The Dark Matter of Cambridge Philosophy

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(1) The Cambridge Triumvirate

Bertrand Russell (1872-1970), G.E. Moore (1873-1958), Ludwig Wittgenstein (1889-1951).

(2) Alfred North Whitehead

Born 1861 Ramsgate. 1875 schooled in Sherborne in mathematics and classics, becoming Head Boy and Captain of Games.1880 awarded scholarship to study mathematics at Trinity, eventually achieving the result of 4th Wrangler.1885 submits Fellowship dissertation on Clerk Maxwell's theory of electromagnetism.1884-8 is an active member of the *Apostles*.1888 appointed a Lecturer in Mathematics and a Teaching Fellow of Girton. 1890 Russell arrives to study mathematics in Cambridge; according to Russell, "Whitehead was extraordinarily perfect as a teacher". 1891 marries Evelyn Wade. 1896 visits Cardinal Newman. 1898 published *A Treatise on Universal Algebra.*1903 elected fellow of the Royal Society. Around this time Russell and Whitehead begin work on their 3 volume work *Principia Mathematics* (1910-13). 1906 published a memoir "On Mathematical Concepts of the Material World" for the Royal Society. 1911-14 appointed Reader in Applied Mathematics at UCL. 1914-24 held Chair at Imperial College London. Published *Principles of Natural Knowledge* (1919), *The Concept of Nature* (1920), and *The Principles of Relativity* (1922). 1924-37 appointed Professor of Philosophy at Harvard University. Between 1925 and 1938 Whitehead publishes a series of more speculative, metaphysical works including *Science and the Modern World*, *Religion in the Making*, *Symbolism its Meaning and Effect*, *Process and Reality*: *An Essay in Cosmology*, *Adventure of Ideas*, *Nature and Life*, and *Modes of Thought*. 1931 elected Fellow of British Academy. 1945 awarded Order of Merit. 1947 died in Cambridge, Mass.

(3) The Reception of Whitehead's Work

"It has been given to few men to start a new career in a new country at the age of 63 and thereafter to spend at least twenty more years in extremely original intellectual activity of the highest quality along quite fresh lines. Whitehead's output during this last period would be astonishing even in a man still in the prime of life" (C.D. Broad 1948: 142).

"The shifts of opinion... the obscurity and looseness of expression... the elusiveness of his multitudinous references... these together produce in the chronicler of contemporary thought a feeling of desperation... no one will ever succeed in writing a short account of his work which is not, in a high degree, arbitrary" (John Passmore *A Hundred Years of Philosophy*, 1966: 336).

"We are not likely ever to know exactly what he *means*" (Susan Stebbing 1927: 217).

"distinctly difficult... first aid to critics.... Very important" (Broad 1920: 217).

"I am a sincere admirer of Dr. Whitehead's philosophy, and am convinced that the truth about the natural world lies somewhere along its lines" (R. B. Braithwaite 1926: 500).

(4) Russell's Debt to Whitehead

"The central problem by which I have sought to illustrate method is the problem of the relation between the crude data of sense and the space, time, and matter of mathematical physics. I have been made aware of the importance of this problem by my friend and collaborator Dr. Whitehead, to whom are due all the differences between the views advocated here and those suggested in *The Problems of Philosophy*. I owe to him the definition of points, the suggestion for the treatment of instants and "things", and the whole conception of the world as a *construction* rather than an *inference*. What is said on these topics here is, in fact, a rough preliminary account of the more precise results which he is giving in the fourth volume of our *Principia Mathematica*. It will be seen that if his way of dealing with these topics is capable of being carried through, a wholly new light is thrown on the time-honoured controversies of realists and idealists, and a method is obtained of solving all that is soluble in their problem" (Bertrand Russell, *Our Knowledge of the External World* 1914: 8).

(5) The Application of Mathematical Science to Physical Reality.

In his 1906 *Memoir* Whitehad began his attack upon "the classical concept of the material world". According to this (Newtonian) concept of the material world, there are three classes of entities: points of space, points of time, and particles of matter. Whitehead's complaint was that there nothing in the way these entities are introduced in Newtonian theory that accounts for their co-ordinate application; it is left an *arbitrary* fact about nature that a particle occupies a point at an instant.

