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Friedrich Stadler

The Vienna Circle

Studies in the Origins, Development, and Influence of Logical Empiricism

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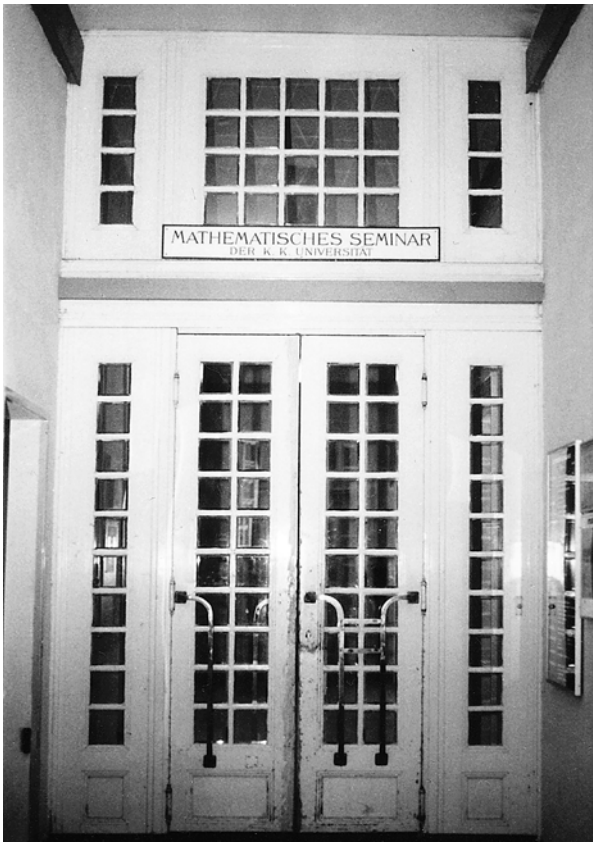

Fig. 1 Entrance to the Mathematical Seminar at the University of Vienna, Boltzmanngasse 5. Meeting place of the Vienna Circle (Schlick Circle)

For Ivich, Serena and Mira

Preface

The first edition of this book, *The Vienna Circle*, that was published in 2001 with Springer (Wien-New York) is now out of print. I have thus decided to have this second edition published as a revised and abridged version in the series "Vienna Circle Institute Library" (Springer: Dordrecht-Heidelberg-London).

Another incentive was the first big exhibition on the Vienna Circle that will be taking place in the main building of the University of Vienna, which is celebrating its 650th anniversary this year.

The first three chapters on the prehistory of the Vienna Circle in the context of Austrian philosophy were omitted in this edition, while new research literature as well as primary sources were added. The core text was copyedited again in order to improve legibility. The bio-bibliographic parts have been revised and slightly reconfigured. The website of the Institute Vienna Circle—www.univie.ac.at/ivc—regularly provides further information on current research on the Vienna Circle/Logical Empiricism.

I am grateful to Dr. Christoph Limbeck-Lilienau for his research and copyediting work together with Martin Strauss and Robert Kaller for his technical support enabling this second edition, who are both affiliated with the Institute Vienna Circle. I would also like to thank the publisher Springer (Dordrecht), especially Lucy Fleet, for the good long-standing cooperation.

Vienna, Austria
January 2015

Friedrich Stadler

Contents

Prologue: On the Rise of Scientific Philosophy—An Overview

Without a doubt, the work of Bernard Bolzano (1781–1848) marks the beginning of scientific philosophy in the Habsburg Empire. As a representative of Bohemian reform Catholicism with a Josephine spirit, this philosopher, mathematician, theologian, and educator inevitably ran into conflict with the alliance between state and church. Above all on account of his "popular edification speeches," Bolzano—along with his reformist-utopian social plans—was removed from his position as Professor of Religion in the Karl-Universität's philosophy department in 1819 and forbidden to write.[1]

From then on, his texts would be published in Austria anonymously, or else in other countries. Nevertheless, through his students, this Bohemian "Anti-Kant" (also known as "the Bohemian Leibniz") did have a decisive influence on the intellectual life in Austria. This influence is reflected in the Thun-Hohenstein educational reforms, as well as in Frege's rather indirect reception and Kasimir Twardowski's Polish school of logic. Given the fact that the Catholic Habsburg countries' German idealism from Kant to Hegel had been repressed, Bolzano could anticipate modern logic and mathematics from Tarski to the Vienna Circle with his objectivist epistemology and his *Wissenschaftslehre* (1837ff; English edition 1972), especially through his theory of "truths and propositions in themselves." The "semantic turn" of Bolzano's anti-psychologistic philosophy left its stamp on set theory and equally on Karl Popper's "Three Worlds" doctrine and Gödel's "logical realism." Hans Hahn, the Vienna Circle's mathematical mentor, annotated Bolzano's *Paradoxes of the Infinite* (1950) (*Paradoxien des Unendlichen* (1920)) and, since

For an overview of and first introduction to the history of Logical Empiricism in the inter-war years, see Stadler 1982b; Dahms (ed.) 1985; Kruntorad (ed.) 1991; Haller and Stadler (ed.) 1993; Haller 1993; Geier 1992. On the intellectual background, see Bradbury and McFarlane (ed.) 1978; Nautz and Vahrenkamp (ed.) 1993; Stadler (ed.) 1987–1988; Kadrnoska (ed.) 1981; Leser (ed.) 1981; Danneberg et al. (ed.) 1994; Sandner 2014. For the book on the chapter's title, see Reichenbach 1951 and 1977.

[1] Berg and Morscher 1986; Neemann (ed.) 1984; Winter, Berg, Kambartel, Louzil, and van Rootselaar 1969 ff., 9 ff.; Lapointe 2011.

1913, was engaged in editing his texts together with Alois Höfler. (In Berlin, it was the mathematician Walter Dubislav—he committed suicide in Prague in 1937—who was responsible for promulgating Bolzano's ideas.)

Within the context of Austrian philosophy, this objectivism and logical realism was taken up chiefly by Franz Brentano and his large circle of students. At the same time, by virtue of his highest ethical maxim—"Always act so that you serve the common good in the best possible way"—Bolzano's vision of life and society must be understood in the context of the Enlightenment movement for social reform; he is thus sometimes described as an early socialist.

The empiricist philosophical discourse in the tradition of both Bolzano and Leibniz, set off from German idealism, begins in Vienna with Franz Brentano (1838–1917).[2] Through his widespread influence, Brentano served as the mentor for Austrian scientific philosophy, although his thinking still lay in the tradition of rational school-metaphysics. Extending into the twentieth century, the objectivist-phenomenological paradigm in Austrian philosophy has its origins with Brentano—whose career, like Bolzano's, suffered from the hostility of the Catholic church. Brentano's philosophical deliberations signify a further step in the direction of exact, empirico-logical thought—a type of thought carefully oriented toward the individual sciences and aimed at the further development of scientific philosophy. In concrete terms, Brentano's doctrines of intentionality and evidence, along with his critique of language and his analytic metaphysics, were the source of the philosophical realism and language-analysis so basic to the formation of Logical Empiricism. We find this orientation already expressed in one of the central principles in his habilitation-thesis: "The true method of philosophy is none other than the method of the natural sciences."[3]

In the academic world, this principle was then developed by Brentano's prominent students, including Anton Marty and Thomas Garrigue Masaryk in Prague, Alexius Meinong in Graz, and Kazimierz Twardowski in Lvov.[4] Brentano's work served as a catalyst for Gestalt theory, phenomenology, and language-analysis, but was also taken up by Moore and Russell. We should here particularly take note of the work of Thomas Masaryk, later president of Czechoslovakia, who designated both "positivism" and "critical rationalism" as basic elements of his worldview.[5] For this reason, neither his support for Carnap's 1931 appointment in Prague nor his founding of the Brentano-Society with Oskar Kraus in the same year can be considered surprising. And considering that during his stay in Vienna, Masaryk taught Heinrich Gomperz, we can also assume that there was a transfer of his ideas to that city. Karel Capek reports that despite his idealistic inclinations, Masaryk postulated the necessity of a scientific philosophy oriented toward the empirical sciences (1969). We should also note the presence of another multifaceted figure in the con-

[2] Baumgartner, Burkard, and Wiedmann (ed.) 1990; Chisholm and Haller (ed.) 1977; Chisholm 1982; Werle 1989; *Brentano-Studien* 1998 ff.; Smith 1994; Jacquette 2004.

[3] Franz Brentano, Habilitation thesis 4, in ibid. 1968b, 137.

[4] On the history of reception cf. Spiegelberg 1969; Lindenfeld 1980; Dölling 1999; Brozek 2011; Antonelli and David 2014.

[5] Novak (ed.) 1988.

text of Prague's intellectual climate: Christian von Ehrenfels,[6] whose pioneering studies in Gestalt psychology reflected the impact of Brentano, Meinong, and, above all, Mach. Through his writings, von Ehrenfels emerges as an intellectual forerunner of the Berlin School that was to achieve fame through the work of Wolfgang Köhler, Max Wertheimer, and Kurt Koffka.

It can be safely assumed that the single most decisive step toward the formation of a scientific philosophy was taken by Ernst Mach (1838–1916) and others in his circle—in the course of a general paradigmatic shift to modernism.[7] A genuine polymath, Mach left his mark as a central figure in fin-de-siècle Vienna's intellectual life and, more specifically, as a reformer within the domain of natural science. Narrowly connected with his political praxis, his attempt to establish a historical-social and evolutionary foundation for science stood under the sign of the French and English Enlightenment. Mach managed to overcome mechanical materialism through an empirical unity of physics, physiology, and psychology—a unity that was received with controversial consequences in the realms of philosophy and the natural sciences, politics, and art. Treated peremptorily as "positivism," this epistemology and philosophy of science incorporated a theory of cognitive elements, the methodological principle of economy, and a discussion of the historical-critical method.

At the turn of the century, the theory already responded to the challenge of formulating an interdisciplinary scientific world conception with a claim to humanizing and democratizing science and society in a way that was independent of his problematical "phenomenalism" or "realistic empiricism" (Banks 2014)—a pointed reaction to contemporary metaphysical-systematic philosophy. Mach thus offered the foundation for the formation of the Vienna Circle. The fact that the institution through which the Vienna Circle reached the wider public between 1929 and 1934 was called the "Ernst Mach Society" correctly reflects his impact.[8]

In Berlin, Ludwig Boltzmann's influence would turn out to be stronger than that of Mach. Still, Mach's disciple Joseph Petzoldt did found the "Society for Positivist Philosophy" in Berlin, which can be considered an early version of the "Society for Empirical and Scientific Philosophy,"[9] established there in 1927. The history of Mach's broad influence can only be sketched in its general developmental lines here: in 1861, he was appointed *Privatdozent* for physics in Vienna; between 1866 and 1867, he held a chair for mathematics in Graz; and between 1867 and 1895, he held the chair for experimental physics while establishing his international reputation in Prague. In his role as both dean and rector in Prague, Mach was inevitably caught up in the simmering conflicts between the nationalities making up the Habsburg Empire. As an opponent of all nationalism, he struggled without success

[6] Fabian (ed.) 1986; Fabian (ed.) 1983 ff.

[7] Blackmore 1972; Haller and Stadler (ed.) 1988; Hoffmann and Laitko (ed.) 1991; Blackmore (ed.) 1992; Banks 2014.

[8] Stadler 1982b, part 2.

[9] In addition to the texts by Hoffmann (1993) and Laitko (1993) cf. Hentschel 1990; Milkov and Peckhaus 2013; Milkov 2015.

to prevent the university's split into German and Czech divisions and argued for the establishment of an independent Czech institution: as a result of German-national centralism under the Habsburgs, the "Bohemianism" advocated by Bolzano—the peaceful, equal coexistence of the two language-groups—had become a minority-position.

Prague's cultural life reflected this development.[10] Half of Prague's German-speakers—representing around 5 % of Prague's population—were Jews; forming the sort of subculture evoked by the topos of "Kafka's Prague," they played an extraordinarily important role in literature, science, and humanistic scholarship. In this light, it is quite clear that—similarly to the situation in Vienna and Berlin—the harmonious picture of an enlightened, multicultural, and multiethnic Prague society is to a large extent an aesthetization of "coffeehouse culture"; it is a picture that needs adjusting through sober consideration of the real sociocultural circumstances. As indicated, in all three capitals, Jewish life—particularly in its assimilated form—played a preeminent role. Nevertheless, before World War II, Jewish intellectuals found themselves in a defensive position vis-à-vis the German-speaking population, as a result of the rise of the racist variety of German nationalism. This development would lead, of course, to the catastrophe of emigration, exile, and mass extermination a few decades later. The destruction of a cultural cosmos had its auguries in the fin de siècle.[11]

In 1895, Mach was appointed in Vienna to a specially designed chair for "philosophy, in particular the history and theory of the inductive sciences." Little time remained before a stroke in 1898 and his retirement as an active scientist 3 years later. A decisive event for the continuity of scientific, antimetaphysical philosophy was the appointment of Ludwig Boltzmann (1844–1906) to the chair created for Mach.[12] Boltzmann was Mach's theoretical counterpart, but—contrary to the persistent account—never his scientific archenemy. Although the myth of a suicidal battle of giants does not stand up to scrutiny, Mach and Boltzmann did indeed play complementary roles in the tense thematic field between "phenomenalism" and "realism," atomic theory and relativity theory.

We also need to recall the crucial role played by Albert Einstein (1879–1955), in both his Prague and Berlin phases, with Mach and Boltzmann in Logical Empiricism's philosophy of natural sciences. This context of intellectual and personal exchange is illuminated by Philipp Frank in his informative biography of Einstein.[13] Einstein's friendship with Frank, enduring into his American exile, is but one manifestation of this much-neglected scientific interaction. From 1912 to his emigration in 1938, Frank, as Einstein's successor in Prague, both experienced and left a distinctive mark on the scientific culture of Central Europe.

On an institutional level, one example of the process of cultural continuity involved here is illustrated by the career of Moritz Schlick. Having obtained his

[10] On the Prague (ethnic) culture: Brod 1979; Frank 1979.

[11] Ehalt, Heiß, and Stekl (ed.) 1986; Botstein 1993.

[12] Broda 1955; Broda (ed.) 1979; Sexl (ed.) 1981 ff.; Stadler and Dahms 2015.

[13] Frank 1979.

training in the natural sciences with Max Planck in Berlin, Schlick took over Mach's and Boltzmann's chair in Naturphilosophie in Vienna, serving in that capacity from 1922 until his murder in 1936. The liquidation of that chair in 1937 marked a decisive caesura in the "rise of scientific philosophy" (Reichenbach 1951 and 1954).[14] The impact of this caesura can still be felt today.

Crossing disciplinary boundaries, the influence exerted by Mach, Boltzmann, and Einstein is a key to understanding the development of Logical Empiricism well into the post-World War I era. But such genealogies should not obscure the basic fact that in Vienna as well as Berlin and Prague, the movement was a marginal one; especially within the academic realm, it stood opposed to a dominant *philosophia perennis* that took many forms.

Before World War I, beginning as early as 1907, discussions reflecting the work of Mach and focusing on the scientific nature of philosophy—in particular, the synthesis of empiricism and conventionalism (Duhem, Poincaré, Brentano, Meinong, Husserl, Helmholtz, Freud)—were held in the circle around Philipp Frank, Otto Neurath, Hans Hahn, and Richard von Mises.[15]

Following Haller (1986), we can thus speak of a "first Vienna Circle" serving as a forum for confronting the older "positivism." Above all, Frank and Mises offered new interpretations that took account of the modern logic being propounded by Frege, Russell, and (later) Wittgenstein. A scientific-philosophical holism (the "non-statement view"), eventually to be taken up by Quine, was developed around Neurath.[16] In the 1930s, a coherence-theoretical consideration and a pragmatic approach to the dynamics of theory had thus already emerged as cornerstones of the physicalist (empirical) *International Encyclopedia of Unified Science*.

Before Carnap himself accepted a variant of the physicalist conception of unified science promoted by Neurath, he had introduced a hierarchical system of scientific concepts in his early masterpiece, *Der logische Aufbau der Welt* (1928). Formulated along conventionalist lines by means of the theory of types, this system had a phenomenalistic basis: it was formulated in a phenomenalistic language with Machian "elements" as building blocks and specified their logical relationships by its basic concepts (methodological phenomenalism).[17]

Let us note in passing that Carnap was very much aware of the role this "logical structure" played in the wider social context of art and architecture—particularly European "New Objectivity" (Neue Sachlichkeit). It is thus not surprising that in talks given at the Dessau Bauhaus, both he and Neurath, along with Herbert Feigl, emphasized the close affinities between the "scientific world conception" and modern social architecture.[18]

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[14] Cf. Chap. 9 as well as Stadler (ed.) 1988; Heiß et al. (ed.) 1989; Fischer and Wimmer (ed.) 1992.

[15] Frank 1949a, 1–52; Haller 1986, 89–107.

[16] Koppelberg 1987 and 1993; Lauener 1982; Schilpp (ed.) 1991; Creath (ed.) 1990.

[17] Cf. the texts on Carnap in Haller and Stadler (ed.) 1993; *Logic and Language* 1962; Schilpp (ed.) 1963; Krauth 1970; Buck and Cohen (ed.) 1971; Hintikka (ed.) 1975; Spohn (ed.) 1991; Carnap 1993; Friedman 1999; Friedman and Creath 2007; Carus 2010.

[18] Galison 1993 and 1990; Dahms 2004.

Transparency of construction, intersubjectively intelligible argumentation, and a conscious shaping of one's life represented a common mind-set and reached its theoretical apogee in Neurath's plans. We can recall here the "Museum for Society and Economy" he founded in Vienna (1925–1934), his development of the "Viennese method of pictorial statistics" (applying the figurative constructivism propounded by Gerd Arntz and others), and his general engagement in settlement and urban planning.[19]

With their manifesto of 1929, *The Scientific World Conception. The Vienna Circle*, the loosely organized group around Moritz Schlick addressed the public for the first time (Stadler and Uebel 2012). At that point, the theoretical pluralism of the "new philosophy" (Reichenbach) was already apparent against the background of a minimal consensus concerning empiricism, logicism, and their scientific outlook. The reform of philosophy was not expected to result from a unitary, homogenous program of action—a program concentrated on one single level. Rather, efforts at such reform could only thrive in an empirical-rational matrix distinguished by an exacting methodology opposed to any cult of genius and philosophical esoterics. As mentioned, Neurath intended the group's official name to underscore its collective orientation as well as its sociohistorical context setting with positive connotations.

The history of the Vienna Circle can usually be divided into four phases[20]:

1. The discussion-circle formed by Frank, Hahn, Neurath, and Richard von Mises from 1907 until World War I; at the same time, Richard von Mises organized his discussion-circle in Vienna.
2. The constitutive phase after the war, extending to the start of the Thursday-evening meetings led by Moritz Schlick (1924) during which Hans Hahn played an important role, prompting Frank to name him the "real founder" of the Vienna Circle.
3. The nonpublic phase from 1924 to 1928, marked by personal contacts with Ludwig Wittgenstein and Carnap's move to Vienna.
4. The public phase inaugurated in 1929 with the publication of the Circle's manifesto, the founding of the "Ernst Mach Society," and the first international appearance of the group in the "First Conference on Epistemology in the Exact Sciences" in Prague. This is the period of regular contacts with Karl Popper. In 1930, the Circle's public role was confirmed with the publication of the journal *Erkenntnis*, edited jointly by Carnap and Reichenbach.

However, the international rise of scientific philosophy was accompanied by the start of a process of inner and outer dissolution: the politically and, for the Nazis, "racially" determined emigrations from 1933 to 1934 to the outbreak of World War II. The murder of Moritz Schlick was a fitting symbol for the decline of reason within Austria. The last, private, and epigone discussion groups were meetings merely tolerated, before the expulsion of Logical Empiricism from Vienna, Prague, Warsaw, and Berlin, where this process had begun earlier following Hitler's rise to

[19] Haller and Kinross (ed.) 1991; Stadler (ed.) 1982; Vossoughian 2011.

[20] On the periodization, see Chaps. 3 and 4.

power. From this point onward, we can speak of a new phase for the movement, now an exiled but essentially successful scientific culture, whose transformation, however, came at the cost of the loss of its original cognitive identity and the destruction of its actual identity.

Let us now return to the "Vienna Station."[21] Following Hans Hahn's return to Vienna in 1921, he was able to ensure Moritz Schlick's appointment to the chair for philosophy of the inductive sciences, despite considerable resistance. Hahn's own lecture courses treated modern logic, primarily Russell and—later, prompted by a guest-professorship in Vienna of the German mathematician Kurt Reidemeister (1893–1972)—Wittgenstein's *Tractatus logico-philosophicus*. (In 1926, with Carnap as the driving force, the Schlick Circle would begin a systematic exegesis of the *Tractatus*.) With Schlick's appointment, an academic intellectual center now existed for scientific philosophy, around which younger, aspiring students and teachers began to gather. Among the newcomers, we can name Herbert Feigl, Friedrich Waismann, Rudolf Carnap (starting in 1924), Bela Juhos, Heinrich Neider, Josef Schächter, Edgar Zilsel, the mathematicians Felix Kaufmann, Karl Menger, Kurt Gödel, Gustav Bergmann, Heinrich Löwy, and Theodor Radakovic, and (among the youngest) Walter Hollitscher, Rose Rand, and Marcel Natkin.

On the group's periphery, the architect Josef Frank merits special mention. In the following years, a series of prominent and less well-known guests came from abroad. These included Alfred J. Ayer, Frank P. Ramsey, Ernest Nagel, Willard Van Orman Quine, Alfred Tarski, Eino Kaila, Arne N ss, Hans Reichenbach, Walter Dubislav, Kurt Grelling, Carl Gustav Hempel, Hasso Härlen, Albert Blumberg, Ake Petzäll, Jörgen Jörgensen, Tscha Hung, and Ludovico Geymonat. We should also note guests occasionally invited from elsewhere in Vienna's intellectual world—figures such as Robert Reininger and Kurt Bühler. In a related manner, the broad range of contributions to *Erkenntnis* was supplemented by the separate publication series *Schriften zur wissenschaftlichen Weltauffassung*, edited by Frank and Schlick between 1929 and 1937, and *Einheitswissenschaft*, edited by Neurath between 1933 and 1938. A series of international conferences signaled the international breakthrough of Logical Empiricism: the workshops held in Prague in 1929 and 1934 and Königsberg in 1930 and the six large meetings of the "International Congress for the Unity of Science" between 1935 and 1941 (twice in Paris and in Copenhagen, Cambridge, Harvard, and Chicago).

The 1930s were thus distinguished by both internationalization and dissolution. For Frank, the fate of the "turning point in philosophy" (Schlick) was linked to that of the new democracies.[22] Despite the differences between individuals, it was possible for something like an independent philosophical movement to emerge almost simultaneously in three adjacent countries, through the contacts we have outlined. In Prague, the intellectual groundwork was laid by Mach, Einstein, and Frank; it was not, however, institutionalized, if we leave aside philosophical manifestations within the literary "Prague Circle" around Max Brod. The trend toward rendering

[21] Coffa 1991.

