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Kantianism and Realism: Alois Riehl (and Moritz Schlick)[1]

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The recent efforts to identify and analyse the neo-Kantian roots of logical positivism have primarily concentrated on the impact of the Marburg School on Carnap and Schlick. Among the Marburgers, attention focused primarily on Ernst Cassirer. From among the contemporaries of the neo-positivists he is commonly regarded as their leading representative. In view of the different currents of the many-faceted neo-Kantian movement, this seems quite a reasonable approach at first sight. This impression is even reinforced if one takes into account Cassirer's intense occupation with the philosophy of mathematics. A second look, however, reveals a further possibility for a neo-Kantian root of neo-positivist thought that is in opposition to the Marburg school – the so-called "critical realism" of Alois Riehl. I think the following appraisal of Riehl's work in 1895 by a fellow realist can – at least *prima facie* – render this plausible:

> Only in Alois Riehl's great work *Philosophy of Criticism And Its Significance For Positive Science* has Kant's criticism found a form which makes it practical for the contemporary necessities of thought and appealing to the different problems of science. This sort of criticism presents itself with the greatest resoluteness as positivism, because it sees the only real source of knowledge in the individual scientific disciplines and because it rejects any fabrication of philosophical systems [*Systemdichtung*]. In the same vein, it dismisses as illusory every belief in the possibility of knowledge that is not rigidly scientific. It determines the task of philosophy in nothing else but science [*Wissenschaft*] and critique of knowledge [*Kritik der Erkenntnis*] (Jodl 1895, 374).

In the following, I will investigate Riehl's special version of neo-Kantianism and compare it to the views of the early Moritz Schlick. The first part of this paper provides some information on Riehl's life, work, and his influence on 20th century philosophy. In the second part, Riehl's special blend of neo-Kantianism with realism and positivism is investigated. It is shown that many of Riehl's tenets agree in a striking manner with later logical positivism. It even seems that Riehl's Kantian doctrines are much closer to logical positivism than to most of the views of his neo-Kantian fellows. In the third part, I will deal with Riehl's criticism of Helmholtz's epistemology which played an essential role in shaping his realist outlook. The fourth part demonstrates that Schlick's early philosophy (i.e. before he took his phenomenalist turn under the influence of Wittgenstein around 1925) can be seen as an attempt to adjust Riehl's heritage to the problem situation of science of Schlick's own time.

This modernising of Riehl's programme in the hands of Schlick admittedly afforded some remodelling and constructive rebuilding, but on the whole Schlick did not have to introduce very much new into Riehl's critical realism in order to come to grips with Einstein's general relativity theory. This modifies the claim of Michael Friedman that the decisive break with Helmholtz's conception of space occurred with and was necessitated by the general theory of relativity and that Schlick was the one to take this crucial step (Friedman 1997, 21f., 42 and *passim*). It is true that "Schlick's conception constitutes a radical transformation or transmutation of the former theory of Helmholtz" (Friedman 1997, 21), but this rupture is not so much Schlick's own achievement, but has already taken place in the work of Riehl in 1879 in the context of a debate that was partly neo-Kantian, partly sensory physiological and psychological, and partly concerned with the foundations

of mathematics. All Schlick had to do was take away from Riehl any notion of a unifying role of concepts that goes beyond the internal unity of a formal mathematical system. But this he could easily do because this notion had already become an idle wheel in Riehl's work that did not accomplish any real work anymore anyway.

The story told in this paper also supplements Barry Gower's recent claim that "structural realism is a theme that enables us to link Schlick's pre-positivism with Cassirer's neo-Kantianism" (Gower 2000, 101). In order to establish such a link one has to go back to the major realist among the neo-Kantians, namely Alois Riehl.

Riehl in Context.

Born in Bozen (today Bolzano, in South Tyrol, Italy, then Austria) in 1844, Alois Riehl[2] took part in the Herbartian movement which was the dominant philosophy in Austria at the time (see Röd 1986). After his *Habilitation* in 1870, he was a professor in Graz from 1873 until he moved to the university of Freiburg i. Br. in 1882. His views on morality and dogma brought him into conflict with the local archbishop and he converted to Protestantism. The problems he encountered as a result of this made him accept a call to the university of Kiel in 1895. Soon afterwards, in 1898, he changed again and went to the university of Halle. His career finally reached its summit with a call to the university of Berlin in 1905 where he taught until circa 1921 as the successor of Wilhelm Dilthey.[3] Riehl died in Neubabelsberg, a suburb of Berlin, in 1924.

His already mentioned main work *Der philosophische Kriticismus und seine Bedeutung für die positive Wissenschaft* appeared in two editions – the first volume of the first edition in 1876 and the second volume in two parts in 1879 and 1887 respectively (cited henceforth as PK1, PK2 and PK3). The heavily reworked and partly posthumous second edition came out in three volumes in 1908, 1925, and 1926. It should be noted that the last instalment of the first edition bears the subtitle: *Zur Wissenschaftstheorie und Metaphysik*. This is one of the first usages of the term *Wissenschaftstheorie*, which is the standard expression for "philosophy of science" in German until today (compare also Köhnke 1991, 245). This volume is also the only one that has been translated into English (Riehl 1894).

In the first volume (PK1), Riehl portrays the development of Kant's critical philosophy and its prehistory. He sees its roots not in Descartes, but especially in Locke and Hume. The first instalment of the second volume (PK2) deals with epistemology. Its first part is concerned with the "sensory basis of experience" and includes a chapter on the "origin and meaning of the ideas of time and space" which takes up almost 40% of the volume and with which we will mainly be occupied in the following. Its second part comprises a discussion of the "logical principles of scientific experience," including an account of the principle of identity, causality, substance, force and magnitude. The second instalment of the second volume (PK3 = Riehl 1894) is something of a mixed bag of problems. Its first part is entitled "problems of general philosophy of science" and deals mainly with the concept of "philosophy as the science and critique of knowledge." Its second part on "metaphysical problems" criticises idealistic treatments of the problem of the external world, deals with the mind-body problem, the problem of determinism and free will, the concept of the infinite in cosmology, and the notions of necessity and finality in nature.

