A Calvin Research Group Academic Resource, Module 013A1

Analysis Of Scientific Truth

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Chapter -- I

Analysis Of Scientific Truth

(What Is Science ?)

In the past one hundred years, attacks against the Christian faith have grown at an alarming rate. Critics have tried to use all possible fields of study and investigation to assault the Bible. "Science" has turned out to be their best weapon.

This is the age of science. Scientific investigations have caused technology to grow explosively. Things which were considered a luxury yesterday have become commonplace today. Everyone is dazzled by the achievements and modern gadgets of science which have infiltrated the present day society. The education system is permeated with science, and unless a person is able to obtain a high degree in science, technology, or medicine, he is kept out of the world of lucrative jobs. Science, has become an object of awe and worship.

The aura that surrounds science today is being used effectively to intimidate people with statements like "Science has disproved the Bible" or that "Modern science has shown that Bible is an outdated book". The listener often accepts these statements as true because in his mind 'science' stands for a staggering collection of knowledge against which no educated person can argue. Frequently this attitude gives rise to great mental conflict and anguish. This person does not know what to do. Onthe one hand he accepts the Bible to be the true word of God, but on the other hand he cannot reject science, which is the result of careful investigation. This kind of conflict produces serious hindrances in spiritual commitment and growth, and the person lives a life of constant uncertainty. This would not happen, however, if people have a proper understanding of what 'science' is.

Usually people use the word 'science' to imply as though it represents a single, absolute, and unified collection of truth. This is a completely erroneous idea because the scientific knowledge acquired by science is a collection of many categories of truth, all of which are NOT equally true or established. Actually science is a collection of different categories of information, some of which have high validity while others are yet to be tested or established. Some of it might even be false. This means that we must start with an overview of what science is.

Categories Of Truth In Science

The actual definition of science and its branches is an activity that requires a good background in philosophy. As not many people have this kind of academic preparation, and as it is not necessary to draw facts essential for our discussion, we will therefore, keep our discussion simple and straightforward, confined to the points essential to draw conclusions good and valid for apologetics.

"Science" is the name given to the knowledge that has accumulated as a result of man's quest to understand the world. "Science" is also the name given collectively to the methods used for gaining objective knowledge and insight about the Universe. The methods of obtaining this knowledge have been refined and made more objective and reliable in each generation.

Technology is the name used to designate all the practical applications of scientific information. Thus the science of physics studies

properties of matter (say silicon), while technology harvests these insights to make useful products (say computer chips) for commercial, industrial, and utilitarian applications. Thus science and technology are two distinct activities, mutually dependent for each other's growth. At the same time there are many areas where it is difficult to distinguish between these two enterprises.

The branches of science can roughly be divided into two categories: Exact Sciences and Non Exact Sciences. Exact sciences would include physics, chemistry, biology, etc. while the non exact sciences would include history, sociology and disciplines related to humanities. In the exact sciences we have greater certainty of information, whereas in the non exact sciences we do not have that degree of definiteness. For example in physics one knows definitely that iron will float in mercury. On the other hand, in history one is not one hundred per cent sure of exactly who caused Taj Mahal to be made into its final form !

Within the exact sciences some branches allow more exactness than the others. For example physics and chemistry allow a better level of exactness than what zoology or botany do. Some of the exact sciences have an analytical function, while others are mostly descriptive. In some subjects it is easy to find a straightforward reason for why some behaviour is seen, while in other sciences it at present impossible to advance much beyond a detailed description of things as they stand.

Within the non exact sciences also, some branches allow more exactness than others. Some are easily influenced by personal subjectivity, while others are influenced to a lesser degree. As a consequence it is easy to recognize bias in some of these subjects while in others it is very difficult to do this.

The methods available for study and analysis differ from discipline to discipline, and many times the methods of investigation or analysis valid in one field is not valid or not applicable in another subject. For example, measurement of mass plays a great role in physics while it plays only a relatively insignificant role in historical analysis. Only one thing is common to the multitudes of these methods of investigation : Logic. It can be defined as that discipline of study which supplies the norms and standards to evaluate truth, and separate true conclusions from false ones.

Thus the world of science is a collection of exact and non exact branches of learning, each with its own differing method of investigation and analysis, which are often incompatible with each other. Great care has to be taken when one talks of the Bible and Science. We are very much for science and scientific activity. In fact the author has been actively involved in scientific research (in physics, information science, classification) for several decades. However, we are against the misuse of science and its name: all kind of misuse, including its wrong and unjustified use against the Bible.

