Joseph LaLumia

EINSTEIN, ANTHROPOCENTRICITY AND SOLIPSISM IN SCIENTIFIC PHILOSOPHY

This paper is about the reference or denotation of the concepts and descriptions of modern physics in contrast to Galilean-Newtonian physics and some reflections therein of some widely influential misunderstandings of Einstein's empiricism.

Background

1. Galileo set the stance of classical physics concerning the reference or denotation of its concepts and descriptions. Classical physics was dualistic; its subject-matter was both qualitatively and existentially extramental. While depending on experience and on constructions of reason stimulated by experience, the subject-matter of classical physics was neither a sensory entity nor an entity of reason resident in human consciousness and inseparable from human consciousness. It was not anything dependent on being known or knowable in order to exist, nor anything the existence and states or properties of which knowing

https://doi.org/10.1177/039219218102911605 Published online by Cambridge University Press

itself in any sense created, changed, or disfigured. The act of knowing did not somehow make the subject-matter known different from the subject-matter it was the physicist's intention to know. Knowing what commonsense takes the external world to be did not somehow only guarantee that the external world in the qualitative and extramental sense intended eluded human reach. The physicist, by doing all the things he did to get to know the external world, did not defeat his very purpose. He was not a new Midas whose very touch turned everything he reached for into something different from what he wanted to have. Physical experience and physical thinking excited by physical experience were, as experience and as thinking, inseparable from the ego, but the physical world was not, nor did this mean to the classical physicist that the physical world was unknowable or the concept of it meaningless. In a word, there was no flirtation with agnosticism as far as the external world was concerned and no flirtation with mentalistic metaphysics.

2. What I have described as Galileo's stance is clear in the sharp distinction Galileo made between the so-called primary and secondary qualities of matter. The secondary qualities were ingredients of experience. They stood for psychological events, sensory states of the ego, supposed to be due to stimuli supplied by the impact of bodies upon us and dependent for their peculiarities relative to the same sense or sensory faculty on the constitution, configuration, and dynamical states of bodies. As Galileo trenchantly put it: when we are tickled by a feather, the tickle is in us, not in the feather, his point being that the same thing is true when an odor is smelt, a color is seen, a sound is heard, or a body is found to be sweet or hard or cold. In themselves, bodies have shape and size, they are numerically single or composite, they are stationary or in motion, and they collide or separate from each other: these are their primary qualities. Except for the stimuli they supply by their impact upon us, there would be no noise, no color, no heat, no taste, no smell, and, moreover, the physicist is not interested, as a psychologist might be, in sensations as such. The physicist is interested in what the states of matter mentioned before, the specific primary qualities, are indicated to be when we hear a noise, smell an odor, see a color, feel warmth, or experience a blow. The

spatial intuitions attending the kinds of experiences mentioned were considered to be objectively significant; the experiences themselves were considered to belong to consciousness, not to that material in space which the physicist is interested in and which, merely as such, is not considered to have, or to need to have, consciousness or any feature of consciousness at all.[1]

3. The subsequent corrosion of the distinction between the primary and secondary qualities of matter is familiar to all students of the philosophy of science. Berkeley attributed the distinction to a trick that scientific intelligence played on itself by means of abstraction. No one has ever seen a shape unassociated with a color, but abstraction, according to Berkeley, separates shape from color and categorizes shape and other geometrical qualities as extramental while relegating color to the status of dreams, feelings, sensations, and similar events in the ego's internal life. Shapes, positions, volumes, and relations of bodies are after-images, so to speak, of color, tactile, and kinaesthetic sensations that we illegitimately hypostatize into qualities of independent entities which cause sensations under appropriate circumstances. "But I desire anyone to reflect and try, whether he can, by an abstraction of thought, conceive the extension and motion of a body, without all other sensible qualities. For my own part, I see evidently that it is not in my power to frame an idea of a body extended or moved, but I must withal give it some colour or other sensible quality which is acknowledged to exist only in the mind. In short, extension, figure, and motion, abstracted from all other secondary qualities, are inconceivable. Where, therefore, the other sensible qualities are, there must these primary qualities be also, to wit, in the mind and nowhere else."[2]

4. Hume took the course of corrosion further. Space, in separation from specific shapes and specific places, is an invention of the mind. It is merely the sum of the shapes and places of all actual and imaginable color, tactile, and kinaesthetic experiences.

