It is generally thought that scientific knowledge is characterized by objectivity, observation, experiment and reproducibility, whereas knowledge in the realm of religion is thought to be based on subjectivity, holy scriptures, tradition and faith.

I shall challenge the above views and demonstrate that there are, in fact, striking similarities between knowledge in the realm of science and knowledge in the realm of religion. These similarities will be shown to form the basis for rational arguments supporting the Divinity of the Torah. A rational approach to belief in the Torah and the existence of God has been the subject of several recent books. However, this analysis is quite different from those found in other accounts.

Knowledge in the Realm of Science

It is widely, but incorrectly, believed that the basis of all scientific knowledge is facts, which are obtained by experiment and observation. Science begins with facts—observations about nature that can be verified by other scientists. Only after there exists an agreed-upon body of facts can one begin to formulate theoretical concepts that might explain them.

Scientists explain this principle of scientific knowledge by asserting that all facts are theory laden. In short, science does not begin with facts. Rather, science begins with theories and concepts about the physical world. Only after a theoretical framework has been formulated can one understand what the facts are. Science advances by postulating concepts and making assumptions, and then investigating to determine whether these concepts and assumptions are successful in explaining phe-
nomens observed in nature or in the laboratory. As successful explanations multiply, it becomes more and more plausible that the assumed concepts and ideas are basically correct. This is what is meant by "plausibility arguments" in science.

Quarks

An instructive example of the use of plausibility arguments in science is the quark, the tiny particle that constitutes the basic building block of the universe. The quark is not a rare exotic particle, unrelated to the everyday world. Quite the contrary—quarks form 99.9 percent of all familiar materials including stars, planets, rocks, water, air, the tissues of your body and the magazine you are reading. (The remaining 0.1 percent is composed of electrons.)

All scientists are convinced of the existence of quarks. As Professor David Bailin of the University of Sussex explains: "Even though no particle detector has ever 'seen' a quark, everyone agrees that they actually do exist." Moreover, quarks will never be seen, because according to the standard theory of elementary particles, they are forever "locked up" in the protons and neutrons (each of which consists of a triplet of quarks), a phenomenon known as quark confinement. Professor David Callaway of CERN (European Organization for Nuclear Physics) explains: "The fundamental particles of matter—the quarks—are permanently confined inside protons and neutrons."

If no one has ever seen a quark, why are scientists absolutely convinced that they exist? Why do quarks rank among the most important building blocks of the universe? Why has the theory of quarks been awarded the Nobel Prize? The answer to all these questions is that if one assumes that quarks exist, then many observed features of the universe can be explained. "Theorists developed the quark model as a compact description of the many new particles detected in the 1950s and 1960s, as well as the familiar proton and neutron. The properties and interactions of all these particles fell into patterns that could be completely explained if all these particles are made up of three species of quarks."

The findings described above, as well as many others discovered subsequently, have led scientists to believe that the existence of quarks is extremely plausible, even though quarks have never been directly detected.

The Big Bang

Another interesting example of a plausibility argument is the big bang theory, which describes the origin and early history of the universe. It is quite obvious that the origin of the universe is a one-time event that can never be replicated in the laboratory. Moreover, it is impossible to reproduce the extreme conditions that are assumed to have existed in the very early universe. Therefore, one cannot verify the scenario that the big bang theory assumes to have occurred in the far distant past. In view of the impossibility of verification, why are all scientists convinced of the validity of the big bang theory? Why has it been designated as the "standard theory of cosmology"? Why has this big bang theory been awarded the Nobel Prize?

This is because if the big bang theory of the origin and early history of the universe is correct, then many predictions can be made about the universe today, and these contemporary predictions can be tested. Since all the predictions of the big bang theory have been verified, it is very plausible that the big bang theory is indeed correct, even though the basic premises of the theory can never be directly tested.

Are there any rational grounds to buttress our faith in the existence of God and the validity of the Torah?

Knowledge in the Realm of Torah

The word “faith" is defined as “belief in religious doctrines for which there is no proof." Although religious belief is based on faith, rather than on proof, our faith has recently been buttressed by a series of plausibility arguments.