For many years, Riehl was also editor or co-editor of the *Vierteljahrsschrift für wissenschaftliche Philosophie* – a journal that promoted Riehl's and others' conception of "scientific philosophy" (see Richardson 1997b for the history of this concept) and documents the strong alliance between neo-Kantianism and positivism at the time (Köhnke 1991, 252-262). Riehl is also to be noted for his book on Friedrich Nietzsche which was the first monograph ever written on this philosopher and which saw seven editions until 1920 (Riehl 1897). As many other "German mandarins" (compare Ringer 1983), Riehl delivered an address during World War I in which he enthusias-

tically greeted the war and which is otherwise alien to the spirit of his work (Riehl 1915, 313-325; Kusch 1995, 214f.).

Riehl was one of few German philosophers of his time who took note of the development of logic in England (Riehl 1877). As the first volume of his main work (PK1) amply testifies, he was also very well informed of English empiricism. Although Riehl published comparatively little, his teaching seems to have been successful, wide-ranging and influential (see Rickert 1924-25, 178). An impression of this is best conveyed by his published lectures on the *Philosophy of the Present Age* [*Zur Einführung in die Philosophie der Gegenwart*] that is very well written and preserves some of the liveliness of the spoken word (Riehl 1903). These lectures saw at least six editions until 1921.

Riehl enjoyed some international renown, because in 1913 he received an honorary doctorate from Princeton University, together with the French philosopher Émile Boutroux and others, on the occasion of the opening of the Graduate School (Siegel 1932, 16, Riehl 1913). His wartime aversion against England notwithstanding, Riehl was invited to the University of London in 1923, but he could not follow this invitation because of his old age (Siegel 1932, 17). Through the Japanese philosopher Kunaki Genyoku who had studied with Riehl in 1907-08, Riehl gained some renown in Japan (see Gülberg 2003). The lectures on the *Philosophy of the Present Age* have been translated into Japanese.

Riehl's work is full of (explicit and implicit) references to Helmholtz and he tried to come to terms with Helmholtz's thought in two articles (Riehl 1904 and 1921). In fact, Riehl was regarded as being very close to the philosophical views of Helmholtz. This becomes evident from a report of the *philosophische Fakultät* of Berlin University to the state ministry which concerned three possible candidates for the professorship vacated by Dilthey in 1905 where we read: "No one stands in a closer relationship to Helmholtz's philosophical work among the contemporaries of Helmholtz and the thinkers that followed him than Riehl" (Erman 1905, 11r).[4] Another argument in this report to promote Riehl's candidacy stressed his capacity to fill a "painfully felt" gap at the University in the subject of "general theory of science [*Naturwissenschaft*]" and "history of the inductive sciences." "Vienna," the report continued, "has in Mach its separate ordinary professor for this field. Through his previous studies, Riehl is prepared to satisfy these needs, for he has also repeatedly held lectures on the fundamental concepts of science" (Erman/ Planck 1905, 13v).

Maybe some members of the commission that produced this report were still remembering that Helmholtz himself had brought up Riehl on an earlier occasion in the summer of 1893, when another post for philosophy was to be filled. As the protocol of this session reads: "Hr. v. Helmholtz referred to Riehl in Freiburg whose book on *Criticism* [i.e. PK1-PK3] has made an excellent impression on him" (Protokoll 1893, 103v). This word must have had much weight because, as is known, Helmholtz showed rarely any patience with philosophers.

One should remember that the sciences at Berlin university still belonged to the *philosophische Fakultät* at the time before they formed their own *naturwissenschaftlich-mathematische Fakultät* in 1936. Accordingly, the report of 1905 was not only signed by an egyptologist, the dean Adolf Erman, but also by a physicist who acted as vice-dean, none other than Max Planck.[5] Planck, of course, was a deep admirer of Helmholtz and also Schlick's doctoral adviser. His mature philosophical outlook - manifested so famously in his devastating 1908 critique of Ernst Mach's sensationalism - has a lot in common with Riehl's kind of critical realism (Planck 1909).

For many of the dissertations written under the psychologist Carl Stumpf in Berlin, Riehl acted as second reader, as in the case of Kurt Lewin, Wolfgang Köhler, and Kurt Koffka. In the case of the psychologist Adhémar Gelb (who wrote on Gestalt-qualities in 1910), he acted as the main supervisor. Mitchell Ash reports that many of the later Gestalt-psychologists followed Riehl's lectures (Ash 1995). Among his students were diverse figures such as Oswald Spengler (who wrote about Heraclitus's philosophy in 1904 when Riehl was still in Halle), the art-critic Carl Einstein, and the philosopher Richard Hönigswald (who is the author of a trenching critique of Ernst Mach's philosophical outlook in a realist vein in 1903; see Hönigswald 1903). Riehl had a profound influ-

ence on the philologist Werner Jaeger, on the founder of the most important tradition in formal logic in Germany, Heinrich Scholz, and on the pedagogue Eduard Spranger. All three were part of a philosophical discussion circle that regularly met in Riehl's house.

In his student days in Berlin between 1911 and 1913, Hans Reichenbach also attended some of Riehl's lectures as his dissertation testifies (Reichenbach 1915, 228). Perhaps Reichenbach's lifelong rejection of positivism and his embrace both of realism and of anti-cognitivism in ethics, as well as his distinction between the context of discovery and the context of justification, are influenced by this experience.