[1] Galilei, G., *The Assayer*, in Stillman Drake's translation in *Discoveries and Opinions of Galileo*, New York, Doubleday, 1957, pp. 273-278.

[2] Berkeley, G., *A. Treatise Concerning the Principles of Human Knowledge*, in *British Empirical Philosophers*, ed. A.J. Ayer and Raymond Winch, Routledge and Kegan Paul, Ltd., London, 152, pp. 181-182.

Having nothing but experience, abstraction, addition, and imagination as its sources, it has no extramental application, but it has, strictly speaking, no cognitively valuable intramental application either since there is no *experience* of the sum itself of the shapes and places of all actual and imaginable color, tactile, and kinaesthetic experiences.[3]

5. Kant took an opposite corrosive course, more congenial to rationalism. Space, in separation from specific shapes and specific places, is not a sum which the mind makes of actual and imaginable experiences of specific shapes and places, but an *a priori* form of sensory consciousness which experiences of specific shapes and places dispose us to think of as having discrete parts although in reality it has homogeneousness and continuity. But, in any case, here also the primary qualities of bodies to which Galileo ascribed the power of bodies to affect us by their impact have disappeared, having surrendered their efficaciousness to noumena or inexperienceable and unknowable things, and the material world is not extramental as commonsense supposes since it is something inherent in the mind itself which makes bodies and the spaces filled by bodies *appear* to be extramental as "Space does not represent any quality of objects by themselves in their relation to one another... Space is nothing but the form of all phenomena of the external senses; it is the subjective condition of our sensibility, without which no external intuition is possible for us."[4]

6. Mach reverts to Hume. The subject-matter of physics, and indeed of any science, is sensations correlated to what we do, while "things" and "bodies" are only symbols standing for composites of sensations that have, in his words, relative fixity of juxtaposition and sequential order of occurrence. There is no misinterpreting him unless we are prepared to believe him feckless in his choice of words:

> "Nature is composed of sensations as its elements... Sensations are not signs of things, but, on the contrary, a thing is a

[3] Cf. Hume, D., *A Treatise of Human Nature*, in *British Empirical Philosophers*, Ayer and Winch, pp. 311-352.

[4] Kant, I., *Critique of Pure Reason*, tr. Max Müller, Macmillan, New York, 1922, pp. 20-21.

> thought-symbol for a compound sensation of relative fixedness. Properly speaking, the world is not composed of 'things' as its elements, but of colors, tones, pressures, spaces, times—in short, what we ordinarily call individual sensations."[5]

In this famous paragraph it is clear that the selective realism of Galileo has vanished and that, with it, there has vanished any basis whatever for ordinary people to think that the world of the physicist has any connection with the world they look to the physicist for special information about and which, moreover, they imagine the physicist shares with them, at least when there are non-scientific things to be done like sitting to one's dinner. Phillip Frank to the contrary, who seems to have imagined that one has to have the materialistic prejudices and the political motivation of a Marxist to think so,[6] it seems clear to me that solipsism is the only word for this. If what Mach says is true, then psychological autobiography is what we have to believe the physicist is really doing when we are under the impression he is describing a cup or the path of a missile. Operational, sensory, and conceptual self-description is what we have to believe he is proposing we ought to be conscious of doing ourselves when we think we are describing a cup or the path of a missile that we have observed and studied.

