CHAPTER 9
Science and Religion

Why was the kettle boiling?

John went into the kitchen and found that the kettle was boiling. He wondered why it was boiling. His older brother Jack came in. "Why is the kettle boiling?" John asked him. Jack, who is a science student, explained that 3 million years ago a forest became compressed and through its decay produced a reservoir of gas. Then 20 years ago some people with a rig drilled a deep hole to discover whether there was gas there or not. There was, so they capped the hole and connected a pipe to it. This pipe led into a network of pipes, one that comes out here (pointing at the wall). Then the gas, which comes out of the ring on the stove, combines with the oxygen in the air. (Where the oxygen comes from is another story.) Someone ignited the combustible mixture with a match made of phosphorus or an electric spark, and it ignited. That's why there is a flame. The methane and oxygen combine together and turn into water and carbon dioxide. The byproduct is a lot of heat. The kettle, which is metal so that it conducts the heat quickly, contains water. The heat causes the water molecules to move more energetically until some of them have enough energy to break free of the surface tension and enter the air. This is steam. That is why the kettle is boiling." "Thank you," said John, "but why is it boiling now?" "Oh!" said their mother as she walked into the kitchen. "I put the kettle on so that we could have tea."

Which explanation is correct? Both. But they approach the question from different points of view. Thus the answers are different. Neither is complete. They are complementary. Jack explains how it is that the kettle is boiling. Their mother explains the purpose for having it boiling and thus gives meaning to it.

It is part of human nature to ask the questions Why? What? and How? We have an inborn desire to understand the world that we inhabit and to find meaning in it. Religion, philosophy, and science all developed partly as an expression of this quest.
for knowledge and understanding about the nature of reality. For much of history there was little distinction between these different paths. They jointly satisfied man’s basic need and responded to his intuition that the universe is meaningful, ordered, rational, and governed by some form of justice, even if its laws are not transparent. Religion, philosophy, and science developed together, and in their approaches they were intuitive and rational at the same time. The priests were the first astronomers, and the medicine men were both prophets and physicians. Philosophers tried with the use of reason to comprehend the whole of reality.

More recently, though, philosophy, science and religion have divided, each developing its separate area of competence. Natural science has focused upon explaining and understanding the material dimension of reality, while religion has focused on the spiritual dimension of reality. In part this division came about when some religious people tried to claim sole authority for interpreting the material reality. In response, some scientists dismissed religion as only superstition and attempted to reduce religious experience to human delusion.

Yet the relationship between philosophy, science and religion can be related to the story Why was the kettle boiling? Philosophy, science, and religion are different ways of looking at and understanding the same phenomena. It is not that one is right and the others are wrong. The three disciplines ask different questions and naturally give different answers. In this sense they are complementary. Each has its area of competence.

- Questions about the nature of the world, what it is and to what extent it can be understood by man belong to the area of philosophy.
- How questions about the way the world works are often regarded as properly belonging to science, particularly the natural sciences.
- Why questions about the purpose and meaning of the world and life are considered the domain of religion.

Many people think that science and religion are mutually exclusive or that one discipline’s claim to truth outweighs the other. In other words, some people think that if one follows science, belief in God is not an intellectual option. And some devout people believe that certain scientific facts about the world are unacceptable and should be rejected due to conflict with their religious beliefs. The view that science has somehow “disproved religion” is not borne out by the facts. For instance, it is no accident that modern science developed mainly in the West. Christianity and Islam provided a framework of thought within which science could develop. This framework includes notions such as:

- The world is created good and is therefore worth examining. (“God saw all that he had made, and it was very good.” Gen. 1:27)
- God made the world in a rational and orderly way so that it is capable of being understood mathematically, systematically and scientifically.
- Nature is not to be worshipped in itself, so people are free to examine it.
- Technology is a valid means of “subduing the earth” (Gen. 1:28), and it is therefore morally right to experiment and create.