Moritz Schlick received his doctorate in physics at the university of Berlin in 1904, a year before Riehl took his chair there in 1905. They must nevertheless have met soon thereafter in Berlin as becomes evident from a postcard in Schlick's *Nachlass*. Riehl invited the 29 year old Schlick in March 1910 to discuss some treatises which Schlick had sent him. Another postcard of 1921 documents that Schlick was still in contact with Riehl in Berlin at that time (Riehl 1910-21). Both, the *General Theory of Knowledge* [*Allgemeine Erkenntnislehre*], a copy of which Schlick had sent to Riehl, and the notes to the Helmholtz centenary edition (Helmholtz 1921), as well as other material and excerpts in Schlick's *Nachlass* reveal that Schlick was quite familiar with Riehl's work.[6] In 1921, when Schlick applied to a professorship at the university of Erlangen he wrote in a letter to Paul Hensel from the philosophy department of that university that besides Planck, Einstein and others also Riehl could speak in his behalf (Schlick 1921).

From the physics context, Ilse Schneider (later Rosenthal-Schneider), another of Riehl's students, should be mentioned. Schneider wrote a dissertation with Riehl on the *Space-Time-Problem in Kant and Einstein* for which Albert Einstein's colleague Max von Laue acted as second reader (Schneider 1921). This brought Schneider into very close contact with Einstein, Planck, and von Laue who subsequently discussed her work with her. The contacts continued after her emigration to Australia with her husband in 1938; in Einstein's case they even lasted until his death (Rosenthal-Schneider 1980, esp. chapter 6). Schneider came to teach philosophy of science at the university of Sydney and wrote an article for the Schilpp volume on Einstein to which Einstein responded (Schilpp 1949).

Not only Schlick himself, but also his Vienna assistant Herbert Feigl were strongly influenced by Riehl. In an autobiographical manuscript Feigl wrote that "perhaps the most decisive turn [away from physics and physical chemistry to philosophy] came with his [i.e., Feigl's] reading (in 1920) of Alois Riehl's *Philosophy of the Present Age* [*Philosophie der Gegenwart*] and Moritz Schlick's *General Theory of Knowledge*" (Feigl 1966, 3). The realism imbibed through this reading proved tenacious because during the days of the Vienna Circle he

> opposed Carnap's phenomenalism (as formulated in *The Logical Construction of the World* [*Der Logische Aufbau der Welt*]) and defended the sort of critical realism which Külpe and Riehl had so beautifully formulated and which Schlick had convincingly presented in his earlier work. (Feigl 1966, 8)[7]

In the same manuscript, Feigl admits that he "was temporarily overwhelmed by Carnap's and Wittgenstein's criticisms, but he had his triumphant vindication when Carnap later turned to his version of physicalism in which his earlier phenomenalism was completely repudiated" (Feigl 1966, 9).

In a draft for his contribution to the Schilpp volume on Carnap, Feigl gave a "brief sketch of the historical background" to physicalism where he dealt with "three main currents of philosophical thought" which, in a revised and reformulated form, he saw eventually culminate in contemporary physicalism. Besides the positivism of Mach, Avenarius, and James and the "psychophysically-monistic forms of realism, notably of Russell and Schlick," he identified as decisive above all "Neokantianism, especially in the 'philosophical monism' of Alois Riehl" (Feigl 1963, 1; compare Feigl 1963a, 254, 261). (Unfortunately, Feigl does not make clear the difference he sees here between Riehl and Schlick.) And in 1974, in the preface to the English edition of Schlick's *General*

Theory of Knowledge, Feigl still testified to the influence in this book of the "sadly neglected" Riehl on Schlick's critique of the "philosophies of immanence" and on his solution of the mind-body problem (Feigl and Blumberg 1974, xxi, xxiii).[8]

To end this short and incomplete sketch of Riehl's impact on the development of philosophy in the 20th century, one should not forget his anecdotal involvement with (and influence on?) the development of modern architecture.[9] In 1907 Riehl entrusted the construction of his villa in the suburbs of Berlin to the still unaccomplished 21-year old student of architecture Ludwig Mies van der Rohe. They must have developed an immediate mutual sympathy when they first met, because Riehl reached his decision to entrust Mies with this task very quickly. Mies in return appears to have gotten some inspiration from Riehl's writings, especially from his *Philosophy of the Present Age* and from his book on Nietzsche (Neumeyer 1991, 36-50, 57-61). It is likely that in Riehl's circle Mies came to meet some of his later clients in Berlin's high society. Riehl had also a strong leaning toward the philosophy of art; he supervised some dissertations in this direction or again acted as second reader with art historians (esp. H. Wölfflin and V. Goldschmidt).

Survey of Riehl's approach.

If Riehl's work is dealt with at all in the historiography of philosophy, he is usually accorded just a few words after treatment of the Marburg and the South-West German schools of neo-Kantianism. The standard phrase to characterise his views describes him as a "realist" interpreter of Kant's philosophy. A closer reading of his work reveals, however, that the Kantian element is comparatively limited and that his treatment of Kant is very idiosyncratic and inventive. Riehl's philosophy is a peculiar, and at times highly original, blend of English empiricism (especially in the spirit of John Locke), of contemporary sensory physiology with a heavy Darwinian bias and of German positivism. The Kantian element comes in with anti-psychologism and with "logic", which, according to Riehl, deals with the function of the unity of reason as provided by judgement.

Riehl uses the term "criticism [*Kritizismus*]" to characterise his own philosophy. It is therefore adequate to start with a clarification of this concept. By criticism the neo-Kantians in general mean a philosophical programme beyond dogmatism and scepticism that is critical of metaphysics and subscribes to certain a priori and/or anti-naturalist principles. The goal is to examine the conditions and presuppositions, the range and the limits of knowledge and to separate in experience the a priori from the empirical. The original method to be employed in executing this task is to be transcendental in a more or less Kantian sense. For Riehl, however, the state of philosophy and especially the necessities caused by the rapid development of science demands an expansion of Kant's original programme and an examination of all preconditions of the faculty of knowledge. "Critical epistemology," Riehl wrote in an unmistakably Helmholtzian manner, "examines the sources of our knowledge and it determines the degree of its justification" (Riehl 1907, 88). "There remains for philosophy in the narrower sense of the word no other problems than such as are treated by the critical science of knowledge" (Riehl 1894, 18).