Einstein and the Epistemological Way of Words

7. With the advent of Einstein's relativity theories, what one might call the epistemological way of words appears to have become for many physicists and philosophers, if not for Einstein himself, a doctrinaire mental set. Epistemology—perhaps we should say methodological policy—now determined what the world might be considered to be or to have in it, what there is

[5] Mach, E., *The Science of Mechanics*, La Salle, Ill, Open Court, 1942 pp. 579-580. Cf. also Alexander, P., *Sensationalism and Scientific Explanation*, London, Routledge and Kegan Paul Ltd., 1963, pp. 1-24.

[6] Frank, P., "Einstein, Mach, and Logical Positivism", in *Albert Einstein: Philosopher-Scientist*, ed. Paul Arthur Schilpp, Evanston, Ill. The Library of Living Philosophers, Inc., n. 272.

did not determine what *we* must be or do if it is our desire to know what there is.

I say "if not for Einstein himself" because, although his example and certain of his words lent themselves to being invoked, and were promptly invoked by a number of thinkers, in support of one variety of idealism or another, there is nevertheless ample evidence that his position was a form of selective realism differing from Galileo's only with respect to the geometry theoretical physics is logically obliged to use or, differently put, the kind of space theoretical physics properly sensitive to the indications of experimental results is obliged to claim existence for. Einstein is a rationalist and even a Kantian, but only in a superficial way, since he subscribes to no fixities of mental structure such as Kant's categories of the understanding and forms of sensibility, but to the cognitive uses of the scientific imagination provided the theories which the latter enjoys complete freedom to invent are submitted by the scientist to the discipline of selection in the light of correspondence to the results of experiment.

The especially provocative example was the standard that, in the following words in his treatment of simultaneous physical events, he set for any concept and any statement to deserve consideration for possibly stating a fact: "The concept [simultaneity] does not exist for the physicist until he has the possibility of discovering whether or not it is fulfilled in an actual case. We thus require a definition of simultaneity such that this definition supplies us with the method by means of which, in the present case, he can decide by experiment whether or not both the lightning strokes occurred simultaneously. As long as this requirement is not satisfied, I allow myself to be deceived as a physicist (and of course the same applies if I am not a physicist) when I imagine that I am able to attach a meaning to the statement of simultaneity. (I would ask the reader not to proceed further until he is fully convinced on this point)."[7] Elsewhere, he points out: "We represent the sense-impressions as conditioned by an 'objective' and by a 'subjective' factor. For this conceptual

[7] Einstein, A., *Relativity: The Special and the General Theory*, New York. 1961, p. 22.

distinction there is no logico-philosophical justification. But if we reject it, we cannot escape solipsism. It is also the presupposition of every kind of physical thinking... After what has been said, the 'real' in physics is to be taken as a type of program, to which we are, however, not forced to cling *a priori*... The theoretical attitude here advocated is distinct from Kant only by the fact that we do not conceive of the 'categories' as unalterable (conditioned by the nature of the understanding) but as (in the logical sense) free conventions. They appear to be *a priori* only insofar as thinking without the positing of categories and of concepts in general would be as impossible as is breathing in a vacuum."[8]

On the other hand, while he is an empiricist also and acknowledges debts to Hume and Mach,[9] he firmly rejects against Hume the view that acceptable concepts and theories of science must have been abstracted from, and must refer ultimately to, sense-impressions. This is a constantly recurring thesis of Einstein, often misunderstood because of Einstein's frequent references to theoretical concepts as "free conventions" (for example, as in Footnote §8 above) and phrases like "the purely fictitious character of the fundamentals of scientific theory".[10] In the latter connection, Einstein's following precaution that the "free conventions" are not fictions should be noted: The scientist's... liberty of choice is not in any way similar to the liberty of a writer of fiction... but to that of a man engaged in solving a well-designed word puzzle...; there is only one word which really solves the puzzle in all its forms."[11] What remains is to find it. Einstein also rejects against Mach the view that scientific laws are merely labor-saving compendiums of sensations and that theoretical entities are psychologically helpful but cognitively worthless or empty myths, which does not deter him from paying homage to Mach: "I see Mach's greatness in his incorruptible scepticism and independence; in my younger years,

[8] Einstein, A., "Reply to Criticism", in *Albert Einstein: Philosopher-Scientist*, pp. 673-674. Cf. also, *ibid.*, pp. 678-679.

