

Chapter 2

The Scientific Approach to Truth

The scientific approach to truth yields what we often call, “objective knowledge.” Here is a simple illustration of the scientific method. Let us say that a man has the hypothesis that he can fly by jumping off a building and flapping his arms. So he tests that hypothesis. If he crashes into the ground, that hypothesis is not true. If he soars through the air, it is true. That is how we arrive at objective knowledge. All scientific research is a sophisticated version of this way of approaching truth: we guess, we create a test for our guess, and then we test our guess. The results of the test give us objective feedback that enables us to guess better the next time. As Richard Feynman so colorfully pointed out in his book *The Character of Physical Law*, a new law of gravity was “discovered” in just this way. Tests raised doubts about Newton’s formulation of the “law of gravity.” Einstein guessed something else. Tests were conducted. Results were better. A new law of gravity became our tradition. Observations of the orbit of the planet Mercury provides an example of how such a new theory is tested. The Newtonian theory of gravity did not account for the seemingly odd nature of that orbit. But when Einsteinian theory spelled out how gravity is a change in the nature of space rather than a force operating at a distance, the orbit of the planet Mercury was accurately predicted. Even more dramatic, the Einsteinian prediction about the equivalence of mass and energy was made quite obvious when that first nuclear bomb blew a small Pacific island to smithereens.

It may seem to some that something more obscure than these obvious dynamics is happening when physicists set up a multi-mile diameter circle of machinery to accelerate protons to near the speed of light and then crash them into one another. But this what they are doing, they are testing some guess about the elemental structure of matter. It does not matter that these tiny subatomic particles are unimaginable by the human mind, and that observing them alters either their location or their momentum. When that Higgs boson recently popped out on a viewing screen, a test of some guess was being confirmed. The elemental scientific process is the same in the most complex arenas of scientific work: guess, test, and guess again. The fact that many of the elemental “objects” that physicists discuss can never be directly observed does not alter the essence of the scientific approach to truth. These “objects” are sensory validated bits of human imagination. But the test for truth in the scientific method have to do with visible streaks on a screen or visible movements of a dial or sounds or some other sensory experience. The factuality of scientific truth has to do with sights, sounds, smells, tastes, and tactile feelings entering into a human psyche. Though the human mind and the love of mental order pervades the scientific method, its tests for truth are not found in the mind, but in the human senses of outward experience. It is experience that tests theory. Any theory is in need of improvement or abandonment if it does not pass these sensory tests. Any departure from this elemental understanding results in a bogus theory of scientific truth.

The “objective” nature of scientific knowledge is objective because in this approach to truth, we attempt to set aside our subjectivity and simply observe the “things” around us as they impact us through our senses. Such conscious noticing of our environment includes the functioning of our minds. The “things” of science are mental abstractions; we use our minds to form recognizable pictures of chosen aspects of the flow of our ongoing outward perceptions. An infant does not see a breast or a woman: it only sees total multi-sensory experiences and reruns of those experiences not yet differentiated into breast and woman and so forth. The infant perceives and begins to

order those perceptions in terms of genetically provided images that direct attention toward that nourishing nipple. But these genetically provided images are still human creations by the human organism. They are theories that need to be tested in sensory experience. Scientific research is not required for testing at this infant level of living. All that is required is the image-using intelligence that the infant has in common with all animal life. The infant will find that nipple without the aid of sophisticated science. But the pattern is similar.

Sophisticated science requires the use of our abstraction-inventing minds to create clarified mental entities that point to and stand for differentiated aspects of our surroundings. Categories such as "cat," "tree," "woman," "man," "child," are all creations of the human mind. Each of these words identify rational forms that we associate with recognizable aspects of our ongoing flow of perceptions. Though we can meaningfully say that there are cats in our experience, the symbol "cats" is a rational form that we have created. Depending on how we have constructed this rational form, "cats" may or may not include "hyenas." Are hyenas dogs or cats or neither? We have to define our rational forms more carefully in order to answer that question. Our minds can discriminate the common features of cats and dogs and then see which of these apply to hyenas. It is clear that some of each apply, so perhaps we decide that hyenas are neither cats nor dogs but something else. We can also notice that all three are what we call mammals. Again, we have created the symbol or rational form "mammals." We have other symbols like "reptiles." We notice that there are creatures in the archeological record that might be dubbed transition animals between reptiles and mammals. We may not know which they are. We have to decide or create a new category. We accomplish this by further defining the rational forms with which we are giving order to our ongoing perceptions.

