

THE BIBLE AND ULTIMATE REALITY

Article by Robert Ginskey
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“Of what is the world composed?” is a question that has intrigued men for millennia. Many answers have been proposed, revised, discarded, revived.

Historically the ancient Greek philosophers proposed that the four basic ingredients of nature were earth, wind, air and fire. A glass of wine, for example, was obviously a mixture of water and earth, and if there were bubbles, air. Similarly a tree was thought to be a mixture of earth and water, with perhaps a little air and fire as well. The sun, on the other hand, was often considered to be pure fire.

Scientific Analysis of 'Reality'

By the end of the 19th century AD science had developed a much more accurate analysis of “reality”. Everything, the scientists of that age maintained, could be explained in terms of about 90 elements (oxygen, hydrogen, carbon, iron, etc.) plus various kinds of energy or force such as electricity, magnetism, radiation and gravity.

The basic, irreducible, smallest particle of an element was said to be the atom. The four ingredients of the Greeks, the scientists pointed out, were simply the basic states of matter: solid, liquid and gas plus radiant energy.

The real, hidden reality, the scientists assured, could be entirely described in terms of matter and motion, i.e., the movements and arrangements of various atoms. If there was a spiritual aspect to reality, it was left to the theologians to find. “From now on,” declared the celebrated French chemist Marcellin Berthelot in 1887, “there is no mystery about the universe.”

Most of the scientists of the 1890's were indeed confident that they had finally arrived at an understanding of nature that was complete, consistent and useful. All that remained to be done, they half-jestingly lamented, was to improve the accuracy of their measurements, to refine their experimental techniques to “determine that next decimal place.”

Yet, by the year 1900, the whole foundation of traditional classical physics had begun to crumble.

Dividing the Atom

The discovery of radioactivity in 1896 clearly implied that the atom was not the ultimate reality. Radioactive atoms were found to emit various subatomic particles, such as the electron, proton and neutron.

But these particles were later found to have a wavelike nature. The particles acted more like the waves produced on the surface of a pond when a rock is thrown in. Yet how could something be both a wave and a particle at the same time?

To make matters worse, light, which scientists thought consisted of waves acted like a particle. In the photoelectric effect, for example, light particles striking the surface of metal can knock out electrons, creating an electric current. This is contrary to what would be expected if light consists of waves.

Compounding the problem was the perplexing fact, demonstrated by scientists A.A. Michelson and E.W. Morely that light does not require a medium for its propagation. This is in striking contrast to sound waves, for example, which must have air or some other substance to travel through. Light, however, can travel in a perfect vacuum.

Then there was the problem of radioactivity itself, where for no apparent reason an atom would suddenly disintegrate. It was almost as though certain atoms were playing atomic roulette.

The consternation of the world's scientists continued to increase with the discovery of many more "ultimate" particles such as pions, muons and omegas. Other strange and puzzling phenomena also began to rudely intrude into the comfortable, almost complacent world of science.

What was the answer? Could anyone make sense out of the myriad of strange, incredible, even contradictory facts that modern science was discovering? What was the basis of reality?

Clearly no conventional approach could extricate science from its predicament. The bewildering impasse could only be resolved by totally revising many of the very foundations of science itself.

Revolutionary Concepts

The first step was taken by German physicist Max Planck, who in 1900 proposed a revolutionary new assumption – that changes in energy were not continuous but "quantized" in small bundles. This assumption was directly contrary to traditional physics, yet it explained beautifully many experimental facts.

Albert Einstein made even more drastic alterations in the classical scheme of the universe. Boldly applying Dr Planck's "quantum hypothesis" to light itself, Dr Einstein solved the riddle of the photoelectric effect by postulating that light is both a wave and a particle. Dr Einstein's explanation helped establish the wave-particle nature of light – a duality that classical science had considered intolerable.

But more was to come! In 1905 Dr. Einstein set forth his famous theory of relativity. The conclusions he drew seemed preposterous, ridiculous, absurd. Yet one test after another vindicated his predictions.

Was there an interrelationship between mass and energy? Classical science said "no"; Dr. Einstein said "Yes"! How? $E=mc^2$ - that is, energy equals mass multiplied by the square of the speed of light. Proof? There are many examples, but surely the atomic and hydrogen bombs direct application of Dr. Einstein's mass-energy relation - are the most convincing!