[9] Einstein, A., "Autobiographical Notes", in *Albert Einstein: Philosopher-Scientist*, p. 53.

[10] Einstein A., *The World As I See It*, New York, Corvici and Friede, 1934, n. 34.

[11] Einstein, A., "Physics and reality", *Franklin Institute Journal*, 1936, p. 351.

however, Mach's epistemological position also influenced me very greatly, a position which today appears to me to be essentially untenable."[12] Further along, he stresses "The antipathy of these scholars [Ostwald, Mach] towards atomic theory can indubitably be traced back to their positivistic philosophical attitude. This is an interesting example of the fact that even scholars of audacious spirit and fine instinct can be obstructed in the interpretation of facts by philosophical prejudices. The prejudice—which has by no means died out in the meantime—consists in the faith that facts by themselves can and should yield scientific knowledge without free conceptual construction."[13] The specific primary qualities of Galileo, which were associated with a commitment to the physical significance of Euclidean geometry, are gone, but they are replaced by others which, in Einstein's opinion, the scientific mind is free to borrow (always as experimental results and logical considerations permit, however) from among new geometries invented in mathematics. This is to say, there is a genuinely physical world in the extramental sense that commonsense supposes and a genuinely physical space, not to be confused with psychology or some mathematical symbolism that is merely convenient for colligating the sensory results of experiment. The world of matter that was genuinely extramental yet not elusive to the human understanding for Galileo is genuinely extramental yet not elusive to the human understanding for Einstein. The commitment to be empirical did not for Einstein damage the objectivity and heteronomousness of the physical world, nor did it damage the reachability of the physical world to the human understanding. As we shall see, it only damaged the old rationalist aspiration, residual in Kant's thought in spite of Kant's concessions to empiricism, that some certainty and some definite and permanent closure for a theory of any kind of reality might be won against the ever-present inevitability of the incompleteness of experience and, one might add for physical theory at least, the contingently incidental limitations of the mathematical imagination.[14]

[12] "Autobiographical Notes", in *Albert Einstein: Philosopher-Scientist*, p. 21.
[13] "Autobiographical Notes", *ibid.*, p. 49.
[14] See below on Einstein's empiricism in contrast to Bridgman's.

Yet all of this appears to have been very difficult for many philosophers and physicists to understand or cheerfully accept. Viewing the philosophical scene from the perspective offered by the more than fifty years which have passed since the debut of Einstein's relativity theories, it is hard to resist the temptation to believe that idealists and metaphysical agnostics among both philosophers and scientists had been waiting for someone of Einstein's unquestionable genius and stature who might possibly be invoked as authority for the truth of their philosophical disposition. Examples are the popularity at the time of idealism in philosophy and Mach's epistemological views and Karl Pearson's agnosticism in science. Einstein's "utterances of epistemological content" were "occasional"[15] but few of his philosophical contemporaries were evidently sufficiently concerned to avoid pressing into them a meaning favorable to their idealistic and positivistic bias, and Einstein himself possibly put the reasons explaining this better than anyone else:

> "The reciprocal relationship of epistemology and science is of noteworthy kind. They are dependent on each other. Epistemology without contact with science becomes an empty scheme. Science without epistemology is—insofar as it is thinkable at all—primitive and muddled. However, no sooner has the epistemologist, who is seeking a clear system, fought his way to such a system, than he is inclined to interpret the thought-content of science in the sense of his system and to reject whatever does not fit into his system. The scientist, however, cannot afford to carry his striving for epistemological systematic that far. He accepts gratefully the epistemological conceptual analysis; but the external conditions, which are set for him by the facts of experience, do not permit him to let himself be too much restricted in the construction of his conceptual world by the adherence to an epistemological system. He must therefore appear to the systematic epistemologist as a type of unscrupulous opportunist: he appears as *realist* insofar as he seeks to describe a world independent of the acts of perception; as *idealist* as he looks upon the concepts and theories as the free inventions of the human spirit (not