Science works with objective reality, but it also works with these rational forms that humans have created in order to point to the "reality" of our outward experience more usefully – that is, more related to what we already know or think we know. These rational forms have made an "it" out of that actuality of which they are rational forms. Science deals only with "its." In the scientific method of truth, subjectivity is assumed as the "I" who is observing these "its," but the reality of the "I" is not observed scientifically. The "I" is not an "it" and therefore the "I" cannot be observed in the sense that science "observes." The scientist is an "I" observing "its." But the scientist as scientist is focused on the "its" not the "I." This is true even though the scientist may spend considerable time in the subjective mind formulating theories to be tested. But the truth that the scientific approach is testing is not the truth of the subjective "I" but the truth of the environment of the "I", an environment that the "I" has mentally formulated into objective "its."

What I have just described is a severe limitation that characterizes the scientific approach to truth. Science can construct objective knowledge about any topic, but such objective knowledge is only a partial view of that topic. The entire truth cannot be apprehended through the scientific approach alone. In a later chapter I will look in detail at the contemplative approach to truth which does deal directly with the "I."

Let us examine further what we mean by a scientific fact. Science deals with facts, but a fact is a creation of the human mind that has a credible level of correspondence with the ongoing flow of perceptions as those perceptions are currently formed into thinkable "its." Facts are indeed tested with these objective perceptions, but even these objective perceptions are carefully defined and humanly crafted mini-experiments. A perception is not simply there. Perceptions are also intellectual creations pointing to what we who are the community of scientists agree is there. Sensory signals are indeed coming into our brains; but when we mentally perceive those signals, we have created

that perception. We have ordered it into a mind item. Facts are assemblies of such perceptions. Our facts change as our perceptions change, and our perceptions can change as we observe more carefully or in some way view more clearly our incoming signals.

The definition of a “fact” is further illuminated by distinguishing *historical* facts and the facts used in *natural* science. An historical fact is assumed to happen only once. Did Booth shoot Lincoln? Such a fact is not repeatable. It did or did not happen. And if it did happen, it happened at a particular place and time only once. But the facts used in the natural sciences are repeatable. We can run experiments over and over to see if we get the same results. This awareness that there are two types of facts warns us that facts are created by the human mind to fit within frames of reference known by that mind. Though this is clearly true, this does not mean that the human mind is the sole creator of a fact. The factuality of a fact is based entirely upon the sensory inputs coming into the mind. Though the mind creates the forms of factuality, the scientific mind defines factuality as a validity determined by sensory inputs from an “objective” world.

Good science includes a willingness to look beyond the inherited current theories and factual definitions. Good science is open to other facts that do not fit into the current consensus of objective knowledge. Indeed, the facts that do not fit are the most interesting facts of all, for they challenge the scientist to create a better theory that includes those new facts as well as the facts already included in an older theory. This is the great gift of science: it does not allow factually ungrounded superstitions to reign in the common mind of society. Science can and often does challenge every commonly held tenet to the test of factual verification. This does not mean that scientists cannot turn some of their discoveries into new dogmas and even new superstitions. For example, the clockwork or mechanical view of the cosmos turned out to be a superstition not a factual truth. The mechanical quality of nature is only one small part of what nature factually is.

Science is a progressive movement toward ever greater knowledge of the objective surroundings. There is no final scientific knowledge. There is always the possibility that more will be learned that will transform current scientific conclusions. Scientific knowledge is always approximate and tentative, never ultimate or final. But this does not mean that scientific truth is arbitrary. Rather it is an ongoing dialogue with what is factual, and this dialogue has a progressive nature. Once an objective truth is clearly seen, we cannot unsee it. We can improve it, but we cannot undo the advance. For example, once Darwin’s theory of evolution has gained traction through the work of many documenting scientists, we cannot reject evolutionary theory because we don’t like its implications for some of our cherished convictions. In other fields of study this is be even more obvious. When we fill our prescription for antibiotics at the doctor’s advice, we are assuming a germ theory in biology that took the place of previous theories we easily dismiss even though there was some truth in them, but the whole truth applicable to our cure of an infection has been expanded. Scientific knowledge is continually expanding its comprehension, but that does not mean that we can take lightly the new vision it continually brings. There is no justification for the views of the antiscientific dogmatists who want to live in a world unformed by a Darwin or an Einstein or some other breakthrough in the ongoing progression of scientific knowledge.