In investigating the sources of knowledge, Riehl also made use of the results of sensory physiology and psychology. Questions of justification, however, he wanted to restrict to considerations concerning the objective order of epistemological concepts (Riehl 1907, 89f.). He advocated a strict and sharp separation between psychological questions that deal with the genesis and development of representations, and epistemological questions that investigate the objective preconditions of knowledge and its meaning.

Riehl saw critical philosophy in a very close relation to science or *Wissenschaft*: "The true system of knowledge [...] is the whole of the sciences themselves" (Riehl 1883, 230). Or in another place he wrote: "True philosophy follows science; in constant connection with science, it is ever obtaining a clearer and more complete understanding of science" (Riehl 1894, 17). This attitude is one of the reasons why Riehl was also regarded as a member of the German positivist movement

and a follower of Eugen Dühring (Köhnke 1991, 243-246; Vaihinger 1893, 732). Riehl has indeed taken over his view of the prehistory of Kantianism in Locke and Hume from Dühring and he rejected metaphysics as Dühring did: "We regard the conviction that metaphysical systems are impossible as one of the most important results of the general theory of science." (Riehl 1894, 118) Another element of positivism in his view is his complete philosophical reliance on sensations, although this is supplemented by his realism.

Criticism for Riehl represented only one side of philosophy, its scientific or *wissenschaftliche* dimension which is coextensive with epistemology and rejects metaphysics. Scientific philosophy does not and cannot aim at building a philosophical system or a worldview. There is, however, also a legitimate role for an unscientific or *nichtwissenschaftliche* philosophy which is not concerned with knowledge, but with the "art of leading a good life" [*Kunst der Lebensführung* or *Geistesführung*] or with the "ideals of action" [*Ideale des Handelns*] (Riehl 1883). Philosophy is thus "twofold": "it includes the general theory of science, and the theory of practical wisdom" (Riehl 1894, 23 and the whole chapter 1).

Riehl's special brand of "criticism" manifests itself in two guises that make up its peculiarity: "critical realism" and "critical monism". To be a realist meant to acknowledge that the process of cognition is related to something outside of consciousness that is not wholly constituted by cognitive categories alone. This still allows for two different versions of realism. There is the naïve claim of common sense to have direct access to reality which was commonly attributed to the materialists. And then there is the critical version which refused to take perception at face value as the "crude" materialists did and which brought the role of the perceiving subject into play in the manner of Kantian philosophy. Riehl seems to have been alone among the neo-Kantians in clinging to Kant's concept of the thing in itself, in the sense of a "cause of the appearances" (B 344, 522). Both, the Marburg as well as the South-West German school of neo-Kantianism were united in their conviction that Kant's philosophy has to be cleansed from the thing in itself in the sense of an ontologically independent basis of being. It does not come as a surprise, therefore, that Riehl's special brand of realism was regarded as opposed not only to phenomenalism (and in the end also to narrow positivism as e.g. the one of Ernst Laas; compare PK3, 141, 154), but also to idealism and all idealist interpretations of Kantianism prevalent in his time (see Rickert 1924-25, 169, 177). Riehl sometimes expresses this by saying that he is opposed to "subjectivism." Moritz Schlick later came to call these opponents of the thing in itself, as it was common during his time, as advocates of the "thought of immanence" or "philosophy of immanence" (Schlick 1925, § 25).

Accordingly, realism for Riehl means to accept that there is something behind our sensations, that all appearances given in experience are tied and related to objects beyond our direct acquaintance. These objects have to be taken as transcending our direct experience, i.e., as different from and independent of our consciousness. "Perceptions are the phenomena of things themselves existing" (Riehl 1894, 162 = PK3, 171). Although we cannot infer things in themselves by reason, we can know of them through our sensation of phenomena. "Sensory knowledge is the knowledge of the relations of things through the relations of the sensations of things" (cited according to Case 1911, 237). This is clearly a version of structural realism.

Riehl produces two main arguments in support of his brand of realism. The first tries to show that idealism does not succeed in contesting the appearances' right to a direct access to external objects and that therefore realism is the more plausible position of the two. In contrast to realism, all idealistic positions must take recourse, Riehl maintains, to convoluted and implausible constructions in trying to make sense of the relations between appearances. "Idealism," he argues,

> cannot explain the only reality it recognises [i.e. the appearances]. The content of consciousness remains for it an aggregate of facts, inconceivable because disconnected. Every step toward the explanation of these facts undeniably leads beyond the content of consciousness as immediately given. We can be sure of no law in perception, unless the conditions of

> perception lie outside of consciousness. Idealism is not compatible with the principle of causation, which underlies all knowledge (Riehl 1894, 152f. = PK3, 161).

Riehl thus comes to question how John Stuart Mill's view of matter as the permanent possibility of sensations can possibly explain the simultaneous existence of one and the same complex of sensations in different knowing subjects, either as actual sensations or as possibilities, and how two people can ever agree on one and the same object. He also asks how on earth the practical manipulation of a complex of sensations can have the same effect for two different perceiving subjects (PK2, 21).

Accordingly, he sees the greatest challenge for idealism in our readiness to co-ordinate one and the same object with different groups of sensations from different sense modalities at different times, as well as in our promptness to co-ordinate our own sensations to those of other persons. In fact, Riehl values the role of inter-subjective agreement among perceiving subjects so highly that he even tries to give a "social proof," as he says, of the existence of the external world. (Riehl 1894, 163 = PK3, 173) The object, he writes, "is the common cause, the foundation of all perceptions, whether actually or only potentially given; it is the rule from which the perceptions as seen from the subject's perspective can be developed with an intuitively appealing consequence" (Riehl 1903, 54).

When he articulates the second main argument in favour of realism, Riehl almost reads like an analytic philosopher. He tries to show that the very concepts of perception and appearance, and with them also the concepts of sensation and representation [*Vorstellung*], already presuppose a relation to real objects beyond the directly given. "I think I am able to show," he writes, "that already the sensation viewed by itself has objective meaning insofar as every sensation is [...] *localised*, i.e., that it includes an indication of something that is not a sensation. It's relation to an object does not first originate in pure, spontaneously produced concepts" (PK2, 32). Every sensation in itself therefore already includes an act of judgement.