"The false idea which we have to get rid of is that of nature as a mere aggregate of independent entities, each capable of isolation. According to this conception, these entities whose characters are capable of isolated definition come together and by their accidental relations form the system of nature... With this theory space may be without time, and time might be without space...The relations between portions of matter in space are accidental facts owing to the absence of any coherent account of how space springs from matter or how matter springs from space...The explanation of nature which I urge as an alternative ideal to this accidental view of nature, is that nothing in nature could be what it is except as an ingredient in nature as it is" (1920: 141-2)

(6) Against 'The Bifurcation of Nature'

Whitehead advanced a thorough going realism about the external world:

"Nature is that which we observe in perception through the senses... In this sense-perception we are aware of something which is not thought and which is self-contained for thought. This property of being self-contained for thought lies at the basis of natural science. It means that nature can be thought of as a closed system

whose mutual relations do not require the expression of the fact that they are thought about" (1920: 3)

And this realism applied to everything we perceive:

"We may not pick and choose. For us the red glow of the sunset should be as much part of nature as are the molecules and electric waves by which men of science would explain the phenomenon" (1920: 29).

Only by recognising this are we able to avoid the threat of scepticism:

"in considering knowledge we should wipe out all these spatial metaphors, such as 'within the mind' and 'without the mind'. Knowledge is ultimate.... natural knowledge is a knowledge from within nature... and is an awareness of the natural relations of one element in nature (namely, the percipient event [roughly speaking, as Whitehead later expressed it, the bodily life of the incarnate mind]) to the rest of nature" (1919: 14, 1920: 32, 107).

And his realism extended to scientific particles:

"The current answer to these objections is that, though atoms are merely conceptual, yet they are interesting and picturesque way of saying something else which is true of nature. But surely if there is something else that you mean, for heaven's sake say it. Do away with the elaborate machinery of a conceptual nature which consists of assertions about things which don't exist in order to convey truths about things which do exist" (1920: 44).

"I am maintaining the obvious position that scientific laws, if they are true, are statements about entities which we obtain knowledge of as being in nature; and that, if the entities to which the statements refer are not to be found in nature, the statements about them have no relevance to any purely natural occurrence. Thus the molecules and electrons of scientific theory are, so far as science has correctly formulated its laws, each of them factors in nature" (1920: 44-5).

(7) The Primacy of Events

"What sense-awareness delivers over for knowledge is nature through a period... Our knowledge of nature is an experience of activity (or passage). The things previously observed are active entities, the events" (1920: 57, 185).

"The event is not bare space-time which is a further abstraction. An event is qualified space-time—or rather, the qualities and space-time are both further abstractions from the more concrete event" (1922: 15).

If his conception of events as ontologically basic is to be at all convincing Whitehead must provide an account (a) of the way in which the constituents of events ontologically depend upon them. But it is also incumbent upon Whitehead to account (b) for the fact that classical physics has been applied to natural phenomena, and

achieved an extraordinary degree of observational success. How can this be if it is events spread over space and time that are ontologically basic, rather than the instantaneous points classical physics posits?

The fundamental relation that imposes structure upon the manifold of events is the relation of extension. One event extends over another when the latter is a proper part of the former. Thus, for example, the event of a clock striking three times extends over the three events that consist of the three individual strokes, and contains each of them as a proper part.

The structure extension imposes upon events is continuous. Every event extends over some other event and is extended over by other events, and any pair of events is extended over by some third event. In particular, there are no minimum or maximum events so the manifold of events is both infinitely divisible and indefinitely extensible,

"An event in passing becomes part of larger events; and thus the passage of events is extension in the making" (1919: 61).

Events do not therefore change but simply pass into larger events of which they become parts. They are also unrepeatable because it is of the essence of an event to extend over the events that are its parts and to be extended over by those events of which it is a part. In other words, it is the essence of an event to occur when and where it does in the manifold of events:

"An actual event is thus divested of all possibility. It is what does become in nature. It can never happen again, for essentially it is just itself there and then. An event is just what it is, and is just how it is related and it is nothing else" (1919: 62).

Space and time are then conceived as 'abstractions' from the manifold of extended events:

"space and time are each partial expressions of one fundamental relation... which is neither spatial nor temporal. This relation I call 'extension.' The relation of 'extending over' is the relation of 'including' either in a spatial or in a temporal sense or in both" (1920: 185).

