jeremy l. walter

Mechanical Engineering

1

Dr. Walter is head of the Engineering Analysis and Design Department within the Energy Science and Power Systems Division at the Applied Research Laboratory (ARL) at Pennsylvania State University. He holds a B.S. in mechanical engineering with highest distinction, an M.S. in mechanical engineering, and a Ph.D. in mechanical engineering, all from Pennsylvania State University. He was a 1975 recipient of a prestigious National Science Foundation Fellowship, funding graduate study at the institution of his choice. At ARL, Dr. Walter has been the leader for a number of undersea propulsion development projects for the U.S. Navy. His research involves multi-disciplinary development and testing of advanced air-independent engines and thermal power systems for various autonomous undersea vehicles.

They Can't Be Wrong, Can They?

In 1961, President John Kennedy set a national goal for the United States to land a man on the moon before the decade was over, and in the summer of 1969 Neil Armstrong made his famous "giant leap for mankind" onto the lunar soil. In the midst of severe social unrest, science and technology seemed to provide an island of stability to a nation caught in internal tension, an unpopular war in Vietnam, and the deep freeze of the Cold War. "New and improved" became the harbinger of what was expected in technology, and

harnessing the secrets of nature for man's benefit was the engine to propel us into a hopeful future.

This milieu was the incubator for many careers in science and engineering, and so it was for that of the author. Public education introduced the sciences of the space program, but also proclaimed as fact the 4½ billion-year age of the earth and that life had gradually evolved over millions of years from a single-cell organism, supposedly formed by chance in a primeval ocean. Students were compelled to accept the evolutionary model of earth history, as is the case for most people educated in this century. The ancient writings of Genesis were relegated as outdated and allegorical, and most Christian students reconciled an immature faith in God and the Bible with a casually contrived version of the "day-age" interpretation of the creation account. The days of Genesis were assumed to somehow represent the ages or stages of cosmic development that the scientists were now beginning to understand and describe more fully in our modern world.

For multitudes today, the story is the same. The implicit authority of the classroom combines with modern technological achievements to validate the "scientific" models of origins and the great antiquity of the universe. Genesis is viewed as myth, if not fairy tale, and our concept of truth is limited to the empirically derived and subjectively interpreted. But we need to ask the fundamental question mouthed by Pilate, "What is truth?" and determine the role that science plays in the overall development of truth.

The discussion in the following paragraphs takes a look at the nature of science, and how true science does not contradict God's inscription on stone that "in six days the LORD made the heavens and the earth, the sea, and all that is in them" (Exod. 20:11).

What Is Science?

Many intelligent people are thoroughly convinced that science has proven the earth to be billions of years old. How can they be wrong? The misconception builds on a neglect of the basic nature of "science" and a natural desire for moral autonomy. Actually, the age of the earth can be neither proved nor disproved by science. Scientific evidence can be compiled to support one model of earth history as compared to another, but such work amounts to a feasibility study, not proof.

Science is the human enterprise of seeking to describe accurately and quantitatively the nature and processes of our universe through observation, hypothesis, and experimental validation. Certain axiomatic principles must be accepted by faith for this method to be valid, the first of which is the expectation of order in the universe. A specific corollary of the order principle is the law of causality, or "cause and effect" relationships. This law states that one cause can have many effects, but no effect can be quantitatively greater or qualitatively superior to its cause.[1] Observed effects are assumed to have causes because of this law, and are not treated as purely random or chance occurrences. The inquisitive mind will speculate on the cause of an observed effect and then seek to recreate and test the cause experimentally. That is the essence of the so-called scientific method.

Note, however, that an observation is always an action of the present, not of the past. Additionally, the observer must recognize that observations are to varying degrees indirect, through an instrument of some sort that may distort his perception. For instance, our eyes are optical instruments that receive incident light, optically focus that light on the retina, which in turn converts the image to a complex system of electrical impulses, transmitted to the brain by

the optic nerve. If the transmission of the image from an object to our brain is distorted at any point along the way, our visual perception will be incorrect. Some optical illusions are actually misinterpreted in the brain because of preconceptions, without any optical or electrical distortion. All observations must be similarly analyzed and scrutinized to develop accurate perceptions. The farther removed in time or distance an indirect observation is, the greater the opportunity for distorted perception.

Applying the foregoing discussion to the age of the earth, we recognize that we have no *human* record of observed events from great antiquity, but rather interpretations of recent observations of present realities. Often the establishment of a great age is built on observations from a very great distance or developed through tedious indirect means. Evidence contradictory to the hypothesis is either suppressed or ignored because of preconceived assumptions. Even the light arriving from distant stars is a present reality, not a direct observation of the past. These observations are of effects for which various hypothetical causes have been proposed. Those causes are sometimes gradual processes that would require very long times to produce the present state.

By way of illustration, consider geologic formations in the Great Basin of the western United States. The vast horizontal layers of hydraulically deposited sedimentary rock are said to take long periods of time to accumulate, based on the assumption that the rate of deposition was always similar to that observed today in a typical river delta. This concept of uniformity may seem like a reasonable starting point when considered abstractly, but no steady-state river flow could possibly cover such a vast area; neither would it produce the violently buried and mangled bodies found fossilized in many rocks of the region. The present-day erosion conditions applied

uniformly in the past could not account for the unusual formations of the Grand Canyon, mesas, badlands, and other canyons. By contrast, the catastrophic processes observed during and following the eruption of Mount St. Helens in the Cascades of Washington state produced a scale model of the Grand Canyon in a very brief period of time. Sediments were rapidly deposited and then suddenly eroded by pyroclastic steam, water, and mud flows in the area northwest of the summit. Now the canyon walls resemble others that are assumed to be of great age, even though they are known to be less than 20 years old.[2]

The point to be recognized is that science deals with observations of present states and processes, and can only discuss the prehistoric past. In the example of geologic formations of the Great Basin, the assumption of uniformity can be contrasted with a model of catastrophic tectonic, volcanic, and hydraulic activity that would accompany a global cataclysm such as the great flood of Genesis. The observed eruption of Mount St. Helens demonstrated that rapid processes can produce effects commonly believed to require long periods of time, and thus gives credence, if not preference, to the concept that the earth's geology did not require long periods of time to develop. Many puzzling formations can only be explained through cataclysmic forces. Similarly, other methods of estimating the age of the earth or of the universe apply assumptions about processes and rates that extend into the distant past. Regardless of how apparently compelling such dating methods may appear to be, the fact remains that they are built on assumptions that must be critically questioned and evaluated.

All events of the past (even the recent past) are best reconstructed from the testimony of witnesses and the accumulation of corroborating evidence. That is the basis of the system of jurisprudence.