[22] Frank 1979.

the Kantian school-philosophy more scientific was manifest in the growing influence of Helmholtz, Hertz, and Planck (whose position had been turned down by Boltzmann) as well as Petzoldt in Berlin. The many obstacles placed in the path of Schlick's appointments in Rostock and Kiel—to which he could call on Einstein and Max Born—point to the depth of the academic resistance. By the start of the 1920s, Einstein's relativity theory, with which Schlick had been one of the first to engage philosophically, had become the center of a cultural-political battle. Einstein's own appointment in Berlin in 1913 offers the theoretical framework for Hans Reichenbach's work in that city in the closing phase of the Weimar Republic between 1926 and 1933: the philosophical assimilation and analysis of the most recent discoveries in the natural sciences in the process of a gradual emancipation from the neo-Kantianism of Leonard Nelson and the school of Jakob Friedrich Fries.

Precisely these roots are apparent in the conventionalism of the early Carnap, writing the first edition of his *Aufbau* in the first half of the 1920s. After studies in Jena and Freiburg (with Frege among others), he, too, breathed the politically and scientifically revolutionary air of the intellectual metropolis Berlin. From 1920 onward, he corresponded with Reichenbach, with whom he was to meet and engage philosophically many times. A first, joint step in this direction was the conference on scientific philosophy which they organized in Erlangen in 1923 and to which they invited, among others, Paul Hertz, Walter Dubislav, and Moritz Schlick.[23]

Excursus. Vienna-Berlin-Prague in a biographical context: Rudolf Carnap, Richard von Mises, Hans Reichenbach, and Edgar Zilsel

Let us now consider the historical and systematic spectrum of Logical Empiricism, as exemplified in the careers of three protagonists born in the same year: in the first place, Carnap, in his role as innovator and systematizer of the movement's program.[24] Carnap's project of rational reconstruction traces a clear line of development from his *Structure* via *Logical Syntax* to his work on semantics and inductive probability. His simultaneous work on the encyclopedia project could not prevent a rift in the late 1930s with Neurath, the committed empiricist. For Neurath, the semantic turn and the formalist trend of Carnap's thought meant a distancing from the program of unified science and its Enlightenment-grounded values. Both substantive differences and differences of mentality had become apparent already in the priority disputes between Carnap, Neurath, and the "mystic" Wittgenstein at the start of the 1930s.[25] Prima facie, there was more in common then between Carnap and Reichenbach[26]: both had been activists in the German youth movement (the

[23] Thiel 1993.

[24] Cf. the articles on Carnap in Haller and Stadler (ed.) 1993. Also the homage to Carnap in: Hintikka (ed.) 1975, xii–xviii.

[25] Cf. Hintikka 1993; Haller 1990. Also Chap. 6.

[26] Cf. the articles on Reichenbach in Haller and Stadler (ed.) 1993 and M. Reichenbach and Cohen (ed.) 1978; Kamlah and M. Reichenbach (ed.) 1977 ff.

Wandervogel and the *Freideutsche Studentenschaft*), and they shared the vision of democratic socialism.

Following the collapse of the political revolution of 1918, Reichenbach and Carnap increasingly devoted their efforts to the revolution in science, since they no longer considered theory and practice to be inevitably linked. This change in focus did not involve a shift in political viewpoints: much later, for instance, Carnap was to be very frank in his criticism of McCarthyism-era America and very open in his sympathies for the Prague spring. Rather, it represented the effort to contribute in a concrete manner to the "exit of man from his self-imposed dependency" (Kant) within the realm of philosophy and science. Until the period of emigration, such projects for the reform of both society and life in general remained regulative ideals for Carnap and Reichenbach—as well as for Edgar Zilsel.[27] In Zilsel's case, this orientation was not only manifest in an engagement with adult education and educational reform in Vienna; above all, it was manifest theoretically in his book-length critiques of the contemporary cult of the genius and in his work on an "ideal of objectivity" directed against all irrationalism, universalism, and Fascism. While Carnap and Reichenbach were able to slowly make their way into university positions, this was not the case with the more uncompromising Zilsel. His studies of the concept of the genius were as little congenial to the prevalent philosophical sensibility as were his rigorous investigations of the origins of modern science, written during his exile. Zilsel's tragic failure—uprooting, pauperization, and finally suicide—serves as one symbol of the history of Logical Empiricism; another is offered by the successful academic careers of Carnap and Reichenbach in America.

It is noteworthy that all three of these figures were considered as candidates for the Prague professorship. Reichenbach declined in 1931 on account of his identification with Berlin's scientific culture; on the other hand, as Carnap's successors in Prague in 1936—Central Europe's last democratic bastion—neither Zilsel nor Neurath managed to get the appointment. (We know from the correspondence that in Vienna, in 1926, Reichenbach was being considered by Schlick for the position that Carnap was to get.) Starting in 1934, the political climate of Prague would itself be poisoned by anti-Semitic and Nazi propaganda, as a consequence of which Carnap was to leave in 1936, supported by Charles Morris and Willard Van Orman Quine.[28] Before the Anschluss and the Munich Agreement, the intellectual and physical exodus of Logical Empiricism (here represented by Carnap, Reichenbach, and Zilsel) was prefigured; it is difficult to refrain from speculating on what would have been if history had decided on a victory for reason, rather than its defeat.

In its basic thrust, Carnap's *Logical Syntax of Language* (1934) signifies the birth of the modern philosophy of science. In his Viennese period Zilsel, as well, was formulating his findings in the history and sociology of science; the historicization of "the logic of science," cultivated since Feyerabend with reference to Mach, had already been a fact before it disappeared in American exile. Zilsel's essays on the

[27] In addition to the contributions on Zilsel in Haller and Stadler (ed.) 1993, cf. Dvorak 1981; Zilsel 1976 and 1990.

[28] Carnap 1963, 20–34; Creath (ed.) 1990, 107 ff.

role of philosophy in Fascism already contributed significantly to the theoretical battle against Nazi ideology and its fellow travelers.[29] On this level, Zilsel was one of the most adamant champions of modern philosophical materialism, standing opposed to romantic metaphysics and academic philosophy with literary pretensions.

In their careers, Carnap, Reichenbach, and Zilsel exemplify basic internal and external elements within Logical Empiricism: an engaged political consciousness with a fundamentally democratic orientation; the significant role of Jewish culture, bringing with it the fate of emigration; the logical-mathematical, combined with the natural-science-centered philosophy and the social-scientific impetus; and finally, the historicization, pragmatization, and naturalization of the philosophy of science that has culminated in present-day debates. As mentioned, Kuhn's influential *Structure of Scientific Revolutions* (1962) was itself written for the *International Encyclopedia of Unified Science*. As the project's editor, Carnap welcomed the study in the warmest terms. The broad influence that this expanded form of philosophy of science also exerted on the modern social sciences (decision theory and game theory) would merit a separate chapter in history.

To round off our biographical remarks on Carnap, Reichenbach, and Zilsel, let us take note of the career of the mathematician Richard von Mises (1883–1953). Commuting between the three Central European capitals, von Mises counts among those proponents of the empiricist conception of science whose work has been undervalued.[30] A connoisseur of Rilke, he pursued his studies in Vienna before teaching in Brünn, Strassburg, and Dresden; between 1919 and 1933, he served in Berlin as professor and director of the Institute for Applied Mathematics that he had founded. Von Mises' influence was not only scientific, but also cultural. There were regular gatherings in his house of a "Mises circle" with members of the scientific and literary avant-garde—including Robert Musil, who carefully followed the development of Logical Empiricism from Mach to the Vienna Circle, incorporating it into his theory of the novel. In his book *Wahrscheinlichkeit, Statistik und Wahrheit* (1928; English trans. 1981), von Mises offered an objective concept of statistical probability that had a decisive impact on the ensuing discussions with Reichenbach and Carnap, as well as on Popper. Together with Reichenbach, he was to go into exile in Turkey in 1933, both figures continuing their teaching and research at the newly founded University of Istanbul and, after their second immigration to America in 1938, both ensuring the continuity of scientific philosophy there: von Mises at Harvard, Reichenbach in Los Angeles.

Written during his years in Turkey, Mises' *Kleines Lehrbuch des Positivismus* (1939; English 1951) is somewhat like the Viennese complement to Reichenbach's *The Rise of Scientific Philosophy* (1951; German trans. 1953); together with Kraft's survey (1950), both accounts are useful starting points for explorations of the history of Logical Empiricism. Reichenbach's monograph *The Theory of Probability* (1949) (*Wahrscheinlichkeitslehre* (1935)) and, above all, his *Experience and*

[29] Zilsel 1992.

[30] R. von Mises 1963–64 and 1990.

Prediction provided his entry into the American "scientific community." Let us note that it was the 1929 Prague conference that had served as the first venue for the thematization of the "statistical epoch" (Neurath): introduced by Boltzmann and linked to the issues of probability and causality, this theme subsequently remained a constant focal point for the advocates of scientific philosophy (Stadler 2011).

Such activities were reflected not only in individual publications, but also in the common project represented by the journal *Erkenntnis*.[31] The idea of founding an independent periodical had been proposed in 1923–1924 by Schlick, Reichenbach, and the Gestalt psychologists Wolfgang Köhler and Kurt Lewin; they created their independent philosophical platform in 1930 by taking over and republishing the *Annalen der Philosophie*, previously published by Felix Meiner Verlag and edited by Hans Vaihinger and Raymund Schmidt. *Erkenntnis* represented the widest range of opinions within the Logical-Empirical movement. Its publication history is itself a barometer for the "spiritual situation of the age" (to borrow the title of Jaspers' essay in cultural pessimism). Edited by Carnap and Reichenbach on behalf of Berlin's Society for Empirical Philosophy and Vienna's Ernst Mach Society, this publication was the first forum for scientific philosophy in Austria, Germany, and Czechoslovakia. This philosophy was introduced programatically through Schlick's article "The Turning Point in Philosophy": an emphatic survey, inspired by Wittgenstein, of the "linguistic turn." That was, however, only one of the editors' intentions. In his introduction to the first volume, Reichenbach expressed his aim as follows:

> To engage in philosophy as a critique of science and to gain those insights into the meaning and significance of human cognition, using scientific-analytic methods, which the philosophy of the traditional schools—formulated in ever-new systems and based on an assumed autonomy of reason—has sought to gain in vain.[32]

Reichenbach considered philosophy as a process of research, of "analysis and penetrating inspection, a steadily progressing search for knowledge."[33] While the journal assumed international importance in the following years, soon after the Nazi takeover it and its publishers came under enormous pressure.[34] In the fourth volume of 1934, for instance, Reichenbach and Felix Meiner had to defend themselves against the attacks of Hugo Dingler: in an anti-Semitically tinged broadside directed at Einstein and the circles in Vienna and Berlin, Dingler denounced Logical Empiricism as a form of "cultural Bolshevism"—an effort on his part to seize control of the journal. As a result of Reichenbach's past political activities in the socialist student movement and his Jewish origins, Meiner's difficulties became ever greater, so he suggested moving to a foreign publisher. The seventh volume of *Erkenntnis* (1937–1938) was consequently edited by Carnap alone, and the eighth appeared in 1939–1940 as the *Journal of Unified Science* with the Dutch press of

[31] Hegselmann and Siegwart 1992, 461–71.

[32] Reichenbach 1930–1931, 1.

[33] Ibid., 3.

[34] Hegselmann and Siegwart 1991.

Van Stockum & Zoon, which had been recruited as their press in exile by Otto Neurath after his move to The Hague. It is remarkable that even in the 1950s, the conflict with Dingler found a bizarre continuation both within the academy and in the science policy of Austria's Second Republic.[35] A more salutary continuity was the reestablishment of *Erkenntnis* in 1975 as an *International Journal of Analytic Philosophy*, edited by Carl G. Hempel, Wolfgang Stegmüller, and Wilhelm K. Essler. The journal is still being published.

Alongside the journal's publication, the public phase of Logical Empiricism was marked, as noted, by the founding of two philosophical societies in Vienna and Berlin. These constituted the organizational basis for both the internal, theoretical communication of the movement and for its cooperative public activities. The inaugural meeting of the Ernst Mach Society, devoted to the "promotion of the findings of the exact sciences," took place on November 23, 1928.[36] The early phase of this institution can only be properly understood in relation to the social-liberal currents in the First Republic's "late Enlightenment," which were also present in the Viennese movement for adult education. The intellectual and political context in which the Ernst Mach Society was placed—it extended from the Ethical Society to the Monist Society, to the "Verein Allgemeine Nährpflicht," to the Freethinkers—was shaped, above all, by the contingencies of the First Republic's conflict-ridden cultural life; it also determined the fate of the Ernst Mach Society. Mainly as a result of the increasing influence of members of the Vienna Circle, above all its president Schlick, the original orientation toward a confrontational stance in the culture wars of the time shifted toward the dissemination of the "scientific world conception." Nonetheless, the strong ties of the Society to the left meant its prompt dissolution after February 12, 1934. Even Schlick's personal engagement could no longer help (he tried, with all good faith in reason, to appeal to the new authorities).

In its lectures and study-groups, the Ernst Mach Society conveyed and practiced a form of democratic science during the 5 years of its active life. The roughly 50 lectures reveal participation of the greater portion of the Vienna Circle and its periphery, along with many other Austrian and foreign natural and social scientists. Despite its political party independence and theoretical plurality, the Society inevitably served as one element of social-democratic Vienna's cultural movement. The participation of Feigl, Waismann, Zilsel, Kraft, Neurath, Kaufmann, and other leaders in adult education and the collaboration of Hahn, Zilsel, and Neurath in Glöckel's movement for educational reform are concrete manifestations of their strong social commitment. Unified science was merely the sharpest instrument—a kind of Occam's razor—in the struggle against burgeoning irrationalism, metaphysical speculation, and universalistic system philosophy. The Society's program was neither temporally nor personally nor theoretically identical with the Vienna Circle's internal philosophical profile, but through its advocacy of physicalism and unified science and its collective, interdisciplinary orientation, it did offer a strong impetus

[35] Kraft 1954, 259–266. Cf. Wolters 1992 for a more recent assessment of Dingler from a constructivist perspective.

[36] Stadler 1982b, 171 f. and Sect. 4.2.1.

to the Unity of Science movement organized by Neurath since 1934. Until that point, the claim that "the scientific world-conception serves life, and life receives it"[37] did express a social reality.

The Berlin Society for Empirical/Scientific Philosophy, which existed from 1927 to 1933, presented an analogous scene.[38] Its main purpose, an overcoming of the growing gulf between the individual sciences and philosophy, had already been formulated in the 1912 inaugural manifesto of the Society for Positivist Philosophy, founded by Petzoldt. The manifesto was signed by David Hilbert, Felix Klein, Ernst Mach, Albert Einstein, Max von Laue, and Sigmund Freud. Here too, we find a rejection of the dominant, a priori-based philosophy in and around the Kant Society—with which the Society for Positivist Philosophy merged following World War I—as a result of both substantive differences between its members and economic difficulties. In a second attempt, Petzoldt was able to found the Berlin branch of the International Society for Empirical Philosophy; participants included medical doctors, technicians, biologists, and psychologists, along with advocates of the new philosophy formed around Hans Reichenbach. Although the basic intentions of the Berlin and Viennese societies were very similar, the former appears to have been less anchored in the movement for adult education and workers' education, but it revealed a stronger interdisciplinary trend. For them, scientific philosophy signified a philosophical method

> that arrives at philosophical problems and solutions through an analysis and critique of particular scientific results. With such a scientific method of analysis, the Society places itself in deliberate opposition to a philosophy maintaining a special claim to reason and desiring to form propositions with a priori validity and not subject to scientific critique.[39]

Here, the focal point was not so much the program of a physicalist unified science but the reorientation of philosophy toward biology, psychology, and other disciplines in the natural sciences and technology. Correspondingly, in the lecture program of the Berlin Society, we find not only philosophers, logicians, and mathematicians, but also doctors, clinical psychologists, and psychoanalysts of equal rank (with whom Reichenbach was to maintain contact in America). These activities of the Berlin Society are linked to the names Friedrich Kraus, Alexander Herzberg, August von Parseval, Kurt Grelling, Carl G. Hempel, and above all the Gestalt psychologists Kurt Lewin and Wolfgang Köhler.

Among the leftist thinkers who appear to have maintained contact with Reichenbach in American exile, we should mention both Bertolt Brecht and Karl Korsch, who participated in the Logical-Empirical movement as contributors to the *Journal of Unified Science*. It is worth noting in passing that the last documented talk given at the Berlin Society was Alfred Adler's, on May 23, 1933, concerning "the psychology of ownership and consumption." In Vienna's Ernst Mach Society,

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[37] Carnap, Hahn, and Neurath 1929, cited from Neurath 1973, 318.

[38] On "Berliner Gesellschaft" cf. the texts by Danneberg, Hoffmann, Kamlah, Laitko, Peckhaus, and M. Reichenbach in Haller and Stadler (ed.) 1993; Danneberg et al. (ed.) 1994.

[39] "Gesellschaft für empirische Philosophie, " in Erkenntnis I 1930–31, 72.

the tradition extending from Bolzano, Brentano, Mach, and Wittgenstein left the strongest mark on the discourse; in the Berlin Society, on the other hand, the strongest ties (at least terminologically) were with Helmholtz, Planck, Boltzmann, and—a typically German phenomenon—the neo-Kantian school (Cassirer, Nelson, Fries). The change of name from Society for Empirical Philosophy to Society for Scientific Philosophy, undertaken in 1931 on David Hilbert's advice, signifies the conscious integration of logic and mathematics. Modern logic and, of course, Einstein's relativity theory were common influences upon both groups, which drew increasingly closer in the 1930s.

In Vienna, plans to publish a self-descriptive pamphlet bore fruition in 1929, when Schlick received a lucrative offer to teach in Bonn. With a heavy heart—and in face of the demonstrative indifference of the Austrian Ministry of Education—Schlick declined due to efforts by the Mach Society and other sympathizers to keep him in Vienna. Schlick's decision prompted collective work on the pamphlet, principally on the part of Hahn, Carnap, and Neurath. The pamphlet—the Circle's manifesto—was published at the Prague conference, held in conjunction with meetings of the Society of German Physicists and the German Mathematical Union. Combative and popularly oriented in nature, a first draft of the text was produced by Neurath and the two coeditors; the final version was written by Carnap. It is thus hardly surprising that the Circle's principles of this-worldliness, connection with life, and interdisciplinarity are stressed in the pamphlet, as are English empiricism and American pragmatism in connection with the Vienna liberals and the Austro-Marxist tradition. The references to Frege, Russell, and Wittgenstein did not keep the latter from distancing himself from the pamphlet on account of its "advertisement style and dogmatic formulations," and even Schlick himself was not exactly enthusiastic about its form and content.[40]

As reported by the Prague conference's chief organizer, Philipp Frank, the first public presentations were marked by hostility to the "scientific world conception" on the part of the German organizations cohosting the event. These organizations reacted with consternation to the prospect of a link between philosophy and the modern sciences. In fact, the focal points of "causality and probability" and "foundations of mathematics and logic" were to become pressing issues over the following decades. The self-presentation of the Berlin and Vienna groups (Frank, Neurath, Reichenbach, von Mises, Carnap, Waismann, and Feigl) thus marks the tangible beginning of the painful, ramified, and interrupted "rise of scientific philosophy" in the twentieth century. Traces of this new beginning have been eradicated in Prague and Berlin, and in Vienna they are only weakly present or in distorted form. The question of why this is so is directly connected to developments in the 1930s. On the one hand, as the internationalization of the movement picked up pace, an entirely new network of circles emerged in Vienna, Prague, and Berlin, surrounding those of Schlick, Reichenbach, Frank, and Carnap; on the other hand, Fascism and Nazism contributed to the slow but systematic destruction or expulsion of Logical Empiricism from continental Europe. With it there disappeared an entire scientific

[40] Mulder 1968.

culture with a flourishing communication network.[41] Outstanding circles were Karl Menger's "mathematical colloquium" with Gödel, John von Neumann, and Tarski; the Richard von Mises circle in Berlin and Vienna with Hahn, Helly, Löwy, and Ratzersdorfer; the small Wittgenstein group including Schlick and Waismann; and the Gomperz circle with (among others) Zilsel, Kraft, and Popper. With their personal interconnections, an intensive dialogue took place between these groups. In such a context, let us also take note of the Karl Bühler circle, with its Research Institute for Economic Psychology (Marie Jahoda, Paul Lazarsfeld, and Hans Zeisel); the Sociological Society (Wilhelm Jerusalem, Rudolf Goldscheid, Carl Grünberg, and Max Adler); the Otto Bauer circle (Otto and Helene Bauer, Edgar Zilsel, Otto Neurath); and, not least of all, Neurath's institution for public education and social-scientific research, the Museum for Society and Economy.

Contemporaneously, similar circles were active in the political sphere of conservative liberalism: the circle around the historian Alfred F. Pribham (featuring Moritz Schlick besides Friedrich Engel-Janosi, Ludwig von Mises, and Friedrich August von Hayek); the Ludwig Mises seminar (Felix Kaufmann, along with liberally oriented economists such as Oskar Morgenstern); and the so-called "Geist circle" (with Herbert Fürth, Friedrich August von Hayek, Friedrich Engel-Janosi, Gottfried Haberler, Fritz Machlup, Oskar Morgenstern, Alfred Schütz, Felix Kaufmann, and Karl Menger). In between the poles of liberalism and conservatism, we find the Vienna School of Legal Theory centered around Hans Kelsen (with Felix Kaufmann) until his politically motivated departure from Vienna in 1930. Following his final emigration at the end of the 1930s, Kelsen was to renew his contact with Logical Empiricism, publishing his important *Vergeltung und Kausalität* (Retribution and Causality) (1940) in Holland in the series "Library of Unified Science."[42]

So much for a cursory panorama of a lost world. The question emerges of why these creative scientific cultures never returned to Austria after the war. We might also ask what sociological and theoretical form such a productive scientific culture would take today—and whether something like conditions of excellence can be constructed. One of the differences between scientific activity then and now is immediately apparent. To formulate it in a fashionable manner: the scientific profile of Logical Empiricism was indeed multiethnic and multicultural, transcending boundaries of discipline and country and characterized by a continuous, dynamic communicative process. But what is perhaps more decisive is that despite individual differences, the process of collaborating on open problems and ongoing themes actually worked. Transparency and clarity were the preconditions for a pluralistic theoretical dynamic, distinguished by the desire for critique and self-critique in the course of argumentative battle. We thus find purposeful teamwork, reflected in the emergence of common book series and organizational activity, accompanied by an absence of any desire to form a hermetic "school."

One of the last phases of this international activity on Central European soil was the 1934 Prague Preliminary Conference, taking place a few days before the large,

[41] Cf. Stadler 1991.

[42] Kelsen 1982.

traditional Eighth International Congress for Philosophy.[43] The latter conference focused on the theme of philosophy's role between Fascism and democracy—Thomas Masaryk was one of the contributors. For Frank and like-minded friends such as Neurath—who could not return to Austria after February 1934 and was stopping in Prague on his way into Dutch exile—the diagnosis was clear, if naively optimistic from our present perspective: it was no coincidence that the ongoing shift from democracy to totalitarianism was accompanied by the regression from a scientific world conception to the philosophies of old. For that reason, the intellectual aspect of the struggle for a democratic society involved dissemination of an anti-metaphysical, science-oriented point of view. The aim was to demarcate a realm standing apart from irrationalism and pseudo-rationalism, while concretely presenting the findings of scientific philosophy as a positive paradigm. This effort was the outcome of the recognition that "human actions are ruled more by unconscious drives than conscious scientific thought" and that "these drives and emotions need to be taken seriously as an object of scientific study."[44] In Prague, the project was pursued with, among others, the Polish school of logic (Kasimir Ajdukiewicz, Janina Hosiasson, Alfred Tarski, Jan Lukasiewicz),[45] American pragmatists (Charles Morris, Ernest Nagel), Scandinavian philosophers of science (Eino Kaila, Jørgen Jørgensen, Åke Petzäll), and French colleagues.