To understand the issues involved, and to be able to face the biased attacks coming up against the Bible, it will be helpful to understand a little more in detail the branches of sciences, and their interrelationship. It is difficult here to do this comprehensively, but the approximate picture given below is sufficient and accurate for the present purpose.

The Branches Of Science

We are using the word "science" to mean the "world of knowledge". This is the broadest of its meaning. The foundation of all

scientific knowledge starts with Logic and Mathematics. They lay down the rules by which an objective interpretation of the world can be obtained, they are called the Normative Sciences. Based on the Normative Sciences we have the Physical Sciences, the Biological Sciences, the Historical Sciences, and the Sociological Sciences. A brief description of each is given below:

NORMATIVE SCIENCES: Logic and Mathematics give us the norms and standards by which any phenomena can be interpreted objectively and without bias. Valid deductions are possible only when everyone involved in acquiring knowledge follows sensible rules. Logic and mathematics provide these guidelines, and therefore these two are the foundation of all sciences. Every deduction has to conform to logical and mathematical stipulations before it can be accepted as true.

PHYSICAL SCIENCES: the world around us is filled with physical phenomena. In fact a good amount of what happens around us can be explained in terms of these. The turning of milk into curd, the drying of wet clothes, the miracle of medicines, radio, TV, and almost everything like that can be expressed in terms of physics and chemistry.

Physics, Chemistry, and their numerous branches are usually called "physical sciences". Information obtained with the help of physical sciences tends to be more accurate and reliable than information obtained with the help of other sciences. Mathematics can be applied to them with greater ease, and therefore predictions can be made with more certainty. Physical sciences deal only with repeatable events, and therefore if a particular phenomenon is non-repeatable or non-testable then it does not come under the realm of the physical sciences.

BIOLOGICAL SCIENCES: Biological sciences study living organisms : plants, animals, and human beings. Living organisms are very complex in nature and studying them is not always as straightforward as studying the physical or chemical properties of matter.

Biologists use a lot of help from physics, chemistry, and mathematics, but due to the higher amount of descriptive content biological sciences still remain less exact than the physical sciences.

HISTORICAL SCIENCES: Man has left a lot of history behind him in the past millennia, and reconstructing it is a pleasure to many. In fact understanding the past is very helpful to understanding our present, and this in turn helps us to plan our future wisely.

People who lived in the past have left a lot of material with the help of which past history can be reconstructed. This includes, ancient writings, pictures, statues, buildings, vessels, and numerous other objects. Archaeologists unearth them, and others use them to tell us about the past.

Historical sciences are descriptive in nature, not governed by the laws of mathematics. It is not possible to repeat them in a laboratory to test the validity of a particular claim, and therefore they are very different from physical sciences. At times there is a lot of uncertainty.

Archaeology is the only historical science that offers some form of exact description. However, this exactness represents only one aspect of the historical study of the past. To reconstruct the other side, a lot of gaps have to be filled with the help of careful

historical/legal reconstruction, and that introduces a measure of tentativeness to the whole field.

SOCIOLOGICAL SCIENCES: The collective and individual behaviour of people in society and related activities are studied in the Social Sciences. Man is a very complex being, and therefore his behaviour cannot be predicted with the help of physics, chemistry or mathematical sciences. As a consequence, the social sciences tend to be less exact than the physical sciences.

For obtaining exact results, one should be able to study a subject repeatedly and preferably in a laboratory. Repetition is necessary to check the predictions, and a laboratory situation is necessary to keep an eye on the factors which influence the subject under study. Neither of these conditions is easily met in the sociological sciences and therefore these sciences have many limitations.

Relationship Between The Different Sciences

Ultimately all the branches of learning are interconnected with each other. So much so that some of them will cease to exist without the others.

The Normative Sciences provide the foundation to all learning. Physical Sciences, the Biological Sciences, the Historical Sciences, and the Social Sciences all depend upon the Normative Sciences (Logic and Mathematics). Without Logic and Mathematics all efforts into gaining knowledge are futile.

Each science has its own methodology and subject of interest. Each one is independent of the other in some measure, but at the same time each one needs to borrow ideas and information from the others. The Normative Sciences are the most independent while the Social and Historical sciences are the most dependent upon the others. An investigator of physics might not need the historian but a historian definitely needs the physicist for radiocarbon dating.

The actual picture is much more complex than the summary given above. Still, what is given above is sufficient to do justice to the needs of the average inquirer of Science and Faith.

