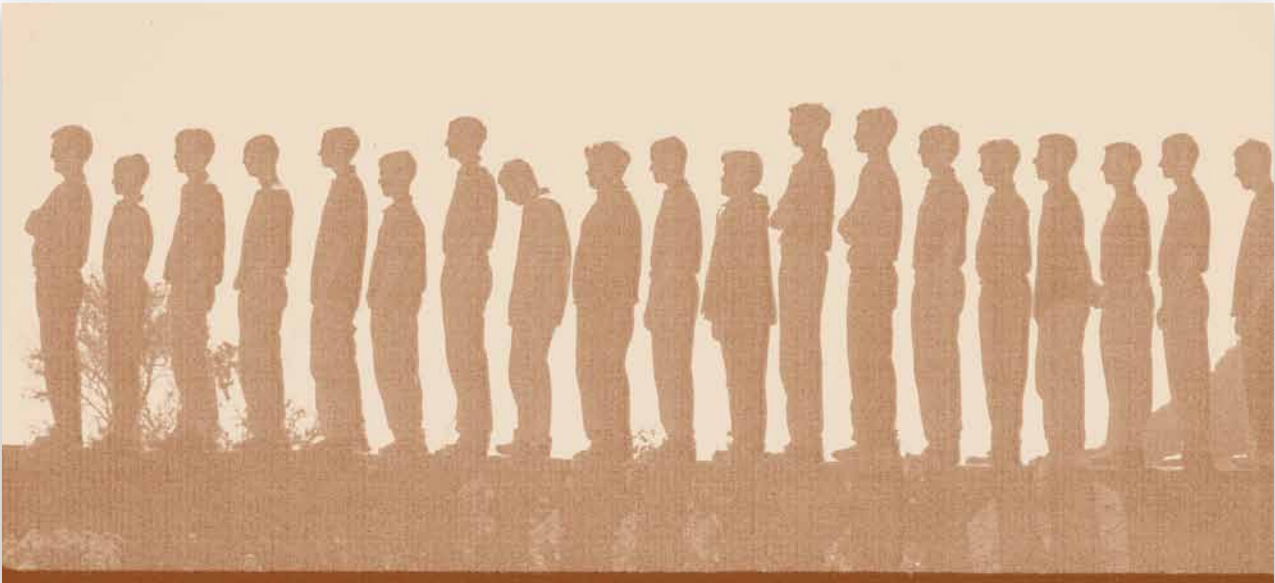
So without further ado, let us learn to read the book of the universe, starting with an example of how *not* to read it: by using science as our only guide – the folly of *science without wisdom*.

### B. “Science without Wisdom”

As we saw in our consideration of scientism in Chapter Two, it is possible to approach the book of the universe as if only science can put us in touch with its deepest meaning. Dr. Anthony Rizzi is one of a number of scientists who have pointed out the danger of approaching the world from an exclusively scientific point-of-view. He gives an excellent example of what happens when one approaches the book of the universe in a *scientistic* way – the myth of the “nothingness” of the atom and of human beings:

We are taught that an atom is composed of electrons and a nucleus. The electron is point-like and most of the mass of the atom is in the nucleus of the atom. If the nucleus of the atom were such that it was the size of a basketball, the “edge” of the atom would be two *miles* away. It is thus said and believed that the atom is filled with mostly space. The inference is then drawn that since we are made of atoms, we are mostly nothing.<sup>6</sup>

YET THE AUTHOR OF THE UNIVERSE  
HAS NOT CREATED A STORY THAT  
DOES NOT INVOLVE HIM. IN FACT,  
THE CLIMAX OF HISTORY IS THE  
MOMENT WHEN HE ENTERS THE  
UNIVERSE, WHEN GOD BECOMES  
MAN IN JESUS CHRIST.



WE MUST GO BEYOND SCIENCE  
IN ORDER TO APPRECIATE THE  
SIGNIFICANCE THAT THESE  
DETAILED SCIENTIFIC DISCOVERIES  
HOLD FOR THE GREATER MEANING  
OF THE UNIVERSE.

If the atom is mostly space, and we are made of atoms, then we are mostly space – a vast nothingness. “Mostly nothing” seems to be a valid conclusion about human beings based on what science has revealed about the proportions of the atom – until we move past the details given by science and begin to look at the bigger picture. After noting that the typical human being contains 1028 atoms, Rizzi demonstrates the insufficiency of a purely scientific approach to the book of the universe:

Science never poses the question: is man one thing or is he 10<sup>28</sup> things? He cannot be in the same way and at the same time both 1 and 10<sup>28</sup>, because 1 does not equal 10<sup>28</sup>. In short, one must understand how the philosophical fact that you are one, that you are not a multiplicity but an individual person, fits with the physics fact that you are 10<sup>28</sup> atoms.<sup>7</sup>

Here is where the falsehood is revealed: The very same scientist who would tell us that the atom – considered purely from the proportion of its parts – is mostly nothing, and that a human being, made up of atoms, is also mostly nothing, would finally have to conclude that a human being is 10<sup>28</sup> things, and not one human being!!! But pure common sense and experience are enough to know that the atomic details cannot be the whole picture. In some way, the human being remains one human being while containing (without destroying) 10<sup>28</sup> atoms.<sup>8</sup> Rizzi draws a very important conclusion from this observation:

Here we begin to see reality itself is *multi-layered*. Reality is not a song with one voice, *univocal*, but a song with multiple voices that can make up chords. Reality is not homogeneous [exactly uniform in every way] but heterogeneous [containing diversity].<sup>9</sup>

“Science alone” as an approach to reality is nothing more than “science without wisdom.” Reality requires more than science to be understood; the book of the universe cannot be fully appreciated through a mere analysis of its details. We must go beyond science in order to appreciate the significance that these detailed scientific discoveries hold for the greater meaning of the universe.