Like the theory of quarks and the big bang theory of cosmology, the basic tenets of our religion can never be verified. God no longer communicates directly with human beings, and the Revelation at Mount Sinai occurred in the distant past and left no historical evidence. Therefore, one may ask: Are there any rational grounds to buttress our faith in the existence of God and the validity of the Torah? The answer lies in plausibility arguments—the same answer given by science to justify the existence of quarks and the validity of the big bang theory. If one assumes that these religious historical events did, in fact, occur, then one can make predictions about today's world that can be tested. If these predictions are confirmed, they constitute plausibility arguments for the validity of the basic assumptions of our faith.

Let us examine some plausibility arguments for religious belief.

Creation of the Universe

Important advances in cosmology during the past few decades have, for the first time, permitted scientists to construct a coherent account of the origin of the universe. An overwhelming body of scientific evidence supports the big bang theory of cosmology. The prestigious Scientific American, in a detailed overview of cosmology, writes: "The big bang theory works better than ever."

The most surprising assertion of the big bang theory is that the universe was literally created. It is instructive to quote from some of the world's leading authorities.

Nobel laureate Paul Dirac of the University of Cambridge writes: "It seems certain that there was a definite time of creation."
From the 2006 OU Convention Resolution Regarding Jerusalem:

“Yerushalyim must forever remain the spiritual, cultural and political center of the Jewish people and the State of Israel, and the Orthodox Union is mandated to undertake all efforts that are necessary to secure and maintain Yerushalyim as the eternal and undivided capital of the State of Israel. The Orthodox Union is further mandated to oppose any proposal or plan to relinquish any part of Yerushalyim to any foreign authority.”

Visit www.oujerusalem.org to learn how you can be part of the OU’s campaign for the holy city to remain the secure and indivisible capital of Israel.
Professor Brian Greene of Columbia University writes: “The modern theory of cosmic origins [asserts] that the universe erupted from an enormously energetic event, which spewed forth all space and all matter.…The currently accepted scientific theory of creation is often referred to as the standard model of cosmology.”

It is hardly possible to carry on a meaningful discussion of cosmology without the creation of the universe assuming a central role. Today, all cosmologists discuss the creation of the universe, while Bereishit discusses the Creator of the universe. It is, therefore, plausible to assume that science and Torah are both referring to one and the same subject.

The Light

When cosmologists speak of “creation,” to what event are they referring? Scientists have discovered that the universe began with the sudden appearance of an enormous “ball of light.” This “explosion of light” was dubbed the “big bang” by British astrophysicist Fred Hoyle. The remnant of the initial light was detected in 1965 by two American physicists, Arno Penzias and Robert Wilson, who were awarded the Nobel Prize for their discovery.

The discovery of the primeval light answers a long-standing puzzle regarding the Torah account of Creation. On the First Day of Creation, the Torah asserts: “And there was light” (Bereishit 1:3). But, at that time, neither stars, nor sun, nor people, nor any other source of light existed. Therefore, how can one understand the “Bereishit light”?

Scientists have now discovered that there was light at the very beginning of time—the primeval light whose appearance heralded the origin of the universe. This light did not appear within the existing universe. Rather, the creation of light was the Creation of the universe. Bereishit does not record two separate creations on the First Day—the Creation of the universe and the creation of the light—but only one.

The scientific confirmation of the Torah assertion—and there was light—constitutes another plausibility argument for the validity of the Torah.

Cosmological Time Scale

How much time was required for all the cosmological events that took place during the creation of the universe? How many millions of years elapsed before the universe was complete and assumed its present form? Bereishit writes of the Creation of the world occurring on the First Day. Is this possible? Could all the cosmological events associated with the Creation of the universe have occurred in a single day?

The remarkable answer is that all the cosmological events involved in the Creation of the universe occurred within a few minutes. This fact has been emphasized by the dramatic title that Nobel laureate Steven Weinberg chose for his famous book on modern cosmology: The First Three Minutes.

Nowadays, cosmological events—events that alter the structure of the universe—require millions of years to occur. How could such events have taken place within just a few moments? The answer is that during the period of Creation, the temperature of the universe was extremely high. At the origins of time, events occurred with amazing rapidity in the blazing universe. In fact, the formation of the atomic nuclei—the building blocks of matter—was completed within three minutes after the instant of Creation. Professor Greene explains: “The newborn universe evolved with phenomenal haste. Tiny fractions of a second formed cosmic epochs during which long-lasting features of the universe were first imprinted.…During the first three minutes after the big bang, the predominant nuclei emerged.”

