On Being a Seven-day Scientist:
Thoughts on the Scientific Attitude

DONALD E. HALL

They called themselves Seven-day Adventists, the returned missionary said. And they could be forgiven for a minor grammatical slip in the foreign tongue. It really wasn't a bad idea anyhow, he pointed out, since their religion was not put on for the seventh day alone but furnished them with an attitude that was useful and used — all week long.

Although it may seem obvious what parallel the title of this article suggests, we are dealing here with at least one word that means different things to different people. It's an interesting experience to go around wearing this label *scientist,* or more particularly *physicist.* When others first see it, their reactions often lie somewhere between "Ohhhhhh . . . I could *never* understand that" and "But what on *earth* do you *do?*" (That latter question seems even funnier to an *astro*-physicist.)

How interesting to have both labels — Scientist and Seventh-day Adventist. The combination is at least enigmatic, and there are a few who consider it downright inconsistent: the Seventh-day Adventist Scientist. Does the average person know many of these odd creatures? Does he have the impression that it is difficult or risky for an Adventist to go into science? that it is unusual for a person who is already a scientist to develop an interest in Adventism? or that "outside" scientists would wonder how one could possibly be religious and at the same time a worthy colleague?

These questions are potentially valid and interesting. But I wish to focus here on the other side of the coin. Is there a sense in which the scientist who publicly bears the label is only a representative of a larger class who deserve it equally? We could readily admit into that class all genuine scholars in all fields of intellectual endeavor. Perhaps before we finish we can invite in even those who make no pretext of scholarly professions.

If I may go beyond what I find in my dictionary, I would like to suggest several levels of meaning for the word *science* and distinguish among them. First, we may speak of one of the intellectual disciplines mainly as an organized body of specialized knowledge. This is usually what we mean when we refer to one particular field, like biochemistry, as well as when we use the general terms "humanities, arts, and sciences." Let us call this [1]Science *Science as Knowledge.* This science corresponds to the picture most common in the layman's mind. In fact, when we are earning a living from day to day, most of us who bear the label tend to be just working as a [1]Scientist, the same way someone else is a carpenter or a musician.

But from a professional point of view, [1]Science only provides a base on which one hopes to build some [2]Science. The latter is more important, and correspondingly harder. I spend at least a little time each work day aiming (I hope) for [2]Science; but if I actually achieve one little piece of it in a week and one medium-large chunk in a year, I will probably keep up my satisfaction — and my reputation. For by [2]Science I mean *Science as Art.* The advancement of [1]Science — the addition of significant new understanding — depends on imagination, originality, creativity, not just familiarity with established ideas and not just ability to manipulate them, but the *generation* of completely new thought. Ideally this concern with being not only a [1]Scientist but also a [2]Scientist will lead me to be a [3]Scientist as well.

Knowledge will be best advanced by Art when that in turn is based on proper Attitude. At first it may seem literary license to propose [3]Science, *Science as Attitude.* I would argue, however, that we are misled if we think we can present the essence of the subject objectively by some list of steps in the "scientific method," such as Awareness, Observation, Induction, Hypothesis, Deduction, and Verification, for if this list is taken only as a recipe, the point has been missed. The significant problems are exactly those not yet listed in the cookbook, and our outline is only an attempt to picture what most often results from an attitude. Inquisitiveness, dissatisfaction with what may be deemed adequate understanding by others, willingness to search out all evidence and view it according to its merits, conscious effort to eliminate prejudice, careful allowance for other possibilities not yet thought of — these will lead us to [3]Science.

The [1]Scientist must bear a special burden of responsibility in setting [3]Science before the layman, for he is continually using working hypotheses. For example, there are significant questions about Einstein's theory of relativity that have not yet been settled. But there would be great logistical

difficulty in beginning one's work anew every day from first principles. So, having at one time thought at length on the subject and being perfectly willing to give it further critical examination whenever that is appropriate, the [1]Scientist will take relativity as a working hypothesis for the day and try to find within that framework what *will* be the answer to the small immediate problem at hand *if* (as he thinks reasonably likely) the hypothesis is really correct. The danger is that this tool of the trade will be used so automatically that it appears as dogmatism to the layman. The [1]Scientist must constantly reexamine his own mind to be sure that the openness is still there and must take pains to make his attitude clear to others.