### C. Learning the Levels

What are the different levels at which the book of the universe can and must be read in order to be understood? St. Thomas Aquinas (1225-1274), following Aristotle, made a very important distinction regarding the levels of reality and our approach to these levels.<sup>10</sup> Each one builds upon the other.

The lowest level is the level of the physical details of the universe. At this level, reading the book of the universe means looking at particular



physical things and drawing conclusions about all other things *that are also physical*. For instance, through the study of a diseased organ a biologist can know the processes and functions of the disease that afflicts it. Then, he or she can apply that knowledge to the treatment of patients who exhibit that disease. We are able to know truths about all of them from the study of one or a few examples.

Aquinas calls this level of knowing “*physica*,” or physics, although he uses this term to apply to all natural sciences and not simply the specialized science of physics as we know it today. In *physica*, we are dealing only with material, changeable reality. We are looking at the vast amount of physical details of which the universe consists; at things which are made of matter and so must be understood in relation to matter.<sup>11</sup>

The next level at which the universe can be read is that of *mathematica*, or mathematics. At this level, reading the book of the universe means approaching things from the perspective of their quantity. We know quantity only first by encountering it at the level of the physical. But we do not need the physical in order to understand quantity. We can discuss quantities in themselves, such as when we recognize that 2+2=4 without two sets of two oranges to combine and count.

In *mathematica*, we have pierced through to something that characterizes all physical things, and not just this or that kind of thing (such as an organ of the human body). We have taken a step up; we are at a level where the physical universe can be read in a very broad way, a way applicable to all physical things – in the words of the great Galileo, “mathematics is the alphabet with which God has written the universe.” Yet even here we have still not reached the highest level.

The highest level at which the universe can be read is at the level of realities which are not always physical and which, in some cases, are not physical at all. Of these things Aquinas says “either they never exist in matter... or they exist in matter in some instances but not in others.” Thomas calls this level of knowing reality “divine science,” and for an obvious reason: the highest non-physical reality we can know is the source of all reality, God. But this level of knowing also has another name, which in Greek literally means “beyond physics.” This is the level of *metaphysica*, or “metaphysics.”<sup>12</sup> We get to this level by first gaining some facility with the first two, which we can achieve through our education and ordinary experience.

We will approach the primary object of metaphysics, i.e., God, in Part II of this text. But there are a number of other things revealed by metaphysics which are essential to reading the book of the universe, and we must first turn to these.

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THE UNIVERSE CAN BE READ IS AT THE LEVEL OF REALITIES WHICH ARE NOT ALWAYS PHYSICAL AND WHICH, IN SOME CASES, ARE NOT PHYSICAL AT ALL. METAPHYSICA, “BEYOND PHYSICS” THOMAS CALLS THIS LEVEL OF KNOWING REALITY “DIVINE SCIENCE.”



## D. Metaphysics: Infinity Between and Beneath the Lines

### THE GRAMMAR OF THE UNIVERSE

As we saw above, St. Thomas Aquinas said that metaphysics is a level of knowing wherein we comprehend objects which are physical in some instances but not in others. As we saw in Chapter One, the adjectives that metaphysicians use for something that is not physical but which truly exists are “spiritual” and “immaterial” (this last word means “not made of matter”). To be physical is to consist of stuff, to be extended in space, to have parts. To be spiritual and immaterial would be to exist but not be extended in space, to be partless. God, angels, and the human soul are examples of spiritual realities. As far as we know, human beings are the only “hybrid” beings in the universe that are physical and spiritual, body and spirit (the human spirit is also called the *soul*).

By looking at objects that are physical in some instances but not in others, we cross the bridge from *physica* and *mathematica* into *metaphysica*. Crossing this bridge between a purely physical reading of the book of the universe and the richer, deeper, spiritual levels of reality and meaning within it is to find the place where theology and science meet.

To go back to our analogy, metaphysics allows us to clearly see reality between and beneath the lines of the book of the universe, the reality of its Author and its own deepest dimensions. Through it we learn the grammar of the universe and all of its parts, a grammar that nature shares with the spiritual.

We need to be ready to learn some new terms, or at least redefine some terms we already know. Some of the traditional English terms that are used in metaphysics are also used to mean very different things in ordinary language. We will focus on two: *existence* and *causation*.