The themes presented at the "preliminary conference" of 1934 determined those of the later international conferences, but that is already a separate chapter in the history of a scientific discipline now in exile. It points to the further development of Logical Empiricism in the direction of analytic philosophy of science, semiotics (Morris), and the history of science (Kuhn). As I have argued, this transformation was a natural result of the open program of research of the 1930s. For most figures in the movement (Wittgenstein was an exception), the idea of a practically oriented collective scientific enterprise was itself the primary expression of the modern cosmopolitan spirit. Accordingly, the goals pursued in the framework of the encyclopedia program were common sense and a cognitive relativism linked to a holistic philosophy of science.

With Logical Empiricism as our example, we thus see how a scientific philosophy emerged and flourished on an international scale, before it was extinguished in Central Europe. Its legacy can only consist in developing its central tenets critically and cooperatively, without preservative nostalgia. As we have seen above, Wolfgang Stegmüller, who, until his death in 1991, contributed substantially in his own right to the resuscitation of the movement, concluded that we did not need to kick back the ladder upon which we have moved beyond empiricism.[46] To this we might add

[43] *Actes du Huitième Congrès de Philosophie à Prague 2–7 septembre 1934*, Prague: Orbis 1936.

[44] Frank 1935b.

[45] Szaniawski (ed.) 1989.

[46] Stegmüller 1983 and 1991.

that, granted pauses, obstacles, and setbacks, the community of theoreticians of science is still ascending this ladder, indeed, partly through a rediscovery of the forgotten circles in Vienna, Berlin, and Prague.

Chapter 1
The Origins of Logical Empiricism—Roots of the Vienna Circle Before the First World War

The early history of the Vienna Circle began around 1907 with a discussion group in a Viennese café, about which Philipp Frank (1949a, 1–52) reports at length. This illustrious circle included Catholic philosophers, romantic mystics, and, alongside Frank, Otto Neurath, Hans Hahn, and Richard von Mises. Stimulated by Mach and taking the allegations of the unscientific nature of philosophy as a given, discussions were held about a synthesis of empiricism and symbolic logic, as well as about Brentano, Meinong, Husserl, Schröder, Helmholtz, Hertz, and Freud. The intention was to update Mach's empiricism with French conventionalism (Duhem, Poincaré) and thus also to counter Lenin's opposition to 'empirio-criticism.' In the persons of Hahn, Frank, and Neurath this heterogeneous coffee-house circle constituted the original core of the later Vienna Circle, with which the younger scientists of the Schlick circle began to associate after World War I. After 1924 the meetings of the Vienna Circle proper were held regularly on Thursdays at Vienna's Boltzmanngasse 5.

Philipp Frank, born in Vienna in 1884, studied at the universities of Vienna and Göttingen.[1] He was a *Privatdozent* for theoretical physics at the University of Vienna from 1910 to 1912, after which he became professor of theoretical physics at the German university in Prague, where he succeeded Albert Einstein and remained until 1938. In Göttingen he studied physics and mathematics with Ludwig Boltzmann, Felix Klein, and David Hilbert and wrote his dissertation there, *On the Criteria for the Stability of the Movement of a Material Point and Their Relevance to the Principle of the Smallest Effect*, in 1906. Four years later he wrote his habilitation thesis about *The Principle of Relativity in Mechanics and Electrodynamics* in Vienna. Frank's first article, "Kausalgesetz und Erfahrung" (The Law of Causality and Experience), published in Wilhelm Ostwald's journal *Annalen der Naturphilosophie* (445–50) in 1907, was a product of the discussions in the original circle striving to solve the problems of the relationship between science and

[1] On his life and work, see Cohen and Wartofsky (eds.) 1965; Frank 1949a, 1952, 1979; Vienna Circle Foundation Amsterdam/Haarlem (WKA/VCF), Holton 2006.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_1

philosophy (the logic or theory of science) which had been provoked by the 'crisis of the natural science' at the turn of the century.

Although it was possible to counteract metaphysical system philosophy with the help of Mach and Boltzmann, the new gap developing between empiricism and modern logic and mathematics still had to be bridged, and this had to be done primarily through an interdisciplinary initiative. For this reason, the young philosophical iconoclasts integrated political, historical, and religious problems in a straightforward way: Otto Neurath, for example, took a course in Catholic philosophy and was able to win a prize for his work on moral theology (Frank 1949a, 1). The scientific problems behind these discussions were—according to Frank—best formulated in the book *La theorie physique chez les physiciens contemporains* (Physical Theory according to Contemporary Physicists) (1907) by the French scientist Abel Rey, who dramatically described the decline of mechanistic physics.[2] As an alternative to the anachronistic organistic world view there was a trend towards a 'scientific world conception,' the beginnings of which had already been anticipated by Ernst Mach, who received critical praise from Frank in two articles (described in Sect. 1.1). Even at that time, the basic aim was to render philosophy scientific and give it an anti-metaphysical (anti-idealistic) orientation, combined with empirical enlightenment ideas. Mach's equating of the concept of physical law with the empirical description of a class of observation data according to the economy principle, and thus overcoming 'mechanical explanations,' did not combine well with the new symbolic logic of Russell and Whitehead's *Principia Mathematica* in rendering the structure of knowledge transparent. Of course, Kant's aprioristic epistemological categories did not do so either: in the eyes of the young critics of Kant, the possibility of a non-Euclidian geometry, the critique of Newtonian mechanics, the electromagnetic theory of matter, and the statistical interpretation of thermodynamics destroyed the foundations of his doctrine of absolute categories. For them the French conventionalist of philosophy and physicist Henri Poincaré acted as a mediator in the conflict between empirical descriptivism and analytical apriorism. Remarkably enough, the early Friedrich Nietzsche was also claimed as an ally in the reform of philosophy, having demolished idealistic system philosophies from Kant to Hegel (ibid., 8 f.).

For the members of the 'proto-circle' the hour had come for 'neo-positivism.' Frank presented this new synthesis in his short article about the "Law of Causality and Experience" (1907) and received considerable response. In it he adapted Poincaré's notion of law—as an arbitrary convention concerning propositions—to a Humean concept of causality. Accordingly, the law of causality is a definition of the expression 'case A has occurred' whereby it becomes a simple definition of the concept of the 'same state' (of A and B) and cannot be checked by experience (1949a, 10 f.). Albert Einstein agreed in principle but objected that the law of causality was not completely reducible to a convention or definition, as the principle of simplicity in terminology (and, finally, nature) showed. With this criticism, Frank realized

[2] Neuber 2010.

Fig. 1.1 Café Josephinum, Wien IX, Währingerstraße 33–35 (Picture taken around 1932. The most important meeting place of the Vienna Circle besides Boltzmanngasse)

very early on the advantages of pragmatic considerations in scientific philosophy. In *Materialism and Empirio-Criticism* (1909), Lenin polemically claimed that Frank's article was the "Machwerk"—with the triple meanings of a 'Mach,' 'construction,' and 'shoddy piece of work'—of an idealistic Kantian, which inspired Frank to study the relationship between positivism and idealism in more detail in the early 1920s. Yet to return to his early work on the attempted synthesis of Mach and Poincaré:

> To summarize these two theories in a single sentence, one might say: According to Mach the general principles of science are abbreviated economical descriptions of observed facts; according to Poincaré they are free creations of the human mind which do not tell anything about observed facts. The attempt to integrate the two concepts into one coherent system was the origin of what was later called logical empiricism. (1949a, 11 f.)

This aim was achieved with the help of David Hilbert's conception of the axiomatics of geometry as a conventional system of "implicit definitions," by means of which geometrical expressions (point, line) could be interpreted. In the form of a description of structure independent of concrete observation the discussions thus began to involve the 'formal' mode of expression, later introduced into the new scientific logic of science by Carnap and Schlick and in contrast to the 'material mode' concerned with 'content.' Yet first of all the connection had to be established between this analytical symbolism and the level of observation data:

> The axiomatic system, the set of relations between symbols, is a product of our free imagination, it is arbitrary. But if the concepts occurring in it are interpreted or identified with some observational conceptions, our axiomatic system, if well chosen, becomes an economical description of observational facts. Now the presentation of the law of causality as an arbitrary convention … can be freed of its paradoxical appearance. The law of causality, as part of an axiomatic system, is an arbitrary convention about the use of the terms like 'the

> recurrence of a state of a system,' but if interpreted physically it becomes a statement about observable facts. In this way, the philosophy of Mach could be integrated into the 'new positivism' of men like Henri Poincaré, Abel Rey and Pierre Duhem. (ibid., 14)

Together with Russell's and Whitehead's *Principia Mathematica*, Albert Einstein's theory of special and general relativity (1905, 1916) was finally greeted as a further contribution to the foundation of Logical Empiricism, in particular for its anti-Kantian thrust and its support of the neo-positivist conception of the formation and confirmation of theories (we may leave open here whether this estimation is correct).

> In this theory Einstein derived his laws of motion and laws of the gravitational field from very general and abstract principles, the principles of equivalence and of relativity. His principles and laws were connections between abstract symbols: the general space-time coordinates and the ten potentials of the gravitational field. This theory seemed to be an excellent example of the way in which a scientific theory is built up according to the ideas of the new positivism. The symbolic or structural system is neatly developed and is sharply separated from the observational facts that are to be embraced. Then the system must be interpreted, and the prediction of facts that are observable must be made and the predictions verified by observation. There were three specific observational facts that were predicted: the bending of light rays and the red shift of spectral lines in a gravitational field, and the advance of the perihelion of Mercury. (Frank 1949a, 18)

However, unlike classical physical theories, the theory of observation itself had to be part of the theory; later—with Percy W. Bridgman's *The Logic of Modern Physics* (1927)—it entered into Logical Empiricism in the form of 'operational definitions.' Accordingly, every physical theory no longer directly describes the 'world in itself,' but only its structure (or structural context). This postulate had already been philosophically anticipated by Moritz Schlick in his monograph "Space and Time in Contemporary Physics. An Introduction to the Theory of Relativity and Gravitation" (in: Schlick 1979b, vol. I, 207–269; *Raum und Zeit in der gegenwärtigen Physik. Zur Einführung in das Verständnis der Relativitäts- und Gravitationstheorie*) in 1917 and a year later in his *General Theory of Knowledge* (still from the position of realism).

Already in the proto-circle, a perennial topic of the later Vienna Circle was discussed: the issue of determinism or indeterminism and mechanism or vitalism in physics and biology. Even at that time, a causalistic and anti-vitalistic tendency which took into account the static notion of probability was emerging, as it later also would in relation to the interpretation of quantum mechanics. In a lecture about "Mechanism or Vitalism," given at the Vienna Philosophical Society in 1907, Frank, for example, arrived at the conclusion that it had not yet been possible to prove the impossibility of causality in the field of biology—just as he refuted the possibility of absolute movement at the same forum 2 years afterwards and finally explained 'the principle of relativity and the representation of physical appearances in four-dimensional space' (Reininger 1938, 29 ff.). Frank collected these results in his book *The Law of Causality and Its Limits* (*Das Kausalgesetz und seine Grenzen* (1932)), which also constitutes a survey of the state of the debate in the Vienna Circle concerning the foundational problem of physics.

In general then, Philipp Frank, made important contributions to physics, mathematics, and the theory of science at quite an early stage. As a physicist he demonstrated in the pre-war years that the theory of relativity could be simplified by the methods of group theory (a theoretical achievement which was one of the reasons for his appointment as Einstein's successor in Prague). In the following years, up until 1914, he worked on the logical and mathematical completion of relativity theory, for example providing a proof of the fact that every loss of energy entails a loss of mass. Further work was devoted to the contradictions between the molecular and continuum theories of thermal conduction and diffusion, to the unification of the representation of technical and theoretical mechanics, and, after the war, to research into the path of light in various media, with the aid of analogies that led to the development of the theory of electron microscopes. In pure mathematics he developed new methods for representing curves and adapted the most recent results in mathematics (Köbe's principle of distortion) to technical problems concerning the flow of liquids and aviation technology. His most important achievement in this field probably remains the classic work *Die Differentialgleichungen und Integralgleichungen der Mechanik und Physik* (Differential and Integral Equivalence in Mechanics and Physics) (1927), which he edited with Richard von Mises and co-wrote with other scientists and which was based on the work of Rieman and Weber. With his apologetic obituary of Ernst Mach in 1917, Frank again resumed his work of the pre-war years in the philosophy of science: the anti-metaphysical standpoint in physics was resurrected, almost as a cue for the later Vienna Circle. With his own later publications—*The Law of Causality and Its Limits* (1998, Germ. orig. 1932), *The End of Mechanistic Physics* (*Das Ende der mechanistischen Physik* (1935)), and *Interpretations and Misinterpretations of Modern Physics* (1938)—Frank, together with Neurath, Carnap, and the American neo-pragmatist Charles Morris, became one of the most important representatives of a physicalist unified science and of the International Encyclopedia of Unified Science.

His co-writer Richard Martin Edler von Mises was one of the most prominent personalities of the logical empiricist movement, from the days before the First World War until his death in American exile in 1953.[3] He was born in Lviv in 1883 to Jewish parents, although their place of permanent residence was Vienna. His elder brother was the renowned economist Ludwig von Mises, who in the Vienna of the inter-war represented, together with Friedrich August von Hayek, Gottfried von Haberler, and Oskar Morgenstern, the Viennese liberal school of political economy (which also had personal connections to the Vienna Circle via Felix Kaufmann, Alfred Schütz, and Karl Menger). In 1901 Richard von Mises began to study mechanical engineering at the Vienna University of Technology, where he published his first mathematical work. In early 1906 he moved to the German University of Technology in Brno as assistant to Georg Hamel and wrote his dissertation on "Die Ermittlung der Schwungmassen im Subkurbelgetriebe" ('Ascertaining Gyrating Masses in Sub-Crank Mechanisms') in the same year. In 1908 he received his

[3] For a survey of biographical data see *Studies* 1954; Frank et al. (ed.) 1963–64; Goldstein 1963–64; Stadler 1990.

doctorate in Vienna and became a *Privatdozent* for mechanics in Brno, writing a habilitation thesis on the '*Theory of Water Wheels*'. ("Theorie der Wasserräder".) A year later he was appointed associate professor of applied mathematics at the University of Strasbourg, although he still returned to Vienna once or twice a year to visit his 'Mises circle.' The people who took part in these discussions in Café Central are said to have included not only those already mentioned, but also writers and artists such as Peter Altenberg and Adolf Loos, and later the mathematicians Eduard Helly, Heinrich Löwy, and even Moritz Schlick (Goldstein 1963–1964). In view of his cultural milieu it is hardly surprising that Richard von Mises became a well-respected specialist on Rilke. He also acquired a reputation as an engineer, technician, mathematician, and philosopher of science in the spirit of what he called 'positivism,' the commitment to the basic principles of clarity, simplicity, and scientificality.

In World War I von Mises acted as technical adviser and organizer in the newly established aviation department of the Austrian empire's military forces, where he supervised, among other things, the construction and testing of the first big military plane—practical activities based on his books *Technische Hydromechanik* (Technical Hydromechanics) and *Fluglehre* (1918; *Theory of Flight* (1945)), the latter being a standard work, the sixth edition of which was published in 1958. After the war, when Alsace-Lorraine once again became part of France, von Mises lost both his position and his property in Strasbourg. He accepted a lecturer position for mathematics at the university of Frankfurt and was appointed full professor of mechanics in Dresden in 1919, and a year later professor and director of the Institute of Applied Mathematics in Berlin, where, together with other artists and scientists, Robert Musil used to attend his circle.[4] At this time he became a classic theorist of probability theory and in 1921 founded the highly regarded *Zeitschrift für angewandte Mathematik und Mechanik* (Journal of Applied Mathematics and Mechanics), which appeared regularly until his emigration in 1933. With *Probability, Statistics and Truth* (1939b; *Wahrscheinlichkeit, Statistik und Wahrheit* (1928)) he made a fundamental contribution to this subject, which was one of the perennial topics of the Vienna Circle. The book remained a standard work, published in several editions and translations well into the post-war years. His assistant and later wife, the Viennese mathematician Hilda Geiringer (the first woman to be promoted to a professor in applied mathematics), also took part in the movement of Logical Empiricism, publishing articles in *Erkenntnis* (Siegmund-Schultze 2004).

Like many other German scientists (for example Hans Reichenbach), Richard von Mises emigrated to Turkey in 1933, where he was appointed professor of mathematics and director of the Mathematical Faculty in Istanbul until 1939 (Widman 1973, 94, 276). There he worked on statistical functions and wrote a book about Rilke, a small monograph entitled *Ernst Mach und die empiristische Wissenschaftsauffassung* (Ernst Mach and the Empirical Conception of Science) (1938). His *Kleines Lehrbuch des Positivismus* (1939), which after the war was published in an extended and revised translation (*Positivism: A Study in Human Understanding*, 1951), presented a comprehensive account of the positivist discourse on nature and society. Up until his emigration to the United States (Harvard University)

[4] On Musil and the Vienna Circle see Arslan 2014.

in 1939, von Mises regularly visited like-minded friends (and, until her death in 1937, his mother) in Vienna. Throughout his career, right up until his death in 1953, this polymath, like Otto Neurath, remained convinced of the necessity of a synthesis of positivism and humanism as a way to oppose the rise of fascism and metaphysical irrationalism.

Yet it is the mathematician Hans Hahn who is regarded as the actual founder of the Vienna Circle (by Philipp Frank, 1934).[5] Hahn does indeed seem to have acted as the organizer, both in the proto-circle and after World War I—not least by being largely responsible for bringing Moritz Schlick to Vienna in 1922—but his role as an organizer must not overshadow his theoretical contributions and popularizations in the fields of mathematics, logic, and the philosophy of science.

Hahn was born in Vienna in 1879 and enrolled in law at the University of Vienna in 1898, shortly afterwards changing to mathematics. He then studied for a year in Munich and Strasbourg, returning to Vienna in 1901, where he obtained his doctorate a year later. Hahn spent 1903–04 in Vienna and Göttingen. He initiated his mathematical publications (in collaboration with Ernst Zermelo) with a development of the calculus of variation, and attended lectures by Boltzmann, Escherich, Mertens, and Wirtinger in Vienna, and Hilbert, Klein, and Minkowski in Göttingen. At the beginning of 1905 he became *Privatdozent* for mathematics at the University of Vienna (with a habilitation thesis entitled *Bemerkungen zur Variationsrechnung* [Remarks on the Calculus of Variation], 1904). In the winter semester, Hahn taught as a substitute professor at the University of Innsbruck, until he was appointed associate professor at the University of Czernowitz (now Chernovtsy, Ukraine). In 1916, after having been severely wounded in World War I, he was appointed associate professor in Bonn, where he was given the chair of mathematics a year later. In spring 1921 he finally returned to Vienna as a full professor and remained there until his death in 1934, achieving broad influence both in his field and in popular education.

According to his student Karl Menger (who, like Kurt Gödel, was 'supplied' to the Vienna Circle by his teacher in the 1920s), Hahn was important for Logical Empiricism for three reasons (Menger 1980, ix ff.): first, together with Frank and Neurath, as the founder of the Vienna Circle; second, as the circle's 'opinion leader' in questions of modern logic; and third, for his mathematical and philosophical contributions to the Schlick circle and the Ernst Mach Society. As an accomplished specialist, Hahn brought modern logic and mathematics into the proto-circle as a constitutive element of the new positivism as well as acquired an excellent reputation as a mathematician:

> Hahn's first results were contributions to the classical calculus of variations. He then turned to the study of real functions and set functions, especially integrals. He further published a fundamental paper on non-Archimedean systems, and early recognized the significance of Frechet's abstract spaces. In a paper introducing local connectedness he characterized the sets which a point can traverse in a continuous motion; that is, the continuous images of a time interval or a segment (now often called Peano continua). The paper is a classic of the early set-theoretical geometry. (ibid., xvii)

[5] Mayerhofer 1934; Menger 1934b, 1935, 1980; Hahn 1980; University Archives Vienna, personal file on Hahn; Köhler, DePauli-Schimanovich, and Stadler (eds.) 1995; Schmetterer and Sigmund (eds.) 1995.

Together with Frank and Neurath, Hahn was one of the original participants in the first discussion circle organized by Schlick (although Frank traveled less frequently to Vienna from Prague). The impetus which Hahn gave to symbolic logic from 1921–22 onwards, together with Russell's and Whitehead's *Principia Mathematica*, dominated discussions in the Vienna Circle, as did Hahn's own mathematical contributions:

> After World War I, Hahn published volume I of his monumental *Theorie der reellen Funktionen* … He then returned to the calculus of variations and to the theory of integrals from modern points of view. He applied some of his results to problems of interpolation, which later turned out to be of interest to the Circle … Perhaps most importantly he developed the concept and parts of the theory of general normed linear spaces, simultaneously with and independently of Stefan Banach, after whom they are now called 'Banach spaces.' (ibid., xviii)

As a result of his consistent criticism, his clarity and exactitude, as well as his impressive lectures, Hahn became a central figure of both the Vienna Circle and the Ernst Mach Society, where he distinguished himself as an emphatic popularizer of Logical Empiricism in the tradition of Hume, Leibniz, Bolzano, Mach, and Russell. It was, after all, Hahn who in 1924–25—after the mathematician Kurt Reidemeister had presented an exposé of Wittgenstein's *Tractatus logico-philosophicus* to the Vienna Circle in 1924—introduced Wittgenstein's little book into their discussions as the most important contribution to philosophy and logic since Russell, so that from 1925 to 1927 the *Tractatus* was discussed line-by-line by the Schlick circle. Hahn regarded this work by an academic outsider as a fundamental text for the explication of the role of logic, even if like Neurath, Menger, Gödel, and others he did not share Wittgenstein's 'silence'—the assertion that it is impossible to make statements about language—although he did remain skeptical about a physicalist unity of science. Together with his mathematical colleagues in the Vienna Circle, Hahn supplied the methodological tools for solving fundamental philosophical problems, such as, for example, the problem of induction in physics. As a speaker at conferences, co-author of the Vienna Circle's manifesto, author of his own polemical pamphlets in the spirit of scientific world conception, and a lecturer at the Ernst Mach Society, Hahn was most instrumental in generating publicity for the Vienna Circle. As professor he also remained true to his socialist beliefs by publicly advocating the democratization of the universities, and as a member of the Vienna Schools Council he supported the Viennese school reform (cf. Chap. 9). On the other hand, his scientism did not prevent him from studying parapsychology, the study of which was prevalent at the time, at the Society for Psychic Research, together with other renowned scientists such as Hans Thirring (Menger 1980, xv f.).

