

Universals
Forms
Scientificism

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HUMAN KNOWING

A Prelude to Metaphysics

UNIVERSITY OF NOTRE DAME PRESS NOTRE DAME, INDIANA

2005

chapter 6

SCIENTIFIC KNOWING AND THE WORLD OF SCIENCE

*I*n a passage that has become famous, Sir Arthur Eddington posed a dilemma about the relation between what our senses tell us and what science tells us. He wrote, in part:

I have settled down to the task of writing these lectures and have drawn up my chairs to my two tables. Two tables! Yes, there are duplicates of every object about me—two tables, two chairs, two pens. . . .

. . . One of them has been familiar to me from earliest years. It is a commonplace object of that environment which I call the world. How shall I describe it? It has extension; it is comparatively permanent; it is coloured; above all it is *substantial*. . . .

Table No. 2 is my scientific table. It is a more recent acquaintance and I do not feel so familiar with it. It does not belong to the world previously mentioned—that world which spontaneously appears around me when I open my eyes. . . . It is part of a world which in more devious ways has forced itself on my attention. My scientific table is mostly emptiness. Sparsely scattered in that emptiness are numerous electric charges rushing about with great speed. . . .

There is nothing *substantial* about my second table. It is nearly all empty space—space pervaded, it is true, by fields of force, but these are assigned to the category of “influences,” not of “things.” . . .

I need not tell you that modern physics has by delicate test and remorseless logic assured me that my second scientific table is the only one which is really there.¹

Which avenue of knowledge are we to believe—the testimony of our senses, or the scientific description of an eerie world unlike anything we can directly experience? Do we have to agree that the scientific table is the only table that really exists, so that the sensible table is only a kind of natural illusion? This perplexity about the relation between the common sense world and the scientific world forces us to examine the unusual way of knowing that is scientific knowing. We do this best, I think, by re-examining and enlarging the concept of *horizon* that has already been introduced.²

6.1 MORE ABOUT HORIZONS: A MATTER OF MEANING

We already noted the delimiting aspect of a horizon—as, for instance, that the visual horizon is limited to the natural capacities of our external senses, so that we can't directly sense anything outside that range. But there is also a positive correlation between our capacity to sense or know and the objects that that capacity picks out.

This point is obvious enough with regard to sense perception. Just as the kind of film we put into a camera determines the sort of pictures it can take, so our ability—or lack of it—to see certain colors defines what sorts of objects we can perceive.

1. Arthur Eddington, *The Nature of the Physical World*, xi-xiv; emphasis in the original.

2. The following development of ideas is adapted from the illuminating but technical essay, “Horizon, Objectivity and Reality in the Physical Sciences” by Patrick A. Heelan, S.J. I attempt here to simplify and adapt Heelan's ideas for the more limited purposes of this essay.

There is another important, positive relation between what we contribute to sensation and what we find in it. This consists in the *interpretative anticipations* that we bring to our sense experience, and which, in turn, determine the *meaning* for us of what we find. The world we find is pretty much the world we were prepared to find, the world we were looking for.

Here is an illustration of what I mean. Suppose there are three persons, an Army general, an artist, and a real estate developer, standing side by side and looking out over a valley. The general sees the valley as an avenue of attack for himself or for the enemy. The artist sees the valley as an interrelation of hues and shapes suggestive of a creative reintegration in a painting. The real estate developer sees the valley as a potential source of development and profit.

Although all three are *looking at* the same valley, there is a clear sense in which each *sees* a different valley. Let me be clear about what I am claiming. I am not saying that although each sees the same valley, each *interprets* what he or she sees in a different way. There would be nothing paradoxical about that. No, I mean that although they are looking at the same valley, what each *sees* is a *different* valley from what the other two see. For what each one sees is in fact already a function of the structured set of anticipations that he or she brings to the experience.

As was pointed out in Chapter 2, *there is no world-in-itself that we attain in sense perception* but always a world already involved in our act of perceiving it (thus a relational world), and consequently a world already attuned to our powers of perceiving. That is what relational realism means. For instance, the color of light falling upon an automobile determines the color of the car we see. We do not perceive the car in itself but the *appearing* car, and the appearing car is already conditioned by the available light. In a similar way, the three persons looking at a valley *do not see the valley in itself but an appearing valley*. By "appearing" we now include its interpretative, psychological, or intellectual "appearance," *the valley in its dimension of meaning*. The valley that each one sees, the appearing or experienced valley, is already conditioned not only in its visual aspect, as by the available light, but in its dimension of meaning



that flows from the observer's interests and anticipations. The valley that each person *sees* is not the physical valley in itself but an *experiential* valley, a relational valley, that is already a function of the structured anticipations that each brings to the experiencing. Thus the appearing valley for each is not just a visible valley but a meaningful valley, and in that sense each sees a different valley from what the others see.

In his seminal book, *The Structure of Scientific Revolutions*, the late Thomas S. Kuhn affirms a similar position though he freely grants that he is unable to explain just how this is possible. He writes: "In a sense that I am unable to explicate further, the proponents of competing paradigms [such as the Aristotelian and the Newtonian] practice their trades *in different worlds*" (my emphasis).³ The epistemological viewpoint I have adopted in this essay, however, especially about the relationality of perception and about horizons, does explicate how different people, and especially different sorts of methodic inquirers, experientially *see different worlds*. What they see is very much a matter of their frames of mind, that is, of the structure of their questioning attitude toward the world and of their anticipations as to what they may find. And such anticipations are indeed structured, for they map the data of the senses against a whole network of interrelated interests and expectations, and those interests are in turn a function of the person's aims.

6.2 DISCOVERY STRUCTURES AND WORLDS

I call such a structured anticipation a *discovery structure*, and in terms of discovery structures we shall be able to make sense of the worlds of common sense and of science as distinct ways of human knowing. A discovery structure stands in a *polar relation* to the world that it reveals, for the structure's function is precisely to reveal a certain sort of world. So when we investigate the nature of scientific knowing we are inquiring into the discovery structure

3. Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 150.

suffering
& discovery
structure