The Anthropic Principle

The Torah implies, and our tradition emphasizes, that the universe was created specifically for mankind. We are the purpose of it all. Is there any scientific evidence to support this seemingly grandiose assertion? The surprising answer is “yes.” Once again, seemingly impossible “predictions” of our Torah and our tradition are confirmed by modern science.

Nowadays, scientists in a variety of disciplines speak of the “anthropic principle,” which states that the universe looks as if it had been specifically designed to permit the existence of human beings. The examples of the anthropic principle are so numerous and so dramatic that many scientists have commented on them. Indeed, the words of the scientist on this topic can hardly be distinguished from those of the “man of faith.”

Particularly perceptive are the impressions of Professor Freeman Dyson of the Institute for Advanced Study in Princeton, whose words capture the very essence of the anthropic principle: “As we look out into the universe and identify the many peculiarities of physics and astronomy that have worked together for our benefit, it almost seems as if the universe must in some sense have known that we were coming.”

Professor Francis Crick, Nobel laureate from the University of Cambridge, writes:

“The origin of life appears to be almost a miracle, so many are the conditions which would have had to be satisfied to get life going.”

Professor Harold Klein, chairman of the US National Academy of Sciences Committee to Review Origin-of-Life Research, is quoted as follows: “The simplest bacterium is so complicated that it is almost impossible to imagine how it happened.”

Professor Stephen Gould of Harvard University tells us that “human intelligence is the result of a staggeringly improbable series of events, utterly unpredictable and quite unrepeatable.…It fills us with amazement that human beings exist at all.”

The scientific confirmation of our tradition that the universe appears to have been designed to permit the existence of life in general, and human life in particular, constitutes another plausibility argument for the validity of the Torah.
Man as the Pinnacle of Creation

A final example of plausibility arguments for Torah relates to our tradition that the entire universe was created solely to serve the needs of mankind. Is there any scientific validity to this seemingly impossible statement? To appreciate the absurdity of this assertion, one need only consider the stars.

Our galaxy, the Milky Way, contains hundreds of billions of stars. The universe contains hundreds of billions of galaxies, each of which consists of hundreds of billions of stars. What possible relevance to mankind could there be in all these countless billions of stars that stretch across the vast expanses of outer space? The belief in a connection between mankind and the distant stars seems to be mere astrology and superstition, long dismissed by educated people.

So it was thought until recently. However, scientific advances in the twentieth century have revealed a remarkable connection between life on earth and the distant stars. In fact, recent scientific findings show that it is no exaggeration to say that without the existence of the distant stars, life on earth would not have been possible.

The basis of our religion was formulated by Rambam in his Thirteen Principles of Faith, which are summarized in the prayer-poem Yigdal, composed in the fourteenth century by Daniel ben Yehuda of Rome. As the poem states: God exists and His existence transcends time. He is One and there is no Oneness like His. He preceded all that was created. God gave to His people the Torah of truth. A

Notes

1. There are also important differences between knowledge in science and knowledge in religion. For example, a characteristic feature of a scientific theory is that it is subject to disproof (what Karl Popper calls "falsification"). By contrast, statements about religion are generally not subject to disproof.

2. Lawrence Kelemen, Permission to Believe: Four Rational Approaches to G-d's Existence (Jerusalem, 1990); Kelemen, Permission to Receive: Four Rational Approaches to the Torah's Divine Origin (Jerusalem, 1996) and Shmuel Waldman, Beyond a Reasonable Doubt: Convincing Evidence of the Truths of Judaism (Jerusalem, 2004).

3. The quark was proposed independently by Nobel laureate Murray Gell-Mann and Israeli physicist Yuval Ne'eman. The name "quark" derives from the esoteric words "Three quarks for Mr. Mark," in the novel Finnegans Wake by James Joyce, reflecting the fact that the theory requires the existence of three species of each type of quark.


7. For a layman's account of the big bang theory, see chapter one of my book, In the Beginning (New Jersey, 1990).

8. There are four major pieces of evidence: the discovery of the remnant of the initial ball of light; the hydrogen-to-helium ratio in the universe; the Hubble expansion of the galaxies and the perfect black-body spectrum of the microwave background radiation measured by the COBE and MAP space satellites.


12. Ibid., 347, 350.


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