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Marvin E. Kanne
University of Nebraska-Lincoln

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PHILOSOPHY OF SCIENCE

WHITEHEAD AND HUME ON INDUCTION

Marvin E. Kanne

Department of Philosophy
University of Nebraska-Lincoln
Lincoln, Nebraska 68588

While modern science has made important contributions to the advance of learning, Hume has pointed out that a crucial element of its methodology is seriously flawed. His analysis concluded that there is no rational justification for inductive reasoning. Viewed from another perspective, the point of Hume's criticism would seem to be that the scientist's faith in the order of nature is without any ground in nature.

Whitehead found Hume's analysis to be profoundly unsettling because it leads to such utter skepticism. Whitehead believed the key to induction is to be found in the right understanding of the immediate occasion of knowledge in its full concreteness. If one turns to experience in all of its fullness, then it will be seen that Hume's analysis deals only in abstract considerations and not in the concrete occasions of experience.

By returning to the immediate occasion of experience Whitehead believed that the essential relatedness of nature will be discovered. It is this relatedness, which is discovered in our pre-analytic knowledge, that provides the ground for our faith in the order of nature and justifies inductive reasoning.

† † †

Francis Bacon was among the first to realize explicitly the antithesis between deductive rationalism of the medieval scholastics and inductive observational methods of the moderns. However, induction proved to be somewhat more complex than Bacon had anticipated. He felt that if sufficient care were taken in the collection of cases the general law itself would stand out. Later scientific investigations have revealed that this is an inadequate account of the procedures which issue in scientific generalizations. Nevertheless, Bacon was one of the prophets of the historical revolt, which overturned the method of rationalism, and rushed to the opposite extreme, which held that all fruitful knowledge was based upon inference from particular instances in the past to particular instances in the future (Whitehead, 1925:44-45).

It was Hume's (*in* Selby-Bigge, 1888:139 and 1902: 63, 72-79) good fortune to show that such an unguarded conception of induction would lead to totally unwarranted conclusions. Adopting the empirical method of the modern scientists, Hume indicated that knowledge of the world could be no more than phenomenalistic. That is, if our experience is stringently limited to appearances, we can draw no conclusion beyond these appearances. As a result of Hume's criticism, one of the unsolved problems bequeathed to us by the 17th century is the rational justification of inductive reasoning. If this problem did not lead us to an utter scepticism, it would not be so urgent and unsettling: "Either there is something about the immediate occasion which affords knowledge of the past and future, or we are reduced to utter scepticism as to memory and induction" (Whitehead, 1925:46).

Whitehead (1925:46) believed that ". . . the key to the process of induction, as used either in science or in our ordinary life, is to be found in the right understanding of the immediate occasion of knowledge in its full concreteness." Our difficulties arise when we substitute for the concrete occasion an abstract consideration in which we attend only to material objects as fluctuating configurations in space and time. So abstracted, objects reveal only their positions, disclosing nothing of their mutual dependencies. Accordingly, we must observe the immediate occasion and use *reason* to discover a general description of its nature.

Both Hume and Whitehead started their arguments from experience; where did the Humean analysis go astray? First, Whitehead denied Hume's view of experience as a mere succession of loose events. That is, Whitehead denied that the immediately given of experience is sensory atoms. But more basically, a false assumption underlies Hume's approach to immediate experience.

This assumption underlies the whole philosophy of nature during the modern period. It is grounded in the answer that the 17th century philosophers gave to the Ionian thinkers'

questions, "What is the world made of?" Their answer was that the world is a succession of instantaneous configurations of matter or material (Whitehead, 1925:51). Science rested content with this assumption as to the fundamental elements of nature, for the great forces of nature were determined by the configurations of masses. These configurations determined their own changes, completely closing the circle of scientific thought. This mechanistic theory justified itself by the pragmatic test.