SUMMARY: It is very clear from the forgoing discussion that "science" does not represent a unified collection of homogeneous truths. Rather, the sciences are a varied collection of information, the reliability of which differs from subject to subject and also from time to time. Knowing this is essential before one can face those attacks against the Bible which are brought forth in the name of "Science".

Chapter -2

The Bible And Science

A clear picture emerges in the light of the foregoing discussion. It is clear that scientific information is split up into many branches of science that have differing levels of reliability. They range from the most unreliable to the most certain kind of information. Scientists use different technical words to represent the types and reliability of this information.

Some of these words are, hypothesis, conjecture, opinion, interpretation, school of thought, approximation, deductions, theory, observations, data, facts, laws, etc. Of these, categories like hypothesis and opinion might have no reliability at all, while data and facts might be reliable beyond doubt. In the matter of reliability the other categories would lie in between these two extremes. Since it is difficult to remember all the above categories, it is helpful to divide them into two categories: theories and facts.

In the above division, all those categories of information that are not one hundred per cent sure are classified as THEORIES. All those categories of information that are reliable and beyond any doubt are called FACTS. Theories are often replaced by other theories, or are even totally rejected. Facts do not change with time. Obviously, unestablished theories cannot be used for questioning the Bible. There is no guarantee that the theory itself is right. Only the FACTS and LAWS of science can be used for any meaningful dialogue or interaction between science and the Bible.

The above condition must be used by the Christian apologist in every place that he discusses Bible and science. He should never allow anyone to attack the Bible and the Christian faith on the basis of any theory or unestablished statement of science. When this is kept in mind, many of the problems would disappear. In fact, most of the attacks that come up against the Bible and where the enemies of the Bible seem to win, the attacks are based on theories, and NEVER on facts.

Model-Making In Science

Model-making is a special activity of modern science that must be understood by every Apologist. This is because scientific models are often used to attack the Bible, though this is not a fully legitimate way of combat. To help us understand this subject we will begin with an introduction to Models Of Science.

Everyone has seen a globe. A globe is a miniature model of the earth that helps us to visualize what the earth looks like. Models are very helpful when studying things and phenomena that cannot be easily seen or handled. It is easy using a globe to show the relative placement of various countries, and also that a certain country is exactly on the opposite side of the globe. No amount of flat-map study can be as enlightening as the study of the spherical globe.

Thus though the globe is not the earth itself, still it is a useful "model" of the earth. Various things can be studied, guessed, and investigated with the help of the model. This is precisely the function of scientific models. On facing a very complex structure (like the atom, or a molecule), they try to represent it with the help of a model. Then they study both the model and also the reality, and try to modify the model so as to correspond as closes as possible with the reality. Such model-making has been very helpful in studying physics, chemistry, biology, psychology, etc. In fact, the Universe and the things in it are often so complex that scientists cannot proceed in any subject these days without model-making.

Models are of two types, Qualitative and Quantitative. Both serve the purpose of research and investigation, but their scientific reliability is different.

QUALITATIVE MODEL (Descriptive Models): A model that is constructed merely on the basis of "description" is called a Qualitative Model. For example, when the four blind men who studied the elephant, combine their observation and arrive at a mental picture of the elephant, this mental picture is a Qualitative Model. Having no eyes, they can never see the elephant in one glance, yet the combining of the description of its various body parts gives them a capacity to guess what the elephant might look like. However, this guess can often be at variance with the original.

Historical, Legal, and Logical reconstruction of past events is in fact a kind of model-making. Here the researcher or the investigator constructs various descriptive models, and then rules out all those that are impossible. In this way he arrives at a few (or even a single) model that is closest to reality. This kind of investigation is very important for Archaeology, history, and the Law Courts of every country.

Qualitative Models often help researchers, but their use is limited. The more complex phenomena in the Universe have to be studied with the help of the Quantitative Model.

QUANTITATIVE MODELS (Mathematical Models): A Quantitative Model is a model that has a definite mathematical relationship with the object represented by it. Consider a map of our country, for example. Somewhere at the bottom there would be a number saying something like 1:100,000,000. This means that one part on the map is equivalent to 100,000,000 parts of the country. Thus the distance between two points on the map can be multiplied by this number to get the actual distance between those two points. Similarly, most globes would also mention the proportion, so that a rough calculation of the actual distance between two points can be made.

Then there are Quantitative Models that are represented purely by mathematical equations. For example, the equation x2 + y2 = a2 represents a circle or radius 'a'. A lot of information about this circle can be deduced from this equation. Not only geometrical shapes, but also particles in motion, the flight path of an artificial satellite, and even the weather of a country can be represented this way. Language, the way in which traffic flows on a busy day, the way in which global climate changes, can also be represented with the help of Quantitative Models.