Otto Neurath was also born in Vienna in 1882, the son of the social reformer and political economist Wilhelm Neurath and his wife Gertrud Kaempffert.[6] In 1902,

[6] M. Neurath and Cohen (ed.) 1973; 1983; Mohn 1977; K. Fleck 1979; Hegselmann 1979; Haller and Rutte (eds.) 1981; Nemeth 1981; Stadler (ed.) 1982a; P. Neurath and Nemeth (eds.) 1994; Cartwright, Cat, Fleck, and Uebel (eds.) 1996; Nemeth and Stadler (eds.) 1996; Nemeth and Heinrich 1999; Nemeth, Schmitz and Uebel (ed.) 2007; Sandner 2014; Cat 2014.

began wide-ranging studies at the university in the fields of mathematics, physics, and then political economy, history, and philosophy. At that time he became acquainted not only with Philipp Frank and Hans Hahn and his sister Olga, but also with his first wife Anna Schapire, who died after giving birth to their son Paul in 1911. A socially critical feminist who spoke several languages, Anna Schapire pursued an international course of study in philosophy, literature, and political economy and wrote her dissertation in 1906 on *Labor Protection and the Political Parties in Germany* ("Arbeitsschutz und die politischen Parteien in Deutschland"), which surely must have had some effect on Neurath's socio-economic and political engagement. It was partly due to her initiative that Neurath went to Berlin, where he continued his studies in political economy under Eduard Meyer and Gustav Schmoller and as early as 1904 published an article on "Geldzins im Altertum" (Interest on Money in Antiquity). In addition, he tried his hand as a literary historian and re-published F. Marlow's *Faust* (1906), to which he also wrote an introduction, before finally obtaining his doctorate summa cum laude under Eduard Meyer in 1906 for a dissertation *Zur Anschauung der Antike über Handel, Gewerbe und Landwirschaft* (The Views of Antiquity on Commerce, Trade and Agriculture). As an alternative he also presented a draft of his *Antike Wirtschaftsgeschichte* (Economic History of Antiquity) (1909).

In 1906–07, after returning from Berlin, Neurath did his military service. In 1907 he married Anna Schapire and worked as an assistant teacher at the New Commercial School of Vienna, teaching economics and history until the outbreak of World War I. In 1910, together with his wife, he published a two-part *Lesebuch der Volkswirtschaftslehre* (Reader in Economics), and in the same year a *Lehrbuch der Volkswirtschaftslehre,* (Primer of Economics) designed for use in business schools. In 1912 Neurath married the mathematician Olga Hahn, who had gone blind in 1904 at the age of 22. With her as well as on his own, he published a number of mathematical papers, which, together with his articles on social science and ethics, anticipate his later position in the Vienna Circle: holism in the theory of science, anti-metaphysical unity of science, logical empiricism, and epistemological relativism. During his student days in Berlin he was influenced, above all, by the anti-metaphysical nominalism of the Russian logician Gregorius Itelson, who is said to have inspired him to compile an anti-essentialist *Index verborum prohibitorum*.[7] Neurath was thus able to help identify the problematic area lying between science, philosophy, and metaphysics in the proto-circle and lay the foundations for the program of unified science and the empiricist encyclopedia. His interest in visual communication had been awakened in the scholarly home of his parents, eventually leading him to invent the Vienna Method of Picture Statistics and the Isotype (International System Of Typographic Picture Education) (cf. Sect. 9.3).

Up to the end of World War I, however, Neurath had primarily published on economics: he was a member of the Association for Social Politics and, thanks to a

[7] On Itelson see Freudenthal and Karachentsev 2010.

travel grant from the Carnegie Foundation, conducted research into the socioeconomic situation in the highly unsettled Balkans. There he was able to reflect for the first time upon war economy as a model of a planned economy on a naturalist basis ('war socialism'). Together with Hahn and Frank, he also gave lectures at the Philosophical Society of the University of Vienna. Following in the tradition of Mach and Popper-Lynkeus, Neurath studied the systematic connections between political economy, the doctrine of values, decision theory, and the theory of life situations ('basic needs'), also initiating a theory of social sciences, which was taken up later in his *Empirical Sociology* (1931). During World War I he took over the direction of the department of war economy at the Ministry of War and in 1916 was appointed Director of the Museum of War Economy in Leipzig. Neurath's studies on the theory and practice of war economy were necessary pre-conditions for the total socialization plans of a nation's economy, which he developed towards the end of the war and attempted to realize in post-war, revolutionary Bavaria. There he became president of the Central Economic Office of the Munich Soviet Republic, but the experiment was doomed to failure, as was the entire movement for economic planning. In 1917 he was able to habilitate in political economy in Heidelberg, but he was stripped of his status as *Privatdozent* after standing trial for his political activities in Munich in 1919.

These biographical marginalia are worth mentioning because of all the core members of the Vienna Circle Neurath, along with Edgar Zilsel, was interested more in integrating the social sciences into the scientific world conception. As an organizer, propagandist, and programmatic thinker, Neurath not only did much for the scientific Circle, but his activities for the later encyclopedia and for social reform also took into account the political pre-conditions and implications of scientific activity. Thus Neurath was influential, on one hand as an organizer of the Austrian settlement movement, a member of the socialist party, an activist in the adult education of 'red Vienna,' founder and director of the Museum for Economy and Society in Vienna, and, in exile, the founder of the International Foundation for Visual Education; on the other hand, he was the co-author of the manifesto from 1929, an activist in the Ernst Mach Society, and the promoter of the International Unity of Science movement from 1934 until his death in England in 1945.

Neurath himself—as the most industrious historiographer of Logical Empiricism—described the early period of the Vienna Circle, discussed here, as follows:

> Mach's and Einstein's critique of Newtonian physics, and the new system of thought that emerged from it, had a very special effect in Vienna. Philipp Frank was in contact with both Mach and Einstein as a young physicist, being the latter's successor in Prague. He pointed out the significance of Einstein's relativity theory at a very early stage: a significance fundamental to thinking in general. It became obvious that physics had to sort out its ideas itself, and that it was certainly not to resort to any philosophers to help it fulfill this task. It is not impossible for philosophers to be great scholars and to exert a fruitful influence on science, but the pure philosophers of our time do not have anything of interest to tell us. Do we have to assume that it will be left to scientists to develop new propositions and then ask for the blessing of the philosophers? Will they teach us what is to be thought, basically, about the concepts used in science? The main work had to be done within the sciences–with

> regard to the analysis of concepts as much as to everything else. This serves to define the empiricist, anti-metaphysical attitude, as exemplified in the physicist Frank as well as in the mathematician Hans Hahn (†1934) or the sociologist and economist Otto Neurath, all of them influenced equally by the French conventionalists and by pragmatism as well as by Mach and Einstein, modern logicians, and an empirically oriented sociology. R. v. Mises (currently in Istanbul), professor of applied mathematics, arrived at a positivist view under the influence of his friend Popper-Lynkeus. Others followed on their path towards a scientific empiricism which may appear in various forms. It is characteristic of their attitude that they did not accept some of Mach's partial theories and that many even abandoned them altogether in order to acquire logical-scientific methods which generated a general empiricist attitude. The scientism developed in Vienna cast overboard the true Machists' particular speculations about the self and about things, such as the one about their "epistemology" where they often lost themselves in metaphysics. Quite on the contrary, its adherents became increasingly aware of the crucial significance of a logical-scientific analysis, for they noticed how Mach, without even the slightest bit of observation, prepared the absolutely fundamental idea of relative movement. Such logical-scientific discussions formed the main link between the representatives of the individual disciplines. As a university professor as well as in his personal works, Hans Hahn mainly dealt with problems of logic and mathematics (the foundations of mathematics, set theory, specific works on logic). One aspect of these endeavors was his commitment to making the works of Russell and other logicians known to a wider audience; in this way he also contributed decisively to the development of the Vienna Circle. (Neurath 1936, quoted from 1981, 695f.)

In these compressed reflections on the formation of early Logical Empiricism, the critical reception of Mach and the anti-metaphysical and 'anti-philosophical' trend are just as noteworthy as the identification of the proto-circle described by Frank (Hahn, von Mises, and Neurath) and its cardinal figures of reference: Mach, Einstein, and Russell. Wittgenstein, Schlick, and their supporters evidently assumed importance only after the early 1920s, when the proto-circle generated increased interest at the same time in the Mach Society. For this reason we may speak of—albeit unsystematic—public relations work even in the pre-war days.

Besides their other activities, Hahn, Frank, and Neurath as well as Viktor Kraft gave talks at the Philosophical Society of the University of Vienna, some of which were published (Reininger 1938):

Hans Hahn: "Is Geometry Based on Facts?" (23-11-1906/05-12-1906)
Philipp Frank: "Hans Driesch's Natural Philosophy: His Relationship to Vitalism" (04-12-1907)
Otto Neurath: "War and the Principles of Morality" (05-03-1908)
Philipp Frank: "Does Absolute Movement Exists?" (04-12-1909)
Discussion of the above contribution (10-12-1909)
Otto Neurath: "Concept and Scope of the A Priori" (17-01-1910/14-02-1910)
Viktor Kraft: "On the Criticism of Epistemological Positivism" (06-11-1911)
Discussion of the above contribution with the title: "Is an Epistemological Idealism Possible Which Does Not Result in Solipsism?" (20-11-1911/04-12-1911/15-01-1912)
Otto Neurath: "The Problem of the Pleasure Maximum" (01-06-1912)
Otto Neurath: "The Lost Wanderers of Cartesius and the Auxiliary Motive (On the Psychology of Decision)" (27-01-1913)
Discussion of the above contribution (08-02-1913)
Otto Neurath: "On the Classification of Hypothetical Systems (with special consideration of optics)" (02-03-1914)
Philipp Frank and Alois Höfler (introduction): "Discussion Evenings: The Problem of Relativity in Physics" (22-03-1915/22-04-1915)

Viktor Kraft: "Mach as a Philosopher" (06-11-1916)
Otto Neurath: "Mach's Position on the Problem of Gravitation and Inertia" (15-12-1916)
Discussion of the lectures about Mach by Kraft and Neurath (06-11-1916/14-11-1916)
Otto Neurath: "Schelling and Faraday (with experiments)" (05-04-1918)
Discussion of the two principles: "Natural Science is Wholly Dependent of Philosophy—Philosophy Is Multiply Dependent on Science" (occasioned by the general closing remarks in the lecture by Otto Neurath of 05-04-1918)

Of a total of 330 lectures given in the Philosophical Society from 1888 to 1918, no less than 18 lectures and discussion evenings were held by the proto-circle between 1906 and 1918. If one adds the other discussions of scientific philosophy, then its wing that sought to emulate modern natural science—which included Franz Brentano, Alois Höfler, Wilhelm Jerusalem, Theodor Meynert, Christian von Ehrenfels, Kasimierz Twardowski, Ludwig Boltzmann, Emil Reich, Friedrich Jodl, Eduard Leisching, Anton Lampa, Rudolf Goldscheid, Carl Siegel, Heinrich Gomperz, Adolf Stöhr, Ernst Mally, Ludo M. Hartmann, and Hans Thirring—can be regarded as embedded in the larger framework of a still only emergent scientific philosophy, which formed the fertile ground for the subsequent rise to prominence of the Vienna Circle. For the period from 1918 to 1938, approximately 10 % of the lectures (33 of 325) held at the Philosophical Society were given by members or sympathizers of the Vienna Circle (among them Neurath, Zilsel, Hahn, Kaufmann, Kraft, Schlick, Carnap, Gomperz, Feigl, Juhos, and Waismann); in the whole period from 1888 to 1938 the corresponding percentage was 7 % (out of 655) (cf. also Chap. 9).

The independent, yet ultimately convergent position of the young Viktor Kraft[8] may also be mentioned in connection with the origins of Logical Empiricism. Even though, according to the sources consulted thus far, he does not appear to have belonged to the original discussion circle, Kraft's theoretical and practical contribution to scientific philosophy at the university and to adult education in Vienna constituted a further building block for the development of the scientific world conception in the period between the two world wars.

Born in Vienna in 1880, Kraft attended the University of Vienna from 1899, studying history and philosophy. In 1903 he wrote his doctoral thesis in philosophy on *Das Problem der Außenwelt* (The Problem of the External World) (published in 1904), a work that was seminal for his later position. He then enrolled at the University of Berlin and in 1915 became a scientific civil servant at the Vienna University library—a position he occupied until he was forced to retire in 1938, resuming again from 1945 to 1947. In 1914, supported by Adolf Stöhr, Friedrich Jodl, and Alois Höfler, Kraft had already completed his habilitation with his book, *Weltbegriff und Erkenntnisbegriff. Eine erkenntnistheoretische Untersuchung* (The Concept of the World and the Concept of Knowledge. An Epistemological Investigation), which had been published 2 years earlier. In it he presented the results of his many years of interdisciplinary studies of idealism, pursued in order to lay the foundations for a critical (anti-phenomenalist and constructivist) realism.

[8] Topitsch (ed.) 1960; Rutte 1973; Kraft 1973; Frey 1975; Kainz 1976; Schramm 1992; Vollbrecht 2004; Radler 2006; University Archives Vienna, personal file Kraft.

Kraft's critical discussions of not only classical idealism but also positivism and materialism, as well as his fundamental *Die Grundformen der wissenschaftlichen Methoden* (The Basic Forms of Scientific Method) (1925), represent an important variation of Logical Empiricism: namely, a (non-sensualist) empiricism with a hypothetical-deductive justification structure, which was subsequently also advocated by the early Schlick as well as by Feigl, Popper, and others:

> The first part of my study, thus, was devoted to the task of clarifying the nature and the true form of the principal concepts of the world, of establishing what they have to be and what they cannot be. The results left no doubt that, basically, it can only be a matter of either a subjective idealism or a dualistic realism. As concerns our concept of the world we are all inevitably faced with this clear either-or. Subjective idealism, therefore, can only be overcome if we are able to justify the cognition of objective reality. This is what the second part of my study aims to achieve. The way through which the cognition of objective reality becomes possible is to be found in the way of the cognition of the theory. This is the third main point of this study: that the method of our cognition of reality determines the theory. Proceeding from the reality which is given by experience, developing the prerequisites under which this becomes comprehensible, i.e., rational, we can arrive at an objective reality. Objective reality is conceived as that which establishes the logicality of experienced reality, which explains it; and its existence has to be presupposed if the latter is to be logically comprehensible at all. The knowledge of an objective reality is valid because it is the precondition for an explanation of experienced phenomena. Hence the existence of a real objective world follows from an explanatory theory of the reality which is given by experience. (Kraft 1912, 232)

Before World War I Kraft devoted his lectures and diverse publications to the popularization of scientific philosophy in adult education in Vienna—an activity which, in the inter-war years, he continued to pursue together with other members of the Vienna Circle (cf. Sect. 9.2).

His academic influence remained limited because he was refused senior appointments twice: from 1924 until World War II and again after the war Kraft held only the title of associate professor at the University of Vienna; in 1947 he became an associate professor proper, but it was not until 1950 that he received a chair of philosophy, which he held until his retirement in 1952. Yet at the same time, as a member of the Vienna Circle and the Gomperz Circle, he made important independent contributions to the establishment of ethics as a science, striving to provide rational justifications as an alternative to the various positions based on natural law (*Foundations for a Scientific Analysis of Value* (1981, *Die Grundlagen einer wissenschaftlichen Wertlehre* (1937)). Furthermore, Kraft wrote essays about the theory of geography and the philosophy of history, which he also presented at the Philosophical Society and at adult education institutes.

To summarize, one may say that some of the essential positions of logical empiricism were already developed before World War I, namely,

1. a basic empirical standpoint, in which operationalism, verificationism, pragmatism, and instrumentalism were more or less well integrated
2. a formal logical instrumentarium combined with methodical phenomenalism
3. conventionalism in combination with a holistic theory of science
4. a principled critique of metaphysics in the context of an empirical enlightenment philosophy

5. scientific monism, with the regulative postulate of the unity of science
6. methodological and linguistic nominalism

1.1 Mach, Boltzmann, Einstein, and the Vienna Circle

At first glance, we may say that Boltzmann exercised less influence on the Vienna Circle than Mach, which is not very surprising considering the global orientation of the Vienna Circle with regard to epistemological theory and methodology, namely its preference for a 'positivist' (i.e., phenomenalist) theory of epistemology rather than a realistic one, with language and logic increasingly in the foreground.[9] Together with Einstein, Frank, Schlick, and Reichenbach in particular criticized the aprioristic tradition in physics, and the problems of space, time, and causality became central for Logical Empiricism—especially from the mid-1920s onwards as a result of the controversies surrounding quantum mechanics. Nevertheless, until well into the 1930s, in the Vienna Circle Einstein was considered a supporter of Mach, so that in Mach's case as in that of Wittgenstein's, we can speak of a selective acceptance which was, in all probability, intended to serve the legitimation of the Circle's own program.

Among the less well-recorded episodes of Austrian intellectual history is the meeting of two men in a student circle in which the writings of Ernst Mach were intensively and systematically discussed. Later, during the First Republic, each of the two were to figure as advocates of completely opposing camps with regard to their philosophy, weltanschauung, and politics. On one side was Viktor Kraft, on the other Othmar Spann, who with his universalism would provide the dominant metaphysical world view of political Catholicism and Austro-Fascism.[10]

According to Kraft a regular discussion circle had formed in the apartment of Spann's parents between 1900 and 1903 (Blackmore 1972, 182 f.). The participants were greatly impressed by Richard Avenarius, although they soon turned to the (more easily readable) books of Mach. Young Spann's enthusiasm for Mach may seem rather surprising at first, yet it can be explained by the fact that he had undertaken empirical statistical work as a student of political economy and only switched from the social reformist German 'academic socialism' to a metaphysical social theory years later (Siegfried 1980, 1 ff.). By contrast, Viktor Kraft remained—with certain reservations—a supporter of Mach, if we except his early attempts at a constructive realism. In November 1916 he spoke about "Mach as a Philosopher" at the annual general meeting of the Philosophical Society in Vienna (Reininger 1938, 33), and as a young lecturer he wrote about this "Austrian thinker" (1918), whom he presented as a reformer of physics as well as a representative of a new conception of the knowledge of nature and of knowledge in general, which had led to the transformation of the world view presented by Du Bois-Reymond and Fechner.

[9] Rosar 1971; Hanisch 1977.

[10] Siegfried 1974, 1979.

He further praised Mach's anti-metaphysical empiricism, his theory of elements with its psycho-physical monism, and his biological foundation of science in general. Like Karl Popper, but still prior to World War I, Kraft had turned from inductivism and phenomenalism to realism which, as methodological deductivism, does not doubt the reality of the external world as a pre-condition of knowledge. In this respect he was not one of the 'Machians' in the Vienna Circle, even if much later—despite his rejection of 'sensualism' and the theory of elements—he still held Mach in high esteem as a critic of the foundations of physics (Kraft 1964, 1966).

In contrast, Philipp Frank rose to prominence as an influential exegete and supporter of Mach. As Einstein's biographer and an expert on physics, he was extremely well-suited to present and interpret this episode in the history of science (Frank 1979; 1949a, b). Through his integration of relativity theory and quantum theory, Frank's work attained a high theoretical value. For him and his partners in discussion, the Machian monism of method constituted an important background, but was nevertheless only *one* factor in the development of Logical Empiricism. This was mainly due to Mach's neglect of the new logic and mathematics in his work:

> Our group fully approved Mach's antimetaphysical tendencies, and we joined gladly in his radical empiricism as a starting point; but we felt very strongly about the primary role of mathematics and logic in the structure of science … We admitted that the gap between the description of facts and the general principle of science was not fully bridged by Mach, but we could not agree with Kant. (Frank 1949a, 7 f.)

The theoretical bridge mentioned by Frank was built by the French mathematician, physicist and philosopher Henri Poincaré. In his article "The Law of Causality and Experience" (1907), Frank 'de-sensualized' the notion of experience and integrated it into science as a system of functional descriptions of relations. The laws of natural science are thus arbitrary and conventional models, while the causal law is a metatheoretical definition or description of a proposition concerning a sequence of events. At the same time, Frank, like Zilsel, criticized the vitalist Hans Driesch, whose theory, as a counter-position, would later repeatedly become the subject of debate in *Erkenntnis*. Thanks to this essay Frank was confronted by two critics who would play a significant role throughout his entire life, namely Einstein and Lenin (Frank 1949a, 10 ff.). While Einstein half-agreed with Frank as far as conventionalism was concerned, Lenin dismissed him as an "idealistic Kantian" with an anti-materialistic, reactionary tendency (Lenin 1909, 161; Frank 1932, 242 f.). Frank's further theoretical development was influenced by the new axiomatic geometry of Riemann, Minkowski, Hilbert, Duhem, and Rey and the theory of science. In this way, abstract theoretical notions could be interpreted by means of empirical notions, the result not being the confirmation of individual facts, but rather science as a whole. It was a matter, thus, of methodological holism, which in the contemporary analytical theory of science was adopted once again as a result of the discussions on verification, falsification, and confirmation (corroboration).[11]

[11] Fodor and Lepore 1992.

The extent to which Mach himself was interested in the geometry of Hermann Minkowski's four-dimensional space-time continuum applied to the theory of relativity is evident from the fact that around 1910 he invited Frank to a discussion about the subject (Holton 1981, 225 f.). Mach, incidentally, approved of Frank's article on Einstein's theory, published the same year, although he later distanced himself from Minkowski's interpretation of relativity theory. Frank, who explained his positive reception of Mach as due to the latter's affinity to the 'philosophy of the Enlightenment' (Frank 1949a, 17), attempted to draw up a summary of Mach's doctrine in the light of modern natural science 1 year after his death (Frank 1917). Frank presented Mach's edifice of ideas in the context of the philosophy of the eighteenth century, which as part of an anti-idealistic current displayed similarities with Nietzsche's philosophy; he recapitulated the Mach-Planck controversy and adopted a standpoint which mediated between Mach and Einstein. As in the case of the conflict between Mach and Boltzmann, he implicitly assumed the complementarity of phenomenalism and realism or de facto evaded it as a pseudo-problem. Einstein's contributions to the understanding of physical theories, in particular his 'operational definitions' and his reflections in *Geometry and Experience* (1922, *Geometrie und Erfahrung* (1921)) on the relativization of Euclidean geometry, were integrated by Frank into the concept of the new theory of science. The philosophical explications and interpretations of relativity theory by Schlick and Reichenbach subsequently entered the scientific world conception without any great modification. Later on, Mach essentially served Frank as the starting point for the empirical unity of science, as he also did for Neurath, Carnap, and Hahn (Frank 1937–38).

