

## Schlick's Critique of Positivism

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It is not well known that Moritz Schlick, whose name is inseparable from the development of logical positivism, was extremely critical of positivism prior to the 1920's. The positivism Schlick found fault with was associated with the physicist Ernst Mach. Schlick went to considerable lengths to criticize Machian positivism on both epistemological and ontological grounds. He also objected to the positivist claim to be able to account for relativity theory within its framework.

Schlick's views before his move to Vienna in 1922 have been labeled a "critical empiricist realism" (see Feigl 1938, p. xx) or a "structural realism" (Friedman 1983, p. 501). His exposure to the work of Ludwig Wittgenstein is generally held up as the crucial factor in turning him away from his early realist views towards positivism. There is general acknowledgment of a major change in Schlick's philosophical thinking in the early 20's; disagreement exists, however, over both the extent of the change and whether it was a positive or negative one. I believe a clearer understanding of Schlick's early criticisms of positivism helps to put the transition in Schlick's philosophical development in better perspective. It also shows the role of Schlick's philosophical work on relativity theory in turning his attention to a positivist concern with empirical verification. His early criticisms of positivism, particularly the fact that it ignored the significance of the logical and conceptual in favor of the immediately experienced, became the issues that he then had to deal with. Familiarity with Schlick's logical positivist writings show that he spent the second part of his philosophical career struggling to work out solutions to the very problems he had so vehemently criticized in his early work.

### 1. Schlick's epistemological objections to Machian positivism

All of Schlick's epistemological criticisms of positivism follow from the sharp distinction he made between 'knowledge' and 'intuition' (or acquaintance). This distinction is without doubt the most important feature of Schlick's early work, not only with respect to his criticisms of positivism but also because he will work on the problems stemming from his efforts to clarify the relationship *between* knowledge and intuition for the rest of his life.<sup>1</sup> Before his move to Vienna in 1922, however, Schlick was more concerned with elaborating on the differences between knowledge and intuition than with showing how they were related.

Schlick identified intuition specifically with the act of sensing, with the fleeting moment before the one who is sensing has become consciously aware of what it is one

is sensing. These moments are vague and blurred in our memories and never constitute genuine knowledge:

Pure unelaborated perception or sensation is mere acquaintance (*Kennen*)... Sensation gives us no knowledge whatsoever of things, but only an acquaintance with them. (*General Theory of Knowledge*, hereafter GTK, p. 89)

Genuine knowledge (*Erkennen*), on the other hand, involves the use of concepts, which we order and coordinate in systems of interlocking judgments: "[s]o long as an object is not compared, or in some way incorporated into a conceptual system, it is *not* known." (Vol. I of Schlick's *Philosophical Papers*, hereafter *I*, p. 146) Therefore knowing involves two factors, not just one: "something known, and that *as which* it is known" (*I*, p. 144), in order to lodge it firmly within our own conceptual system. Schlick contrasts this to the "mere experiencing" of an object, which is only a one-place relation: "in contemplation or intuition we are confronted by a single object, without relating it to anything else." (*I*, p. 146.)

Besides this strict identification of intuition with the act of sensing, Schlick also identified intuition more generally with any philosophy that was 'anti-science' in attitude. (This may explain what Coffa has called his "anti-intuitionist zeal" in developing "a picture of knowledge where intuition plays little or no role." (Coffa, ch. XI, p. 31) Schlick directed a good deal of criticism at philosophies that rejected the type of knowledge found in the exact sciences in favor of a type of knowledge immediately experienced by a knowing subject. He frequently mentions the work of Bergson and Husserl in this context (see *I*, pp. 142-7). Schlick writes of these philosophers that

they believe that intuition attains in perfect fashion to precisely what scientific knowledge is pursuing vainly by imperfect means. (*I*, p. 145)

Further, they directly invert Schlick's picture:

It is not by comparing, measuring and calculating, they say, that we obtain our final insights, but by the most immediate experience, by living and looking. (*I*, p. 142)

But, as we have seen, for Schlick "intuition and science, experiencing and knowing, are opposites." (*I*, p. 151)

Schlick had been trained as a physicist,<sup>2</sup> and was well aware of the prevailing hostility towards philosophy among scientists.<sup>3</sup> He was also enormously impressed at this time with Planck's mandate that progress toward a "unified world-picture," the goal of mature science, involved the elimination of the qualitative, sense-derived "anthropomorphic elements" in favor of the quantitative results of experimental science.

