

# ***Symposium: Metaphor as a Space for Religion/Science Engagement***

EXPERIENCE AND THEORY

*by Mary Gerhart and Allan Melvin Russell*

*Abstract.* N. R. Hanson's discussion of experience is criticized. Experience, though necessary for knowing, is insufficient as a basis for understanding in either science or religion. Experience alone can be misleading. We may begin with experience, but we cannot claim to understand until experience has been mediated by theory. The article is excerpted from *Metaphoric Process: The Creation of Scientific and Religious Understanding* (Gerhart and Russell 1984), Chapter 2.

*Keywords:* demonstration; direct experience; N. R. Hanson; Don Ihde; illusion; instrumentation; mediation; mysticism; phenomenology; sense perception; theory.

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The idea of experience, and its relationship to what we claim to know and to how we come to know it is a fundamental question in both science and religion. In this chapter we attempt to dispel the naive notion that science bases its understanding entirely on direct experiences with an external reality whereas religion derives its understandings entirely from experiences of an "internal" kind.

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## DIRECT EXPERIENCE AND MATURE SCIENCE

Norwood Russell Hanson, in the first chapter of his book *Patterns of Discovery* (1972, 6ff.), described what he believed to be going on when Tycho Brahe and Johannes Kepler stood together on a hill and watched the dawn. He raised the question of whether these two seventeenth-century astronomers, one who held that the sun circles the earth and the other who claimed that the earth circles the sun, saw the same thing. "Seeing," said Hanson, "is an experience" (1972, 6). Then the question becomes whether these two men experienced the same thing. Hanson concluded that they did not; we will argue that they did. Before considering this situation further, we must examine the role of experience in science in a number of other instances which are designed to make the general relationship clearer and which will afford an alternative to Hanson's formulation and conclusion. So, for the time being, we will leave these two ancient astronomers staring eastward from their dewy knoll while we look elsewhere.

Experience is certainly one of the most important components of human learning and, depending on how we choose to define experience, it may be the *sine qua non* of cognitive development. Nonetheless we wish to examine the proposition that a mature science does not advance on the basis of a scientist's direct experience with the world. In particular, modern physical science develops, at least in part, on the basis of observations that can hardly be called observations at all.

The situation is similar to that which one finds in high energy particle physics where an array of bubble tracks in a photograph, such as those sketched in Figure 1, is studied by a physicist in an effort to gain some understanding of the interaction between high energy submicroscopic particles that could never themselves be seen. Such particles last for only a fraction of a billionth of a second after they have been generated in a collision by an accelerator beam. Does the physicist "experience" the particle production? We would say "no."

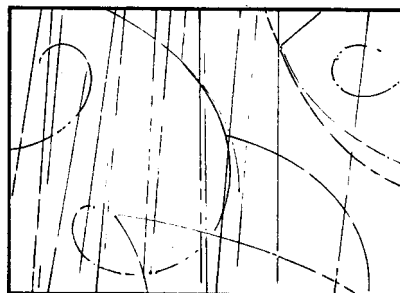


Fig. 1. A drawing of tracks in a bubble chamber made by the particles generated in a high-energy accelerator.

Consider now a scientific observation as it might have taken place in a biology laboratory prior to 1950. The investigator is examining fruit flies that are the offspring of irradiated parents. The scientist looks at the flies through a low-power microscope and uses a needle to separate those with white eyes from those with red, counting carefully the number of each kind. Can we say, in this case, that the scientist is experiencing the genetic result of the mating of irradiated fruit flies? In this case we think that we can, and to do so makes it possible to distinguish the data of instrumentation, which are not directly experiential, from the data of experience itself. We do not mean to imply that the data of experience need be less precise or less quantitative than the data of instrumentation. Nor do we wish to suggest that the scientist is more or less self-conscious during the course of the direct experience (immediate) or during the course of the general experience (reflective). We wish merely to emphasize that in the mature sciences what was formerly conceived as experience is now mediated by instruments to such an extent that the experience is of an instrument and not of the natural system under investigation.

In order to describe the role that instrumentation plays in the mediation of experience we need to refine some of these ideas. To begin with we will distinguish "direct experience," which may be either of a body or of a thing [in Bernard Lonergan's sense<sup>1</sup>], from "instrumentally mediated experience," which must always be experience of things.