Quantitative Models of physical objects like atoms and molecules are often quite reliable. On the other hand, Quantitative Models of weather, language, sociological behavior, etc. are still in their infancy. Perhaps scientists will never be able to represent these things fully with the help of Quantitative Models.

VALUE AND LIMITS OF MODELS: Model-making is an inseparable part of modern scientific endeavor. No progress is possible without this activity. However, a model in itself is not the "actual truth". It is only a representation of the truth. Further, in the case of very complex phenomena, a model is only a *possible* representation of truth. There might be many other possible representations of this same phenomenon.

Thus the development of a model of any phenomenon does not mean that man has arrived at the final truth. Rather, allthat one can decide is: which model seems to be closer to the truth. Thus the Theory Of Evolution as well as Scientific Creation are both models of science. Both of them try to explain the origin of life and associated phenomena. However, the evolutionist cannot claim that his model represents THE truth. Rather, he has to admit that his model represents one possible way in which things might have taken place.

For any further discussion on Evolution/Creation, both models have to be tested. The model that is able to do the following two things is considered the superior one (closer to reality):

1-It should be able to explain the maximum number of observed phenomena related to life.

2-It should be able to make the maximum number of predictions about phenomena related to life, but not observed so far.

Whichever model outperforms the other one is to be accepted as the better one, and closer to reality. The reader would be happy to note that in every way the Scientific Creation model turns out to be superior to the Evolution Model.

SUMMARY: Models are not truth in themselves, but only a representation of truth. Thus the Christian apologist should be careful in emphasizing the limits and boundaries of models. Further, he should remember that a model very popular today might seem like foolishness tomorrow. For example, the Big Bang Theory of Universe was very popular in the sixties and seventies. Scientists started questioning it in the eighties, and it seems that very soon it will be rejected.

Models have only a very limited role to play in the Bible/Science/Logic debates. Models do not represent the final truth, and thus they cannot be used to question statements in the Bible.

Chapter -- 3
Historical Studies

In a generation that worships science, many people do not realize that historical studies are different from material sciences. Material sciences like Physics and Chemistry study those properties of matter that can be investigated with the help of repeatable experiments. Historical sciences, however, deal with things that have taken place in the past. They cannot be repeated.

For example, any investigator into the Laws of Motion can perform any number of experiments and verify to his satisfaction that these laws represent reality. On the other hand, a person studying the Pyramids in Egypt cannot replay the entire history. History is not like a videotape which can be rewound and replayed any number of times. Thus historical studies have many restrictions. Demanding precision in this field equivalent to that which is seen in materials science is not fair.

The Origin Of The Universe, The Origin Of Life, and Archaeology are some examples of Historical Investigation. The impression

given to students is that studying the Origin Of The Universe and The Origin Of Life is part of material sciences. In fact these subjects are handled by cosmology and biology, respectively, but that is only for the sake of convenience. These investigations are actually non-repeatable and historical in nature.

People often demand scientific proof for the historical narratives in the Bible. The demand is that these historical narratives should be supported by the help of the physical science. This is contrary to what can be done. The historical sciences can be investigated only with the methods of historical research. Any other demand is contrary to reason, and is a mark of ignorance about the nature of scientific investigation.

Thus whether Jesus Christ came out of the grave, was there a long day at the time of Joshua, was a star seen at the birth of Jesus, did Moses exist, etc. are questions falling into the realm of historical investigation. These should therefore be investigated with the help of historical sciences.

It is often seen that people having no perception of the difference between historical and material sciences demand material proofs for historical subjects. No meaningful discussion is possible before this difference is made clear to them. Thus the best approach for the Christian apologist facing this kind of question is to bring the opponent to the realization that historical and physical sciences should not be mixed illegitimately.

Bible/Science: Summary

Science is made up of facts, theories, and models. Of these, only established facts and laws can be used to examine the Bible. Theories and models have no permanence, and therefore they cannot be used to question the Bible. On facing an attack based upon science, the Christian apologist should immediately ask the question, "is it a fact, theory, or model". Once a clear answer is obtained, the rest becomes easy.

The Biblical Position

***Sola Scriptura** (The Bible Alone)*
***Sola Gratia** (Grace Alone)*
***Sola Fide** (Faith Alone)*
***Solus Christus** (Christ Alone)*
***Soli Deo Gloria** (To God Alone Be The Glory)*
Anyone Who Says That He Is A Christian And Then Disputes The Above Statements, Is A Heretic

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