The Creation Story
In the Bible there is an account of the creation of the world in six days. How should one understand this? If it is understood as literally true, one has to dismiss either the biblical account or the scientific account of the world’s origins. However, to think that the Bible story is meant to be a scientific account is to misunderstand the
nature of the Bible. The Bible includes poetry, law, proverbs, prophecy, history, songs and even jokes. It provides deep insights into the nature of man and human history. But when we read it, we have to bear in mind the cultural background of those people who — many centuries ago — wrote down the biblical texts, often using metaphorical language, and their intended audience.

So when the opening verses of the Book of Genesis say, “In the beginning God created the heavens and the earth,” this is not to be understood as a modem scientific statement. Although the biblical account of the creation is surprisingly scientific in one sense (the order of creation more or less follows modern geological and evolutionary accounts), it was also written to convey other messages. The statement that God created everything means that nature and the physical world are good. This view can be contrasted with other worldviews which regard matter as evil, meaningless, chaotic or to be feared.

Throughout history, religious people have tried to reconcile their faith with the foremost philosophical and scientific discoveries and methodologies. For example, early Christian thinkers showed how Greek philosophy was supported and completed by Christianity. St. Augustine, one of the most notable theologians in early Christian history, developed his perspectives based on Plato’s philosophy, while St. Thomas Aquinas did the same using Aristotle. Muslim philosophers and naturalists, such as Averroes and Avicenna, followed Muhammad’s instruction to “seek knowledge even if it be in China.” Averroes (1126-98) was the greatest Arab philosopher who expounded the Koran according to Aristotle. Avicenna (980-1037) was an Arab philosopher and physician from Uzbekistan. His medical system provided a foundation for Western medicine and included treatment for smallpox and painless operations under anesthetic. Their achievements laid the foundations for modern science.

In fact, many important scientific discoveries, such as the zero used in mathematics, were made by Muslims during the Middle Ages, when science was comparatively undeveloped in Europe.

At different times in history religions have lost their vitality and creativity, falling into dogmatic patterns of thought and behavior. The Roman Catholic Church during the Middle Ages, for example, allied itself with Aristotle’s views and accepted his conclusions as fact, but neglected his method of open-minded critical inquiry. At that time people were overly respectful of ancient authorities and did not verify conclusions for themselves. One result of this was the clash between Galileo and the Vatican. The Church acted beyond its sphere of competence in trying to determine which astronomical theory was correct. However, this celebrated case was not typical of the relationship between science and religion. Throughout the Renaissance and the golden age of humanism, the Church celebrated scientists, along with the leading artists. Benedictines, Dominicans, Franciscans and Jesuits in turn were the leaders of research into the natural world. Later we find that many eminent scientists were believers in God, including Copernicus, Kepler, Galileo, Newton, Darwin, Lomonosov and Einstein. They found no contradiction between their scientific views and adherence to a faith.
The nature of science

Science is a magnificent human endeavor to discover the structure of the world and the laws that govern its working. Many different sciences have developed to examine different areas, and the same phenomena can be studied by different sciences in different ways. For example, the human brain can be studied by physicists, chemists, biochemists, anatomists and psychologists. Generally we make a distinction between:

- **Natural sciences**: physics, chemistry, biology, geology, etc.
- **Social sciences**: psychology, sociology, linguistics, economics, etc.

Science is in many ways a spiritual adventure, conducted by people of great imagination, creativity, insight, intuition and intelligence, into a world of unobservable entities, invisible forces and waves, all inter-related at a more profound level than anything we have yet managed to penetrate. Scientists have a passionate desire to understand the world and to discover knowledge. In many cases they could have used their talent and knowledge in other ways to become rich, but knowledge and understanding was more valuable to them.

Science is also a communal enterprise. The results of independent initiatives are evaluated by other scientists in the scientific community. Over a period of time a consensus is reached by dialogue over which theories best fit the known evidence. It is not unusual for theories that are later accepted to be initially rejected because they challenge the received and established scientific suppositions of the day. In this respect scientists, being only human, are often as dogmatic as religious people. For example, even though Charles Darwin published his book *The Origin of Species* in 1859, it was not until the middle of the 20th Century that his ideas were generally accepted by most biologists. In fact, most of the opposition to the theory of evolution came from scientists and not from religious people.