Given Schlick's strong pro-science sentiments, why would he reject the dominant scientific philosophy of his day, the positivism associated with the physicist Ernst Mach? The culprit was Mach's theory of sensations. If "pure unelaborated perception or sensation" did not constitute knowledge for Schlick, it is not surprising that he would oppose Mach's view that we cannot know anything about the world beyond the complexes of elements of sensations that are simply given to us in various combinations. Schlick's acceptance of Planck's "non- anthropocentric thesis" of the progress of science also made it impossible for him to agree that Mach's complexes of sensations (the colors, sounds, pressures, temperatures, etc., that we directly perceive) constitute all that we can know about the world.

Schlick's most vehement criticisms of Mach concern the latter's construal of the 'principle of the economy of thought.' In Mach's words,

The goal which [science] has set itself is the *simplest* and *most economical* abstract expression of facts. (Quoted in Blackmore, 1972, p. 169)

Schlick stated his own rather utopian vision of the goal of knowledge, and of science in particular, as follows: "to designate univocally the largest possible number, and thus ultimately all the facts in the entire world, by means of a *minimal* number of concepts" (I, p. 139). While the two versions do not appear to differ radically, Schlick regards Mach's proposal for economical expression as "a sort of mental indolence" (I, p.226) which is to be "understood psychologically to mean the shortest and easiest possible way of representing or imagining the facts" (I, p. 293). Schlick contrasts this to his own version, which is to be "interpreted logically to mean designation by a minimum of concepts" (I, p. 293). Mach's version does not remove us from, but keeps us within the realm of the human senses; Schlick saw this constraint as precluding the 'logical' activity of working with systems of concepts:

How absurd to believe that the goal of knowledge is to make our thought processes less arduous, to spare us intellectual effort, when in fact labour of the greatest intensity is demanded... [Mach's] is a principle of convenience, of taking the easy path; the other is a principle of unity. (I, p. 292 and GTK, p. 99)

Are Schlick's epistemological criticisms of Machian positivism warranted? Mach often spoke in terms of the abstract conceptual formulations that could be built on our basic units of sense-experience.<sup>4</sup> However, Schlick ignores Mach's references to the construction of conceptual and mathematical formulations, and focuses his critical remarks on Mach's *foundation* of knowledge in sensations. Further, although much of Schlick's criticisms of philosophies of intuition appear to be directed more towards philosophers such as Bergson and Husserl, the following passage makes it clear that Schlick is directing his "anti-intuitionist zeal" at Mach as well:

they still conflate knowing (Erkennen) with being acquainted with (Kennen), that is, with pure experiencing, mere being given... What the "elements", in the case of Mach and Avenarius, "are" we know by direct acquaintance... It is not a judgment or a definition but experience alone that gives us information about their "nature". But this does not mean that the elements and their nature are *known*. (GTK, p. 231)

## 2. Schlick's ontological objections to Machian positivism

Schlick's ontological criticisms of positivism concern its denial of the existence of things-in-themselves. He devoted two sections of his *General Theory of Knowledge* (25. and 26., pp. 194-231) to an examination of the *notion of immanence*, advocated by philosophers who reject the existence of things-in-themselves. Immanence philosophy confines both what there is and what can be known to the realm of the given. Since this view, according to Schlick, "is found in its purest form in Avenarius and Mach," he presents and criticizes "the essentials of the immanence standpoint with reference to these authors." (GTK, p. 201) The basic thesis of immanence philosophy, or positivism, is:

(1) Only the given is real.