If this mechanistic materialism is accepted, *i.e.*, if there is a presupposition of nature at a point-instant (as Newtonian science presumed), then causality is, as Hume pointed out, merely a "habit" or "custom" with no counterpart in nature. However, such a theory involves the error of mistaking the abstract for the concrete. It is an example of what Whitehead (1925:52) called the "Fallacy of Misplaced Concreteness." More specifically it involves setting up distinctions which disregard the genuine interconnections of things. Due to "Misplaced Concreteness" the real continuity of experience is atomized, and temporal duration is denied.

More specifically, what is entailed is a sub-fallacy of Misplaced Concreteness: the concept of simple location. By simple location Whitehead (1925:50) meant ". . . one major characteristic which refers equally both to space and to time, and other minor characteristics which are diverse as between space and time." The fallacy of simple location occurs when it is assumed that in expressing the space and time relations of a bit of material, it is unnecessary to say more than it is present at a specific point in space at a specific instant of time. "The characteristic common both to space and time is that material can be said to be *here* in space and *here* in time, or *here* in space-time, in a perfectly definite sense which does not require for its explanation any reference to other regions of space-time" (Whitehead, 1925:50). Once it is determined what is meant by definite place, the relation of a specific material bit to space and time can be adequately stated by saying that it is simply in that place, and there is nothing more to be stated regarding that particular bit of matter.

Regarding the minor characteristics which were mentioned above, Whitehead undertook some subordinate explanations. With respect to time, dividing the time does not divide the material that existed in a longer period of time. However, with respect to space, dividing the volume does divide the material that existed previously in the undivided volume of space. That is, if material exists throughout a volume, there will be less of that material distributed throughout any given portion of that volume. Such considerations lead Whitehead (1925:51) to the interesting conclusion that the lapse of time is accidental, rather than essential to the character of the material. The material is equally itself at any instant of time, or any sub-period of that instant.

If the concept of simple location is held, difficulties arise immediately. If a material configuration has no inherent relation or reference to configurations in any other times, past or future, it immediately follows that nature within any period is not connected to nature in any other time, that nature is, as Hume's analysis draws out, "loose and separate." If there is no inherent reference, Hume's "external objects" offer no ground for the justification of inductive reasoning. Consequently, Hume was correct: the only alternative for grounding inductive reasoning is the mind. If there is no basis in nature for any justification of the order nature displays, this order must be mind-imposed since in reality it is mind-based. That is, the consistent contiguity and temporal succession observed in nature are in reality a random sense manifold; and, since we observe no necessary connection or power in nature itself, the order of nature is really the order of mind.

By accepting mechanistic materialism, which was the basis of Galilean-Copernican-Newtonian universe, Hume brought about a unique turn of events for empiricism, especially a highly empirical scientific methodology. If one of the aims of science is projection (*i.e.*, prediction either into the future or the past), mechanistic materialism's fallacy of simple location prohibits this attempt. Since material configurations lack inherent reference, there is nothing in the present observed nature that could possibly enable the scientist to project either to composition of past configurations or future configurations. The most he could do is consider nature at the present, cataloguing his observations of the *present* from instant to instant. Any projection beyond the present would be futile guesswork, since the observed present has no inherent reference to any unobserved future or past. At best there could be an accidental relationship between the observed and unobserved. But an accidental relationship in nature would not offer any basis for a legitimate scientific knowledge of the physical world, since our knowledge of nature would be as random as the occasional relationships. In brief, when Hume accepted mechanistic materialism, his analysis poignantly pointed out that one could not go beyond what Whitehead (1925:52) was later to call the fallacy of the simple location of here and now. Consequently, insofar as a scientific methodology is based on this fallacy, it is bound to a succession of present here and now's. Inasmuch as mechanistic materialism passed the pragmatic test, it has been highly successful. Philosophically speaking, however, it posed an insurmountable obstacle, and "the only wonder is that the world did in fact wait for Hume before noting the difficulty." The point of Hume's analysis, then, would seem to be that scientists' simple faith in the order of nature was without any ground in nature.

Having just seen that Hume's challenge is unanswerable, if we grant his premise of mechanistic materialism, we can see that Whitehead was forced to return to a new analysis of nature, if he were to remain empirical and yet justify inductive

reasoning. In analyzing our immediate experience, Whitehead (1925:57) found that among the primary elements of nature as apprehended, there is no element whatever which possesses this character of simple location.