Throughout history many scientific discoveries have been rejected by a scientist's own contemporaries and only accepted by a later generation.

Often more than one theory about a phenomenon is accepted by different, well-respected scientists. Theories "compete" with each other. The one which is best wins until it is itself replaced by a better one. During the 1950s, for example, there were two theories about the origin of the universe which were equally well respected. One, the "Steady State" theory, has subsequently been set aside in favor of the "Big Bang" theory because subsequent evidence has confirmed the second and not the first. In a similar way today, one can see different theories competing in their explanations of earthquakes or the origin of oil. In fact, our understanding of nature is never complete and is always being improved.

The scientific method

Scientists in general are motivated by a desire to understand how the world is organized. They search for patterns and laws that will enable them to grasp the hidden order, and they develop theories that seek to explain the phenomena they study. An unusual phenomenon may arouse the curiosity of a scientist. He may have some idea, a hypothesis, of what is happening and then design an experiment to test that idea. As he accumulates evidence, general features may begin to emerge, and he develops a theory that should be able to account for this phenomenon and maybe
make predictions about other phenomena. Often scientists use models and analogies to try to explain and understand their theories. For example, the atom is often said to be like a miniature solar system. Of course, an atom is not literally like a solar system, but such models help us to visualize what we cannot see.

However, the whole enterprise of science rests on basic beliefs about the world which themselves are not subject to scientific or rational proof. These notions are assumptions, basic ideas that we believe in without any proof. These are:

- **Rationality** — Our thought processes make sense and are basically reliable.
- **Intelligibility** — The world can be understood.
- **Orderliness** — Nature is an orderly system — a cosmos (from the Greek word meaning universe and order), not a chaos — and it is worthwhile searching for patterns which can be summarized as scientific theories and laws.
- **Uniformity** — The main laws of nature remain the same and apply everywhere in the universe and not just here on earth. In other words, the law of gravity is the same on Mars as it is on earth.
- **Causality** — For every thing that happens in this world, there is a cause. We would be very surprised if things started to happen for no reason at all.

To the sphere of religion belongs the faith that the regulations valid for the world of existence are rational, that it is comprehensible to reason. I cannot conceive of a genuine scientist without that profound faith.

— Albert Einstein

Historically, these assumptions are partially derived from the religious view of the world mentioned above. Far from being the source of certain knowledge, science itself is dependent on assumptions with a religious origin. That the whole of science rests on foundations whose validity it is impossible to prove is embarrassing to many scientists. The greatest scientists have all thought and written about this problem.

Furthermore, when we look at the history of science, we can see that scientific knowledge is always tentative and never certain. This is because scientific theories are only approximations of the truth. They are like maps that describe the landscape but can never represent all the detail in it. Scientific theories are attempts to describe and explain reality, but none is able to explain everything. Always there is some aspect of reality that will not fit into the tidy scientific theory. Such problems are usually the starting point for new and deeper discoveries about the structure of the world.

As time goes by, old theories are discarded or modified and replaced by new ones that seem to fit the facts better. Still, scientific theories can never be proved. No matter how many times a theory is verified by observation or experiment, it only takes one exception to prove the theory wrong or at least incomplete. This is true even for such a fundamental assumption as causality. In the 20th Century it was discovered that there is a lack of a distinct point of causality in the realm of elementary particles. So, after surveying the history of science, one might conclude that any theory will be discovered to be false within, say, two hundred years of being propounded.
I do not know what I may appear to the world, but to myself I seem to have been only like a boy playing on the seashore, and diverting myself now and then finding a smoother pebble or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me.

— Isaac Newton

Great scientists have always recognized that no matter what science could explain, most discoveries opened up doors to still greater mysteries. What we know is far outweighed by what we do not know.

As we noticed earlier, science and religion have always been linked together. In the past few hundred years, science has gone ahead with new discoveries and seems to have left religion behind. As the mechanistic suppositions of 19th century science have been undermined by advances in the 20th century, science has now started to investigate the invisible world, the world of mind and subatomic particles. Many scientists experience a sense of wonder when they look at the world. They have an intuition that there is more to the world than meets the eye.