Neither Mass Nor Energy

According to Dr. Einstein, matter and energy were not different quantities, but equivalent concepts. James H. Smith, in his text *Introduction to Special Relativity*, states that the equation $E=mc^2$ "must really be thought of as the conservation equation of some new quantity, neither 'mass' nor 'energy' but having properties of both."

But what is this "new quantity"? Can something be both matter and energy at the same time?

Mathematically linked to Dr. Einstein's prediction that mass and energy are equivalent were several additional conclusions equally strange from a traditional commonsense point of view. Thus Dr. Einstein asserted that mass increases with velocity. Many people objected that "velocity" was certainly unrelated to mass. Yet, once again, repeated careful experiments - including studies with giant particle accelerators proved conclusively that Dr. Einstein was right!

In addition, the theory of relativity predicted time was related to velocity. Contrary to classical physics? Certainly. Experimentally verified? Yes. Scientists have found, for example, that unstable particles traveling near the speed of light can have their lives extended as long as the proverbial cat - that is, the particles can live nine times longer than normal.

Similarly, Dr. Einstein showed that length is altered by velocity, that change in velocity can be considered equivalent to gravitation, and that gravitation and the properties of space are related to mass. Dr. Einstein's prediction that velocity is related to gravitational fields was verified by studies conducted by the Jet Propulsion Laboratory (JPL) of Pasadena using the Mariner VI satellite.

A Fundamental Essence

So what does all this have to do with the ultimate reality? Simply this: Modern science, largely as a result of Dr. Einstein's theory of relativity, has shown that the so-called ultimate realities - space, time, matter, energy and gravitation -are apparently not separate entities. Rather, they appear to be interrelated, equivalent expressions of a single fundamental essence!

But what is the nature of this "fundamental essence"? Is it physical? Spiritual? Or is it meaningless to even ask such a question?

Scientists are increasingly perplexed. They use terms like "spacetime continuum," "primitive material," "primordial essence," or "quantum fields." Thus Murray and Cobb's college physics text states: "Fields are now believed to be the only entities in nature...all matter merely consists of condensed quantum fields." Some scientists, such as Murray Gell-Mann of Caltech in Pasadena, have theorized that the fundamental basis of reality must lie in even more basic - and elusive - particles called quarks.

But other scientists have questioned whether science will ever really understand the "ultimate reality."

Theoretical physicist Sir Arthur Eddington analyzed the discoveries of modern science and concluded: "The stuff of the world is 'mindstuff.' Yet this mind-stuff is not spread in space and time; these are part of the cyclic scheme ultimately derived from it."

Physicist Eddington maintained that space and time are not separate entities, but are derived from the basic essence he calls "mind-stuff," for want of a better term!

Similarly, the famed English physicist and astronomer Sir James Jeans concluded the basic realities of modern science "seem to my mind to be structures of pure thought, incapable of realization in any sense which would properly be described as material."

In other words, physicist Jeans concluded that the ultimate reality, as deduced from the facts of modern science, is not physical or material, but nonphysical.

The Ultimate Reality

But isn't this what the Bible has proclaimed for nearly 2,000 years? "Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear" (Hebrews 11:3).

The Phillips translation makes it even clearer: "And it is after all only by faith that our minds accept as fact that the whole scheme of time and space was created by God's command - that the world which we can see has come into being through principles which are invisible."

The apostle Paul died 19 centuries before the discoveries of 20th-century science; nevertheless, he knew, or at least was inspired to write, that the visible, physical, tangible creation was made from the invisible, the nonphysical, the intangible - which manifests itself in terms of matter, energy and time.

"It is the glory of God to conceal a thing: but the honour of kings is to search out a matter," according to the book of Proverbs. Yet as scientists have probed deeper and deeper into the ultimate constituents of the universe, it seems increasingly evident that science is dealing with an essence that cannot even be visualized in the' imagination - at least not as physical human beings!

Space, time, matter, energy and gravitation have been shown to be interrelated, even equivalent manifestations of a single fundamental essence - but to describe that "essence" seemingly defies the capabilities of even modern science. As scripture says, "the secret things belong unto the Lord our God..." (Deuteronomy 29:29).

Perhaps it is premature to say that modern science has absolutely proved that the ultimate basis of the physical universe is spiritual. Perhaps some people are not yet ready to believe that God created the universe by means of a spirit essence known as the "spirit of God" (Genesis 1:2).

But the undeniable fact remains that the scientific view of the universe increasingly sees nature as a unity - as tantalizingly elusive as it may be - and in reaching such conclusions science draws closer to the biblical view of ultimate reality.