Whitehead argued that Hume, by neglecting the causal mode of perception, missed the essential relatedness of things, and by missing the essential relatedness of things, slipped into sceptism. According to Whitehead (1927:17), in our experience we discern two distinct modes of direct perception of the external world: perception in the mode of causal efficacy and perception in the mode of presentational immediacy. When a person vaguely prehends data, which are felt as coming into the experience of the subject from the past, through the mediation of the body, this is causal efficacy (Whitehead, 1929:184, 189, 266–267). (Whitehead also discerned in a subject's experience a vague feeling of "on-going" toward the future.) Presentational immediacy, on the other hand, is an experience of clear-cut sense data definitely located, with an emphasis on the present and a minimum of reference to past or future (Whitehead, 1927:13–29 and 1929:185,271).

There is a close relation between these two modes of perception. The sense data of presentational immediacy are derived from the data of causal efficacy. A significant change in the characteristics of these data occurs in this derivation. In the mode of presentational immediacy what (in causal efficacy) was vague in quality and function becomes clear and distinct (Whitehead, 1929:262). For example, a subject vaguely experiences pain as derived from the body. This perception is in the mode of causal efficacy. When this pain is clearly apprehended as localized, there is perception in the mode of presentational immediacy. Hence, the later mode of perception is found only in organisms of a high grade (Whitehead, 1929:261).

Since data in the mode of presentational immediacy are clear and distinct, it is this mode of perception that is the basis of all exact measurements (Whitehead, 1929:197–499). Whitehead granted the importance of this mode of perception; however, he also offered very vigorous criticisms of this essentially abstract approach to the complex of environment. In presentational immediacy (or, to speak less technically, in ordinary sense experience), there is a tendency to assign excessive importance to clear-cut and apparently unrelated bits of sense data. According to Whitehead (1929:263), this is precisely what Hume did, for in Hume's theory response is to presentational immediacy and nothing else.

Whitehead contended, contrary to Hume, that there can be an impression of causality. For example, when a bright light is presented as a stimulus, a man blinks. In the terms of the mode of presentational immediacy the sequence of the percepts is: flash of light, feeling of eye-closure, and instant darkness. Although these three percepts are practically simultaneous, the flash maintains its priority over the other two; and the priority of the last two percepts is indistinguishable. In Whitehead's philosophy of organism, the man also experiences another percept in the mode of causal efficacy. "He feels that the experiences of the *eye* in the matter of the flash are causal of the blink" (Whitehead, 1929:265). The man who experiences this does not doubt it. Actually, it is the very feeling of causality which enables the man to distinguish the priority of the flash over the blink and instant darkness. If asked why he blinked, the man will reply, "The flash made me blink." And, if asked how he knows this, he will reply, "I know it, because I felt it."

Whitehead's view differed from Hume's here because he accepted the man's statement. Hume, however, would have stated that in our perception (Whitehead's mode of presentational immediacy) there is found no percept of flash *causing* the man to blink. In our experience there are simply the two percepts: the flash and the blink. Hume refused to admit the datum that the compulsion to blink was indeed felt by the man. Whitehead contended that Hume could not admit this datum, because he was correct that there is no such datum in his view of percepts. Whitehead replied, however, that our view of percepts must be broadened to take in such a percept as "cause." Hume would have interpreted that what the man really felt was his habit of blinking after flashes and not causality. Whitehead (1929:266), then, asked Hume:

> But how can a "habit" be felt, when a "cause" cannot be felt? Is there any presentational immediacy in the feeling of a "habit"? . . . by a sleight of hand [you] confuse a "habit of feeling blinks after flashes" with a "*feeling of the habit* of feeling blinks after flashes."

The notion of causality did not arise from clear and distinct impressions of experience, but rather because man experiences in the mode of causal efficacy.