Frank viewed the use of the antiquated conceptual system of traditional philosophy as one of the causes of misinterpretations of Mach's teaching. He praised Mach as a pioneer of anti-metaphysics, the two main tendencies of which were the unification of science and the elimination of the trans-empirical. Consequently, it was only a matter of choosing, in accordance with the principle of economy, a suitable language for the model of a unity of science in order to overcome the traditional antithesis between materialism and idealism. Thus Mach became the *spiritus rector* of the Unity of Science Movement, with the following solution: "The unification of science by means of the elimination of metaphysics" (ibid., 256). Frank claimed that there was general agreement on the roles of Mach and Einstein as precursors of the Vienna Circle. Although in his biography of Einstein he voiced the doubt that "in reality … Einstein's position towards both positivism and metaphysics had not been so unambiguous" (Frank 1979, 347), he remained a staunch Machian, a defender of an anti-metaphysical unity of science. Frank also published popular articles about the problematic relation between Marxism, materialism, and Neopositivism and maintained contacts with the Austrian (and Czech) social democratic movement. As far as his political orientation and his understanding of the scientific world conception is concerned, Frank can be placed on a par with Neurath and Zilsel, since he was not only a renowned physicist, but also made valuable contributions to the sociology of science (Frank 1932, 1952). His response to Lenin's criticism of Mach on the part of Logical Empiricism was the most precise: he countered Lenin's accusation of idealism with the reminder that Mach had actually eliminated the concept of the

'true world' in order to destroy metaphysical philosophy.[12] Lenin's materialistic criticism was therefore wide off the mark:

> The doctrine of 'school' philosophy, that there is a true world outside all experience, one that had to be explored, was so familiar to all who are occupied with such problems, that we now try at once to answer the question, which in fact Mach had maintained about the true world. If we answer that Mach does not speak at all about the 'true' world, we often conclude that he believed it to be unknowable, or mostly, that he maintained that the real world "does not exist at all." Both interpretations of Mach's teaching are equally meaningless, if we adopt the standpoint proposed here, which I believe to be the consistent standpoint of Mach's teaching. The conceptions that according to Mach the true world is either knowable or non-existent, are both compromises with 'school' philosophy. If something is meaningless, I cannot decide whether it is knowable or unknowable, existent or non-existent. (Frank 1998, 256)

Referring to Lenin's struggle against 'Machism,' Frank concluded, "however, in my view this entire conception of Mach comes about because the supposed defenders of materialism against Mach have not thoroughly enough made their break with 'school' philosophy." (Frank, 257)

Frank ended with an apology for Mach, which also clarified in an exemplary way the Vienna Circle's position towards dialectical Marxism-Leninism and philosophical materialism:

1. It is not correct that materialism, as it appears among the French encyclopedists of the eighteenth century, has claimed the 'reality' of matter. (…)
2. Mach never denied the 'reality of matter', because, as we have already seen, the word 'reality' is never used by him in this sense.
3. It follows from the above that Mach cannot contribute anything to 'overcoming materialism.'
4. Mach has nothing at all to do with what in philosophy is usually called 'idealism'.
5. The polemics of Lenin and his philosophical successors are perhaps truly justified against the numerous philosophers who want to interpret Mach strictly in the sense of 'school' philosophy and must therefore put him along with 'idealism', but not at all against Mach himself, if he is understood from a purely scientific point of view.
6. As long as materialism makes only such statements as that the processes of life can be reduced to physical processes, it is a theory of natural science and has nothing to do with the doctrines of 'school' philosophy about the 'true' world.
7. In Russian literature, the development of materialism often displays a distancing from the classical 'mechanistic' materialism of Enlightenment and a strong emphasis on the dialectical side of 'dialectical materialism'; thus again it gets closer to Hegel's philosophy, from which Marx and Engels has developed by stressing the materialist side and transposing Hegel's dialectic from the idealist into the materialist. (ibid., 257–258)

The significance of Frank's position lies in the fact that he refuted the main accusation against Mach and neo-positivism, namely the denial of the reality of matter and the external world, with scientific and linguistic arguments. Essentially, his reply to Lenin and his supporters was that they were still thinking in terms of traditional philosophy. For Frank it would be a misunderstanding "to claim that 'Machism' or 'positivism' 'denied' the 'reality' of the outer world, of matter or any auxiliary concept …" (ibid., 259).

[12] For a recent interpretation of Mach's philosophy see Banks 2014.

In the light of this it becomes easier to understand why Frank was convinced of the complementarity of Mach and Boltzmann as precursors of the scientific world conception based on their joint critical transcendence of a pseudo-problem and why there also still existed the possibility of a shared perspective between dialectical materialism and (suitably reformed) Logical Empiricism (Frank 1963). With this judgement Frank placed himself in the Machian tradition of Austro-Marxism represented (with less sophistication) by Friedrich Adler.

In addition to his philosophical and scientific work, Edgar Zilsel was also committed to school reform and adult education. He engaged in regular discussions with Otto Bauer, Otto Neurath, and others, and dealt with the problems of the scientific view of the world in several articles. Drawing on Otto Bauer's work *Das Weltbild des Kapitalismus* (The Capitalist View of the World), he argued against the Leninist interpretation of Mach by employing a sociological analysis (along the way criticizing Max Adler as an idealistic Kantian). For him, this analysis produced the separation between social democracy and Bolshevism. For Zilsel, philosophy was fruitful only in cooperation with individual sciences and he placed Lenin's critique of Mach in its historical context:

> In Mach's philosophy the psychophysical problem, among others, plays a bigger part. Mach assumes the existence of 'elements' which are neither of a physical nor of a mental nature; from these neutral elements both matter as well as mental processes are then supposed to originate by way of only two different forms of combination. Lenin now passionately objects against this critical dissection of matter while, strangely enough, he does not have a single word to say about the fact that Mach devoted the same zest to dissecting the soul. Of all the "scholarly" philosophical movements, therefore, the Bolsheviks fight most bitterly against the one which most radically denies any spiritual mythology: Materialistic Bolshevism may tolerate Samoyedic fetish worshipping, if necessary, but "Machists" are forever faced with suspicion… A simple comparison will serve to explain why this is so. The Catholic Church, too, agitates more zealously against Protestantism than against Islam, and most zealously against modernism; and small sects, science and art cliques, etc. show the same pattern of behavior in an even more pronounced way. In fact, each group of people which, based on a group ideology, claims any kind of privileges for itself, seems to direct its pugnacity against those who are closest to it ideologically, the less members the group has and the more members its opponent has: Small, hard-struggling groups guard their ideological purity more jealously than others. (Zilsel 1929, 178ff.)

One may or may not agree with this sociological and ideological explanation, but it signaled the break between social democracy and communism completed in the 1930s on the threshold of the scientific turn. This debate continued in subsequent years in the social democratic journal *Der Kampf*. The subjects of concern there were, in particular, questions of party ideology and the materialistic theory of history and society, with Max Adler adopting the role of the 'house philosopher' of Austromarxism. In Zilsel's expanded dissertation *Das Anwendungsproblem* (The Problem of Application) (1916), published during World War I, he philosophized, in a Machian way, about the concepts of the world and knowledge, emphasizing in particular psychological monism and the sensually given as the functionalistic structural connection in the "flow of sensations":

> We human beings have to take the world, which is the totality of psychophysical phenomena, as a given. Yet this given remains forever indistinct and changing, it is not completely defined. In this world there are but relationships, structures … We engage in science, mathematics and logic, i.e., we seek to express the relationships or structures which we find through theories, through systems which are to be utterly precise and completely defined. These theories may be set as something rational against both what is physical and what is psychic. The world will always remain changing, partly blending things into each other, yet these changes are increasingly compensating each other, these uncertainties are distributed in so fortunate a way as to enable us humans, in spite of all vagueness, to determine very precise relationships in the world, even though we have to add to and continue these determinations ad infinitum. This fortunate distribution of uncertainties, thus, is the precondition for the knowability of the world. (Zilsel 1916 cited in Dvorak 1981, 28)

For the most part, Otto Neurath shared Zilsel's standpoint, and in the Circle's manifesto he allocated a central philosophical and scientific role to Ernst Mach, along with Otto Bauer and Rudolf Hilferding as well as Friedrich and Max Adler. Neurath's life was closely linked to the political events of the First Republic and also exemplifies the fate of the Vienna Circle.[13] His model of a unity of science had to lead him to criticize Mach's 'neutral' phenomenalism and under-appreciation of modern logic and mathematics (McGuinness 1987, 132f.). Yet like Frank, Neurath never doubted that Mach had accepted the reality of the material external world in accordance with 'common sense.' His criticism faded into the background compared to Mach's role as an anti-metaphysical monist and 'externalist' historian of science. Neurath constantly promoted monism in scientific communication and pluralism in the formulation of theoretical suppositions. Still, in the last year of his life, he wrote a critical summary of the concept of science he favored in an article entitled "The Orchestration of the Sciences by the Encyclopedism of Logical Empiricism" (in: Neurath and Cohen (eds.) 1983, 230–42). The high esteem in which he held Mach was expressed in his numerous historical reviews of the movement of Logical Empiricism and in his own practice. Around 1914 Neurath wrote two letters to Mach from the eastern front which can be regarded as indicative of the extent and manner of his reception of Mach (Thiele 1978, 99ff.). In the first letter, he thanked his role model for some "friendly lines" and promised to send the manuscript of a lecture on the "Zur Klassifikation von Hypothesensystemen. (Mit besonderer Berücksichtigung der Optik)" ('Classification of Systems of Hypotheses') (Neurath 1916), in which he dealt in particular with optics—a rare subject for him at that time, since he primarily wrote on political economy (Neurath 1915). Then he asked Mach to refer him to literature in which the development of optics was linked to that of acoustics, so as to be able to follow the simultaneous manifestation of the interference theory in both disciplines. Neurath's elaborations provide an instructive insight into Mach's role in his intellectual socialization:

> I had often had the wish to visit you in Vienna, but never dared to for fear of disturbing you or of appearing presumptuous. There is so much I would like to ask you, so much that only few will know besides you … It is with the greatest of interest that I hear about the new turn in relativity theory which leads up to your idea that gravitation appears as a function

[13] Hegselmann 1979a; Nemeth 1981; Stadler (ed.) 1982.

> depending on mass distribution as a whole and remaining constant as against certain transformations … It was this idea in your Mechanics which has fascinated me ever since I first read it and which has influenced my thoughts and ideas in the area of economics, too, in a somewhat peculiar, roundabout way. It is the tendency to derive the meaning of the particular from the whole, and not the whole from a sum of particulars. In value theory, especially, impulses like this have greatly inspired me and stimulated many associative conclusions. I have always felt a deep gratitude towards your works; your thoughts on physics have offered me ample stimulation not only in that field, but also—and even more so—in others. I would like to use this opportunity to thank you as a person *in concreto*, so to speak, sincerely and from the bottom of my heart. (Thiele 1978, 100)

These lines make clear once again how influential Mach's interdisciplinary impulses were and what powerful inspiration he provided. The latter also becomes evident not only from Neurath's corresponding publications (Neurath 1910a, 1910b, 1911, 1912, 1913a, 1913b), but also from his general approach to scientific research. In the second letter of the same year, Neurath mentioned that he was sending his article on optics in which he propounded the metatheoretical considerations influencing the possible taxonomies of systems of hypotheses, taking as his example the history of optics from the seventeenth to the nineteenth centuries with reference to the corpuscular and wave theories of light, thus anticipating his own later work:

> The theory of systems of hypotheses has been greatly advanced by men like Mach, Duhem, Poincaré. The right moment may now have come to group the systems of hypotheses of all sciences systematically and to supplement the actual hypotheses by possible ones into a more or less complete whole. It is the task of philosophical reflection to appreciate the significance of this aim; it is not the concern of the individual sciences. As we need theories to classify things, so we need theories to classify theories. (Neurath 1916 quoted in Neurath and Cohen (eds.) 1983, 31)

A later evaluation of Mach and Boltzmann, complete with a critical commentary, is found in the manifesto of 1929, written by Neurath with Carnap and Hahn:

> He [Mach] was especially intent on cleansing empirical science, and in the first place physics, of metaphysical notions. We recall his critique of absolute space which made him a fore-runner of Einstein, his struggle against the metaphysics of the thing-in-itself and of the concept of substance, and his investigations of the construction of scientific concepts from ultimate elements, namely sense data. In some points the development of science has not vindicated his views, for instance in his opposition to atomic theory and in his expectation that physics would be advanced through the physiology of the senses. The essential points of his conception however were of positive use in the further development of science. Mach's chair was later occupied by Ludwig Boltzmann who held decidedly empiricist views. (Neurath 1973, 302)

Even though Neurath did find some mistakes in Mach's work, he only allocated a secondary role to Boltzmann, whereas Einstein, Russell, and Wittgenstein were named as the three most prominent thinkers "who represent the scientific world conception most effectively in public and also exert the most influence upon the Vienna Circle" (ibid., 54).

Neurath emphasized empiricism more consistently than any of the other members of the Vienna Circle and did not hesitate to express his skepticism towards the exaggerated expectations of semantics found in the work of the 'realists' Schlick and

Feigl as well as in that of Karl Popper. To that extent he shared Mach's reservations towards all construction and abstraction which took place far away from the work of practical research, if it proceeded with no link, not even indirectly, back to experience (through the rules of correspondence or other reductions).

Hans Hahn, like his student Karl Menger, contributed to the understanding of the consequences of relativity theory for mathematics (1933a); his statements are situated within the context of the so-called foundational crisis of that discipline in the 1920s (Hahn 1933a; Oeser 1995; Sigmund 1995; Mancosu 1997). Also like Frank, he was wholly convinced of the complementarity of Mach and Boltzmann as the intellectual mentors of the Vienna Circle: in spring 1932, as part of a cycle of lectures dedicated to raising funds for a monument to Ludwig Boltzmann, he gave two lectures which he then repeated in autumn of the same year at the Ernst Mach Society (Hahn 1933b).

From the perspective of the fruitfulness of Mach's and Einstein's ideas for mathematics, Karl Menger pointed to positivist geometry and the mathematical concept of function (Menger 1970a). Yet in 1960 Menger provided a historical and critical introduction to the sixth American edition of Mach's *Mechanics* (Menger 1970b), where he argued for the continuing relevance of Mach's methodology and his history and theory of science and sketched the history of their influence. Thus he demonstrated the relevance of relativity theory for geometry by emphasizing the close connection between differential geometry and relativity theory (Menger 1949).

An effective implementation and further development of the Mach-Poincaré tradition was achieved by Rudolf Carnap in his two books of 1928, *Scheinprobleme der Philosophie* (*Pseudoproblems in Philosophy*) and *Der logische Aufbau der Welt* (*The Logical Structure of the World*). The latter represents an ambitious attempt, later relinquished, to establish a hierarchical constitution system of scientific concepts on an empirical basis, namely by means of sensual perceptions in a phenomenalist language, with the aid of the theory of types. Much later Carnap acknowledged the continuing relevance of Mach's theory of knowledge when, regarding the question of the empirical basis, he remarked:

> I should now consider for use as basic elements, not elementary experiences (in spite of the reasons which, in view of the findings of Gestalt psychology, speak for such a choice…). but something similar to Mach's elements, e.g., concrete sense data, as for example, "a red of a certain type at a certain visual field place at a given time." I would then choose as basic concepts some of the relations between such elements, for example "x is earlier than y", the relation of spatial proximity in the visual field and in other sensory fields, and the relation of qualitative similarity, e.g., color similarity. (Quoted from Carnap 1967, p. vii)

As theoretical points of reference for this project, Carnap further named Avenarius, Schubert-Soldern, and Schuppe (Carnap 1963, 18). However, for a comprehensive evaluation of his influences we also have to take into account Wittgenstein, Frege, and Russell, as well as the neo-Kantian influences from Carnap's student days in Germany (Wandscheider 1975, 13–29; Friedman 1996; Richardson 1997; Friedman 2000).

As already indicated, Moritz Schlick's *General Theory of Knowledge* (1974, *Allgemeine Erkenntnislehre* (1918)) diverged considerably from empirio-criticism

(Blumberg and Feigl 1974; Rutte 1970, 1976). Schlick, like Einstein, proposed a realistic theory of knowledge that kept its distance from the positivisms of Mach or Avenarius and their supporters as well as from phenomenology, neo-Kantianism, and intuitionism. The deductivist approach brought him—like Kraft, Feigl, Reichenbach, Hempel, and Popper—close to Boltzmann, even if the latter's ideas were not explicitly incorporated into his work. In contrast, Schlick took account of the fundamental contributions of Albert Einstein, in particular as far as his philosophical relevance for the concepts of space, time, and causality was concerned. Schlick became acquainted with Einstein between 1907 and 1910 in Zurich and became the first of the philosophical exegetes and popularizers of relativity who were recognised as such by Einstein himself (Schlick 1915, 1916, 1917, 1919, 1921). Einstein regarded Schlick's first such treatise, "The Philosophical Significance of the Principle of Relativity" (in: Schlick 1979b, vol. 1, 153–189; "Die philosophische Bedeutung des Relativitätsprinzips" (1915), as one of "the best things which have so far been written about relativity," and continued that "from the philosophical side nothing has been written about the subject with anything like the same degree of clarity."[14] At that time Einstein also emphasised the relation of relativity theory to positivism and the influence of Mach and Hume. In 1917 Schlick sent Einstein his essay "Space and Time in Contemporary Physics" (in: Schlick 1979a, b, vol. 1, 207–269; *Raum und Zeit in der gegenwärtigen Physik*) and the latter approved its "peerless clarity and distinctness."[15] Two years later Einstein visited Schlick in Rostock, where the latter was teaching at the university, read his *Theory of Knowledge* and committed himself to helping Schlick in his career.[16]

Schlick was at that time an associate professor lecturing in an environment characterized by idealistic philosophy, prompting Einstein to write to Max Born: "Schlick is a fine thinker, we must see to it to get him a post as professor. Given the current inflation, he will need it badly. It will be hard to get this through, though, as he is no member of the indigenous 'church' of Kantians".[17]

His further correspondence with Einstein reveals that Schlick rejected the work of Hugo Dingler on the foundations of physics, and that some of the epistemological questions dealt with in Schlick's essay on the principle of causality were discussed in depth. It was only with Schlick's 'linguistic turn' in the 1920s (after 1927 at the latest) and his reorientation towards the philosophies of Frege, Russell, and Wittgenstein that their common ground gradually began to diminish, until Einstein finally criticized Schlick's work as being too positivist; nevertheless their correspondence continued until 1933 (Holton 1981, 233). An analogous tendency can also be found in the correspondence between Schlick and his former teacher Max Planck.[18] Schlick's departure from the realistic position signified a development towards

[14] Einstein to Schlick, 12-14-1915 (WKA/VCF Haarlem).

[15] Einstein to Schlick, 2-6-1917 (ibid.).

[16] Schlick to Einstein, 10-15-1919 (ibid.).

[17] Einstein to Born 1969, 38 ff.

[18] Planck to Schlick, 12-15-1932 (ibid.); on this see Planck 1931.

"consistent empiricism," as he himself called it, and at the same time he became interested in the critical analysis of language.

Schlick's favorite student, Hubert Feigl, regretted his teacher's divergence from his earlier realistic position and himself remained true to critical realism all his life.[19] He too proved to be a brilliant interpreter of relativity theory and pure research in physics. Feigl's book *Theorie und Erfahrung in der Physik* (Theory and Experience in Physics), published in 1929, was praised by Einstein and Wolfgang Pauli (Feyerabend 1966, 6). In an autobiographical sketch, Feigl described his own philosophical line as follows:

> Having had the advantage of an early and thorough training in the 'exact' sciences (mathematics, physics, chemistry and astronomy) I could only heartily agree with Kant that (especially) metaphysics is a 'groping in the dark.' Yet, Kant's own 'critical' philosophy seemed to me peculiarly musty and dogmatic. My teenage idols were the philosophizing scientists Ernst Mach and Wilhelm Ostwald. But even then I objected to their (rather anachronistic) negative attitude toward the atomic theory. In this issue I agreed enthusiastically with the realism of Ludwig Boltzmann and Max Planck. (Feigl 1981, 1)

By way of comparison, Richard von Mises showed a much stronger identification with Mach. He wrote several portraits of both Mach and Popper-Lynkeus, among them the small monograph *Ernst Mach und die empiristische Wissenschaftsauffassung* (Ernst Mach and the Empirical Concept of Science), originally published in German in 1938 as volume 7 in the Unity of Science series. His survey led from Newton to Hume, Kant, Darwin, Fechner, Helmholtz, to Mach, whom he elsewhere called the "most influential and typical enlightenment philosopher of recent generations" (von Mises 1962, 499). In his book, von Mises also dealt with the problem of knowledge from the point of view of empiricism within the framework of Mach's scientific biography, and the culmination of these ideas in the Vienna Circle. In a retrospective commentary on his book, von Mises described himself as a pupil of Mach, albeit with a critical attitude towards the problem of language (Frank et al. 1963–64, 524–29). After emigrating in 1938 he continued to follow this line of thought in his English publications, although dealing with Einstein and Boltzmann only marginally in comparison with his earlier writings (ibid., 537–47).

As a significant counterpart to the wide-ranging reception of Mach in the Vienna Circle, Karl Popper may be mentioned, as he always favored the Boltzmann-Einstein tradition in his theory of knowledge and science. In his intellectual autobiography, Popper described his intellectual socialization, which led him from the Machian Arthur Arndt to the rejection of Marxism and psychoanalysis—stimulated primarily by Einstein's criticism of Newton and his 'Socratic' ethos. As a result he studied the problem of the content of theories in greater depth, arriving at the principle of falsification (Popper 1974, 28 f.). Looking back at the year 1919 he wrote: "For at the same time I learned about Einstein; and this became a dominant influence on my thinking—in the long run perhaps the most important influence of all." (Popper 1976, 37). Popper's preference for Boltzmann rather than Mach continued, even though he severely criticized the former with respect to the problem of time (ibid.,

[19] Neuber 2011 and 2014.

227–36). As a representative of philosophical realism and objectivism and an anti-inductivist methodology on a deductive-nomological basis, and as a supporter of atomic theory and quantum theory, Popper consolidated his anti-positivist standpoint and subsequently fought against every kind of subjectivism in science. He thought highly of Mach as a "great personality and great historian of science" (ibid., 221 ff.) but not as a physicist. Mach's image of himself as a critic of Boltzmann's concept of entropy (H-theorem) is paralleled by Popper's own image of himself as the destroyer of logical positivism (ibid., chap. 35; also Curd 1981).

It is remarkable that the two most important personalities on the periphery of the Vienna Circle, namely Wittgenstein and Popper, were 'anti-Machian' in their orientation. Both of them found themselves attracted more by the model thinking of Boltzmann than the phenomenalism of Mach (Popper 1953; Janik and Toulmin 1973, 138–45). Nonetheless, neither of them were able to diminish the acceptance of Mach by the Vienna Circle to any considerable extent—despite the divergences, which are all too often rather exaggerated.[20]

In 1926 an Ernst Mach monument was unveiled in Vienna's Municipal Park, having been erected upon the initiative of Ludo Moritz Hartmann, Friedrich Adler, and Wolfgang Pauli father and son.[21] Adler and Hartmann had started the project in 1924 and also planned to publish an edition of Mach's complete works. On the occasion of the unveiling ceremony in June some articles about Mach appeared in the newspapers which—according to Mach's son Ludwig—claimed that he would have been against the erection of a monument.[22] Wolfgang Pauli jun., the later Nobel laureate educated by Ernst Mach, was at that time still a supporter of positivism, though he later became critical of the "Viennese confession" and tried to distance himself from Schlick's position on the question of causality in quantum theory.[23] (The creator of the Mach monument was the sculptor H. H. Peter, who later sought, through the mediation of Schlick, to get a recommendation from Albert Einstein in support of his application for emigration to the U.S.[24])

To coincide with the unveiling of the bust, Einstein published an article in the *Neuen Freie Presse* (12-6-1926, 11) in which he praised Mach's criticism of the fundamental concepts of physics as one of the "most effective driving forces behind the creation of the theory of relativity," before going on to accuse him of a one-sided rejection of atomic theory and the theory of kinetic gases, condemning it as an attitude which had diverted Mach from his own innovations. Schlick, too, emphasized Mach's services as a precursor of empiricism and anti-metaphysical positivism. The two professors of physics at the University of Vienna, Felix Ehrenhaft and Hans Thirring, gave lectures on Mach's importance for physics; Thirring later became a member of the board of the Ernst Mach Society and frequently lectured there.

[20] As a critique of this see Hoyer 1983; Blackmore 1983.

[21] Friedrich Adler archive, Verein für die Geschichte der Arbeiterbewegung Vienna, portfolio 130, no. 8 ff.

[22] Ibid., no. 87.

[23] Pauli to Schlick, 8-21-1922/2-5-1932 (WKA).

[24] Einstein to Schlick, 6281930, and Schlick to Einstein, 721930 (WKA).

Incidentally, the unveiling ceremony, which was described in an article in the *Arbeiter-Zeitung*, was also parodied by the satirist Karl Kraus in his journal *Die Fackel* in his usual critical manner, in which he commented on the Austrian enlightenment tradition with Mach as his example under the headline *The Way into the Open* (1926, 14 f.).