[15] "Replies to Criticisms", *Albert Einstein: Philosopher-Scientist*, p. 683.

logically derivable from what is empirically given); as *positivist* insofar as he considers his concepts and theories justified *only* to the extent to which they furnish a logical representation of relations among sensory experiences. He may even appear as *Platonist* or *Pythagorean* insofar as he considers the viewpoint of logical simplicity as an indispensable and effective tool of his research."[16]

For a clearer understanding of Einstein's meaning, these remarks which warn against any scientist's accepting, as an epistemologist might wish, an epistemological system *in toto*, and which even defend a kind of epistemological opportunism on the part of the scientist, should be juxtaposed to other remarks Einstein makes in rejoinder to an observation by Henry Margenau that "Einstein's position... contains features of rationalism and extreme empiricism":[17]

"This remark is entirely correct. From whence comes this fluctuation? A logical conceptual system is physics insofar as its concepts and assertions are necessarily brought into relationship with the world of experience. Whoever desires to set up such a system will find a dangerous obstacle in arbitrary choice (*embarras de richesse*). This is why he needs to connect his concepts as directly and as necessarily as possible with the world of experience. In this case his attitude is empirical. This path is often fruitful, but it is always open to doubt, because the specific concept and the individual assertion can, after all, assert something confronted by the empirically given only in connection with the entire system. He then recognizes that there exists no path from the empirically given to that conceptual world. His attitude becomes then more nearly rationalistic, because he recognizes the logical independence of the system. The danger in this attitude lies in the fact that in the search for the system one can lose every contact with the world of experience. A wavering between these extremes appears to me unavoidable."[18]

[16] *Ibid.*, pp. 683-684.
[17] *Ibid.*, p. 679.
[18] *Ibid.*, pp. 679-680.

Conclusion: Epistemological Systems and the Empirical Spirit

Einstein had ample reason to be troubled by idealistic and agnostic uses to which his relativity theories were pressed with respect to the physical world and its nature. Percy Bridgman built operationism on the basis of Einstein's special theory of relativity and, moreover, was frankly disappointed when he discovered that Einstein was not prepared to support the solipsistic position to which he felt himself logically driven by operationism: " 'Public Science' is a particular kind of the science of private individuals... This position, which I suppose is the solipsist position, is often felt to be absurd and contrary to common sense... It seems to me that as I have stated it, the solipsist position, if indeed this be the solipsist position, is a simple statement of what direct observation gives me, and we have got to adjust our thinking so that it will not seem repugnant."[19] Eddington built a new brand of Kantian agnosticism which he called "selective subjectivism" and did not hesitate to find in quantum physics scientific allowance for advancing the possibility of mentalism in the form of free will in the world of matter itself.[20] Jeans found vindication for the Pythagorean and Platonic theological vision.[21] The Wiener Kreis found justification for re-vamping Hume and Mach. "For, as A.J. Ayer said, the position which they [the Vienna Circle] held was, in its main features, a blend of the nineteenth-century Viennese positivism of the physicist, Ernst Mach, and his disciples, with the logic of Frege and Russell. So far as their positivism went they were continuing an old philosophical tradition—it is remarkable how many of their most radical doctrines are already to be found in Hume. Their originality lay in their attempt to make it logically

[19] Cf. Bridgman, P.W., "Einstein's Theories and the Operational Point of View", in *Albert Einstein: Philosopher-Scientist*, pp. 335-354. Cf. also Bridgman, P.W., *The Way Things Are*, Cambridge, 1959, pp. 1-11, 246-248 and Bridgman, P.W., *The Nature of Physical Theory*, Princeton University Press, 1936, pp. 14-15.