By presentational immediacy we are made aware of the observed world as illustrated and made vivid by certain sensa. While in this mode, we discern no referential qualities, and we merely see the sensa disposed in a particular manner. Hume took presentational immediacy to be the primary fact in perception, and he held that whatever is to be posited in the perceived world should be derivable from this fact. In opposition to this view, Whitehead held causal efficacy is more fundamental than presentational immediacy. In fact, as was pointed out above, causal efficacy is at the root of all our objective experience. This mode can actually be called causal *feeling* (Das, 1938:132).

Because they have not properly considered the real character of time, philosophers have found it easy to overlook

the feeling of causal efficacy. Time is primarily recognized as the succession of our acts or experience, and derivatively as the succession of events objectively perceived in those acts. However, there is no such a thing as mere succession. According to Whitehead (1925:52), Bergson rightly called this a distortion of nature due to the intellectual "spatialization" of things. In the concrete, succession is the conformation of one event to another, of the later to the earlier. There is no such thing as the lapse of empty time, but only a succession of events, which means that every event is derived from its predecessor to which it conforms in some fashion. The flow of time is really the causal flow of events, in which the later events must conform to earlier ones. Time is irreversible (Das, 1938:134). When one considers the idea of empty time, mere succession, he is considering an abstraction from the concrete fact of immediate experience. This is an error, an accidental error of mistaking the abstract for the concrete (Whitehead, 1925:52).

The feeling of causal efficacy, although deep and inescapable, and heavy with emotion, fails to capture its due measure of recognition, because our attention is held by the clarity and distinctness of what we get in the mode of presentational immediacy. Because this clarity and distinctness captured Hume's attention, he took presentational immediacy to be the only mode of perception. Taking presentational immediacy as the only mode of perception, he priorly assumed that time is pure succession. That is, if one assumes that time is pure succession, one will consequently take presentational immediacy to be primary in perception. As noted above, to take time as pure succession is an example of the fallacy of Misplaced Concreteness.

How is this so? The notion of pure succession is analogous to a notion of color. In our concrete, immediate experience we never discover mere color, but always a red or blue and so on. Analogously, we never discern pure succession, ". . . but always some particular relational ground in respect to which of the terms succeed each other" (Whitehead, 1927: 35). Integers succeed one another in one way, and events succeed each other in another way. When these ways of succession are abstracted, it is discovered that pure succession is an abstraction of the second order. That is, we have a generic abstraction omitting the temporal character of time and numerical relation of integers. In our concrete, immediate experience, time is known to us as the succession of our acts of experience. And, as indicated above, this succession is not pure succession, but rather it is the derivation of state from state, with the later state exhibiting a conformity to the antecedent. In reality time is experienced as the conformation of state to state, the later conforming to the earlier. Pure succession, then, is an abstraction from the irreversible relationship of settled past to derivative present (Whitehead, 1927: 35). The past consists of a community of settled acts which, insofar as they are objectified in the present act, set the conditions to which that act must conform (Whitehead, 1927:36).

Employing Aristotlian terms, Whitehead (1927:36) wrote:

> . . . we say that the limitations of pure potentiality, established by "objectifications" of the settled past, expresses that "natural potentiality"—or, potentiality in nature—which is "matter" with that basis of initial, realized form presupposed as the first phase in the self-creation of the present occasion. The notion of "pure potentiality" here takes the place of Aristotle's "matter," and "natural potentiality" is "matter" with that given imposition of form from which each actual thing arises.

The constitutive elements which are given for experience can be found by analyzing natural potentiality. The immediate present, then, must conform to what the past is for it (Whitehead, 1927:36), and pure succession is an abstraction from the more concrete relatedness of conformation. The substantial character of actual things expresses the stubborn fact that whatever is actually determined must be conformed to by the determinable present. In other words, the unobserved must conform to the observed in some degree. (The phrase "in some degree" is used designedly here, for there is novelty in the unobserved.) According to Hume, there are no stubborn facts of immediate experience, for it is "habit" or "custom" alone that remains recalcitrant when all is said and done. To conclude, let us quote Whitehead (1927:37):

> Hume's doctrine may be good philosophy, but it is certainly not common sense. In other words, it fails the final test of obvious verification.

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