The limitations of science

Which of the following questions can be answered by natural science?

× How are atomic bombs made?
× Should we make atomic bombs?
× How does the human organism function?
× What is the meaning of human existence?
× How does a compact disc work?
× Is playing a compact disc enjoyable?
× Why are the laws of nature mathematical?
× Why do the laws of nature exist?

Natural science enables the understanding and prediction of events in the physical world and their control through technology. It has enabled us to have a far higher standard of living than ever before in human history. Through modern agriculture, it has become possible for the earth to support a large population; and through medicine the lifespan of the average person has been greatly extended. But has scientific knowledge always benefited mankind? If not, can science provide the values that should govern its use?

There exists a realm of reality that until today natural science has not explored. You cannot measure the beauty of a sunset with a multimeter. Material happiness alone cannot completely satisfy us. Can science explain about values, love, beauty, and friendship? Just because such questions cannot be answered by science does not imply that they lack meaning.
The nature of religion

Religion is a very complex phenomenon, but one aspect of it reflects the desire of people to understand the inner essence of life — not only what is happening but why it is happening. Religion focuses on finding the meaning of events and the meaning of our lives. It tries to answer the “ultimate questions” that life poses, such as:

- Was this world created?
- Does God exist?
- What is the origin of good and evil, and what is the difference between them?
- Why is there suffering?
- Is there life after death?
- For what purpose — and how — should I live my life?

Religion can be described as the ultimate quest to discover the nature of the Ultimate Reality. In this sense it overlaps with science. This is why Albert Einstein said, “I want to know God’s thoughts.”

The heart of religion

The founders of religions undertook a spiritual quest, which always involved great suffering and hardship, to try to solve life’s mysteries and discover the true way of life. Through this process they gained profound insights into the nature of the human situation and spiritual reality. Often they called these insights “revelations” because they felt that their knowledge had come through a personal encounter in which some Ultimate Reality was revealed to them.

In the past, people sometimes accepted the existence of many gods. This is the way it was in ancient Egypt, Greece, and Rome. In other places and times, they gave this Ultimate Reality one name, such as “God,” “Yahweh” or “Allah.” Yet they were also deeply impressed that they had only glimpsed, barely touched, the surface of God’s nature. God was a Mystery that could never be fully comprehended. God’s depth was unfathomable. These revelations of the Divine Being are the primary source of religious knowledge and truth. In this sense, the source of religious knowledge is experiential and not rational. Reason is used to reflect upon and more deeply understand this primary experience.

Because it is impossible to adequately describe this Mystery, religious language is full of similes and metaphors such as “The Kingdom of Heaven is like a mustard seed” and “God is our heavenly Father.” Human concepts have to be used to try to describe and communicate what is indescribable. Someone once said, “To speak of God, we should be at once poets, musicians and saints.” Of course, metaphors have to be
understood correctly. Muslims liken God to a king because in their culture the word “king” refers to a person who is wise and just and protects his people. As in science, where models are also used, there is always the danger of taking the metaphor too far and equating the metaphor with the reality, forgetting that it is merely an aid to understanding. A famous Taoist saying captures the problem of the limitation of language in talking about such matters:

The Tao that can be spoken of
Is not the everlasting Tao.
The Name that can be named
Is not the everlasting name.

The lives of the people who encountered this Mystery were changed dramatically. When they started to share the content of their revelations with others, they attracted many followers, who found that by following the teachings of the founder, they too could grow spiritually and develop a deeper relationship with the Divine Being. This was the origin of the various religions. Religious teaching has endured for thousands of years. Each religion has also remained to a greater or lesser extent open to further revelations. Religious people recognized that the Mystery they had encountered could never be limited and would continue to reveal more and more of itself. This is why the founders of many religions taught that in the future further revelations would be given.

As religions passed through generations, the founder’s teachings often became dogma. Believing the “correct” things about the Way often became more important than its sincere practice. Many religions lost their spiritual vitality and declined into empty formal ritualism, and this is why several major religions of the ancient world faded away and were replaced by newer, more vital ones.