So as to make things very concrete, I have decided to take this opportunity to study my favorite metaphysical example – my dog, a beagle that my daughter named Lucy after Lucy Pevensie, her favorite character in C.S. Lewis’ *The Chronicles of Narnia*. Let us allow Lucy to lead us across the bridge from *physica* to *metaphysica*.

**Existence** – the first and most basic thing about Lucy, the one thing she shares in common with the whole universe and everything in it, is obviously not her cuteness or even her dogness. It is her *existence*, her *being* – if Lucy did not exist she would not be a part of the universe at all.



Lucy has being, but she **is not** being. If Lucy was being itself, then she would have always existed, and everything that ever existed would have to share in, or participate, in Lucy! But there was a time not long ago when Lucy did not exist. Her existence is something that she **has**, not something she **is**. And she did not give existence to herself – existence comes to a thing from without – it is like a gift.

Existence is the most fundamental reality of the universe, the primary thing studied in metaphysics. Even something I imagine, such as a *Patronus* (the guardian being which Harry Potter can summon for protection), has existence – the Patronus exists **as** something thought. Every thing, even thoughts, is connected by existence and share in it as a common characteristic in different ways.

But even in our own language, we see existence as more than a characteristic. It is not just something every existing thing *has*, it is also something every existing thing *does*. Lucy pants, jumps, and barks, but before all and above all, she *exists*. The Latin word *existere*, is a verb, an action-word, that literally means “to stand forth”—in metaphysics, it means to stand forth from nothingness, from non-existence.

Think about this for a moment—if you can say something true about existence, then you have said something true about every existing thing in a single statement.

You have made it this far through our discussion of existence, and so you may be asking, “What is existence in itself? A being is something that has being, but what is Being? Where do all beings get their existence from?” To be Being Itself is to exist necessarily, and to be the source of being for all things, because all things do not and cannot give themselves existence. It is “the infinite fullness of pure unlimited existence, and the one ultimate Source of all being.”<sup>13</sup> It would be, in fact it is, God. As St. Thomas Aquinas would say, God is being in itself.

An important metaphysical principle for understanding the relationship between faith and science is to note that, above and beyond any other consideration, the most basic relationship between God and the universe is that God is the Giver of the gift of existence to all things. God is not simply perfect. He makes all things, and all the perfections of those things, *real* by sharing with them from his own unlimited existence.

Right away we can see that existence is something not limited to physical realities. All physical things exist, but existing is not necessarily tied to physical reality. It transcends *physica*. With one short leap, Lucy has taken us way past science.

**Causation** – Lucy has been the reason for a number of changes at my house since she came to live with us three years ago. Nearly all of my children’s plastic toys bear her teeth marks. She has also been



WE SEE EXISTENCE AS MORE THAN A CHARACTERISTIC. IT IS NOT JUST SOMETHING EVERY EXISTING THING HAS, IT IS ALSO SOMETHING EVERY EXISTING THING DOES.



AN IMPORTANT METAPHYSICAL PRINCIPLE FOR UNDERSTANDING THE RELATIONSHIP BETWEEN FAITH AND SCIENCE IS TO NOTE THAT, ABOVE AND BEYOND ANY OTHER CONSIDERATION, THE MOST BASIC RELATIONSHIP BETWEEN GOD AND THE UNIVERSE IS THAT GOD IS THE GIVER OF THE GIFT OF EXISTENCE TO ALL THINGS.

responsible for holes all over my backyard. In these and many other cases, Lucy has caused real changes in the things and people around her. In classic metaphysical terms, Lucy is the *cause* of many things (some good, others not so good).

Understanding the nature of cause and effect is a major part of understanding the book of the universe. An *efficient cause* is that which contributes in a real way to the being of another by its action. Science continuously explores the cause-effect relationships which make up the material universe. But causal relationships bear some important characteristics which transcend the purely material universe studied by science.

We should start by noting that not only is causality important to science, but to the very ability to think about anything at all. The great foundation for all thought about anything is the Principle of Sufficient Reason: that every being has the sufficient reason for its existence either in itself or in another thing.<sup>14</sup> Here is a question one can and should pose about every thing in existence: does the existence of this thing explain itself, or does it have its explanation in a different thing? The way that this is related to causality is that any being that does not have its sufficient reason in itself requires an efficient cause. To deny this would lead you into a situation of utter absurdity; in the words of W. Norris Clarke, “if nothing at all is required for something new to come into existence, then anything can happen at any time with no explanation needed or able to be provided.” This is the very opposite of our experience of the world.<sup>15</sup>

The existence of Lucy, for instance, is not self-explanatory. For one thing, Lucy had beagle parents that explain how she first came to be. For another, Lucy requires many conditions to be in place for her to exist at any moment, such as a stable environmental temperature and a healthy diet. When one wants to explain Lucy, one must make reference to many other things that are not Lucy that in their own way cause Lucy to be.

Is it possible for a being to be self-explanatory, requiring no cause for its existence? To answer, we must first rule out the possibility of a being causing itself. A *self-caused being* is an impossibility, because such a being would have to preexist or be outside itself in order to cause itself – an utter absurdity. But what about an *uncaused* being, a being that has its existence not from another but by its very nature? Such a being would have to be the source of existence and the ultimate cause of all other beings, to exist necessarily. Here we land right back with God as “the infinite fullness of pure unlimited existence, and the one ultimate source of all being.” God is the Uncaused (not the Self-Caused) Cause of all else that exists.