According to Riehl, a sensation is never the result of a single stimulus, but always of a difference of stimuli and it is formed by a unity of quality and feeling [*Gefühl*] (PK2, part I, chapter 1). The force of the latter depends on the intensity of the sensation and on the strength of the stimuli and of the psychical activity of grasping them. In its strongest manifestation, feeling comes as pleasure or displeasure. Every sensation thus consists of a reciprocal and correlative action of objective and subjective elements. Riehl sees the doctrine of the pure subjectivity of sensations as a remnant of Cartesian dualism which has to be rejected. In addition he claims that Darwinism also suggests an objective ingredient in every sensation, since a sensation that is not directed towards movement and external activity of an organism would be useless and would therefore not have evolved (PK3, 60 = Riehl 1894, 62). Riehl has no qualms to generally combine "Darwinism and transcendental philosophy" with each other. (PK3, part I, chapter 4)

Riehl goes even so far as to claim that consciousness of the self and of the object outside of the self arises out of the apperception of the subjective as well as objective sides of sensation. No side can be understood separately without simultaneously grasping the other one. Riehl therefore sees reason to radically transform the Cartesian *cogito* into a "sentio, ergo sum et est":

> To talk about the *Ego* without thinking its opposite, the *non-Ego*, does not make any sense, since the Ego exists only through this opposition. [...] It might be true that the *presence of thought* implies and guarantees nothing besides the *Ego*; it is certain, however, that the *presence of sensation* implies the existence of the non-Ego. (PK2, 67)

This suggests that there exists a deep connection of Riehl's epistemology with his anti-Cartesian mind-body theory.

This brings us to the second ingredient of Riehl's criticism, his "critical monism". It holds that the basis of physical and psychical phenomena is neither bodily nor mental, thus connecting the Kantian doctrine of the thing in itself with the solution of the mind-body problem as proposed by psychophysical parallelism (see Heidelberger 2003). To accomplish this aim he relies heavily on

the chapter on the paralogisms in Kant's *Critique of Pure Reason* (A 381-406; esp. 385-387) and interprets it as a straightforward endorsement of the parallelism doctrine. Kant suggests there that we have no ground for asserting that the substratum of mental phenomena is different from and independent of that of physical phenomena. Psychophysical parallelism (which Riehl names "identity theory") is the view that mental and physical phenomena are two different aspects of one and the same object.

So far, we have considered elements in Riehl's philosophy that are close to empiricism and positivism, albeit of a realist variety, and to psychophysiology. It is time to take a look at the Kantian ingredient which is present nevertheless. This element has precisely to do with Riehl's realism. Riehl argues that in order to have an experience in the true sense of the word, appearances must not only be *given*, but they have to be *thought of* as related to and as united in objects, that are not given. Thinking is thus an a priori condition of any possible experience. In Riehl's opinion, the "logical" a priori manifesting itself in the twelve categories as identified by Kant has come together in the unifying thought of the object which stands under the principle of identity, or, in Kantian terminology, under the transcendental unity of apperception. As a matter of fact, Riehl sees the unity of the object manifested in two ways:

> It is a fact of our thought that we assume a much wider connection between the objects of perception than seems justified by the perceptions themselves. We assume that there is something that persists through time, or, to put it in philosophical jargon: that their properties and states hang together in the unity of *substance*. We assume further that the changes of objects stand in a necessary connection to each other; we say that they have a connection through causality [...] With both assumptions thought transcends the facts that are given in perception. A "substance" cannot be seen; matter also, as the "substance" of the physicist, is not seen but thought [...] and causality is equally imperceptible by the senses [...] If we call the totality of facts in perception: *pure* experience, we are already here carried to the conclusion that pure experience cannot serve as foundation of science, that it is unsuited [by itself] to constitute knowledge of an object (Riehl 1903, 66, 68, compare 94).

Here, Riehl refers to John Locke as his main authority and considers his distinction between sensation and reflection: Locke has shown, so he maintains, that in every experience we have to presuppose a substance, although he could not clarify its exact nature and significance in the end. This step was taken satisfactorily only by Kant by his introducing the concept of the thing in itself.

A similar development has taken place, according to Riehl, in relation to the concept of causality. Hume's treatment of causality had to be complemented by Kant just as was Locke's treatment of substance. Kant has shown that mere regularity has to be heightened to strict lawfulness in order to account for our experiences. He was right in claiming that "a judgement has to be made before a perception can become an experience." Experience must be seen as "a perception that is judged and understood; it is the product of thought in intuition [*Anschauung*], it is the unity of intuition and concept, thus nothing simple that could already be given in mere perception" (Riehl 1903, 103).

According to Riehl, this view carries over to the development of the concepts of space and time from Locke and Hume to Kant and the latter's "doctrine of the subjective origin and the objective significance of space and time" (Riehl 1903, 106). He identifies Newton's distinction between absolute and relative space and time as a source of this particular view. Kant agreed with Newton on the necessity of presupposing absolute space and time, but he disagreed with him in conceiving space and time as given in itself as an absolute reality. "Absolute space (and absolute time)," Riehl says, is for Kant "not the concept of a real object, but an idea which should serve as a rule to view all movement in it as relative. This means that absolute space is necessary in order to imagine relative spaces" (Riehl 1903, 107). Absolute space and absolute time are therefore not to be conceived as objects of our intuition. They are rather forms of intuition and thus necessarily valid of all per-

ceived objects. Riehl is at great pains to show that relative space and relative time cannot be a priori and that they depend on our empirical perceptions. Only absolute space can have objective significance.