Don Ihde (1979, 6ff.), writing about the phenomenology of instrumentation, used this way of diagraming situations of the kind we are describing as direct experience:

HUMAN <—————> WORLD

A first-order instrumentally mediated experience such as the experiences of Michael Polanyi's blind man with a stick might be shown as follows:<sup>2</sup>

( HUMAN + INSTRUMENT ) <—————> WORLD

A second-order instrumentally mediated experience, as in the example of the paleomagnetic studies, is diagramed as follows:

HUMAN <—————> (INSTRUMENT + WORLD)

From time to time a conflict arises between the data of instrumentally mediated experience and those of direct experience. How might we encounter and then resolve such a conflict? Consider the following situation. You are at the supermarket and have just chosen two heads of cabbage which must be weighed and priced. You hand the heads to a clerk who places them one at a time on the scale. After each head is placed on the scale, the scale buzzes, clicks, and delivers to the clerk a gummed label. The latter is affixed to the plastic wrap that covers each of the cabbages. Having finished the weighing, the clerk hands the cabbages to you and you look at the labels. One says 5.7 pounds, .51 dollars; the other 3.5

pounds, .32 dollars. As you stand there with the two heads of cabbage, one in each hand, you perceive by “hefting” them that the one marked 3.5 pounds is heavier than the one labeled 5.7 pounds. What do you do? Your experience of the comparative weights of these two cabbages is contrary to the “official” instrument determination of their weights. Which do you believe? The answer is clear. Experience has taken precedence over instrumental data, and you have no doubt that the heads are marked incorrectly.

However, such is not always the case with experience. We can be misled by the illusion of experience or the experience of illusion so that our actual experience will not finally be given precedence. We will illustrate this kind of situation by means of [two] tactile illusions.

Cross your index finger and your second finger (either hand) and roll a marble around on a hard surface in such a way that the marble is in contact with the ends of both fingers. Close your eyes. Do you experience two marbles? Keep trying until you do. Notice that your experience is contrary to your understanding. Even though you know there is only one marble, you still experience two!

Take a long piece of chalk (or a short pencil), holding it firmly between the first and second fingers of one hand and then rotating the chalk about an axis that is perpendicular to the axis of the chalk and runs between the ends of the fingers. After you have done this for a number of turns the chalk will begin to feel as if it is “pinched in” at the point where it is being held. It will feel this way despite the fact that you are looking at it and know full well that the chalk has straight sides. Your tactile experience of the chalk leads you to an understanding that belies the understanding that is derived from your visual experience.

Now that we have demonstrated some of the kinds of difficulties that can be encountered in the understandings derived from experience, let us rejoin Tycho and Johannes as they stand on their hill in the early morning sun.

According to Hanson, these two great figures from the history of astronomy each “saw” different things. That is, their experiences were different. Just how different becomes finally apparent toward the end of Hanson’s first chapter:

Tycho sees the sun beginning its journey from horizon to horizon. He sees that from some celestial vantage point the sun . . . could be watched circling our fixed earth. Watching the sun at dawn through Tyconic spectacles would be to see it in something like this way. Kepler’s visual field, however, has a different conceptual organization. . . . Kepler will see the horizon dipping, or turning away, from our local fixed star. This shift from sunrise to horizon-turn . . . is occasioned by differences between what Tycho and Kepler think they know. (Hanson 1972, 23)

Seeing meant experiencing for Hanson, and he claimed that Kepler experienced the horizon “dipping or turning away.” We cannot agree. No one, not even a modern practicing astronomer, will, under the conditions de-

scribed, experience anything but the sun making its way higher and higher into the sky.

This state of affairs becomes clearer when we realize that we do not experience the surface speed of the rotating earth (about one thousand miles per hour near the equator) nor do we experience the earth's annual rush around the sun which results in the observers being carried in head-long flight at a rate of some sixty-seven thousand miles per hour no matter at what latitude. No one really experiences this.

The idea that scientific understandings are based on immediate experience is an error that has caused many otherwise sophisticated people to misunderstand the grounds of scientific claims. This kind of misunderstanding is nicely illustrated by Thomas S. Kuhn in his book *The Copernican Revolution* (1957), where he described the reaction of Jean Bodin, "one of the most advanced and creative political philosophers of the sixteenth century," to the Copernican understanding that the earth moves in an orbit around the sun. Bodin wrote: "No one in his senses, or imbued with the slightest knowledge of physics, will ever think that the earth, heavy and unwieldy from its own weight and mass, staggers up and down around its own center and that of the sun; for at the slightest jar of the earth, we would see cities and fortresses, towns and mountains thrown down" (Bodin, quoted in Kuhn 1957, 190).