At the University of Vienna during the 1920s, positivism was treated in the lectures of Adolf Stöhr, Viktor Kraft, and Moritz Schlick, yet this represented a much smaller reception of Mach than in the field of adult education. For instance, during the inter-war years, not a single lecture explicitly devoted to Ernst Mach was given at the Philosophical Institute of the University of Vienna, and of the 650 dissertations submitted in that period, only five were concerned, either directly or indirectly, with the work of this physicist and philosopher.[25]

[25] Dissertations with reference to Mach from this period: Fiscu 1920; Rittersporn 1922; Schleichert 1927; Kronstorfer 1928; Blumberg 1930; Weinländer 1936.

Part I
The Vienna Circle and Logical Empiricism Between the Wars—Emergence and Banishment

Chapter 2
The Vienna Circle and Logical Empiricism in the First Republic

As we have seen above, between 1907 and 1911 the proto-circle of what would later emerge as the Vienna Circle was formed with Hans Hahn, Philipp Frank, Otto Neurath, and also Richard von Mises. Essential elements of Logical Empiricism were already anticipated in that discussion group, but World War I represented a radical caesura within this intellectual development. It could not, however, permanently stop the efforts to bring about a renewal and a "turn in philosophy." The return of Hans Hahn to Vienna as professor for mathematics in the summer semester of 1921 signified the launching of scientific philosophy in terms of content and organization.

Thus, we can consider the period between 1918 and 1924 to be the *constitutive phase* of the Vienna Circle. With Schlick's appointment to Vienna in 1922, the personal and philosophical basis was laid—in conjunction with the pre-war formative phase—for the Circle's regular Thursday evening meetings. These were arranged by Schlick, beginning in the winter semester of 1924–25.

This institutionalization inaugurated the *non-public phase* of the Schlick circle. Approximately five years would pass before the circle's first public gatherings in Prague. This period was marked by the efficacious and mutually enriching contacts with Ludwig Wittgenstein, reaching their peak in 1930.

The *public phase* was inaugurated with the collective appearance of members of the Schlick circle, under the name "Vienna Circle," at the First Conference on the Epistemology of the Exact Sciences in Prague, accompanied by the presentation of the manifesto *The Scientific World Conception: The Vienna Circle*; the establishment in 1928–29 of the Ernst Mach Society as the circle's populist arm; and the publication, starting in 1930, of the journal *Erkenntnis.* The Circle's increasingly public activity came to a temporary halt in 1934: the Ernst Mach society was dissolved, Otto Neurath emigrated after February, 1934, and Hans Hahn died unexpectedly. An externally-determined dissolution process had already begun with the onset of emigration early in the thirties; the murder of Moritz Schlick in June,

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_2

1936, brought a final, brutal end to the expansive phase inside Austria. In the subsequent *phase of decline* between 1936 and 1938 a few peripheral circles formed around Friedrich Waismann, Viktor Kraft, Heinrich Neider, and Edgar Zilsel tried to maintain the original communicative network in Vienna. This ended with the "annexation" of Austria to Hitler's Germany in March, 1938.

It is to be noted that, in parallel to the start of the public phase with its conferences and congresses and manifold publications, we find an *internationalization* of both the Vienna Circle and Logical Empiricism (1930–1940). The process involved an exchange of views with related groups such as the Polish school of logic and the American pragmatists. At the start of the 1930s as well, communication with Karl Popper began on the group's periphery. Soon the "mathematical colloquium," organized by Karl Menger, represented a broadening and accentuation of the Circle's focus; Menger's colloquium met regularly and published the *Ergebnisse eines mathematischen Kolloquiums* (Reports of a Mathematical Colloquium) (8 vols., 1931–36).

Following their appearance at the Prague conference, the Vienna Circle participated in the Second Conference for the Epistemology of the Exact Sciences in Königsberg (1930), in Prague's Eighth International Congress for Philosophy (1934), and in six International Congresses for Unity of the Sciences (1935–41)—twice in Paris, and once each in Copenhagen, Cambridge, Harvard, and Chicago.

With this interdisciplinary expansion and pluralization, both Logical Empiricism and the Schlick circle's philosophy of science were transformed into the "unity of science" movement, organized by Neurath and Carnap with non-Austrian philosophers such as Charles Morris. Along with the ninth volume of the journal *Erkenntnis,* edited by Carnap and Reichenbach (starting with vol. 8, as the *Journal of Unified Science*), additional diversity was achieved through the series *Schriften zur wissenschaftlichen Weltauffassung* (ed. by Moritz Schlick and Philipp Frank, 11 vol., 1929–1937), as well as *Einheitswissenschaft* (ed. by Otto Neurath, 7 vol., 1933–39). Finally, the latter efforts at a pluralization and concretization of scientific empiricism culminated in the publication, starting in 1938, of the large-format *International Encyclopedia of Unified Science* (ed. by Otto Neurath, with Rudolf Carnap and Charles Morris). The project has appeared in a body of two volumes and 19 monographs, under the title *Foundations of the Unity of Science* (ed. by Neurath, Carnap and Morris, 1970–71). The activity after 1940 already signifies, however, a new phase in the final emigration, exile, and transformation of Logical Empiricism; it represents part of a development to be considered separately: the movement's international influence following the outbreak of World War II, which includes the phenomena of integration and diffusion.

Before more closely scrutinizing these external and internal developmental phases, let us first consider the cultural context of the Vienna Circle and Logical Empiricism in the First Republic.

2.1 The Sociocultural Framework: The "Late Enlightenment"

We can gain a deeper sense of the Vienna Circle's history, as well as that of its wider milieu, by considering "late Enlightenment" currents both within the Ethical Movement and among monists and freethinkers. The context for such an orientation is Austria's socio-liberal cultural movement.

A variety of neo-liberal groups and associations both on the edge and inside the "leftist camp"—the social-democratic cultural movement—offered the conceptual grounding and institutional framework for the late Enlightenment: a phenomenon defined by programmatic homogeneity, ideological affinity, and personal interconnections (Stadler 1981a). What all the late Enlightenment currents had in common was a basic humanitarian-cosmopolitan perspective, an uncompromising orientation toward progress and reason, and the advocacy of social and cultural reform. In addition, the groups involved worked, both theoretically and in practice, on forming an anti-metaphysical world view and shaping an ethical foundation for everyday life through non-revolutionary strategies that corresponded well to an ethos fundamentally radical-bourgeois in nature.

In 1919, these groups were united under an umbrella organization called the Free Union of Cultural Associations. It included the General Austrian Women's Association, the Ethical Society and Ethical Community, Readiness [*Die Bereitschaft*]. Association for Social Work and for the Spread of Social Knowledge, the Association for the Reform of Marriage Law, the Austrian Monist Society and Viennese Academic Association of Monists, the League of Austrian Freethinkers, the Society for Social Pedagogy, and the Association for Popular and Young People's Education. The Union of Austrian Associations for Peace, the Viennese Sociological Society, and diverse, smaller reform associations (e.g., Josef Popper-Lynkeus' Association for a Universal Alimentation Service) were closely connected to the other groups. Along with the more narrow linkage of all the groups to the Viennese movements for adult education and school reform, there was also collaboration and intellectual exchange with the Ernst Mach Society and Otto Neurath's Museum for Society and Economy.

By virtue of their particular qualities, most important among these groups were the monists, the freethinkers and the members of the Ethical Society linked to them, and the Association for a Universal Alimentation, for it is only within the context of their activities that the Ernst Mach Society assumes its intellectual-historical value and socio-historical dimension. In addition, we need to take account of the Masonic influence (Zirkel 1984; Patka 2010, 2011): the Monists' Association and Ethical Society, for instance, were founded by lodges—a fact reflected in their humanistic-pacifist perspective. The partial integration of the groups into the culture of the labor

movement represented another key element of their identity[1]—an element likewise reflected in the social standpoint of the Ernst Mach Society. Although the other groups belonging to the Free Union had been strongly stamped with social-democratic tendencies since 1918, this applied for the Society only to a limited extent, as we will see. Put briefly: due to its program for a logically and empirically based rationality and a scientifically grounded philosophy, the Ernst Mach Society "emancipated" itself more strongly from the metaphysical, historical-dialectical materialism of Austro-Marxist provenance and instead developed the concept of unified science in the spirit of Logical Empiricism.

The roots and operating conditions of all these intellectual phenomena lie in the Vienna of the fin-de-siècle and in the breakup of the Habsburg monarchy. The present chapter of the Austrian history of science did not emerge ex nihilo, but continued from the earlier developments, under the transformed social conditions of the post-war period. These conditions can only be touched on briefly here. They mark a phase of late-bourgeois and high-capitalist society, which led to the fascist seizure of power—a phase characterized, on the one hand, by a process of societal democratization in the wake of a failed revolution, and, on the other, by the remaining leanings of a "conservative monarchy." Alongside and in interaction with these social realities a second revolution took place in the natural sciences and a corresponding process of technological innovation with particular emphasis on concepts of rationalization and planning.

The crucial presence of directly opposing political-cultural camps is mirrored in a predominantly bipolar cultural landscape (Heer 1981), which an externally-oriented intellectual history must consider in relation to both epochs (monarchy and republic) and integrate into a differentiated perspective. Let us cite several trends within this pattern of "modified continuity": leaving aside their continued dominance within Austria's press, liberal ideas, strongly influenced as they were by German and Austrian Jewry, had exhausted their political effectiveness long before World War 1; they nevertheless still set the tone of discourse in the sciences and arts. Cultural streams such as humanism, pacifism, scientism, and social and cultural reform had already been strongly represented in the monarchic period by figures including Ernst Mach, Josef Popper-Lynkeus, Albert Einstein, Ludwig Boltzmann, Bertha von Suttner, Alfred H. Fried, Rudolf Goldscheid, Friedrich Jodl, and Sigmund Freud. After 1918, their impact was presented in what was perhaps a sharper and less compromising manner than in the previous aesthetic and impressionistic epoch.

Through the new party landscape (comprised of social democrats, Christian socialists, pan-Germanists, and German nationalists), neo-liberalism was either squeezed into the political subculture[2] or gradually absorbed by the mass parties; the Austrian Social-Democratic Workers' Party was here destined to be an integrating

[1] Glaser 1981; Weidenholzer 1981; Pfoser 1980; Langewiesche 1979; *Arbeiterkultur* 1981; *Die ersten 100 Jahre* 1988; *Das Rote Wien* 1993. On "red Vienna" in general see Rabinbach 1983; Gruber 1991.

[2] For example anarchists and reformers of living conditions: Botz/Brandstetter/Pollak 1977.

vehicle. The alliance of scientific philosophy with the adult education movement emerged from precisely this social constellation in the post-revolutionary phase of an unstable republic, threatened by fascism and civil war. Rationality, technophilia, an anti-metaphysical orientation, all directed at promoting science and progress, served as a means to emancipate the masses. The gulf between this program and the opponents of progress was so great that more subtle means of social critique and contemplation of nature could be dispensed with: a solid basis among the populace had to be first informed and then mobilized in any event. In this particular situation, given the antagonistic environment of "black Vienna" (Wasserman 2014), the social-democratic stronghold of "red Vienna" underwent considerable radicalization, everyday political life being marked by a process of self-confirmation and self-representation—an assertion of a strength that was often auto-suggestive. Equally at play was the theme of constructive action and thought on the part of the new people, future *Bauvolk*, or founding populace, of an anticipated socialist society. Both manifestations, the interaction of world view and ideology, on the one hand, and strictly scientific development, on the other, will be described below in relation to the Ernst Mach Society (Sect. 4.2).

On the initiative of the Freethinkers, the Austrian Monists' Association was founded before World War I, following some official resistance.[3] The actual agent of the group's establishment, however, was the 6,000-member strong German Monists' Association under the direction of Ernst Haeckel and Wilhelm Ostwald (Lübbe 1963, part 3). Already in 1911 the Viennese philosopher Friedrich Jodl had spoken of cultural issues at the international congress of monists held at Hamburg, and he subsequently became a major intellectual and organizational activist for the Monist movement. As in Austria, the German Monists' association stood in close proximity to the workers' movement through its mass agitation to renounce membership in the Christian churches. The common front formed by Wilhelm Ostwald and Karl Liebknecht demonstrated that a political-ideological coalition between the progressive, liberal bourgeoisie and socialism did exist. A similar movement emerged in 1913 in Austro-Hungary, in which the Czech Socialist Monists' Association initiated a large campaign to leave the church in order to commemorate the 500th anniversary of Jan Hus's burning at the stake (Herneck 1960, 35).

During World War I, the pacifist tenets of Ostwald and a large portion of the German association faltered (in contrast to the Austrian monists). With ninety other distinguished artists and scientists, Ostwald signed the pro-war appeal "To the World of Culture"; in doing so, he set himself apart from the modest number of anti-militarist and pacifist scholars grouped around Einstein (Lübbe 1963, 1972, 238; Böhme 1975). As was the case with his scientific program for "energetics," Ostwald would come to accept the untenability of his pro-war position. Along with Jodl, active members of the Austrian Monists' Association before 1914 included Rudolf

[3] Sources: Unpublished handouts and lecture programs; *Schriften des Deutschen Monistenbundes*; Belke 1978, pp. 43–48.

Goldscheid, Wilhelm Börner, Wladimir Misar, and Paul Kammerer (Misař[4] would later participate in the Ernst Mach Society). In 1913, Edgar Herbst founded the Viennese Academic Monists' Association. This group was active only to a modest extent, since its anti-metaphysical, scientific orientation held a defensive, minority status in the university. The already mentioned Rudolf Goldscheid (1870–1931) played a central role within this circle. As a freethinker, he had published numerous texts before the war treating women's emancipation, human rights, and pacifism.[5] He is considered the founder of the "sociology of finance," and of the concept of the "economy of humans"—the terminology now meets with disfavor—that was particularly favored by the monists; he arrived at the latter through his rejection of any mode of Social Darwinism and his uncompromising anti-militarism.

Goldscheid based his work on a Marxist-monistic ethic with biological, sociological, and economic foundations ("ethical positivism"). He arrived at a theory of society oriented toward the natural sciences, condemning the inhuman conditions accompanying the commodification of human beings and advocating their rectification through an economical development that excluded conflicts between classes and peoples. The premise for such a process—and here we see the weakness of a sociology based on economic-developmental principles—is a non-capitalist society existing in a peaceful world, which according to Goldscheid can be achieved through planning and organization (Herzberg 1928, 192ff.). Let us note that a strikingly similar model of rational social technology is to be found in Otto Neurath's planning -schema. Alongside Max Adler, Rudolf Eisler, Josef Redlich, and Wilhelm Jerusalem, Goldscheid was a founder of the Viennese Sociological Society. As editor of the internationally circulating journal *Friedenswarte,* he was a chief representative of the European peace movement, as well as a member of both the Ethical Society and Readiness. Accordingly, along with a few members of the Monists' Association, he vehemently turned against the war -euphoria of his German colleagues: a position he would maintain after the war in an even less compromising manner.

With Paul Kammerer (1880–1926), the monists' ranks included a distinguished natural scientist with pacifist sympathies as strong as Goldscheid's. In his role as an internationally recognized biologist, Kammerer attempted to sustain the Lamarckian thesis that the inheritance of acquired characteristics is possible under either natural or artificial conditions; in doing so, he drew bitter opposition from a number of neo-Darwinists. This debate, and the accusation (still unsubstantiated) that he doctored his experiments, may have contributed to his sudden suicide.[6] In their early phase, the Austrian monists engaged above all in activities related to social reform in the realms of law, education, and public welfare, along with the anti-alcohol and women's suffrage movements. Their philosophical doctrines of monism were basically

[4] Wladimir Misař: teacher, also at secondary schools (physics and mathematics); freethinker, member of the Ethical Community, Freemason High Secretary.

[5] On Goldscheid: Belke 1978, p. 34 f.; *Deutsche Biographie* 1953 ff.; Hickel (ed.) 1976; Ch. Fleck 1990.

[6] On the eventful life and work of Paul Kammerer: Koestler 1971.

copied from the organization's German branch and included the assumption, amongst others, of a natural unity of the world and its explainability through scientific reason alone.

This vague program had room, however, for a broad range of different "monisms," as one can see from their lecture schedule. After the war, only a small membership was available to resume monistic activity—and then only in cooperation with the proletarian freethinkers. Goldscheid remained the dominant personality, partly because, after 1918, he continued to publish pamphlets on socialization and brochures on problems of the state budget and taxes (Schwarz 1919). The names of the members, authors, and lecturers demonstrate that, with its appeal to reason and science and its technologically-oriented planning, the Austrian Monists' Association was attractive to both those in the Austro-Marxist sphere and members of the Vienna Circle. We thus find Moritz Schlick, Otto Neurath, and Herbert Feigl giving talks in the Monists' Association, along with the author Hedwig Rossi, with whom Schlick maintained a warm correspondence.[7] In February 1921, Schlick had delivered a talk "on the meaning of life" at the German Monists' Association; his *Allgemeine Erkenntnislehre* (1918, *General Theory of Knowledge*) was considered not only as a critique of traditional positivism but also as offering a scientific foundation for the monistic view of the world (Schlick 1927; Herzberg 1928, 115f.). Schlick directly affirmed the monistic perspective in the second edition (1925), indicating in chapter 35 ("Monism, Dualism, Pluralism") that

> Thus we are thoroughly convinced that all the qualities of the universe—all being whatsoever—are of one kind in so far as they can be made accessible to knowledge by means of quantitative concepts. In this sense we embrace a monism. There is only *one* kind of reality, that is, we need in principle only *one* system of concepts to know all the things of the universe. And there do not exist in addition classes of things that this system does not fit. (Schlick 1974, 326)

In Austria, Schlick seems to have refrained from further engagement with the Monists' Association—after 1929 the Ernst Mach Society served as a platform for his ideas. Schlick's student Herbert Feigl wholeheartedly agreed with Schlick's pointed critique of any sort of psychophysical parallelism or dualism. Feigl was to be concerned for many years with the mind-body problem; he formulated a language-analytic, monistic solution to the problem, without classifying it—in the manner of Rudolf Carnap—as a pseudo-problem or one lacking content. Schlick's own "identity theory"—in the end a metaphysical construct—had anticipated Russell's position of "neutral monism"; it was then refined by Feigl in his talk "The 'Mental' and the 'Physical'" (1958) (Blumberg and Feigl 1974, xxii ff.). It is thus not surprising that Feigl appeared as a speaker for the Monists' Association in 1930, presenting a talk on "Naturgesetz und Willensfreiheit" (The Laws of Nature and Free Will)"—nor that talks by both Neurath and Sigmund Strauß, supporter and member of the Ernst Mach Society, were announced for the program of January-April, 1923.[8] Two years later, Neurath, along with Theodor Reik and Rudolf

[7] Further speakers and supporters of the monist movement included Max Adler, Theodor Reik, Julius Tandler, Josef Karl Friedjung, Robert Wälder.

[8] *Flugblatt* 1923; *Der Pionier* 1930, No. 150.

Goldscheid, was included in the program of the Association with a lecture entitled "Gott in der Geschichte" (God in History)." Neurath, however, had doubts regarding both a trivialized monism and an ideological brand of freethinking:

> It is rather annoying to see how the doctrines of semi-theologians and academic philosophers, adorned with modernist finery, are confronted by freethinkers, monists, and other opponents with outdated arguments that were lame and weak even a generation ago. A discussion between modernized reaction and old-fashioned freethinking quite often leaves one with the impression that one party is trying to milk the bull, while the other is holding a sieve underneath. (Neurath 1932, 387)

However much the philosophical profiles of Schlick and Feigl differed from that of Neurath, the monists' program doubtless comprised a conceptual basis for the program that would be presented in the Circle's manifesto and in the Ernst Mach Society. The family resemblances between (natural-scientific) monism and the scientific world conception become apparent when one compares the main philosophical currents in the Monist movement with the description of the historical background of the Vienna Circle in the Circle's manifesto (1929, cf. Neurath 1973, 301–05). They suggest at least an overlapping of influences. At the same time, there is a clear-cut divergence between the two movements: in the Vienna Circle, the latest developments in scientific research (e.g., the work of Helmholtz, Poincaré, Duhem, Boltzmann, and Einstein) as well as mathematics and logic (Frege, Russell, Wittgenstein) were always being taken into account, whereas the Monists based themselves on popular science. Unlike the prehistory of the Vienna Circle Monists who were essentially amateurs, those at the center of the Vienna Circle engaged, to some extent, in basic research. Against the backdrop of this difference, the distinction that would later be drawn between the *wissenschaftliche Weltanschauung* and *wissenschaftliche Weltauffassung*—between the scientific world view and the scientific world conception—takes on plausibility. In any event, it is striking that both Rudolf Carnap and Karl Popper cite monism as both backdrop and starting point of their intellectual development (Popper 1976, 12f.; Carnap 1963, 7).

However committed the Monists' Association activists, their role within the Viennese late Enlightenment remained a minor one. As indicated, the group to which they were closest was the Freethinkers, whose activities proceeded on a broader basis and with more publicity within Vienna's labor movement. The consistently monistic world view and ideology of the Freethinkers, as well as their political program, also furnished a framework of orientation for some members of the Vienna Circle, for example Philipp Frank and Otto Neurath. Conversely, the Ernst Mach Society offered the League of Freethinkers a suitable forum for promulgating their viewpoint, so that a majority of the Society's members were in fact freethinkers. But despite such narrow connections, it would be an error to speak of a symmetrical relation of influence between freethinkers and representatives of Logical Empiricism: despite a certain interdependency, we in fact find a growing intellectual dominance on the part of the Society as the influence of the Vienna Circle grew (Sect. 4.2.4). The League of Austrian Freethinkers was founded during the First Republic (1921), but revived the Society of Individuals without Denomination first established in 1871, and advocated the separation of church and state for school

reform, in particular for a free-spirited, worldly ethic and a corresponding program of instruction in the schools.[9] In 1931, the league had 310 local groups in nine provincial organizations, and a total of 45,000 members; the journal *Der Freidenker* appeared with a circulation of 50,000, and up to that point 41 brochures had been published by league members using their own press.[10] The League also founded an office for legal defense, a network for medical care, and an arts center. Despite official resistance, a program on the "ethical approach to life" was established by Wilhelm Börner and like-minded colleagues in the league's own school, which had 2,000 children in 60 classes directed by 35 teachers.

Together with the Readiness association as well as Hans Kelsen, the freethinkers pushed unsuccessfully for a reform of the marriage law, that is, for the legalization of so-called dispensation marriages, which, although entered into by approximately 50,000 couples, had been declared invalid by the Constitutional Court as a result of Church pressure. It is clear from this and similar efforts that the League of Austrian Freethinkers was very much part of the labor movement. Even though it speaks of itself as an "unpolitical association" in its statutes (*Der Freidenker* 1922, 2) a later paragraph corrects the impression this might leave and describes the League's purpose (in 1933 it was to serve as a pretense for the legal dissolution of the League): "Cultivation of free thought, that is, the construction and promulgation of a socialist world view and way of life on a scientific basis." The freethinkers were not uncontroversial within the Social Democratic Party, for there was, after all, competition in the form of the Religious Socialists around "little" Otto Bauer. Still, they did represent a significant cultural-political entity in "red Vienna"—one that was strengthened through membership in the International Proletarian Freethinkers.