Another characteristic of causality becomes clear when we think about intelligent causes such as human beings. Humans, because they are endowed with reason, are capable of understanding cause-



effect relationships in themselves. Therefore, a human being is able to string causes together, to cause not some immediate effect only, but also to bring about a “domino effect” involving many cause-effect relationships that are all intended to bring about a final desired effect. Humans are also capable of consciously employing chance in an intelligent way when they act as causes of things. For instance, a fisherman uses a net that covers a wide area in the hopes that by chance one or many fish might be in that area.

These cases reveal that it is possible for an intelligent being to be the first cause in a whole chain of causes, and also to include other causes within its own causality. Therefore, it is possible to distinguish between *primary causality* and *secondary causality*. Primary causality is when an intelligent agent employs other causes to bring about a desired effect – secondary causes are those other causes.

In the case of God, we can say that God’s causality is the greatest realization of primary causality; in fact, God is the only being that can be called Primary Cause without any further qualification. God creates the universe and sustains it in existence. But he does so not by replacing secondary causes, but by governing true secondary causes with perfect unlimited intelligence. God’s use of natural causes, including “chance,” as we shall see in Chapter Six and Chapter Eight, reveals his power, intelligence, and skill in an even greater way than if he directly caused all things.

We must consider one more aspect of causality. To cause something is to make an effect come to be. But causing does not necessarily involve a change in the causing being (the *agent*) itself. Material beings always change while they change other things; for example, Lucy expends energy when she chews up toy light sabers. But being a cause does not necessarily involve being changed; it involves changing something else. A perfect cause would never be diminished or altered by causing other things. God is unchanging, but yet out of his perfect fullness he is able to be the primary cause of the universe and every thing in it.

LUCY AND INFINITY:  
THE TRULY MAGICAL UNIVERSE

We are beginning to see in living color the point that Dr. Anthony Rizzi pointed out earlier – that reality is not exactly uniform in every way, but contains diversity. Our brief romp with a beagle has brought us, through ordinary observation and logic, to conclusions about the universe that reach beyond the physical and even bring us to the reality of God himself, who is Perfect Being and Primary Cause of all things. The ordinary things that we observe on a daily basis, the stuff of science that is ever examined and investigated, are the details that point beyond themselves to a wider, fully dimensional universe, one that is physical and spiritual.



GOD IS THE ONLY BEING THAT  
CAN BE CALLED PRIMARY CAUSE.  
PRIMARY CAUSALITY IS WHEN AN  
INTELLIGENT AGENT EMPLOYS  
OTHER CAUSES TO BRING ABOUT  
A DESIRED EFFECT – SECONDARY  
CAUSES ARE THOSE OTHER CAUSES.



Earlier, I observed that the excitement of Harry Potter’s world is that it is filled with amazing details in which every detail of our own world has become fascinating through the presence of magical characteristics that in reality they do not possess. Metaphysics shows us that we too often sell our own world short. The Author of the book of the universe created a reality that only seems ordinary when we do not look at it closely enough. Physicality and spirituality, the gift of existence, the spiraling interaction of causes, all in their varied combinations, show us a truly awesome universe.

METAPHYSICS: THE KEY TO A  
FRIENDLY REUNION BETWEEN  
FAITH AND SCIENCE

In this section, we have learned the “grammar” of the book of the universe. In doing so, we crossed a crucial bridge that joins science and faith, at least potentially, if not actually. By looking at existence and causality we grasped concepts that apply to the object of science – that is, the material universe. But we also saw that they are not limited to the material universe; they show ways in which the material elements of the universe are like the spiritual elements revealed by God. Existence and causality show us how the whole universe, both material and spiritual, is both like and unlike God.

Learning grammar is usually not the fun part of reading. Generally, we learn grammar so that we can read, not because we want to know it in itself. Metaphysicians are like grammarians, a special breed that enjoys the study of these things for their own sake. Without them, reading the universe would be difficult if not impossible. But with our new metaphysical knowledge, we are poised to engage in the real adventure of this text – to look directly at scientific findings in the light of faith and to see how theology, when done on the cutting edge of science, reveals the credibility of the Christian Faith, even while the Christian Faith affirms science.

One of the great tragedies of our own day and age is that few have bothered to learn this grammar. Slowly over the course of centuries, the worlds of theology and science have drifted apart, each reading only its own “book” and forgetting how to read the masterpiece of the other. Scientists like Fr. Stanley Jaki, Stephen M. Barr, Peter E. Hodgson, Paul Davies, Ian Barbour, Rev. John C. Polkinghorne, Fr. Michal Heller, Kenneth R. Miller, Francis S. Collins, and Owen Gingerich have done much to revive the relationship.

As noted earlier Pope John Paul II, even before he became pope, played a significant role in fostering this dialogue. Let us look at four principles that guided Pope John Paul II in his efforts to renew the dialogue between science and faith.