[20] Cf. Eddington. A., *The Nature of the Physical World*, Cambridge, 1948, and *The Philosophy of Physical Science*, Cambridge, 1949. Cf. also Stebbing, L. Susan, *Philosophy and the Physicists*, New York, Dover, 1958

[21] Cf. Stebbing, L. Susan, *op. cit.*

rigorous and in their use for the purpose of a developed and sophisticated logical technique."[22] C.G. Darwin and Herbert Dingle saw the revolutionary character of Einstein's theories of relativity as consisting precisely in their appearing to have made matter of reality and matter of experience and thought logically inseparable and even interchangeable.[23]

It seems to me that the statements by Einstein which I have quoted or to which I have referred leave no doubt about Einstein's commitment to a realist interpretation of his theoretical contributions to physics, the same in spirit as the realism of Galileo. But, more important for my purpose in this paper, they make clear the different sense of Einstein's commitment to empiricism compared to the commitment to empiricism underlying and explaining the misinterpretations to which I have referred. Bridgman's epistemological interpretation of Einsten's work is an excellent example of the latter. Experience in Einstein's empiricism is always opportunity to know a world as genuinely external and public for him as for Galileo and ordinary consciousness, that is, a world that experience and thought make us competent to know but that is neither experience nor thought. Experience and an inventory of conjunctions of experience are not by themselves the knowledge that science seeks and Einstein, it seems to me, correctly identifies the difficulty which might make his realism appear inconsistent with his empiricism to an epistemologist. The epistemologist requires empiricism as a theory of knowledge to offer a systematic perspective on the nature of knowledge, whereas Einstein's commitment to empiricism is not the commitment of an epistemologist but the commitment of a physicist to the utility and indispensability of experience for realizing a theoretical objective which is different from the theoretical objective of an epistemologist and which the physicist can allow himself to forget only at the risk of ceasing to be a physicist and becoming an epistemologist. In

[22] Ayer, A. J., "The Vienna Circle" in *The Revolution in Philosophy*, Ayer, A. J. *et al.*, New York, Macmillan, pp. 73-74. Cf. also Kraft, Victor, *The Vienna Circle*, New York 1953, pp. 3-11; also, *Logical Positivism*, ed. Ayer, A.J. New York, The Free Press, 1959, pp. 3-28.

[23] Cf. Dingle, H., *The Scientific Adventure*, New York, 1953, Ch. 11; Darwin, C.G., *The New Conceptions of Matter*, New York, 1931, pp. 23, 81.

other words, the theoretical physicist's interest in systematics serves a different God and his consistency as a physicist must have priority for him ahead of consistency to suit the epistemologist or the philosopher. For this reason, Einstein correctly speaks of opportunism and fluctuation: the distinction of physics from philosophy, and the integrity of physics, are at stake for him.[24] In contrast, Bridgman shows just the opposite of this attitude and a primarily epistemological and philosophical obsession when he writes that his purpose in proposing his epistemological position was to state our relations to that which we wish to know in any science in such a way that revolutions on a scale like the revolution which Einstein appeared to him to have stimulated in physics would *never occur again.* Or, quoting him: "We should now make it our business to understand so thoroughly the character of our permanent relations to nature that another change in our attitude, such as that due to Einstein, shall be forever impossible. It was perhaps excusable that a revolution in mental attitude should occur once, because after all physics is a young science, and physicists have been very busy, but it would certainly be a reproach if such a revolution should ever prove necessary again."[25] It is paradoxical that Descartes did not anywhere in all his writings express the *a priori* hope and (in a practical sense) the unempirical spirit better, and it is a curious fact which does not seem to be just a coincidence that, scandalized as he was by the scale of the scientific revolutions effected by Kepler, Galileo, and Harvey, Descartes was inspired by a similar motive.

Joseph LaLumia
(*Hofstra University*)

[24] LaLumia, J., "From Science to Metaphysics and Philosophy", *DIOGENES,* No. 88 (Winter, 1974), pp. 18-19.
[25] Bridgman, P. W., *The Logic of Modern Physics,* New York, Macmillan, 1949, p. 2.