

CHAPTER 4

THE METAPHYSICAL FOUNDATIONS OF MODERN PHYSICAL SCIENCE

The Metaphysical Foundations of Modern Physical Science is the first historical account of the scientific revolution.¹ In this book Burt placed Newton within a context of culture and religion without devaluing his scientific achievement. But, in a surprising way, the Newtonian world-view is thrown into new light. Burt claims that the mechanical universe with its Cartesian underpinning, that is, the duality of subject and object, and the mathematization of nature, culminating in "laws of nature," is just "the objectification of the mood of an age, fitful and temporary". Furthermore, scientific claims to truth come at the expense of other means of human knowing which we can not afford to lose. Although the book might be read simply as a polemic against logical positivism, which was competing with pragmatism in the U.S. in the 1920s, it should also be considered as a demonstration of a new philosophy of science. In *The Metaphysical Foundations of Modern Physical Science* Burt is saying that science is a culturally conditioned expression of human experience, just one way of knowing among many, and that scientific truth is a changing truth.

UNDERSTANDING THE METAPHYSICAL FOUNDATIONS OF THOUGHT IS PART OF ACCEPTING CHANGE

There are two lines of philosophical argument in Burt's thesis presented upon a framework of historical evidence. One is a critique of Newton's *Rules of Reasoning* informed by Burt's own careful study of Hume. Burt wanted to challenge the premise of universal order and predictability upon which the scientific method is based. The other is a systematic historical analysis of the scientific world-view. According to Burt the scientific world view is a perspective on the physical world, but not a true picture. Modern science has become so fully in-grained in us that we no longer think about how we use the legacy from Descartes to interpret our world. It is because of our training that we experience ourselves as the sensate center of consciousness, radically cut off from objective physical reality. We think we experience subjectively the objective real world, which is

taken to be the physical world of matter and motion. Burt argued that we perceive the world more or less subjectively based upon sensory "input," processed by mental function, imagination, and memory. The scale of what we judge (erroneously) as more or less real coincides with what is more or less objective and what is more or less objective coincides with what is more or less quantifiable and mathematically expressible. The more mathematical, the more objective, the more objective, the more real.

In modern-day scientific culture it is common-sense that the world of physical stimulation is separated from the world of ideas. It is part of the scientific world view that we attempt to "know" the world of our experience by dividing it into "primary" qualities--those which inhere in matter, are mathematically quantifiable, and therefore "real" and "secondary" qualities--those which are not quantifiable, less accessible to scientific explanation, and therefore, less "real." Science has expelled the "less real" aspects from meaningful experience. The effect has been to devalue ideas and overvalue mathematical, empirical information.

Burt undertook his study of the historical development of scientific objectivity to illustrate that it is a only one perspective on perception and not an infallible window on reality. Classical modern science is simply the current operating framework and has no necessary claim to explain reality, whatever that might be, and certainly no claim on future explanations. Later, in 1935, he would argue that it is just a biological adaptation that has evolved and will continue to evolve. In *The Metaphysical Foundations* Burt made his point and at the same time demonstrated a powerful philosophical method. At the same time, he did the groundwork for his own theory of metaphysics as a study of the categories of mind through which we experience the world as we do.

Important, too, for Burt's inspiration that the Newtonian world-view is not the last word on physical reality were new developments in physics. Einstein's work was rapidly becoming known. At the time, it must have seemed that the Newtonian world-view was about to collapse just as the medieval world-view had done in the wake of Newton. It is small wonder that the young Columbia philosophers thought of themselves as new humanists ushering in a new renaissance. Burt's goal was to prepare the world for change.

Einstein's world-view has not become integrated with everyday experience. At the beginning of the twenty-first century, we still live in the man-sized world of Newtonian principles. While we recognize that this is not the real physical world, educated people know only vaguely of that other world, the newer real world of the quantum. So far, it has not affected us much.

Burt proposed a new definition for metaphysics to facilitate shifts in world-view. Metaphysics would become the unrecognized premises at the bottom of confidently held concepts. Logical and penetrating analysis of the presuppositions of thought, accomplished by reducing interconnected ideas to their simplest relations, was to Burt the logical extension of the realists' own procedure. It was they, who recommended determining the meaning of a concept by analyzing it into its logical simples fixed by the relations of presuppositions supporting propositions. But Burt could not accept the realists' "teleological faith" that an "external structure of meaning that is common to all of us" can be revealed in this over-simplified way because "the history of philosophy show[s] that we can [never] transcend our variable biases." Finding out what presupposes what does not get us any nearer to the truth. Burt saw "that what presupposes what depends on one's point of view and in particular on what he takes the process of explanation to be, while any object is simple if one can offer in terms of it the kind of explanation that one wants."²

Burt's metaphysics, an analysis of underlying cultural or personal presuppositions, was to become a fixture in his thinking. Other philosophers adopted and followed his lead, notably R.G. Collingwood with his own Kant-dependent version, of Burt's ideas, *Essay on Metaphysics* (1940).³