This latter organization, with its journal *Atheist,* split off from the Comintern's Opposition of Revolutionary Freethinkers in 1931 (*Protokoll* 1931). The philosophical foundation of the freethinkers' world view and understanding of science was formed by empirical rationalism, a (partly eclectic) assimilation of dialectical materialism, and to a great extent by the (non-dialectical) "Epicurean Marxism" in Otto Neurath's sense of the term, which represented a further development of traditional, mechanistic materialism. In late 1928, Neurath explained his special form of Marxism programmatically in a short exposé in the *Freidenker* (basically a summary of chapters from his book *Lebensgestaltung und Klassenkampf* ("Personal Life and Class Struggle", in: Neurath 1973, 249–298)). Neurath argued there for the advantages of the Epicurean and Enlightenment tradition within Marxism in opposition to that of the German Idealist tradition grounded in Kant and Hegel. With reference to Marx's dissertation on Epicurus and Democritus, he offered a bipolar, historical-genetic interpretative schema, which served to separate the tradition of Plato-reception that he rejected from the tradition stemming from Epicurus that he favored. During his entire lifetime, Neurath would remain an advocate of this

[9] Sources: Ronzal 1931, pp. 86–92. *Freidenkerbücherei*; *Der Pionier*; *Der Atheist*; *Der Freidenker*; handouts and programs of the Austrian Union of Freethinkers; *Arbeiterkultur* 1981; Kahl/Wernig (ed.) 1981.

[10] Until 1928 32 volumes appeared in the *Freidenker-Bücherei* (Freethinkers Library).

eccentric position within the dazzling spectrum of Austro-Marxism; in the process, he took on the position of an anti-idealist, anti-dialectic outsider, competing above all with Max Adler's synthesis of Kant and Marx.[11]

Yet the freethinkers also remained open to a dialectic version of their theoretical superstructure. This was the point, for instance, of the talk given by the biologist Julius Schaxel—one of the few "dialectic" natural scientists writing in *Erkenntnis* (1930–31)—at the 1931 Congress of Freethinkers on the dialectic of nature as a fundamental scientific orientation. Furthermore, the Austrian freethinkers viewed Goldschied's "economy of humans" as a prescription for social planning; in this vein they organized a "conference for an ethical approach to life [*sittliche Lebenskunde*]" in April 1928, together with various teachers' organizations. Designed to offer an alternative to compulsory religious instruction,[12] this gesture was greeted with severe criticism by the bourgeois press. The general intellectual situation was also reflected very lucidly in freethinkers' descriptions of the cultural scene and in their self-understanding. We thus find references to "the struggle of monism for its existence," objections being raised to speculative and irrationalist trends, and lectures delivered in 1930 concerning the concordate and the peace movement.[13] Slowly and reluctantly, freethinkers began to analyze the rise of fascism, while proceeding with their activities for workers' sport, the youth movement, and proletarian art. In 1931, they organized the International Conference for Sexual Reform in Vienna—a goal fitting well into their broader socialist schema for reforming human life.[14]

We can discern additional biographical and intellectual ties with Logical Empiricism at work within the Ethical Society, in its relation to both the Ernst Mach Society and certain members of the Vienna Circle. The naturalistic-utilitarian ethic of the educator and philosopher Friedrich Jodl (1849–1914) formed the philosophical basis for the Ethical Society after World War I. As one of the chief figures in Vienna's late Enlightenment, Jodl's biographer Wilhelm Börner (1882–1951) was the First Republic's most prominent champion of the ethical movement.[15] Börner was a tireless advocate of adult education—between 1906 and 1909 he served as secretary of the Viennese Association for Popular Education—and an independent author. Until his emigration in 1938, his talks and articles championed radical pacifism, monism, and freethinking, along with the goals of the bourgeois feminist movement and a partly psychoanalyticallyoriented educational theory.[16] Börner's "critical optimism," with its aesthetic-literary tenor, offered him a framework for opposing the age's growing anti-Semitism. Considering all politics to be a form of applied social ethics, he also condemned the violent daily politics he saw around

[11] Glaser 1981, p. 39ff. and pp. 48–58ff.; Pfabigan 1982; Stadler (ed.) 1982, pp. 1–181.

[12] *Atheist* 1927, no. 11, p. 9; *Enquete* 1928.

[13] *Atheist*1929, no 1, p. 1.

[14] *Sozialismus* 1981; *Arbeiterkultur* 1981.

[15] Sources: library and estate of Wilhelm Börner; Vienna Municipal Library and Vienna Municipal Archives; literature: *Zum Gedächtnis Wilhelm Börners* 1971.

[16] Huber 1977; Wiesbauer 1982.

him (Maderegger 1973, 185f.). The "ethical approach to life" was his response to an education centered around state authority; he hoped to see this response integrated into a comprehensive social and popular ethic. The philosophical world view he strived for was meant to find its technical completion in an "art of living."

Considering its social-liberal humanism, it appears to be no coincidence that Moritz Schlick was a member of the Ethical Society. The puristic-ethical Börner was more aware than Schlick of a specific mission: in the inter-war period, he delivered approximately 800 lectures to the different groups connected with the Free Union of Cultural Associations and other such forums, treating themes such as sexual education, penal education, the formation of character, the anti-alcohol movement, pacifism, the ethical approach to living, scientific philosophy, knowledge of human beings, public welfare, wisdom concerning life, and social ethics. Still, for Schlick such concerns converged with his own literary alter ego and his own interest in eudaimonistic ethics and a humanistic sense of wisdom in life. The "worldly Sunday celebrations" inaugurated by Börner and copied by the Monists' Association were intended as a non-religious (albeit similarly structured) alternative for freethinking people (workers and bourgeoisie alike); these meetings suited Schlick's this-worldly orientation and his stress on social harmony. In 1928, Schlick thus lectured at the Ethical Society—he had been on its board since 1926—on "The Ethics of Duty and Ethics of the Good." After Schlick's murder in June, 1936, Börner evoked his role as an ethical thinker in a short public eulogy and in a note to his wife, praising him as a worthy successor to Jodl and as a friend of Popper-Lynkeus, and stressing his harmonious conception of "between ethical theory and ethical praxis."[17]

Among the Ethical Society's members and supporters (after 1927) were Rudolf Carnap and Viktor Kraft, together with other members of the Ernst Mach Society (Hans Thirring, Wladimir Misař, Bruno Schönfeld).[18] As the center of the Free Union from 1918 onward, the Ethical Society would continue to exist until 1938, in contrast to other groups in the Union. It postulated a humanistic-cosmopolitan program similar to that of the Freemasons, its goal being the secular ethicization of education and politics. Correspondingly, a women's group was formed for the promulgation of pacifism and social ethics,[19] courses were held on worldly moral instruction and the "ethical approach to life," and the already-mentioned Sunday celebrations were organized, with classical music and solemn speeches.[20] Practical work was carried out at the Center for Social Protection founded to help those threatened and in need of assistance; among other things, the center supported sexual and educational reform as well as pacifism through its conference on ethical education. The Society presented its worldly, anti-metaphysical ethic as a minimal

[17] Börner 1936. Cf. the correspondence Schlick-Börner (Vienna Circle Archives, Haarlem).

[18] Sources: Börner library, loc.cit.; *Flugblätter* and *Mitteilungen der Ethischen Gemeinde*, Vienna Municipal Library. A. Fuchs 1978, p. 147 ff.; Belke 1978, p. 39 ff. See also a letter from W. Eckstein to V. Kraft, 3.6.1929 (Viktor Kraft estate, Vienna).

[19] *Mitteilungen* 1918, p. 1.

[20] Cf., for instance, the report in: *Abendblatt*, 1.18.1919.

goal for the moralists. On this basis remarkable activities were organized in the period of incipient civil war: against militarism, for the (bourgeois) women's' movement (conference on the equality of women, 1927), and—together with the Social Democrats—for a reform of marriage law (the retention of dispensatory marriage) in the framework of the association formed for that purpose. In addition, Börner established a *Lebensmüdenstelle*—a Center for Suicidal People, which often served as a shelter in a Vienna already marked by a high rate of suicide.

The Association for a Universal Alimentation Service operated in a similar manner.[21] In Popper-Lynkeus's spirit, this association, like that of the freethinkers, advocated a program of social reform and educational policies located between liberalism and social democracy. Dedicated to enlightenment and remaining aloof from party politics, this relatively small organization existed between 1918 and 1938, producing a journal with the same name. Its members demanded the free provision of food, housing, and clothing, created by an "alimentation army" in which it would be compulsory to serve. The utopian socialist program was based on Popper-Lynkeus's concept of socialization and aimed for the semi-socialization of the economy, a mixed economy that allowed both a planned centralized economy and a private economy with free competition and money.

Within the Social Democratic movement, this program was discussed heatedly by figures such as Wilhelm Ellenbogen, Otto Bauer, Karl Renner, Engelbert Pernerstorfer, Käthe Leichter, and Otto Neurath.[22] Neurath, in particular, was from his youth a follower of Popper-Lynkeus and his plan for a rational economy. At the start of 1919, in his role as director of Munich's Central Planning Office, he euphorically (and inaccurately) evoked Popper-Lynkeus' semi-socialization schema in a telegram to him: "Your work is becoming reality, we are proceeding toward full socialization" (Weissel 1976, 231). Among the founding members of the Association, members of the Readiness group were conspicuous; later members included Wilhelm Börner, Felix Frankl, Bruno Frei, Fritz Wittels, Albert Einstein, Margit Ornstein, and Richard Coudenhove-Kalergi. To be sure, with only 1,000 members in 1929, the Association appears to have played merely a marginal role within the First Republic. The alimentation program was popularized widely in the social democratic movement and by the Readiness group, the Society for Social Pedagogy, and the centers for adult education. One expression of the much harried liberal cosmopolitanism at work here was the Association's solidarity with the Pan-European and Esperanto movements—each reminding us of the vision shared by Carnap and Neurath of a world society and an encyclopedic program linking different peoples and cultures.

[21] Belke 1978, chapter 5; handouts of the "Allgemine Nährpflicht" association, Vienna Municipal Library.

[22] Popper-Lynkeus 1925; Frankl 1930; Belke 1978, pp. 132–196; März/Weber 1978a, b.

Chapter 3
The Non-public Phase of the Vienna Circle 1918–1928

3.1 The Formative Years 1918–1924: Hans Hahn—The "Actual Founder of the Vienna Circle"

In 1921 the chair in the tradition of Mach and Boltzmann became vacant as a result of Adolf Stöhr's[1] death. During World War I, the latter had ensured a certain continuity of scientific, language-critical philosophy. The first chair had not been occupied again since Friedrich Jodl's death in 1914. The mathematician Hans Hahn returned to Vienna accepting a full professorship for mathematics at the University of Vienna. Hahn sought to continue the debates of the proto-circle in the pre-war years and backed the appointment of Moritz Schlick (1882–1936) to the chair for natural philosophy. His efforts proved successful in spite of considerable resistance in 1922.

Immediately after his arrival in Vienna, Schlick organized informal discussion groups with mathematicians in connection with his lectures, which were well attended. In addition, he reworked, still strongly influenced by Russell, Hume, and Hilbert, the second edition of his *General Theory of Knowledge*, which appeared with the Viennese publishing house Springer in 1925. In the opening remarks of his inaugural lecture on natural philosophy at the University of Vienna in the winter semester of 1922–23, he mentioned his predecessor Ernst

Mach whose *Mechanics* he had read with great enthusiasm as a high school student[2]:

> The name Mach has ever since been associated with very strong emotions, for he was a radiant symbol of an unusual method of philosophizing. This method seems to be one of the most productive ones ever known in the history of human thought. How much more intense and different my feelings would have been if I had known that I was once to teach at the same place as E. Mach did here at the university.

[1] On Adolf Stöhr's life and work, cf. Austeda (ed.) 1974.

[2] Schlick, Vorrede zu: Naturphilosophie (WKA Haarlem, Inv. Nr. 8).

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_3

This commitment to the new scientific spirit in natural philosophy is all the more notable given the fact that in his early phase of epistemological realism, Schlick took issue with Mach's phenomenalism while still elevating his general view of science as the model of a whole philosophical movement. It also becomes clear why he became chairman of the Ernst Mach Society, founded in 1928, notwithstanding the considerable differences existing between the other members of the Society on political and scientific strategy (cf. Sect. 4.2.1). The young professor was certainly aware of these differences when in his inaugural address he spoke of the need to keep the spirit of Mach and Boltzmann in Vienna alive, even if their philosophical positions were not identical. Both predecessors had shared a commitment to the stringent methods of thinking intrinsic to the exact sciences, which was why there could be no longer be a *via regia* for philosophy, and in particular for natural philosophy, besides or above the single disciplines. Schlick's university courses in the formative phase of the Vienna Circle ranged, in addition to his main subject natural philosophy (including an introduction to Einstein's Theory of Relativity), from the history of philosophy (Schopenhauer, Nietzsche, contemporary philosophy) to moral philosophy, logic, and epistemology, as well as philosophy of history. At first glance, this seemed to be in keeping with the traditional canon of philosophical education, but it also corresponded to Schlick's all-embracing notion of philosophy which placed the special philosophies (of history, language, religion, morals, beauty, and nature) under the regulative primacy of modern natural science. He concluded his inaugural address with a motto uttered well before the linguistic turn—which was to characterize his thinking up until the late twenties: "Almost *all* philosophy is natural philosophy."[3]

In his own courses, the mathematician Hans Hahn, who had a congenial spirit,[4] promoted modern mathematics and logic, reflecting his own intellectual training with Boltzmann, Hilbert, Klein, and Minkowski. From the summer semester on, he offered courses on differential and integral calculus, function theory, natural geometry, and elementary mathematics, as well as Boolean algebra in the winter semester of 1924–25. He also taught a seminar on Russell and Whitehead's *Principia Mathematica*. Kurt Reidemeister, Josef Lense, and Leopold Vietoris attended this course, in which chapters of the book were recited. The German mathematician Kurt Reidemeister (1892–1972), a specialist in the field of foundations of geometry and combinatorial logic, was appointed associate professor of geometry at the Vienna University's Institute of Mathematics at Hans Hahn's behest. Up until the beginning of 1925, he was to play an important role in the formation of the Vienna Circle.[5] Together with Hans Hahn, Otto Neurath, Felix Kaufmann, Friedrich Waismann, Herbert Feigl, and Rudolf Carnap (in the second seminar), Reidemeister

[3] Ibid. Cf. the variation of Wittgenstein's dictum in *Tractatus* 4.003I: "All philosophy is 'language critique.' (But not in Mauthner's sense)."

[4] On Hans Hahn's life and work cf. the bio-bibliography in the second part, in particular in connection with the University of Vienna, see Einhorn 1985, 139 ff.

[5] Further references in the section on Reidemeister, part II, Einhorn 1985, 163 ff. Additional biographical material can be found in Otto Neurath's papers (WKA Haarlem).

participated actively and lectured in the joint reading of *Tractatus*. According to him, these seminars in autumn 1925, which could be seen as the Vienna Circle's first events, only dealt with Wittgenstein, discussing him point by point. Topics for talks were distributed to the participants and then discussed ad hoc (Schlick to Cassirer, 03-30-1927). In retrospect, Reidemeister believed that the *Tractatus* did not exert a great influence on the Vienna Circle, and was, instead, a document, on the basis of which the individual positions were formulated and stated.[6]

This corresponds to Karl Menger's recollections of the *Tractatus*-exegesis (Menger 1980, xviii): up until the 1924–25 seminar, Wittgenstein did not figure in Hahn's seminars. It is only through Reidemeister's report at the Schlick seminar in 1924–25 that Hahn's attention was directed to Wittgenstein's *Tractatus* and its significance for modern philosophy and logic, after he had initially ignored it. From 1926 on, the *Tractatus* was studied systematically, mainly on Carnap's insistence, and first contacts were made with the quasi-mystical author (by written correspondence from the end of 1924, through personal contacts from early 1927). After Reidemeister accepted a call to Königsberg as full professor, he organized the Second Conference on the Epistemology of the Exact Sciences there in September of 1930, where Kurt Gödel presented his revolutionary results on incompleteness for the first time.

By the end of 1924, the intellectual and institutional ground had been laid for the formation of the Vienna Circle: Frege, Russell and Whitehead, and Wittgenstein formed the theoretical frame of reference against the background of the anti-metaphysical world view of Mach and Boltzmann as well as Duhem and Poincaré:

> In the intellectual atmosphere of Vienna in the early 1920's, everything seemed to point to one fact: that the stage was set for more systematic discussion on a higher level. Schlick's Circle filled a definite need. (Menger 1994, 35)

In 1924 Schlick's students Friedrich Waismann and Herbert Feigl had suggested to their teacher a sort of regular "evening circle."[7] Together with Hahn, their mentor represented the intellectual nucleus of the progressive scientific philosophy and world view within academia. Two years after Schlick's appointment, the "symposion" project, a "republic of scholars" (Neurath) became a reality. The group included not only recognized scientists such as Schlick, Hahn, Kraft, Philipp Frank, Neurath, Olga Hahn-Neurath, and Heinrich Gomperz, but also younger students and doctoral candidates. This composition was reflected in the pluralistic and egalitarian spirit within the group. In the first years the following people figured as participants: Herbert Feigl and Friedrich Waismann, Rudolf Carnap, Bela Juhos, Heinrich Neider, Josef Schächter, Edgar Zilsel, Robert Neumann (a secondary school teacher), the mathematicians around Karl Menger, Kurt Gödel, Gustav Bergmann, Heinrich Löwy, Theodor Radakovic, Felix Kaufmann, and, from the younger generation, Egon Brunswik, Rose Rand, Marcel Natkin, Walter Hollitscher, and others.

[6] Reidemeister interview, Henk Mulder's papers (WKA Haarlem).

[7] Feigl interview ibid.

The expansion and networking of the new community of like-minded scholars was intended from the beginning. Its public-mindedness and internationalization can be understood as the direct result of its neo-Enlightenment discourse of science.

3.2 The Institutionalization of the Schlick Circle 1924–1928: Between Tractatus and Structure

Concerning the first intense phase of the Circle, we have to rely on what the participants left behind, their papers and their (auto)biographical writings. Our reconstruction of this period thus remains dependent on fragmentary evidence.[8]

In the fall of 1924, Moritz Schlick initiated interdisciplinary discussion rounds which met regularly at the instigation of his students Friedrich Waismann and Herbert Feigl, continuing the informal meetings that had taken place at the Institute of Mathematics on Boltzmanngasse 5 in Vienna's ninth district on Thursday evenings (Feigl 1969, 633 ff.). These discussions can be seen as the beginning of the Vienna Circle. These meetings were co-initiated by Hans Hahn, Otto Neurath, his wife Olga Hahn-Neurath, Viktor Kraft, the legal theorist Felix Kaufmann, and immediately before his departure, the mathematician Kurt Reidemeister. Waismann worked as a scientific assistant and librarian for Schlick and earned his living as a tutor and, above all, as a lecturer at Vienna's adult education centers. In the Vienna Circle of the 1920s he played the role of the interpreter of Wittgenstein's ideas. Following the meetings with Schlick and Wittgenstein and further conversations with the latter, he sought to publish an accessible and authoritive interpretation of the *Tractatus* philosophy but was not successful. The publication of the book *The Principles of Linguistic Philosophy* that had been announced since 1934 failed mainly because of Wittgenstein's own reservations and objections, along with almost dramatic priority disputes (Baker 1979). We know that the Friedrich Waismann's "Theses," completed around 1930, circulated in the Schlick Circle. Together with the manuscripts "Introduction to Wittgenstein" and the "The Nature of Logic," they were to form the basis for the announced book (McGuinness 1967, 22; Baker 2006 provides an overview of Waismann's manuscripts on Wittgenstein). The book, which was to appear as volume 1 of the series *Schriften zur wissenschaftlichen Weltauffassung* (Writings on the Scientific World Conception) with a programmatic introduction by Schlick, was finally completed in a strongly modified form by Waismann in 1939. It appeared in 1965 in English and only in 1976 in German. Together with his own publications, it is mainly the documented talks that Waismann had with Wittgenstein (1929 to 1932) that offer indirect access to the discussions on Boltzmanngasse, insofar as they were influenced by Wittgenstein (Waismann 1967; see below, Sect. 6.4).

[8] For relevant literature, see Feigl 1969, 1981; Ph. Frank 1949a; Carnap 1963; Neider 1977; Kraft 1973.

Rudolf Carnap reports on this revolutionary phase of the twenties dryly:

> In the summer of 1924, through Reichenbach, I had become acquainted with Moritz Schlick. Schlick told me that he would be happy to have me as an instructor in Vienna. In 1925 I went for a short time to Vienna and gave some lectures in Schlick's philosophical circle. From the fall of 1926 to the summer of 1931 I was an instructor of philosophy at the University of Vienna. (Schilpp 1963, 20)

Unfortunately, no copy remains of the first version of the *Logical Structure* which Carnap had been circulating in 1925 in the Circle, so it is not possible to trace in the later version the modifications of the neo-Kantian and conventionalist as well as Machian and Gestalt-psychological base of the *Structure* that were triggered by the discussions of it. Carnap reported only retrospectively that Hahn had seen Russell's program of an exact philosophical method developed in the *Structure* (ibid., 20). Generally, Carnap recalled the

> open and undogmatic attitude taken in the discussions. Everyone was willing constantly to subject his views to a re-examination by others or by himself. The common spirit was one of co-operation rather than competition. The common purpose was to work together in the struggle for clarification and insight. (ibid., 21)

According to Carnap, this pleasant atmosphere was derived from Moritz Schlick's personality, his friendliness and modesty. This sometimes negatively obscured his preferences and achievements—most notably those in his *General Theory of Knowledge* (*Allgemeine Erkenntnislehre* (1918, 2nd ed. 1925)). It can be safely assumed that the main arguments of this philosophical oeuvre, above all its epistemological realism, did not stand in the center of discussions at this time. By contrast, Neurath is reported to have regularly insisted in his combative way that scientific knowledge must take into account external conditions. The integration of the history of science and the sociology of science, together with epistemological naturalism, represented, to Schlick, a provocative alternative within a (philosophy-free) scientific world conception. The limits of consensus had thus been reached when Neurath gave more weight to his pragmatism than to the theoretical (logico-empirical) foundations and legitimation:

> Most of us, myself included, were socialists. But we liked to keep our philosophical work separated from our political aims. In our view, logic, including applied logic, and the theory of knowledge, the analysis of language, and the methodology of science, are, like science itself, neutral with respect to practical aims, whether they are moral aims for the individual, or political aims for a society. (ibid., 23)

Here the crucial element of political pluralism is addressed, which reflected their theoretical disagreement (e.g., on the question of a physicalist unified science as a form of modern non-metaphysical and non-dialectical materialism from 1930 on, as we will see further below).

In addition to the discussion of the *Structure*, the reading of the *Tractatus* was the second main focus in the non-public phase. As Carnap sums it up succinctly and candidly,

> In the Vienna Circle, a large part of LudwigWittgenstein's book *Tractatus Logico-Philosophicus* was read aloud and discussed sentence by sentence. Often long reflections

> were necessary in order to find out what was meant. And sometimes we did not find any clear interpretation. But still we understood a good deal of it and then had lively discussions about it. (ibid., 24)

Against the backdrop of this account, it is only understandable that Wittgenstein, the man and his work, polarized the members of the circle and triggered negative to euphorically affirmative positions. The so-called mystique of silence was, for Neurath, Carnap, and others, but a lapse into a metaphysical philosophy. In view of this highly differentiated Wittgenstein philosophy in the Vienna Circle, it makes sense to take extreme care when assessing the direct influence of the "unknown genius" on the Circle and to delimit the Wittgensteinian influence both in terms of persons (Schlick, Waismann) and theme (by the diverging positions of Neurath, Carnap, Feigl, Menger, and others) (cf. Chap. 6 and Sect. 4.1.1.5).