Did Bodin react to the Copernican understanding on the basis of his own theoretical understanding? Of course not. His reaction was based on his direct experience with external objects and a common-sense understanding of the experience of stability in such objects. His mistake was his assumption that his understanding, based on a direct experience with external objects, was superior to Copernicus' understanding which was not based on direct experience.

What then is the role of experience in science? What kind of experience of the world do we have when this experience is mediated by instrumentation? A modern and sophisticated—that is to say, scientific—experience of the world is an imaginative one. The world that we know is a world of our imaginations, a world that is "made up" of our largely second-order mediated experiences. This world, this universe, is filled with stars and galaxies, with atoms and DNA molecules which we either do not experience at all (in the sense of direct experience) or which we experience in a way that so little informs our understanding (the case of a star, for example) that the experiences become almost unrelated to our understanding.

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The demonstrations of the ambiguity which can accompany our sense perception of objects and Hanson's statement that "observation is theory-laden" are pertinent to religious as well as to scientific experience. A passage from William James's classic study *The Varieties of Religious Experience*

([1902] 1958) will provide us with an example. James makes the point that, contrary to public opinion, not all mystical experience is religious. His observation is parallel to the demonstrations of the ambiguity which can attend our sense perception of objects under scientific observation.

. . . religious mysticism is only one half of mysticism. The other half has no accumulated traditions except those which the text-books on insanity supply. . . . In delusional insanity, paranoia, . . . we may have a *diabolical* mysticism, a sort of religious mysticism turned upside down. The same sense of ineffable importance in the smallest events, the same texts and words coming with new meanings, the same voices and visions and leadings and missions, the same controlling by extraneous powers; only this time the emotion is pessimistic: instead of consolations we have desolations; the meanings are dreadful; and the powers are enemies to life. It is evident that from the point of view of their psychological mechanism, the classic mysticism and these lower mysticisms spring from . . . the great subliminal or transmarginal region . . . of which so little is really known. That region contains every kind of matter: "seraph and snake" abide there side by side. To come from thence is no infallible credential. What comes must be sifted and tested, and run the gauntlet of confrontation with the total context of experience, just like what comes from the outer world of sense. (James ([1902] 1958, 326)

One can well imagine that almost everyone who has ever had the experience of "voices and visions and leadings and missions" has also had the conviction that these are true and also that they are religious. James cautioned that "inner" experiences (like the sense perceptions in the previous demonstrations) are ambiguous taken by themselves and that they must be "sifted and tested" in a larger context.

Sense perception or all that is understood to be the sensation model of experience, then, is only one part of the totality of our experience. Sense perception necessarily excludes the most basic awareness we have of ourselves: awareness of ourselves as moving, feeling, thinking, acting and deciding. In the phenomenological model, by contrast, the self as experienced is involved in a process of change and continuity, of developing and breaking relations with reality as perceived.

What, then, can we say about the two astronomers watching the dawn? At the level of direct experience the sun was understood by each of them as a warm body to which they related directly and in the same way. They were both deluded into seeing the sun rise higher and higher above the horizon in much the same way we felt the chalk as pinched. However, at least one of them knew that what he was seeing was not the case, just as we did with the chalk. Thus, it is not until we reach the level of experience mediated by theory that the disagreement between these two noble intellects emerges. They are now no longer operating on the level of direct experience, and they might have saved themselves the discomfort and cold of the meadow and returned to the warmth of the study where they could put pencil to paper and draw the circles (or ellipses) that more adequately represent those "things" with which they were dealing.

NOTES

1. By direct experience we mean a non-instrumentally mediated experience of an object—the object being understood either in relation to the self (in which case the object is understood as a body) or in relation to other objects (in which case the object is understood as a thing).
2. See Polanyi 1964, 55–56: “Think how a blind man feels his way by the use of a stick, which involves transposing the shocks transmitted to his hand and the muscles holding the stick into an awareness of the things touched by the point of the stick.”

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