The life and teachings of the founders of these religions were written down and became what is known as “scripture.” Scripture can be compared to a textbook teaching the truth. All too often, though, it became equated with the truth itself, and new insights and other textbooks were rejected. It was during periods like this that religion and science came into conflict.

Evaluation of religious truth

Just as scientific theories have to be evaluated, so do religious teachings. There are many different religious teachings that we can learn about in the world today. In the past, a single view tended to be accepted and became dominant in one area. Often the religious authorities in that area had a vested interest in the acceptance of their theory, and they rejected and persecuted other views. Today, however, it is much easier to learn about other ideas. In one sense this can be very unsettling and confusing. Different religions may challenge our own ideas, but this process can be an opportunity for growth and development.

In the study of science we do not have to discover for ourselves the laws of gravity. Nor do we just accept the theory on the basis of authority. At school we ourselves work our way through the same calculations so as to understand how the theory works. In this way we can inherit all that Newton discovered and make it our own. We can discover for ourselves the beauty of his theory. In the process of learning well-established theories, people sometimes find insights that lead to new discoveries. Religious teachings should be examined in the same way. While authority is important and should be respected, we should test religious knowledge through our own lives to make it our own. In this way we ourselves will gain new insights and realizations.

Despite the fact that there are many different religions, we find that there is a general consensus among them on many important moral matters. The moral and
ethical teachings of all religions recognize that murder, adultery, theft, addiction, dishonesty, greed, selfishness, and pride cause harm to others and harm to ourselves. All religions teach about the value of honesty, humility, righteousness, love, loyalty, purity, respect and self-sacrifice. However, on questions concerning the origin of evil, the reason why God created man, life after death, and the purpose of life, among others, each religion has its own theory and emphasis. These differing views can be compared and evaluated. However, the best laboratory for religious research is inside ourselves. Through study, reflection, prayer and meditation, we can decide which view gives the most satisfactory explanation of the reality of the human situation. We can discover which ideas best help us to understand ourselves. We can learn which one may offer a solution to the problems humankind faces, and which solution is the most realistic and effective in daily life. Our views on these matters will probably develop and change as we grow and mature.

Human culture needs both science and religion to develop. These two disciplines represent complementary paths to a fuller discovery and understanding of the world in which we live. There is no need to claim the authority of one over the other. Science is able to reveal the nature of the physical world, and technology enables us to create a comfortable living environment. However, the cultural purpose of science and technology can be misdirected without the values often derived from religion. These values provide meaning and seek to ensure that scientific knowledge is used responsibly and for the benefit of all. As Albert Einstein said, “Religion without science is blind, and science without religion is crippled.”

**Questions for Discussion**

- How do you understand the statement “To speak of God, we should be at once poets, musicians and saints”?
- What did Paul Dirac mean when he said, “It is more important to have beauty in one’s equations than to have them fit the experiment”?
- How are metaphors and models used in science and religion?
- In what ways do science and religion pursue a complementary path for truth?
- Why has there sometimes been conflict between the scientific and religious ways of looking at the world?
- What are the values that should guide scientific research?
- What values should govern the way technology is used?
- In what contexts might it make more sense to say that a scientific description of the moon is better than a poetic one and vice versa?
The quest for truth

There are many occasions in life when we criticize and disagree with others and sometimes even come to blows. Why? Sometimes it is because we can only see things from one point of view — our own. Suppose you saw someone standing with a bloody knife over a dead body. What would you conclude? Is the person a murderer? Maybe he was defending himself, maybe he was a passerby and tried to help the victim by removing the knife. Often we don’t know all the details. In the course of an investigation, many witnesses are called to testify in order to build up as complete and accurate a picture of what took place as possible. The different testimonies are compared for discrepancies, and the value of each individual’s testimony is carefully weighed. It is like trying to do a jigsaw puzzle.

In this book we are looking at many questions that do not always have easy answers. They have to be thought about and examined in some depth. Sometimes a person will spend his whole lifetime thinking about a question or an issue that is very important to him. This quest for truth and understanding is very human. Just because it is not always easy to find the answer or even to understand it when we do, doesn’t mean that such a quest is pointless.