The truth that scientific knowledge is progressive is also the truth that it is approximate. No current theory is an end-of-the-road truth. Current theory is vulnerable to change though the assault of new facts. Yet, the past theories that have been so transformed were not wholly wrong. They too were approximate truth.

These past theories may even hold fragments of truth better than the newer and more powerful theories that have replaced them. The best scientists know this and continue to mine past theories for clues for better theories to be tested for future knowledge.

Approximate and *progressive* can be seen as serious limitations on the veracity of scientific truth, but they do not undermine the basic truth quality of the scientific approach to truth. The scientific method is not illusory or wrong because its results are constantly proved wrong. Empirical science is a life method that is build into the nature of being human. Science is a sophisticated version of one of the natural and normal aspects of human thinking. The roots of science preceded the human species and the human symbol-using form of intelligence. A dog is a sort of scientist in its trial and error learning. The dog can venture assumptions, try them, and if they fail, try something else, until some "theory" actually works for its intended purpose. Both dogs and humans simply do not live their lives without this trial and error process of learning. In order to live better, we need truth; and trial and error science is one of the ways we seek it.

But when we choose to view science as the all-inclusive pathway to truth, then we are living in an illusion. I will examine in a subsequent chapter how the "I" approach to truth (which I will also call "contemplative inquiry") is another approach to truth, an approach that is distinctly different from the scientific approach to truth. Nevertheless, I will show how and why the contemplative approach to truth is equally valid as the scientific approach to truth, and equally necessary for the living our lives.

In order to see that both scientific research and contemplative inquiry are equally valid approaches to truth, we have to give up the notion that Reality is rationally understandable by the human mind. The word "Reality" with a capital "R" will be used in this book to indicate that Reality is a mind-assaulting Mystery that becomes ever more mysterious the more we know about it. As many good scientists have asserted in one form or another, "The more we know about nature, the more we know we don't know." If we resonate with such a statement, we are recognizing the Mystery (the yet unknown and unknowable) that surrounds and penetrates all our knowing. If we dream of someday discovering a scientific theory that explains everything, then we do not accurately understand science or Reality. We have entered into an illusion, an illusion about the capabilities of the human mind and the unfathomable quality of Reality.

In summary, empirical science is an approach to the truth that yields a body of knowledge, but it is the approach to truth that defines the truth validity of science. The current body of knowledge is vulnerable to change. To conduct the approach to truth called "empirical science," the scientist creates overviews or theories to be tested by facts that have been humanly formulated from the flow of sensory experience. It is the sensory experience (sights, sounds, tastes, smells, feels) that give facts their factuality. The human mind does not contribute factuality, it relates sensory factuality to the rest of what the human mind already knows, or thinks it knows. The scientific approach to truth yields an objectivity about our surroundings that is true and yet approximate and progressive. The truth of science is approximate because it can be improved. It is progressive because once a new era of scientific research has been entered, you cannot go back to the previous era. Once we have a well documented germ theory, we cannot go back to "demons" or "humors" as if bacteria and viruses are not real. Once Einstein's theory of gravity has been documented by the physics community of scientists, we cannot go back to the Newtonian theory, even though the Newtonian theory can still be used in special cases. Yet in spite of this progressive nature of scientific knowledge, no final scientific knowledge is possible or expected. Each new documented theory is still vulnerable to transformation as further sensory experience

enters the scientific discussion. Part of the meaning of “objective” when applied to scientific knowledge refers to the communal nature of science. A factual formulation is viewed as objective if the community of scientists who are versed in this topic can independently test the formulation and come to the same conclusions. In the following chapters, I will dig deeper into the limitations of the scientific approach to truth, but these limitations do not mean that empirical science is not an approach to truth. Indeed the process of empirical science defines part of what we mean by the word “truth.”