In further reconsidering Kant's transcendental doctrines, Riehl came to the conclusion that substance and causality do not achieve separate functions in relating diverse perceptions to one unique object, but that they are fundamentally connected with each other. In this process, substance is seen to play the deeper role of the two. Riehl tries to show that causality can be reduced to substance if substance is conceived as governed by a principle of identity. This principle states that in all change of our perceptions, something to which these perceptions refer remains identical through time. We can therefore say that "cause and effect are connected to unity through the concept of substance" (Riehl 1900, 172f.).

In this context, Riehl cites as a key witness Julius Robert Mayer, the discoverer of conservation of energy, for having shown that causality is nothing but a function of the identity principle. To state a causal relation meant for Mayer to identify cause and effect in respect of their exact numerical equality.[10] Riehl reached the conviction to have found the function of reason par excellence in Mayer's conservation principle – something Kant had longed for in vain when he said: "The functions of reason can all be found, if one can represent the functions of the unity completely in the judgements" (B 94). Riehl thought that a solid basis for the alliance between philosophy and science has been re-established only with Mayer, an alliance which rising neo-Kantianism had hoped for after the adventures of speculative idealism had been over. Moreover, Riehl sees in Mayer the true spirit of "scientific philosophy" represented more in great scientists of his time like Helmholtz and Hertz, and not so much in the contributions of the academic philosophers themselves (Riehl 1903, 236, compare Riehl 1900).

Riehl's Criticism of Helmholtz.

It is very revealing to see now how Riehl applies his epistemology in criticising Helmholtz's views. Helmholtz is the most cited contemporary author by Riehl and over long stretches Riehl's work reads like a running commentary on Helmholtz.[11] One can very well imagine that Helmholtz's ideas were the original starting point for Riehl and that he only found his own outlook by a careful scrutiny of Helmholtz's position.

Riehl first of all criticises Johannes Müller's principle of specific nerve energies which Helmholtz had taken over and had made the cornerstone of his theory of signs (PK2, 50-64). He relies mainly on Wundt who has shown that the "principle of the functional indifference" of the nerves, as one could call it, on which Helmholtz himself relied is also valid for the central nerve endings. One has to suppose an interaction between stimulus and sense-organ which leads to the eventual adaptation of the sense-organ to the stimuli of its environment. Riehl claims that the principle of specific nerve energies is thus incompatible with Darwin's evolutionary theory and therefore to be rejected. The doctrine of the mere subjective nature of secondary qualities has to be abandoned too and it has to be assumed instead that all qualities have a subjective and an objective part.

The most important component of Riehl's critique concerns Helmholtz's conception and use of the principle of causality. According to Riehl, this conception misleads Helmholtz into an idealism alien to realism and to the true scientific spirit. As is well known, Helmholtz distinguishes in his theory of signs between sensation and perception. Sensations are conceived as states of our nerves that come to our consciousness. They are subjective appearances caused by the influence of external causes on our sense organs. Perceptions, on the other hand, are hypotheses about the existence, form and position of these external objects; they are the result of an inference, leading from the sensations to their causes and they appear as ideas [*Vorstellungen*], as interpretations of the sensations. The basis for this inference therefore lies in the law of causality which has to be presupposed as an a priori principle of all scientific experience.

Riehl now claims that Helmholtz's account of the transition from sensation to perception through causal reasoning commits two grave errors: a mistake in presupposing the causal principle as innate and a mistake in the way the principle is actually applied.[12] First of all, if sensations were subjective states of which we are conscious as states of our nerves, then only physiologists would have sensations, as Riehl sarcastically puts it, since only they have the scientific competence to describe the factual connection between nerve and sensation correctly. Normally, sensations are taken as part of direct perception and not as arrived at by any reflection. So perceptions (in Helmholtz's sense) are primary and given without any causal inference. The identification of a subjective ingredient in perception is the result of an abstract reflection which already presupposes successful perceptions (PK2, 195f.).

Second, a causal inference from sensations to perceptions cannot lead as far as Helmholtz wants it to. Take, for example, a sensation of blue. If we assumed that our mind came to the conclusion that this sensation is the result of a cause, what could its cause be? Since the alleged transition from sensation to perception already happens in everyday life and does not need the insight of physiology or any other science in order to be successful, it would be wrong to say that we infer some vibration of the ether as its cause. All we can legitimately say is that our sensation of blue is caused by – something blue! This shows that the application of the principle of causality cannot lead us any further than to our sensation and never to causes outside of sensation. We have to conclude that the existence of the idea of an external reality cannot be the result of a causal inference; it is and must already be present in our sensations. The desired explanation of the functioning of our perception can therefore come only from a more detailed "analysis of sensation" (PK2, 197). Helmholtz could have easily avoided the two mistakes if he had admitted that there are no purely subjective sensations, but that from the very beginning they have an objective ingredient. The idea of an original and pure subjectivity in experience has to be rejected. To be conscious of a perceptual content as purely subjective already presupposes some objectivity. Sensory consciousness arises out of a state of indifference between the subjective and the objective (PK3, 53f. = Riehl 1894, 55f.).

There is more, however, to be criticised according to Riehl in Helmholtz's conception of causal inference. Helmholtz takes this inference as providing not only the concept of the outer object, but also the idea or image [*Vorstellung*] of space. Causal reasoning as a result of our experimental interaction with the world is also supposed to somehow transform our spaceless sensations into spatial perceptions. Riehl argues against this by saying that even if we could relate sensations to an external cause in our reasoning, all we would get is the notion of an object that is different from and independent of our consciousness, but we would never get the idea [*Vorstellung*] of space through this. Causality can never create spatiality since the effects an object has on us never transmit the spatial form of the object. There is no mental act through which we can find out that an object outside our consciousness is something in outer space. "It is not only completely incomprehensible but also inconsistent to assume that through whatever acts of practice and habit spatial representations should develop out of unspatial elements, like sensations and local signs (Riehl 1925, 106; compare PK2, 136).