# E. Reading the Book of the Universe with Pope John Paul II

## STEP ONE: DISTINGUISHING IN ORDER TO UNITE

As we have already seen, the Pope’s vindication of Galileo was directly related to his commitment to the Catholic teaching that science and faith represent two distinct orders of knowledge. John Paul II would repeat the teaching of Vatican I and Vatican II many times, using his own words:

Both religion and science must preserve their own autonomy and their distinctiveness. *Religion is not founded on science nor is science an extension of religion* [italics mine]. Each should possess its own principles, its pattern of procedures, its diversities of interpretation and its own conclusions. ... While each can and should support the other as distinct dimensions of a common human culture, neither ought to assume that it forms a necessary premise for the other.<sup>16</sup>

In the Galileo case, some believers had tried to impose on scientific knowledge a limit that did not fit it.<sup>17</sup> In modern times, it is more often the case that scientists will try to overreach their own findings and make the whole world fit into purely physical boundaries. To both errors, John Paul II was outspoken on the fact that *real unity preserves legitimate differences*.

## STEP TWO: RECOGNIZING THE BLESSINGS OF UNITY

Separationists like Stephen Gould might wonder why the pope would bother with trying to unite the distinct kinds of knowledge given by science and faith. But John Paul II saw that the two really need each other to be complete.

In the first place, the pope saw that faith can actually help a scientist be more scientific, and that science can help a believer deepen his understanding of the Christian Faith. As he put it, “Science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes. Each can draw the other into a wider world, a world in which both can flourish.”<sup>18</sup> Without science, a believer will be missing a lot of the sharp detail of God’s creation, and can fall into the trap of arriving at mistaken conclusions about how God acts. Without faith, a scientist will make errors about the ultimate meaning of the world they study, and will fall prey to the



error of “overscientizing” reality. In either case, real wisdom will be lost. Einstein expressed a similar view when he said: “Science without religion is lame; religion without science is blind.”

One real danger for science separated from faith is that it will develop technologies from its findings that are destructive. Evils such as global nuclear arms proliferation and human cloning are prime examples of science making itself absolute, and of humanity falling victim to what science, devoid of value and meaning, creates.

## STEP THREE: THE LOVE OF WISDOM – FINDING THE MISSING LINK BETWEEN SCIENCE AND FAITH

Many religious thinkers, even Church leaders, have regarded the sciences as good but have warned scientists to avoid trying to explore larger questions than those the scientific method can answer. But in the thought of John Paul II, scientists are highly qualified to approach the ultimate questions, and in fact, should attempt to grapple with them – as long as they realize that something more than science is needed to answer them. As we have already seen, this “something more,” which can shed light on the greater questions of the value and meaning of the world which science investigates, is metaphysics or philosophy.

Philosophy, which means “love of wisdom,” takes a broader approach than science, and uses common experience and logic to investigate questions such as “Why does the world exist? What is the meaning of the world and of human life? What things should human beings do, and what should they avoid?” It is through this kind of approach, John Paul II insisted, that the desired unity between science and faith can come about, and through which the dialogue between science and the Church occurs.<sup>19</sup>

Philosophy is also where the autonomy of science ends. Science is based on the idea that real truth exists, and that human beings were created to find it. Therefore, it must submit its findings to a process of integration into a unified worldview that does not make its findings the be-all and end-all of human knowledge. That is, scientists must avoid materialism, reductionism, and scientism, which are all false views of reality, and begin to see science as one part of a total approach to truth.<sup>20</sup>

## STEP FOUR: MAN, THE KEY TO THE UNITY BETWEEN SCIENCE AND FAITH

Pope John Paul II recognized the human person as the key to unity between faith and science. The human person can be studied



scientifically, and much insight has come from the scientific understanding of the nature of the human body, including the brain. But the human ability to do science itself shows that man is more than a body, that he *transcends* (a word which literally means “climbs over”) the world which he observes in scientific discovery:

...the adventure of science has made us discover and experience with new vividness the immensity and transcendence of man’s spirit, capable of penetrating the abysses of the universe, of delving into its laws, of tracing its history, rising to a level incomparably higher than the other creatures that surround him.<sup>21</sup>

Science’s findings concerning the human body prove that science is necessary for understanding man; but man’s ability to do science shows that more than science is necessary for the whole truth about humanity to be known.

In summary, the study of man is a place where science and philosophy meet. It is also the place where the Church has much to offer – in particular, the truth which God has revealed about himself as the Creator of all things and humanity as his image.

THE “DISPASSIONATE SEARCH”  
FOR “MARVELOUS MYSTERIES”

John Paul II’s reverence for science and his excitement about the possibility of unity between science and faith can be summed up in a single paragraph, one which he wrote to the Jesuit priest/scientist who until recently served as the Director of the Vatican Observatory:

Our knowledge of each other can lead us to be more authentically ourselves. No one can read the history of the past century and not realize that crisis is upon... both [the Church and science]. The uses of science have on more than one occasion proven massively destructive, and the reflections on religion have too often been sterile. We need each other to be what we must be, what we are called to be.<sup>22</sup>

Science, which John Paul II saw must be a “dispassionate search” (another way of saying “calmly objective search”) that does not give way to making conclusions before investigation,<sup>23</sup> has revealed “marvelous mysteries” about the universe.<sup>24</sup> Our response to these should be wonder, awe, and openness to answers about the universe which science cannot give. In this way, science and religion serve each other; like two spouses, they make each other complete.