Since Schlick defined things-in-themselves, as "objects whose reality is asserted without their being directly given"<sup>5</sup> (GTK, p. 195), it follows that positing their existence is incompatible with (1), above. But denying the existence of not- given

objects had extremely unfortunate consequences, according to Schlick: at best, it could not be reconciled with empirical principles used in science, such as the principle of causality; at worst, it could lead to the "renunciation of knowledge" completely. In regard to the former, Schlick states that the positivists are faced with "the impossibility of reconciling the denial of things-in-themselves with the soundness of empirical research methods and their best established principles" (GTK, pp. 200-1). The most important principle (and the only one that Schlick mentions) that the positivists are forced to relinquish is the principle of causality, which "demands an unbroken interconnection of all that is real so that real processes proceed according to strict empirical laws..." (GTK, p.220)

But far worse than the prospect of abandoning the principle of causality is the loss of knowledge itself. Schlick states that it is obvious that

a meticulously rigorous execution of [the positivist] program would unfortunately mean a total renunciation of knowledge. Knowledge presupposes some kind of thinking, and for this concepts are needed. (GTK, p. 198)

This harsh pronouncement does indeed follow from Schlick's definition of knowledge as distinct from intuition, and from the fact that Mach's theory of sensations fell on the wrong side of the the knowledge barrier, on the side of intuition.

Severe polemics aside, it is interesting to note, in the light of Schlick's later views, that he cannot hide his feeling that nevertheless there is something extremely attractive about the positivist view:

Here we have in outline a grand world view of astonishing simplicity... necessarily free from contradiction... so well chosen that the immanence philosopher remains just as far from the dangers of dualism and materialism as from subjective idealism... (GTK, p. 202)

### 3. Machian positivism and relativity theory

Schlick devoted section VII of his "Philosophical Significance of Relativity Theory" (1915) to an examination of J. Petzoldt's claim<sup>6</sup> that Einstein's principle of relativity was a "truly positivistic achievement," in that "the ideas of Mach were necessarily bound to lead to [it]." (*I*, p.178) Schlick first acknowledges that relativity theory is *compatible* with positivist thought, and that Einstein "could hardly have arrived at his theory, if he had not himself already been toying with these ideas." (*I*, pp. 178-9) It is the stronger claim that positivism already in some way prefigured the principle of relativity that Schlick challenges:

The basic thesis of positivism, that only the perceived is to be declared real, and that the world is to be constructed solely from immediately given 'elements', has often led to the claim that since only relative motions are perceivable, it is they alone that are real; that absolute motions have no existence whatever, and can thus have no physical effect either. Is this postulate in any way equivalent to the proposition that we have designated hitherto as the principle of relativity? (*I*, p. 179)

Schlick states the *basic thesis* of positivism as (above)

(1) Only the perceived (the given) is real.

He had earlier in the same essay stated the principle of relativity as:

(2) All uniform and rectilinear motions referred to in natural laws are relative.

When applied to motions, (1) leads to the claim that

(3) Only perceived motions are real.

Since only *relative* motions are perceivable, they alone are real; in other words, (3) can be stated as

(3a) Absolute motions do not exist, since they are not perceivable.

But this means that

(3b) All motions are relative,

since anything that is a real motion is a perceivable motion, and only relative motions are perceivable.

Schlick proceeds to show that this very general postulate of relativity, (3b), is not equivalent to (1), as the positivists would have it.