We have again to conclude that to imagine an object as spatial cannot be the result of an inference in which the causal principle functions as a premise, but that spatiality, i.e., the representation of an object's form and situation, is already contained in the physiological and psychological nature of the sensation beforehand! And indeed, at least our visual sensations are already extended from the start. The idea of spatial extension of external reality is thus for Riehl to be conceived as the result of experiences in time that associate themselves with the extension that is already present in the visual sense *from the beginning* (PK2, 136, 198).

Riehl claims independent evidence for his thesis in the fact that the idea of space inherent in the visual sense is different from that of the sense of touch (PK2, 137f.). The changes in the visual space are lawfully related to those in the space of touch but these relations have to be learned. The fact that we experience the spaces of different senses to be intimately related makes us forget that the spatial ideas of one sense can only be signs and not pictorial images of the spatial ideas of an-

other sense – they are not similar to each other. As evidence for this, Riehl refers to the Molyneux-problem: a person born blind who later acquires her eyesight will not be able to transpose the spatial ideas of touch to her visual impressions. Riehl reaches the conclusion that each sense has its own spatial abilities:

> Visual sense and sense of touch are two languages that put the same sense into different words, such that the capability to translate from one capacity into another one has to be learned in a painfully difficult way, in spite of the organic connection that exists between the two senses. (PK2, 139; compare ibid. 137, 148)

From this diagnosis, Riehl draws the important conclusion that we have to distinguish between space as the subjective form of a particular sense and space as the objective order underlying our perceptual elements (PK2, 105). Indeed, we would not be able to relate the different sensory spaces to each other, the above quote continues, "if the idea of space were nothing but 'pure intuition [*reine Anschauung*]' in Kant's sense" (PK2, 139). Instead, we have to oppose Kant's identification of sensory space with the mathematical one (PK2, 91). Space is therefore not just a mental representation, a form of intuition, as Kant thought. "Magnitude and distance of the objects is something [real] that is given in experience, not just something that is purely intuited [*etwas rein Vorgestelltes*]" (PK2, 165). Since experience is not to be identified with sensation even if sensation plays a role in it, the "properties of space are partly of a sensory and empirical nature, partly of a conceptual one" (PK2, 164, see 134).

The same difference is described by Riehl in various other ways: as one between the "sensual apprehension" of spatial properties and their "real validity" (PK2, 80), between the "empirical" and the "logical" relations of space (PK2, 182), or as one between the "sensory-empirical qualities" and the "logico-mathematical properties" of space, relating the latter distinction to Riemann's division of "extensional relations" and "measurable relations" (PK2, 170, 173). Riehl also distinguishes the "*factual* foundations of our space perception lying in the mode of our sense perception" and the "*formal* properties which, according to the concept of space, we have to attribute to our mental activity" (PK2, 133). This clearly forshadows the logical empiricists' distinction between pure and physical geoetry.

At another place which deserves to be quoted in full, Riehl distinguishes between the "image" of spatial extension as given by a particular sense, such as the visual one, and its "objective correlate [*das sachliche Correlat*]":

> We have to attribute an independent existence to spatial distances which rests upon itself, because spatial distances act as causes. This is true even if the *image* [*Bild*] of spatial extension, as delivered by our visual sense, has to be regarded as something subjectively produced. Here as in other cases it is not necessary that the idea [*Vorstellung*] as delivered by the senses be congruent with reality itself or that it repeat reality [*die Sache selbst gleichsam decke oder wiederhole*]; it is enough that it stands in a lawful relation to reality, and I think that this can also rightly be said of the content of our space perception. The objective correlate of our space perception *in general* lies in the *coexistence* of the objects. The determinate, measurable relations in which the objects coexist are the [objective] correlates of our *special* spatial perceptions. (PK2, 165)

From this critical assessment of Kant's conception of space it is only a short way to a fundamental critique of Helmholtz's theory of space perception: "As great as are the merits of the *physiological optics* in explaining the separate determinate spatial intuitions," Riehl writes, "as small must be judged its success in explaining the idea of space in general." It turns out that Helmholtz's theory does not deal with the real correlate of general spatial intuition at all. Instead, it already *presupposes*

objective space and asks how it turns up in our sensory experience (PK2, 83f., compare the second edition of PK2, 106).

All this does not mean that Riehl now turns his back completely to Kant's doctrine of space and time as a priori forms of intuition. Although the conceptual part of space and time is determined by measurement, it nevertheless has an "origin a priori," because in order to unify experience we cannot help but *think* space and time as perfectly homogeneous, as strictly continuous, invariable, necessarily uniform, infinite and with zero curvature (PK2, 115f., 132f.). Besides the original form of intuition of objects

> there must equally be an original thinking from which the intellectual form of the experience of objects is derived. The reason for this is that experience and mere perception are different from each other. It is true that perception gives rise to concepts which would otherwise not have developed, but this does not mean that these concepts originate from perceptions. The reason is that the function of these concepts rests in the judgement of perceptions and in the determination of the object. They therefore have to lie at the basis of this determination. That there have to be concepts that originate from thought [and not from perception] can be known a priori from the concept of experience. What these concepts are can only be found out from what they have to accomplish: to be the conditions of the idea of an object. (Riehl 1903, 111)

This is Riehl at his most Kantian.

Moritz Schlick building on Riehl

The foregoing has now prepared the way for my claim that, in his early work, Schlick could largely build on foundations which were already laid by Riehl. What Schlick did to many of Riehl's ideas is on the one hand to energetically clarify and generalise them. On the other hand, we have to ask ourselves what he did to Riehl's doctrine of the a priori origin of concepts.