William-Adolphe Bouguereau (1825-1905)  
- Song of the Angels

F. Looking Forward – Faith and  
the Frontiers of Science

THE SEARCH FOR ANSWERS  
ABOUT THE UNIVERSE WILL BE  
SEEN TO OFFER CLUES ABOUT  
THE UNIVERSE’S MAKER. AND THE  
CHRISTIAN FAITH WILL ALSO TAKE  
ON A GREATER CLARITY, IN THAT  
OUR DEEPER UNDERSTANDING  
OF THE UNIVERSE WILL ALSO  
HELP US TO UNDERSTAND GOD’S  
TRUTH MORE FULLY. IT WOULD  
NOT BE INCORRECT TO SAY THAT  
MOTHER NATURE WILL TEACH US  
ABOUT FATHER GOD, AND THAT  
FATHER GOD WILL SHED LIGHT ON  
MOTHER NATURE.

We have come to the end of the first part of our journey, a part entitled “A Friendly Reunion: The Relationship between Natural Science and Supernatural Faith.” With an eye towards a reunion between science and faith, we looked at certain belief systems (such as scientism) in which faith and science have drifted apart and have even been rumored to be enemies (Chapter Two). Then, we considered their relationship from many angles: from the perspective of the Bible, God’s Revelation (Chapter Three); from the history of the Church, God’s People (Chapter Four); and finally, from the perspective of philosophy, especially metaphysics (the present chapter). In these chapters we saw that a faithful union between faith and science is true to both science and the Christian Faith. *In fact, we saw that they are already united in reality and only need to be reunited in the modern mind.*

The next two parts of the text deal directly with science in the light of the two principal subjects in the Christian Faith, which we earlier defined as the truth God has revealed in Sacred Scripture, Sacred Tradition, and the teaching of the Church. God’s Revelation concerns two things directly: himself and humanity. It deals with all other things in relation to these two subjects. Therefore, we will follow God’s lead and do the same.

Part II of this text, entitled “God and Science: The Credibility of the Creator” contains three chapters on God. In Chapter Six, we will investigate whether or not science has disproved God’s existence or simply helped us understand the reality of God more clearly. In Chapter Seven, we will examine some marvelous discoveries by modern science that point to the existence of God. Chapter Eight will be entirely devoted to the special and controversial question of biological evolution and its relation to God.

In Part III of this text, entitled “In His Image: Human Personhood and Modern Science,” humanity itself will take the center stage.

In both parts we will rely on what we have established so far, especially in this chapter. By the end, we will see that John Paul II’s claim that philosophy is absolutely necessary for the dialogue between science and faith is true. By introducing metaphysics, we will be able to approach all the levels of the universe and even God in the harmony that exists between Creator and creation.

Scientific research will take on a new meaning; the search for answers about the universe will be seen to offer clues about the universe’s Maker. And the Christian Faith will also take on a greater clarity, in that our deeper understanding of the universe will also help us to understand God’s Truth more fully. It would not be incorrect to say that Mother Nature will teach us about Father God, and that Father God will shed light on Mother Nature. Then, as believing thinkers and thinking believers, we will be better able to embrace both.





Supplementary Reading

Patroness or Presecutor?  
The Catholic Church and  
Scientific Discovery

1. “GALILEO ON READING THE BOOK OF NATURE”

(excerpted from Antonino Zichichi, “Galileo, Divine Man” in *The Session Commemorating the 400th Anniversary of the Founding of the Pontifical Academy of the Sciences (1603-2003)*. Internet. Available from [http://www.vatican.va/roman\\_curia/pontifical\\_academies/acdscien/acta17\\_anniversary/part2.pdf](http://www.vatican.va/roman_curia/pontifical_academies/acdscien/acta17_anniversary/part2.pdf); accessed April 17, 2006.)

Galileo on Divine Power and Authorship of the Universe

“We do not seek that which God could have made, but that which he made. But I ask you: if God could have made the world infinite or not: if he could and did not, making it finite, as it is de facto, he did not exercise his power more in making it so, than if he had made it as large as a pea.”  
(Galileo Galilei, *Opere*, VII, 565)

“... God could have made the birds fly with bones of heavy gold, with veins full of living silver, with flesh heavier than lead and with small, heavy wings, and in doing so he would have demonstrated his power even further; he could have made fish heavier than lead, that is 12 or more times heavier than water: but he made the first of bones, flesh, and the lightest of feathers, and the second as light as water, to teach us that he enjoys simplicity and easiness...”  
(Galileo Galilei, *Opere*, VII, 566)