It may still seem that this attitude is just a description of my six-day work week. But I am proposing that [3]Science is the kind that has most to offer to religion. For while the layman may tend to think of Belief in a vague and mystical way, Belief is not something that just happens — and happens in such a way that the person speaking fortuitously ends up with the correct version, the Last Word. The training of the [3]Scientist (and ideally of the philosopher or any other well-educated person) makes him keenly aware that all belief is based on evidence of one kind or another — it may be strong or weak, good or bad, direct or indirect, properly or improperly used, but evidence nonetheless.

To go even further, those things we customarily refer to as Facts are also dependent on evidence — from the senses, or from authority, or from logical deduction from premises. They can be assigned only relative "certainties," depending on the quality and quantity of evidence. The point can be made clear by an extreme example: I feel quite confident, emotionally, that there exists a typewriter with which I am now writing. In fact, if someone denied it, my instinctive reaction would be "Are you out of your mind?" Yet at a different level I realize that I can "know" (or believe) this "fact" only (*a*) insofar as the signals from my eyes and hands and ears are reliable and are being correctly processed in the brain, (*b*) insofar as my dictionary is correct in telling me the correspondence between word and object, and (*c*) insofar as it is correct to think that I myself have a rational existence.

Even to the [1]Scientist it is important to recognize that all his interpretations of nature are really models. The careful [1]Scientist will not make categorical statements insisting that his description of a natural phenomenon cannot possibly be wrong in any way; he will only assign a relative value to his model on the basis of its usefulness in making sense of the evidence. And if he should use the phrase "I believe that — " his intended meaning will be "I assign a fairly high probability to the correctness of this explanation" or

"I have found it helpful in achieving a coherent relation among several pieces of evidence."

Now it may be a distinctly unpleasant transition for a person from a conservative religious background that places a high premium on "faith" to adopt this critical attitude toward religious ideas. Yet I consider it desirable. Are not bald statements of belief (in God, in the Bible, or whatever you will) practically meaningless apart from the evidence that prompts them? The evidence is there, without exception; the only question is its strength. If the evidence is good, it will stand; if it is bad, we would do well to renew the search. But I cannot rationally assign *certainty* to any model of reality (be it the natural or the supernatural aspect of reality) as long as there is (or may come to be) contradictory evidence. I may assign a very high probability to a model which says God exists, yet even for the sake of "faith" I cannot claim that the evidence is entirely on one side, or that I am an infallible interpreter of that evidence.

Then what is the value of faith? It does not increase our knowledge; on the contrary it is precisely what encourages us to proceed and act even though our knowledge is *not* complete. What value do we assign to the ability to make positive, categorical statements of belief? Sometimes I have thought it a good thing to have some people around who could do that, to balance my view. Then again I have thought we would profit if others would join the [3]Scientist in making this semantic distinction. Am I advocating an irreversible path which will mean a loss of innocence for those who travel it? Yes, probably, and I agree that this has its sad aspects. But so also does the growth of our children. The road to maturity must be traveled.

I recall a perennial sequence in "Peanuts" in which Charlie Brown is persuaded, in a different way each year, to believe that Lucy is going to hold a football for him to kick. He invariably lands on his head when she jerks the football away. If we pick a particular doctrine and say, "Here we must ignore some contrary evidence, exercise our faith, and boldly state our unhesitating belief," is there not a parallel? It may be argued that some questions are so fundamental, so important, that this must be done. But should that not mean instead that it is all the more important to be careful and accurate? Rushing forward time after time, with great assurance, when the football just might not be there after all, may be cute for Charlie Brown, but it is unbecoming to the supposedly mature Christian.

Should not Science as Attitude — desire to get to the root of things, to view all evidence without prejudice, to allow alternative explanations, to be

willing to admit uncertainty — become the property of the layman just as much as of the professional scholar? And could it not be a useful, and used, attitude on all seven days of the week?

Sheaf . . . DIRK KOOPMANS