As far as Riehl's distinction between the sensory and the conceptual in spatial properties is concerned, Schlick generalises it and arrives thereby at the distinction between *Kennen* and *Erkennen*, between acquaintance (or intuition) and cognition (or knowledge). Whereas in Riehl this distinction is primarily limited to the treatment of space and time, Schlick sees it as an all-purpose key to epistemology.[13]

Schlick also clarifies Riehl's concept of the "objective correlate" of perception that lies in the "coexistence" of objects. Schlick accomplishes this clarification through his concept of "co-ordination" [*Zuordnung*] or "designation" [*Bezeichnung*]. Whereas for Riehl the lawful relation existing between the subjective image of space and time and its objective correlate is the expression of an identity (since all laws are ultimately derived from the identity principle), it is for Schlick an irreducible fact of nature, a coincidence of events that has to be taken as it stands. And second, whereas for Riehl concepts in science are unifying instruments and thus ultimately to be reduced to laws, they are just signs for the objects in Schlick. It is unnecessary and inadequate to suppose the more intimate relation between concept and object that the Kantians assume.

We can now identify the essential correction Schlick brings about in Riehl's conception. It appears that Schlick wants to eliminate the remnants of apriorism as they still exist in Riehl's thought, namely the special role of the unifying concepts. Schlick provides for them a positivist substitute à la Avenarius and Mach which does the same trick but is epistemologically less problematic. This is to say that Schlick wants to melt together the "valuable parts of both the critical and positivist theories" (Schlick 1916, 251) as he had done before with his solution of the mind-body problem in an article of 1916:

> In order that they once more converge upon the truth, criticism must offer up as a concession to positivism its conception of appearance, while the latter must thankfully take over from the former the concept of the thing-in-itself; in this way the two merge into a world-view [*Weltansicht*] which has nothing to fear from any critical attack. (Schlick 1916, 249)

In order to correct Riehl's epistemology one has not only to give up the (neo-)Kantian conception of appearance but any organising principle of unifying the manifold of the appearances other than the "sign system" of the things in themselves and the objective order among them.

Conclusion

The foregoing suggests that Alois Riehl's philosophy is of high relevance for Schlick's pre-positivist philosophy of science. I would even say that Riehl's importance for logical empiricism is of the same order as the importance of Ernst Mach for it. This claim immediately raises the question why Riehl has so much fallen into oblivion in contrast to Mach. The most important reason is that Riehl did not manage to connect his philosophy of science anymore with the natural sciences, especially physics, of his day after about 1895. He kept on promoting a general view of science that was popular in the 1870s an 1880s. The most modern part of science he dealt with in print is the controversy around Wilhelm Ostwald's energetics in his *Philosophy of the Present Age* (Riehl 1903, chapter 5). It is known that he treated relativity theory in his lectures and seminars (and he had supervised at least one dissertation on the subject; see above), but he apparently did not find the strength anymore to integrate this new theory into his account of science. In addition, his general view of science contained too many elements that seemed old-fashioned, e.g. his high valuation of Julius Robert Mayer, so that it must have looked already dated when he took his professorship in Berlin in 1905 at the age of sixty.

A second reason why his philosophy went out of fashion is the insufficient connection with the philosophy of his time. There was the idealist turn of neo-Kantianism after about 1878 (Köhnke 1991, esp. chapters 6 & 7) which eventually led to a new valuation of the cultural and social sciences, especially in the South-West German school of neo-Kantianism. There was the rise of *Lebensphilosophie* which worked hand in hand with Nietzsche in criticising science as a means of a general philosophical orientation. (see Hofmann 1926, Spranger 1944, 130 and Heidelberger 2002 for a general view of the scientific worldview in Germany around 1910.)

Ernst Mach's views were much more apt to give an alternative to these movements, because he could integrate, and indeed carry on, some of their concerns in his own philosophy. As a result, it developed much more programmatic force than Riehl's did. Riehl's account was attractive enough, however, to find the interest of Schlick and Feigl. In the end, it seems that, with the physicalist turn of logical empiricism around 1830, the realist element of Riehl's heritage has even taken the upper hand.

Notes

1. Part of the research for this paper was conducted during my time as a fellow at the Center for Philosophy of Science, University of Pittsburgh, 1998-99.

2. For Riehl's biography and philosophy see: Graykowski 1914, Rickert 1924-25, Jaensch 1925, Hofmann 1926, Hönigswald 1926, Maier 1926, Spranger 1944, Köhnke 1991 (see the book's index), Goller 1991, Röd 2001, Rutte 2001.

3. Gerhardt 1999, 185-90 provides an account of Riehl's call to Berlin; see also below.

4. The other two candidates were Benno Erdmann and Wilhelm Windelband. – I am grateful to Reinhard Mehring for providing me with archival material on Riehl from the archive of the Humboldt University Berlin.

5. The members of the commission were Wilhelm Dilthey, Carl Stumpf, Friedrich Paulsen, Hermann Diels, Gustav Schmoller, a certain Möbius and Adolf Erman.

6. It is interesting to note that both Riehl and Schlick signed the petition of the 107 philosophers to the ministers of culture of the German states in 1913, demanding that no further philosophical faculty positions should go to experimental psychologists, but that they should receive positions of their own (Kusch 1995, 286). On the development leading up to this petition see Schmidt 1995, chapter 4 and 5, and Kusch 1995, chapter 7.

7. Compare Feyerabend 1966, 7, and Feigl 1974, 8f. For Külpe's critical realism, see Henckmann 1997.

8. See Heidelberger 2003 for Feigl's and Riehl's identity theory of mind and body as a close continuation of Riehl's conception.

9. I am grateful to Hans-Joachim Dahms for informing me of Riehl's relation to Mies van der Rohe.

10. These ideas are very similar to the ones by Émile Meyerson (Meyerson 1908). They seem also to have some similarity with Phil Dowe's recent conception of causality as conserved quantity; compare Dowe 2000, chapter 5.

11. In the preface to PK2, Riehl was at pains to inform his readers that Helmholtz's *Facts in perception* (Helmholtz 1878) came too late to have been considered by him in this work. He stated, however, that taking it into account would not have changed his concept of space as he conceived of it in his book (PK2, iv).
12. Riehl, by the way, sees Schopenhauer committing the same two mistakes.

13. Compare, however, Riehl 1907, 93 where Riehl insists that a sharp difference must be made between the *Kenntnis* of facts and the *Erkenntnis* of a law.

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