First, the general proposition (3b) must include *accelerated* as well as uniform motions, while Einstein's principle (2) refers to uniform motions only: "The positivist must either maintain this proposition for any given motion, or has no right to maintain it at all. For the grounds of his claim are present in the same fashion with regard to every motion." (*I*, p. 179) However, experience has confirmed the relativity of uniform motions only (recall that Schlick is writing this in 1915). Second, Einstein's principle (2) is a contingent proposition, "a result of perfectly specific experiences, not a mere consequence of this general relativistic proposition." (*I*, p. 179) The positivists' (3b) is, on the other hand, invoked as a "necessity of thought" rather than "ultimately left to experience to decide how far it may be regarded as valid," as Einstein intended.<sup>7</sup> (*I*, p. 183)

Another major fault that Schlick finds with the positivist account of relativity concerns the distinction between what Schlick called 'subjective' and 'objective' notions of space and time. The distinction figures prominently in Schlick's writings on relativity theory, and can best be understood in the context of his knowledge/intuition distinction. Schlick's complaint against the positivists was their exclusive focus on what Schlick considered our "[s]ubjective, psychological experiences of extension in space and order in time," rather than on "the 'objective' sense in which these conceptions occur in natural science." (*I*, p. 259) In the case of spatial perceptions, for instance, each of our senses gives us a different experience of space, so that "[t]actual space has so far not the slightest resemblance to visual space, and the psychologist finds himself obliged to say that there are just as many spaces for our intuition as we have senses." (*I*, p. 260) By contrast, "the space of the physicist," Schlick continues,

which we have set up as objective in opposition to these subjective spaces, is a single definite one, and we think of it as independent of our sense impressions... The objects of physics are therefore *not* the data of sense: the space of physics is not in any way given with our perceptions, but is a product of our conceptions. (*I*, p. 260)

Schlick also finds no justification for singling out only the intuitional elements and the relations between them as real. The arbitrary restriction of reality in this way to what is given is "unsatisfactory on account of a certain lack of continuity. In narrowing down the conception of reality...we tear, as it were, certain holes in the fabric of reality" (*I*, p. 265).

#### 4. The Transition

In 1921 Schlick published a review of Cassirer's *Einstein's Theory of Relativity*, entitled "Critical or Empiricist Interpretation of Modern Physics?" It is within the context of criticizing Cassirer's neo-Kantian interpretation of relativity theory that Schlick has his first words of approval for Machian positivism. Schlick drops earlier equally-weighted attacks on both epistemological schools and now pits them against each other:

it seemed to me that the principles needed for a philosophical illumination and vindication of [the] theory [of relativity] could be drawn far more readily from the empiricist than the Kantian theory of knowledge; and even on subsequent occasions I found no reason to abandon this position, more especially since the successful completion of the general theory... brought victory to an idea that had arisen from the soil of extreme empiricism (namely the positivism of Mach). (*I*, p. 322)

The publication of Einstein's *The Foundation of the General Theory of Relativity* in 1916 and the experimental confirmation of the effect of gravity on light in 1919 vindicated Mach's earlier 'general postulate of relativity.' ((3b), above) Schlick is now satisfied that this proposition has been empirically verified, and not merely invoked as a tenet of an epistemological school. He is also prepared to give Mach credit for having anticipated Einstein's work on general relativity.

Cassirer, according to Schlick, makes the mistake of contrasting "the critical viewpoint only with the sensualist one, under the name of 'strict' positivism... Between the two we still have the empiricist viewpoint, according to which these constitutive principles are either *hypotheses* or *conventions*; in the first case they are not *a priori* (since they lack apodeicticity), and in the second they are not synthetic." (*I*, p. 324) It is this new empiricist viewpoint that Schlick now wants to defend, dissociating it from what he now labels 'strict positivism', an "exaggerated relativistic positivism [which] has actually led to claims which contradict the presuppositions of the theory of relativity, and indeed of physics generally." (*I*, p. 349)

Friedman writes that Schlick "prefigures the principle of verifiability" (1983, p. 505) in his first pro-empiricist writings, in the following phrase:

the principle that differences in reality may be assumed only where there are differences that can, in principle, be experienced. (*I*, p. 330)