In *The Metaphysical Foundations of Modern Physical Science* Burt described uncritically-held metaphysics as "unconscious metaphysics," and identified three main types. The first is what he called the "ideas of an age on ultimate questions," which are uncritically held insofar as they do not run counter to personal interest, in which case the individual might be awakened to criticize them. Burt says that there has never existed anyone in human history who was free from this particular brand of unconscious metaphysics; but the real philosopher and, therefore, metaphysician, will be constantly on guard against such "idola theatri"⁴ influencing his philosophical thinking.⁵

The second sort of unconscious metaphysics is "metaphysics of method." Since every thinker has a method, he "will be under strong and constant temptation to make a metaphysics out of his method, that is, to suppose the universe ultimately [to be] of such a sort that his method must be appropriate and successful."⁶

Finally, Burt says, "human nature demands metaphysics for its full intellectual satisfaction [since] no great mind can wholly avoid playing with ultimate questions."⁷ These sorts of questions are thrust upon every scientist, philosopher or religious individual. This is presumably the kind of metaphysics which compels people to use words such as "I wonder." Burt's point was that metaphysics can not be avoided by anyone who thinks at all. Metaphysics should be recognized and accepted, but philosophers should

compensate for it by being self-critical and aware of their own metaphysical leanings.⁸

Burttt wanted to attack the received view of causality using this concept. He repeatedly made the point that the idea of causality has had a dynamic history and he used that history to criticize the position of the positivists. The argument worked on two levels.

First, Burttt's treatment of the history of science suggests that all scientific meaning is in flux. If causality as a philosophical concept has undergone a succession of interpretations, then any current interpretation, even if it is called a scientific one, cannot claim any greater validity than its predecessors or its successors. Burttt suggested that scientific concepts in general are part of a dynamic progression of idea systems.

Second, Burttt showed how a logical extension of Newton's causality had an old metaphysical foundation. If the positivists adopted Newton's logic, they adopted his metaphysics of causality and the positivists' claim for the escape from metaphysics is a false one. According to Burttt, one by-product of Newton's philosophy in early modern science was that God was replaced as first efficient cause of the world by the idea of universal law as formal and only cause of natural phenomena.

Burttt explained how the logical extension of Newtonian philosophy of nature produced a new concept of cause and effect. For example, according to Newton's thinking, it is possible to "reduce the major phenomena of our solar system to mathematical law on principles that do not depend on the presence of the fixed stars, and hence with no reason to suppose that their disappearance would upset our formulations in the least."⁹ We actually have no idea what the disappearance of the fixed stars would, in fact, do to our solar system, but in the absence of this knowledge and while the stars are still in place, therefore not testing our formulations, it is still perfectly possible to erect a system of presuppositions and base mathematical formulations upon them. This is possible because we simply narrow the field of cause and effect relationships without worrying too much about unanswerable questions--that is metaphysics. The idea of cause and effect has been transformed by Newton's own "metaphysics of method," which ignores its own metaphysics of excluded hypotheses, so that we understand that certain physical phenomena occur according to laws operating independently of other causes in the universe. The philosophical lesson Burttt draws from this inquiry and example is "even the attempt to escape metaphysics is no sooner put in the form of a proposition than it is seen to involve highly significant metaphysical postulates."¹⁰

Next comes Burttt's punch at the positivists. "There is an exceedingly subtle and insidious danger in positivism."¹¹ As demonstrated, metaphysics

can not be avoided. Anyone who denies that fact is unaware of his own metaphysics. Such a person holds presuppositions dangerously because they are held uncritically and unconsciously. This is a grave philosophical error because the "unconscious metaphysics" are communicated indirectly to others. Burtt says that they "are propagated by insinuation rather than by direct argument."¹²

[That metaphysics cannot be avoided] can be illustrated by analyzing any statement you please; suppose we take the central position of positivism itself as an example. This can perhaps be fairly stated in some such form as the following: It is possible to acquire truths about things without presupposing any theory of their ultimate nature; or, more simply, it is possible to have a correct knowledge of the part without knowing the nature of the whole.¹³

By demonstrating how Isaac Newton's most serious students had uncritically adopted his unconscious metaphysics, Burtt's argument implies that logical positivism, insofar as it had adopted the logic of mathematics, could be shown to be as metaphysical as mysticism. The strength of the argument could come from concentrating upon the uncritically held assumptions the positivists had accepted from the dogma of early modern science without examination of their origin within the whole idea set from which science derives and its evolution within the history of ideas. Burtt used the history of science as a mirror for the positivists; the picture he drew reflected the progress of science as a parade of world views built perpetually on shifting sands, one idea system following another and destined to continue the pattern.

Burtt simply refused the notion that modern science is a cumulative enterprise culminating in objective truth about what nature is in itself. He decided that the early modern scientists, renowned for the certainty with which they "delivered to the conquering mind of man" the hard facts of the universe, had a "metaphysical" intellectual foundation. They had based their formulations upon unverifiable "presuppositions," their own "metaphysics," their aesthetic proclivities or their religious beliefs.

Is there not a flagrant contradiction in such a phrase as 'the metaphysics of Newton?' ...Newton we are told was the first great positivist...He turned his back on metaphysics in favor of a small but growing body of exact knowledge. With his work the era of great speculative systems ended and a new day of exactitude and promise for man's intellectual conquest of nature dawned. How, then, speak of him as a metaphysician?

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A Study of the author of The Metaphysical Foundations
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