The value of freedom lies in its enabling us to search for understanding.

Creating an atmosphere in which people can have the freedom to pursue the truth is not easy. It requires that each person:

- listen to what another person is really saying to make sure that he understands the way that words are being used. For example, when two people argue about democracy, sometimes they don’t mean the same thing. One person may associate it with equality and liberty, the other with anarchy and selfishness.
- be honest and accurate in the way he portrays other views and other people. For example, Protestants are mistaken when they accuse Orthodox believers of idolatry because they bow in front of icons.
- be discerning and recognize that although people are sometimes hypocrites, one should be careful not to “throw the baby out with the bath water.” Just because one doesn’t like a person, this doesn’t mean he may not be right or have a good idea. Of course, the opposite may also be true.
- realize that profound questions do not give rise to easy answers. While it is true that I can write on either one side of a piece of paper or the other side, I can’t write on both sides at the same time. However, many other issues don’t fit into a precise “this” or “that” framework. For example, a person can do both good and bad deeds. To say a person is either good or bad is too simple. Nor does one have to either like or dislike modern music. There is a whole spectrum of possible views.
- be prepared to argue for what is true and against what is false, while still respecting the person holding the opposite opinion.

In evaluating a belief or an idea, there are many questions that can be asked, such as

- Is it logical or inconsistent?
- Is it practical or unrealistic?

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The evil of silencing the expression of an opinion is that it is robbing the human race; posterity as well as the present generation; those who disagree with the opinion even more than those who hold it. If the opinion is right, they are deprived of the chance to exchange error for truth; if wrong, they lose the clearer perception and livelier impression of truth produced by its collision with error.

— John Stuart Mill
19th century English philosopher

I disapprove of what you say, but I will defend to the death your right to say it.

— Voltaire
18th century French philosopher
None of these questions by itself is enough to decide for or against a particular belief, but taken together they are a fairly good way of weighing it up.

There is a famous Buddhist story that illustrates the problem we face in trying to understand the world in which we live. It is easy to see things from only our own point of view, more difficult to see things from another person's point of view, and even more difficult to grasp the whole picture. Like all good stories, this one has many different levels of meaning and can be understood in many different ways.

The Blind Men and the Elephant

"Once upon a time," said the Buddha, "there was a certain prince who called to his servant and said, 'Come good fellow, go and gather together in one place all the men who were born blind and show them an elephant.'

'Very good, sire,' replied the servant, and he did as he was told. He then said to the blind men assembled, 'Here is an elephant.' And he led each blind man to a different part of the elephant. Then each of the blind men was asked to explain what an elephant was like.

"The first blind man, who had seized hold of the elephant's tail, said, 'An elephant is like a snake. It is long and skinny and moves to and fro all the time.'

"The second man had seized the elephant's leg. 'You're wrong,' he said. 'An elephant is like a tree. It is wrinkled and round. I can barely get my arms around it.'

"Wait," cried the third man, who had grabbed the elephant's trunk. 'An elephant is like a large hose with a hole in the end that sucks up water."

" 'You are all wrong,' exclaimed the fourth man, holding the elephant's ear. 'An elephant is like a flat, hairy piece of burlap. It flaps all over the place, but it is much thinner and flatter than a hose or a snake.'
"What are you saying?" asked the fifth man, who had hold of the elephant's tusk. 'An elephant is smooth and hard, like a smooth rock, and it also has a point on the end that could harm a person.'

"Then they began to quarrel, shouting, 'Yes it is!' 'No, it is not!' 'An elephant is not that!' 'Yes, it is like that!' and so on, till they came to blows over the matter."

- How does the story teach us to regard people who have beliefs different from our own?
- What can we learn from such people?
- What is truth? If so, can it be known?
- Are there limits to tolerance, and what might they be?
- How should we respond to and interact with people who hold beliefs different from our own?
- Have you ever had the experience of thinking that you understood everything about a person or a situation, and then finding out later that your view was very one-sided and incomplete?
- Is there only one valid way to understand and interpret the world and our experience?