Schlick even says at this point that this principle can "be elevated to the supreme principle of all empirical philosophy, to the ultimate guideline which must govern our attitude to every question of detail, and whose ruthless application to all special problems is an exceedingly fruitful procedure" (*I*, p. 331). Further, relativity theory then points the way to the correct epistemology:

the theory of relativity can enable us to separate the legitimate aspects of this philosophy from those that are hasty or perverse. The theory permits no wild, uncritical empiricism or positivism, but...restricts them within quite specific limits... (*I*, p. 349)

A year later, in his "The Theory of Relativity in Philosophy" (1922), Schlick again spoke of a new epistemological postulate, "the principle that *only something really observable should be introduced as a ground of explanation in science.*" (*I*, p. 345) The powerful theoretical significance and empirical success of Einstein's relativity theory had forced a rethinking of epistemological assumptions: "this philosophical postulate

carries so much weight with all those of us who believe in Einstein's theory, that we cheerfully accept into the bargain all the consequences that follow from the doctrine based on it..." (*I*, p. 345)

## 5. Concluding Remarks

Schlick's better known logical positivist writings, written after his move to Vienna in 1922 and his founding of the Vienna Circle, show that he dedicated tremendous energy to the problem of how to ground scientific knowledge on sense-experience. The success of relativity theory forced him to take seriously the role of experience and observation in science. He then concentrated his efforts on finding a solution to the very problem he most criticized about positivism in his early work: specifically, that sense-experience did not of itself constitute genuine knowledge. The logical positivists' well known preoccupation with verification encompassed both the logical and the empirical. When Carnap and Neurath gave up the project of grounding our empirical knowledge on immediately given data in the famous 'protocol debates' of the 30's, however, Schlick upheld his proposal for just such a sensory foundation for empirical knowledge. (Vol. II, pp. 370-387) His *Konstatierungen*, or 'ascertainments' were meant to endow those fleeting moments of intuition, or sense-experience, with a respectability worthy of the scientific enterprise. They were "the unshakeable points of contact between knowledge and reality" from which "comes all the light of knowledge" (*II*, p. 387). The unreliability of intuition as a ground for knowledge, which he argued for so forcefully during his early years, was finally dissolved in these "moments of fulfillment and combustion." (*II*, p. 387)

## Notes

<sup>1</sup>Later variations on the distinction (e.g., form vs. content, communicable vs. incommunicable, public vs. private) will be vehicles for Schlick's continuing work on the problem of how the communicable, conceptual knowledge of science can result from the incommunicable, private experiences of its practitioners.

<sup>2</sup>Schlick's doctoral dissertation, on the reflection of light in a nonhomogeneous medium, was completed in 1904, under the supervision of Max Planck at the University of Berlin.

<sup>3</sup>This hostility, according to Schlick, was "psychologically explicable as a residue from the period during the last century when the special sciences...had to defend themselves against the pretensions of philosophers, as exhibited in the idealist systems of Fichte, Schelling and Hegel..." (*I*, p. 104)

<sup>4</sup>Mach spoke of *adapting* thoughts to facts (*Analysis of Sensations*, p. 316), and in *Science of Mechanics* (pp. 522-23) Mach wrote that "our mental representations of the facts of sensual experience must be submitted to conceptual formulations."

<sup>5</sup>Compare Mach's definition of a thing-in-itself: "something that is left over when we think of a thing with all of its properties removed." (Quoted in GTK, p. 195)

<sup>6</sup>In Petzoldt's 1912 article (see Schlick's #44, *I*, p. 189) and in his article published in *Zeitschrift für positivistische Philosophie*, 1914 (see Schlick's #55, *I*, p. 189).

<sup>7</sup>Schlick notes with irony that it is "remarkable to observe how often the very endeavour to hold always to sense experience alone, leads to bold *a priori* postulations" (*I*, p. 181).

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