Galileo on Using Caution in Reading the Bible and the Universe

“Take note, theologians, that in your desire to make propositions concerning the movement or fixity of the [Sun] and the Earth a matter of faith, you expose yourselves to the risk of having eventually to condemn for heresy those who assert that the Earth is fixed and that it is the [Sun] that moves; eventually, I say, at such a time as it might be sensibly or necessarily demonstrated that the Earth moves and the Sun stands still.”  
(Galileo Galilei, *Opere*, VII, 541)



Supplementary Reading



Galileo: The Book of the Universe is Written in Mathematical Language

“...this grand book (the universe) which is always open in front of our eyes, but which cannot be understood if first one has not learnt to understand the language, and read the alphabet in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures, without which it would be humanly impossible to understand a word of it; without which one wanders vainly in a dark labyrinth.”  
(Galileo Galilei, *Opere*, VI, 232)

2. “ST. THOMAS AQUINAS ON  
STUDYING THE LEVELS OF  
REALITY”

(excerpted from St. Thomas Aquinas, *In Boeth. De Trin. 5.1 resp.*, in Mary T. Clark, *An Aquinas Reader* [New York: Fordham, 2000], p. 30).

... the speculative sciences are differentiated according to their degree of separation from matter

and motion.

Now, there are some objects of speculation that depend on matter for their being, for they can exist only in matter. And these are subdivided. Some depend on matter both for their being and for their being understood, as do those things whose definition contains sensible matter and which, as a consequence, cannot be understood without sensible matter. For example, it is necessary to include flesh and bones in the definition of man. It is things of these sort that **physics** or **natural science** studies. On the other hand, there are some things that, although dependent upon matter for their being do not depend on it for their being understood, because sensible matter is not included in their definitions. This is the case with lines and numbers – the kind of objects with which **mathematics** deals. There are still other objects of speculative knowledge that do not depend upon matter for their being, because they can exist without matter; either they never exist in matter, as in the case of God and the angels, or they exist in matter in some instances and not in others... The science that treats of all these is... **divine science**, which is so called because its principle object is God. By another name it is called **metaphysics**; that is to say, *beyond physics*, because it ought to be learned by us after physics, for we have to proceed from sensible things to those that are non-sensible. It is also called **first philosophy**, inasmuch as all the other sciences, receiving their principles from it, come after it...



Supplementary Reading

3. “SCIENCE AND METAPHYSICS:  
AVOIDING MISUNDERSTANDINGS OF DIVINE CAUSALITY”

(excerpted from Christoph Cardinal Schönborn, “In the Beginning God Created...” Internet. Available from <http://stephanscom.at/edw/katechesen/articles/2005/12/02/a9719/>; accessed April 2, 2007.) This has been reproduced as part of *Chance or Purpose? Creation, Evolution, and a Rational Faith*, trans. Henry Taylor, ed. Hubert Philip Weber (San Francisco: Ignatius Press, 2007), p. 27.

The first and most usual misunderstanding is that God is seen as the first cause. He is indeed the first cause of all causes but he is not as it were at the beginning of a long chain of causes, like a pool player who hits a ball which rolls and hits another ball which in turn hits yet another—as if God were just the first cause in a long series of causes.

...

We believe in a creator, not in one cause among others, one which occasionally intervenes when the limits of all other causes have been reached. God does not intervene like a mother who intervenes when her children fight but who otherwise lets them play with each other. Of course there are wonderful interventions of God, as we will see later. God is sovereign in relation to his creation and he can heal a cancer with his sovereign creative power. This is what we call a miracle. But at present we are talking about the act of creating the world, and this is not just the first push in a long chain of causes but is rather the more fundamental thing of **sovereignly conferring** being. “God spoke and it came to be.” All that exists owes its being to this call, to this word, to this creative act of God. He created everything, heaven and earth, and there is nothing that was not created by him. He created everything in heaven and on earth, the visible and the invisible (for we believe that there are also invisible creatures, namely the angels). Everything is created reality. This is the first and most important affirmation to be made... But before going further, let us raise the following question: is this affirmation a pure article of faith, or can each human being understand it with his reason? The *Catechism answers* (286): “Human intelligence is surely already capable of finding a response to the question of origins. The existence of God the Creator can be known with certainty through his works, by the light of human reason,<sup>25</sup> even if this knowledge is often obscured and disfigured by error. This is why faith comes to confirm and enlighten reason in the correct understanding of this truth.”



Supplementary Reading

4. “SCIENCE AND METAPHYSICS, PART II:  
GOD’S CAUSALITY INVOLVES NO CHANGE IN GOD”

(excerpted from Christoph Cardinal Schönborn, “In the Beginning God Created...” Internet. Available from <http://stephanscom.at/edw/katechesen/articles/2005/12/02/a9719/>; accessed April 2, 2007.) This has been reproduced as part of *Chance or Purpose? Creation, Evolution, and a Rational Faith*, trans. Henry Taylor, ed. Hubert Philip Weber (San Francisco: Ignatius Press, 2007)

...[F]rom the side of God the act of creating involves “no movement.” Why? All making and producing and acting that we observe in the world is a moving or changing of something that already exists. A carpenter makes a table out of wood, he changes the wood, he forms it, giving a new shape to some pre-given material. Someone

at home takes a bunch of ingredients and makes a wonderful meal out of them, shaping pre-given elements into something new. But it is not something absolutely new, it is not a real creating, it is only a shaping. Things are changed so that they become edible. It is the same way with the artist, with the technician, even with intellectually creative people. Even my best ideas are not absolute novelties. They always presuppose that others have already done some thinking and that I have already done some thinking...