To explain the successful application of Newtonian mechanics Whitehead introduces the notion of a logical construction. His basic idea is that, "A moment is a limit to which we approach as we confine attention to durations of minimum extensions" (1920: 57).

"an abstractive set of events is any set of events which possess the two properties, (*i*) of any two members of the set one contains the other as a part, and (*ii*) there is no event which is a common part of every member of the set" (1920: 79; 1919: 104).

It follows from this definition that an abstractive set has no smallest element; rather this series of events converges without limit toward the small end. Whitehead likens an abstractive set to the nest of boxes of a Chinese toy, with each successive member a part of all the members that precede it, but with an important difference. Whereas the toy has a smallest box, the abstractive set has no smallest event nor does it converge towards an event as its limit. For if it did then the parts of the smallest event, or the limiting event, would be common parts of every member of the set, in violation of (*ii*).

Now consider an abstractive set of durations—an infinite set of ever diminishing temporal cross-sections of the universe nested within each other. Whitehead's idea is to employ such a set as a code for the ideal limit to which it converges:

"Thus an abstractive set is effectively the entity meant when we consider an instant of time without temporal extension. It subserves all the necessary purposes of giving a definite meaning to the concept of the properties of nature at an instant" (1920: 61).

So the scientific purposes that are served by speaking of nature at an instant are sub-served by speaking of a set of events that are available to sense perception.

(8) Objects

"Objects are elements in nature which do not pass... An object is an ingredient in the character of some event. In fact the character of an event is nothing but the objects which are ingredient in it and the ways in which those objects make their ingression into the event. Thus the theory of objects is the theory of the comparison of events. Events are only comparable because they body forth permanences. We are comparing objects in events whenever we can say 'There it is again'. Objects are the elements in nature which can be 'again.' (1920: 143-4)

Whitehead has an elaborate story about how the structure of our thought and language has misled us to misconceive the structure of reality:

"All thought has to be about things... Thought cannot proceed otherwise; namely, it cannot proceed without the ideal bare 'it' which is speculatively demonstrated... The separate distinction of an entity in thought is not a metaphysical assertion, but a method of procedure necessary for the finite expression of individual propositions" (1920: 8, 9, 12)

"the chief confusion between objects and events is conveyed in the prejudice that an object can only be in one place at a time. That is a fundamental property of events, and whenever that property appears axiomatic as holding of some physical event, that entity is an event" (1919: 65)

"An object is ingredient throughout its neighbourhood, and its neighbourhood is indefinite.... Finally therefore we are driven to admit that each object is in some sense ingredient throughout nature; though its ingression may be quantitatively irrelevant in the expression of our individual experiences." (1920: 145)

"The same doctrine is essentially interwoven in all modern physical speculation. .... Faraday... remarked that his theory of tubes of force implies that in a sense electric charge is everywhere. The modification of the electromagnetic field every point of space at each instant owing to the past history of each electron is another way of stating the same fact." (1920: 146)

"We can however illustrate the doctrine by the more familiar facts of life without recourse to the abstruse speculations of theoretical physics. The waves as they roll on to the Cornish coast tell of a gale in mid-Atlantic; and our dinner witnesses to the ingression of the cook into the dining room." (1920: 146)

Sense-objects, perceptual objects and scientific objects "form an ascending hierarchy, of which each member presupposes the type below. The base of the hierarchy is formed by the sense-objects. These objects do not presuppose any other type of objects." (1920: 148)

"Thus in modern scientific phraseology, a perceptual object means a present focus and a field of force streaming out into the future. This field of force represents the type of the control of the future exercised by the perceptual object (which is, in fact the perceptual object in ots relation to the future, while the present focus is the perceptual object is its relation to the present. But the present also has a duration. What we observe is the control in action during the specious present" (1922: 17)

"A scientific object such as a definite electron is a systematic correlation of the characters of all events throughout all nature. It is an aspect of the systematic character of nature. The electron is not merely where its charge is. The charge is the quantitative character of certain events due to the ingression of the electron into nature. The electron is its whole field of force. Namely the electron is the systematic way in which all events are modified as the expression of its ingression" (1920: 148)