Now we see what is decisively different about the creative act of God: **it is without movement**. It does not change that which already exists. It does not form some pre-given material... Thus St. Theophilus of Antioch, writing around the year 180, says: “If God had drawn the world out of some pre-existing stuff, what would have been so special about that? If you give to a human worker some material, he makes out of it whatever he wants. But the power of God shows itself in the fact that he starts from nothing to make anything he wants.” This does not mean that “nothing” is something out of which he produces things, but that God’s creative act is a sovereign act of

bringing into being. We can also say: it is a pure act of “calling into being.” God spoke and it came to be. That is what is so wonderful and so unique about the biblical belief in creation.





Study Guide

Faith and Science:  
At the Crossroads of Nature and Spirit

VOCABULARY

Define the following terms:

- |                              |                                    |
|------------------------------|------------------------------------|
| 1. The Two Books             | 8. <i>Existere</i>                 |
| 2. “Science without Wisdom”  | 9. Efficient Cause                 |
| 3. Matter (physical reality) | 10. Principle of Sufficient Reason |
| 4. Physica                   | 11. Primary Causality              |
| 5. Mathematica               | 12. Primary Cause                  |
| 6. Metaphysica               | 13. Secondary Causality            |
| 7. Existence                 |                                    |

II. STUDY QUESTIONS

- How is the universe like a book with different “reading levels”?
- Compare the *Harry Potter* series with the drama of history and the universe. How are they alike? How are they different?
- Give an example of “science without wisdom.”
- What are the three elements of St. Thomas Aquinas’ multi-leveled approach to the Book of the Universe?
- How does metaphysics give us the “grammar of the universe” at its richest, deepest level?
- What are the characteristics of existence?
- What is the difference between “being” and “Being”?
- Describe God as uncaused cause.
- How is “cause and effect” absolutely essential to the very ability to think about anything at all?
- Is change within an agent essential to its being an agent? Explain.
- Is metaphysics compatible with science? How about with faith?
- Why is metaphysics the key to a faithful reunion of science and faith?
- What principles did Pope John Paul II develop for a healthy relationship between faith and science?

Study Guide

III. PRACTICAL EXERCISES

- Think of a novel which you have been assigned to read in English class in the past 2-3 years. On the basis of your reading, as well as teacher instruction and other resources offered to help you understand the book, reflect on the “book-learning” approach (in which the deeper meaning of the story is missed) to “learning a book,” a deeper reading of the story. Then, answer the following questions:
  - Is the story interesting if only the details of the story are noticed?
  - Does one even understand the details when they are studied as if they were the only element of the story?
  - Are there values and meanings which are central to the story but could also be central to another story without the same details?
  - Summarize the novel according to its levels: details, characters, and themes.
- Jacques Maritain, the famous twentieth century Catholic philosopher, believed thatthe relationship between essence (what a thing is) and existence (that a thing is) is a reality that requires a special “intuition of being,” an inner silence that allows us to “listen to” the mystery of existence whispered by all things.

Find a quiet space, preferably outside, and spend five minutes silently attentive to the things around you. When you find yourself focused on something, consider first what it is, and then consider the fact of its existence. Finally, consider how existence unites all things.

After you are done, answer this question: Did I have an intuition of being?

Endnotes

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|--|--|--|
| 1. Barbour, <i>Religion and Science</i> , 15.  | 2003), 14-15. My use of the book analogy is different  | 6. Ibid., 2.   |
| 2. Antonino Zichichi, “Galileo, Divine Man” in <i>The Session Commemorating the 400th Anniversary of the Founding of the Pontifical Academy of Sciences (1603-2003)</i> . Internet. Available from <a href="http://www.vatican.va/roman_curia/pontifical_academies/acdscien/acta17_anniversary/part2.pdf">http://www.vatican.va/roman_curia/pontifical_academies/acdscien/acta17_anniversary/part2.pdf</a> ; accessed April 17, 2006 | than Haught's, but his development of the analogy originally inspired this chapter.  | 7. Ibid., 23.  |
|  | 4. At the time of this writing, the <i>Harry Potter</i> series have yet to be completed — one book remains to be published.  | 8. Id.   |
|  | 5. The title of this section is from Chapter 1 of Anthony Rizzi, <i>The Science Before Science: A Guide to Thinking in the 21st Century</i> (Baton Rouge: IAP Press, 2004), 1. | 9. Ibid., 23-24.   |
|  |  | 10. St. Thomas Aquinas, <i>In Boeth. De Trin.</i> 5.3, resp. |
|  |  | 11. Ibid., 5.1, resp.  |
|  |  | 12. Ibid., 5.1, resp.  |
|  |  | 13. Clarke, 87.  |
|  |  | 14. Ibid., 21.   |