Carnap's fragmentary notes on the discussions in the Schlick Circle[9]—on Carnap's arithmetics, Ramsey's definition of identity, the foundations of mathematics and probability, the reality of the other minds—are confirmed by Herbert Feigl's recollections (Feigl participated regularly in the Vienna Circle from 1924 to 1930):

> The approximate date of the beginning of the W.K. was 1924, but I do not remember whether it was in the spring or in the fall of that year. It was Professor Kurt Rademeister, the mathematician, who proposed the first reading of the *Tractatus*, and who (together with Hahn, Schlick and Neurath) was most active in that first exegesis. I myself, had read the first publication of the *Tractatus* in Ostwald's *Annalen der Naturphilosophie* (1922, I believe), but at that time I was a very young student and I dismissed Wittgenstein as a most curious mixture of intuitive genius and schizophrenia.[10]

Feigl, one of Schlick's very first students in Vienna and a skeptical reader of Wittgenstein, also reports on the sentence-for-sentence exegesis in the circle following Reidemeister's lecture. However, he concludes that "about 60 % of our time was devoted to the problems of the foundation of mathematics and the rest to philosophy of science and epistemology. Carnap's *Structure* was discussed elaborately sometime between 1926 and 1928" (ibid., 2) and that the first volumes of *Erkenntnis* (1930 ff.) reflect to some degree the results of a discussion in the Circle.

Whereas Schlick's *General Theory of Knowledge* was completely ignored, much to Feigl's dismay, in addition to the *Tractatus* and the *Structure* the discussion focused on probability (following, among others, Kaila) and the Dutch intuitionists (Brouwer) until, in the early thirties, the group began to read the manuscripts of Carnap's later book *Logical Syntax of Language*). Nevertheless, Feigl reports that in spite of all the discrepancies between the concerns of rational reconstruction (Carnap) and the pursuit of ideal—and later ordinary language—philosophy (Wittgenstein), by 1926 the group shared a common understanding and identity, namely that of a reform movement in philosophy.

Feigl's own interest was mainly influenced by his studies with Schlick, under whom he wrote a thesis on *Zufall und Gesetz* (Chance and Law). Inspired by Edgar Zilsel's relevant works (1916), he dealt here with the so-called problem of

[9] Cf. the survey in Sect. 4.1.1.2.

[10] Feigl interview, op. cit., 1964, 1.

application. It is likely that Feigl's considerations in his book *Theorie und Erfahrung in der Physik* (Theory and Experience in Physics) (1929), which was commended by Einstein and Wolfgang Pauli, would have exerted a greater influence on the Vienna Circle if Feigl had not emigrated to the United States in 1930 because of the dominant anti-semitism and the resulting reduction in professional opportunities. In this first and last German-language book, Feigl described in an accessible way the foundations and the types of physical theories in order to then discuss their meaning and validity in connection with quantum mechanics. As an early advocate of a critical realism—in agreement with Schlick (up until 1925), Kraft, and later with Popper—Feigl took issue with Kantianism and conventionalism and promoted a (hypothetical-deductive) "neutral positivism" beyond classical idealism and materialism. Feigl contributed in a dual sense to the internationalization of the Vienna Circle: first, through his lectures at the Dessau Bauhaus (together with Carnap and Neurath), second, through his publication of the essay "Logical Positivism. A New Movement in European Philosophy" (1931) in the renowned American *Journal of Philosophy*. He had written this influential essay together with his American friend Albert E. Blumberg, who had come to Vienna in 1929 and completed his doctoral thesis under Schlick on *The Philosophy of Emile Meyerson and Positivism*. The cited article began as follows:

> One of the most interesting phenomena in recent European philosophy has been the convergence of two significant traditions: the postivisitic-empirical and the logical. Comparable in importance with the Kantian synthesis of rationalism and empiricism, this new movement is sharply distinguished from it both by its results and by the fact that it embodies not the work of an individual, but the agreement of numerous logicians, philosophers and scientists independently arrived at. This is particularly encouraging in a field like philosophy in which anything approaching a general unanimity has seemed hopelessly unattainable. The essence of this new development is its radically novel interpretation of the nature, scope, and purpose of philosophy–an interpretation gradually achieved through extensive inquiries into the foundations of logic, mathematics and physics… To facilitate criticisms and forestall even more unfortunate attempts at labelling this aspect of contemporary European philosophy, we shall employ the term, logical positivism. (Blumberg and Feigl 1931, 281)

This was the calling card of the Vienna Circle in the Anglo-American world, Schlick having been a visiting professor at Stanford in 1929. Apart from the synthesis of rationalism and empiricism, the externalist account of the new Viennese philosophy is of importance because of its development in the thirties: namely, that it took the form of interdisciplinary collective work of an open group of scholars united by the spirit of the Enlightenment. The genial, solitary thinker as acrobatic systematic philosopher, as an individual subject in the flow of intellectual history, had resigned theoretically and practically and become a symbol of old-style philosophy estranged from its surroundings.

New participants joined the circle, most notably Karl Menger, a mathematician and logician, Kurt Gödel, and Gustav Bergmann. With this intellectual input, the Wittgenstein critique became more differentiated and strengthened. At the same time, a break with the anti-metaphysical unified science was promoted, which ultimately resulted in the creation of a separate logical-mathematical platform parallel to the Vienna Circle, Karl Menger's so-called "Mathematical Colloquium" from 1928 to 1929 on.

In fall of 1927, Karl Menger, a young mathematician, came back to Vienna from Amsterdam, where he had worked as Brouwer's assistant and private lecturer for two and a half years. In Vienna he had studied with Hahn and Schlick. As a specialist in curve theory, Menger became associate professor for geometry (as Kurt Reidemeister's successor) at the University of Vienna in 1928. On Hahn's initiative he was introduced to the Schlick Circle as a specialist in the theory of dimension. The ambience of the Circle's meeting place on Boltzmanngasse 5 in Vienna's 9th district is described very graphically by Menger:

> The meeting place of the Schlick Kreis was a rather dingy room on the ground floor of the building in the Boltzmanngasse that housed the mathematical and physical institutes of the University. The room was filled with rows of chairs and long tables, facing a blackboard. When we were not in session it was a reading room, occasionally used for lectures. Next door, there was a small library and a tiny office for Schlick and his assistant. Those who arrived first at the meeting of the Circle would shove some tables and chairs away from the blackboard, which most speakers used. In the space thus gained, they arranged chairs informally in a semicircle in front of the blackboard, leaving one long table for those who brought books along or wished to smoke or take notes. People would stand in informal groups until Schlick clapped his hands. Then the conversations stopped, everyone took a seat, and Schlick, who usually sat at one end of the table near the blackboard, announced the topic of the paper or the report or the discussion of the evening. The size of the Circle varied from 10 to 20 in the course of the years. During each academic year, the list of those attending remained on the whole the same, except for foreign guests. (Menger 1994, 54 f.)

The focal point of this semi-circle was clearly Schlick, who would also read out loud from the latest scientific correspondence (with Einstein and Russell) or cited announcements and new publications requesting that they be discussed. It was also he who personally introduced foreign guests at the beginning of each session, before a paper or a discussion on a previously agreed-upon theme began. With regard to the topics discussed, Menger recalls,

> … in none of the many meetings that I attended in the course of the years did the debates ever touch political or economic problems. Even men with strong political convictions never expressed them in the discussions of the Circle. It was in these discussions that Schlick particularly excelled both as a stimulating participant and a moderator of ideal poise. (Menger 1982, 86)

Menger reported debates on elementary statements and tautologies, with whose definitions he was dissatisfied. For him, these basic components of the empirical sciences were to be understood in pragmatic terms and as relative to the observer. He himself gave a critical talk on Brouwer's intuitionism to the Circle in 1927 and formulated—according to him, long before Carnap's discovery—the principle of tolerance with regard to the use of logic and languages:

> I presented the intuitionistic-formalistic dictionary of set theory that I had devised as well as what just at that time had begun to take a firmer shape in my mind–the epistemological consequences of my critique of intuitionism: the plurality of logics and languages entailing some kind of logical conventionalism. (ibid., 88)

According to Menger, his innovations did not meet with much response given the dominance of the "philosophy of ideal language" (Sinnreich 1972). Carnap, along with Hahn, allegedly was skeptical, whereas Schlick, Kaufmann, and Waismann

repudiated this relativistic conception which undercut final foundations. Neurath did not show much interest and Kraft remained reserved. The young Gödel, who had been a guest of Schlick's Circle since his enrollment in the winter semester of 1924, hardly took the floor:

> … he evinced interest by slight motions of the head indicating agreement, skepticism or disagreement. … at Schlick's request, I did report in two sessions about the contents of my paper 'Bemerkungen über Grundlagenfragen' (Remarks about the foundations of mathematics). The second of these reports, which gave rise to what Carnap later called the Principle of Tolerance, prompted some rather unfavorable immediate reactions; but I noticed that Gödel greeted my presentation with vividly approving nods. (Menger 1994, 200)

In connection with his own path-breaking works in logic and mathematics, Kurt Gödel met regularly up until 1929 with Carnap and other members of the Vienna Circle, sometimes apart from the Thursday evening meetings—as Carnap noted in his diaries. Parallel to this, Godel also, surprisingly enough, studied Hegelian German idealist philosophy and commented positively on Lenin's *Materialism and Empirio-Criticism*, including the concept of planned economy. However, he focused particularly on the life and work of Leibniz. After the Circle's manifesto was published, the introverted logician is said to have met only sporadically with the Vienna Circle. Menger recalls one of these rare meetings as follows:

> After one session in which Schlick, Hahn, Neurath and Waismann had talked about language, but in which neither Gödel nor I had spoken a word, I said on the way home: 'Today we have once again out-Wittgensteined these Wittgensteinians: we kept silent.' 'The more I think about language,' Gödel replied, 'the more it amazes me that people ever understand each other.' (Menger 1994, 210)

From 1930 on, Gödel's scientific communication—intensified by the contact with Alfred Tarski—concentrated even more on the Mathematical Colloquium of Karl Menger whose work, as a visiting professor at Rice Institute in Houston in 1930–31, made him known internationally. In this way, he also paved the way for Gödel's visiting professorships and later emigration to the United States.

According to Menger, the principle of tolerance received as little positive response in the Vienna Circle at the end of the twenties as did his own critique of verificationism and of the absolute concept of tautology, which anticipated Quine's later relativization of the dichotomy of "analytical" and "synthetical" in the 1930s.

The differentiation of logical empiricist theory ultimately resulted in a further pluralization of the Vienna Circle which became manifest with Menger's founding of the Mathematical Colloquium. This high-brow circle, similar to the Vienna Circle, promoted logical-mathematical discourse in particular in the period from 1928 to 1936. It was influenced intellectually by the Schlick Circle and had a strong international orientation.

The work of this widely ignored circle is documented in the publication series *Ergebnisse eines Mathematischen Kolloquiums* 1931–1937 as well as articulated in three popular lecture series. The titles of the published lectures indicate the programmatic reformist orientation: *Krise und Neuaufbau in den exakten Wissenschaften* (1932), *Alte Probleme – Neue Lösungen in den exakten*

Wissenschaften (1934) and *Neuere Fortschritte in den exakten Wissenschaften* (1936) (cf. Chap. 5).

It was only a question of time before Menger—who like Schlick and Gödel differed with the content and the combative diction of the Vienna Circle manifesto—saw himself as only "standing close to the Vienna Circle" (1982, 91 f.). Menger's significance is also illustrated by his role as a mediator vis-à-vis the Polish school of logic. With his invitation to Tarski in 1930, Menger initiated the fruitful communication between the Vienna Circle and the Polish School of Logic which continued in the phase of emigration and internationalization up to World War II.[11]

Viktor Kraft developed a similar position of critical-sympathetic distance from the Schlick Circle, in which he was a regular participant from 1924 to 1936. It was Kraft who composed the first monograph about the Vienna Circle in 1950. He remembered the thematic chronology of the debates conducted in Boltzmanngasse, which in the early phase involved Frege, Russell, and Wittgenstein. He reported,

> The discussion evenings were continued uninterruptedly from 1924 to 1936. Even when Schlick was in America. Always on Thursday evenings. Often until late at night. Usually a subject was introduced by a paper and then a discussion developed. The moderator was Schlick, who also once presented a paper himself on causality.[12]

Like Feigl, Kraft did not see the manifesto but rather the publications as being representative of the actual discussions in the non-public phase of the Circle, in particular those of Carnap, Schlick, Hahn, and Gödel:

> The pamphlet *The Scientific World Conception. The Vienna Circle* lists a great number of philosophers, sociologists and logicians who are described as the precursors. Yet historical matters were never discussed in the Vienna Circle. The cited authors broadly determined the direction, as it were, in which the V.C. discussions were to be pursued, but this does not mean that Hume, Bolzano or Brentano, Helmholtz, Mach and Boltzmann would not occasionally be mentioned in connection with a certain subject. The same is true for Avenarius and Popper-Lynkeus. Poincaré was not dealt with, either, as his theories were assumed to be known to everybody. (ibid.)

According to Kraft, three general stages in the Circle's discussions can be distinguished in the period from 1924 to 1936 (apart from specific meetings on books or articles). Up until about 1930, discussions, initiated by Hahn, Menger, and Carnap, dealt with logic and the foundations of mathematics (Russell, Frege, Wittgenstein; fragments from the *Structure*). In the second stage, Wittgenstein's *Tractatus* was discussed intensively by Schlick and Waismann. In the third phase after 1930 the following themes were central: (a) Carnap's *Logical Syntax* against Waismann's opposition, (b) physicalism as promoted by Neurath and Carnap, and (c) the writings of Heisenberg, Bohr, and Planck, predominantly by Schlick and Hahn.

It is surprising that Kraft's own position (constructive realism) was not addressed in the first phase, even though his *Grundformen der wissenschaftlichen Methoden*

[11] On this see the report "Bibliographical Remarks on the Modern Literature of Anti-Irrationalism in Poland," in *Erkenntnis* 5 (1935), 199–204. On the latest research, see Szaniawski (ed.) 1989; Kijania-Placek and Wolenski 1998.

[12] Kraft's reminiscences 1973 and Kraft's interview, op. cit. (WKA Haarlem).

(Basic Forms of Scientific Methods) was published in 1925. This approach apparently only began to have an effect through Tarski and Popper during the later public phase of the Circle. Schlick was similarly reserved as far as his own individual philosophical development was concerned (this can be discerned in the *Gesammelte Aufsätze* (Collected Essays) and colluded with the then-dominant Wittgenstein discourse (Kraft 1973, 16).

In the late twenties, younger students and doctoral candidates, usually students of Moritz Schlick and Hans Hahn, came into contact with the Vienna Circle as young-generation scientists. One of them was Marcel Natkin (born in Lodz, Poland; died 1963) who had obtained his doctorate from the University of Vienna with a thesis on *Causality, Simplicity and Induction*. In the spirit of Mach, he took recourse to the principle of simplicity as the basis of theory formation and all inductive knowledge. Natkin, who was good friends with Feigl, moved to Paris after completing his studies, where he earned his living as a photographer, and lived as an isolated and alienated immigrant under very difficult conditions.[13]

Theodor Radakovic (1895–1938), a mathematician born in Graz, was another of the sporadic visitors. Radakovic had been a *Privatdozent* of mathematics at Vienna's Technical University from 1928 to 1938, even though he had been appointed associate professor for mathematics at the University of Graz in 1934. In his habilitation thesis, he dealt with the theory of the so-called singular intervals as developed by Henri Lebesgue and Hans Hahn, but he also showed a strong interest in the foundational issues of mathematics that may have brought him into contact with the Vienna Circle.[14] Another representative of this younger generation was Béla Juhos (1901–1971), who was born in Hungary, studied with Schlick and Reininger, and wrote his doctoral thesis on *To What Extent did Schopenhauer do Justice to Kant's Ethics?* From the beginning of his studies he was a regular guest in Boltzmanngasse. Given his economic independence he was able to devote his efforts to epistemological and logical studies and to contribute to the meetings of the Vienna Circle. He brought together these studies in his first book, *Über die Grundlagen der Gewißheit des reinen Denkens* (On the Foundations of the Certainty of Pure Thought) (1928). Following the logical-mathematical discussions in the Vienna Circle, Juhos developed his own epistemological-analytical method for dealing with foundational questions and addressed these questions in publications on physicalism.[15]

Gustav Bergmann has left us a vivid and informative account of the inner life of the Schlick Circle. This report was commissioned by Otto Neurath in 1939—in exchange for his financing Bergmann's move to America—and published after his

[13] The life and work of Marcel Natkin is presently only indirectly accessible through unpublished materials; e.g., the correspondence with Carnap, Schlick and Neurath at WKA Haarlem. See Natkin's dissertation 1928 as primary literature, in Haller (ed.) 1999, on Natkin see also the introduction of this volume.

[14] On Radakovic in connection with his time in Vienna: Einhorn 1985, 559 ff.

[15] Cf. the literature references concerning Juhos in the second part. From an autobiographical perspective see interview Juhos, Henk Mulder's papers (WKA Haarlem); Juhos 1965. On Juhos' biography see Reiter 2011.

death.[16] In 1925, Waismann had suggested inviting Bergmann, a trained mathematician, to the Circle meetings, where he remained a critical participant up until 1931:

> The Boltzmanngasse group, however, had, as I see it, already reached its highpoint in 1927/28, maintained momentum for several years and by 1931/32 already showed clear signs of splintering and, as a consequence, declining. The advocates of a consistently physicalistic theory of science, whose "logical reconstruction of the world" and the radically rationalistic general attitude bound up with it, had lost with Carnap's departure the personality that would have been appropriate to form the center of an academic colloquium. The Wittgensteinian esoterics, however, under whose influence Schlick himself increasingly fell, were not reluctant to see the decline of the old Circle. Their aversion to "beating an issue to death" and to discussions with people who lacked the "capacity to grasp the essential, the necessary intuition", had likewise increased their alienation from those who maintained the traditional attitude of the Circle.. (Bergmann 1993, 195)

What Bergmann is quoted as saying pointedly here some twelve years later corresponds to Karl Menger's reconstructions. However, its dramatic diction should be not be overestimated, since Bergmann also wanted to meet some of the expectations of Neurath with this overdrawn account of group formation. Since the thirties the latter had been developing an alternative to the academic circle in Boltzmanngasse—in response to the "fuss about Wittgenstein" ("Wittgensteinerei") he so much detested. Of interest in this context is Bergmann's assessment that with the growing dominance of Wittgenstein's ideas the phenomenological group around Felix Kaufmann had gained influence, opposed by Schlick and Hahn. The general assessment of the Vienna Circle in the cultural life of its time converges with the official account, for instance, when Bergmann said that "as a fellow combatant on the broad front of progress" one sets oneself in an enlightenment context, which was in keeping with the self-understanding of a sort of "left" opposition against the traditional community of philosophers (ibid.). The internal dynamic of the group can, in a sense, be understood as a 'language game' with distributed roles: Schlick as the leader in the background; Carnap, Neurath, and Hahn as drawing cards in special discussions, as "veterans of the last line of defense in a struggle for pure concepts and consistent development of ideas" (ibid.) and with ambitions for the popularization of these ideas; Waismann as the advocate of the Wittgenstein faction; Kraft as a regular but silent "dissident." In spite of such very different mind-sets, a discussion culture emerged that was characterized by serious objectivity but "not without a cheerful and fresh spirit," a forum unprecedented in terms of quality and duration. In this climate of a non-hierarchical "republic of scholars" which was loath to any cult of genius and personality, the following subjects were dealt with after Bergmann had left: Brouwer's ideas, Hilbert's mathematics, Russell's theory of types, the probability calculus as well as current reports on Carnap's works, issues concerning the supposed separation of the social sciences, typifications, even legends and simply unconscious ideal formations can be discerned in the diverse recollections of former members of the Vienna Circle. These can be accounted for by not only the temporal distance from the actual meetings and the pluralism of this dynamic scien-

[16] Bergmann 1988 (English: Bergmann 1993).

tific community, but also by the selective nature of memory. The autobiographical texts must therefore be read as impressionist elements of a mosaic which remains embedded in a loose network of traditional philosophical texts and other written sources. Bergmann's autobiographical assessment of the Circle are significant not only in a subjective sense, but also against the backdrop of the cultural history of the First Republic. He concluded as follows:

> Seen in this way, the important scientific movements, which until now had their common center of radiation in Vienna – psychoanalysis, the philosophy of the Vienna Circle, and Kelsen's legal and political philosophy – really belonged together and they determined the specific intellectual atmosphere of the Austria that vanished, just as did, in the artistic sphere, the authors Broch, Canetti and Musil. (ibid., 207)

The rather introverted Heinrich Neider (1907–1990) was a regular member of the Schlick Circle from 1927–28 on and was also responsible for the publication of important writings of the group in his function as co-owner of the publishing house and bookstore Gerold & Co. He completed his doctoral thesis on *The Significance of Understanding for the Method of the so-called Geisteswissenschaften* (1930) under Schlick, strongly advocating the principled unity of sciences. Subsequently he claimed to have created the concept of "physicalism" in discussions with Neurath and Carnap, who eventually strongly backed the concept (Neider 1977).

Neider is also important as a contemporary witness of the Neurath wing in the thirties, as documented by comprehensive correspondence, and as an activist in the Ernst Mach Society up to its dissolution in spring of 1934.[17] He gave a lively report of his first contacts with Vienna Circle around 1925:

> One day at the end of my second semester I sat in the "Café Arkaden" next to some colleagues, namely Feigl, Natkin, and Carnap who had just come to Vienna. We spoke about our plans for the future, and I told them, 'I would like to go to Freiburg next semester to study with Husserl.' Natkin laughed and said, 'So there are still people who are going to Freiburg! People are pouring to Vienna, the new Mecca of philosophy, from all over the world. And here is a man from Vienna who wants to go to Freiburg.' I was highly amused, but he went on to explain, 'If I want to study physics, I will go to Göttingen, and for philosophy to Vienna.' I began to think about this, and we had a long discussion; Carnap was a very skilled debater who could express himself in a very convincing way and left a profound impression on me. He hadn't taken up his lectures then. It was getting late and they asked me, Don't you want to come with us? We are going to Neurath's now.' 'Who is Neurath?,' I replied. And again Natkin, a short man from Lodz in Poland, said, 'You don't know Neurath? He's the funniest man in Vienna.' This is how I came to know Neurath, who was living in an old and rather run-down house in the fifth district at the time. The smell was awful. We came to an apartment door which was opened by a blind woman: Mrs. Neurath. She led us to her husband, who was sleeping, and she had to shake him awake. He was a huge man, big like an elephant … I was introduced to him. His first question was, 'What are you studying?' 'Philosophy, pure philosophy,' I said. And he, 'How can you do something filthy like that? You might as well study theology!' That was my first meeting with Neurath. A lively discussion ensued, one subject always leading to another. Neurath was extremely stimulating, lecturing extensively on patristic philosophy, natural computation, marginal utility theory, probability theory. All these topics he addressed in the course of a few hours. The others could not always entirely follow him. Then he switched to his plans for the

[17] Cf. Sect. 4.2.1. and the extensive correspondence with Otto Neurath 1934–1938 (WKA Haarlem).

> future. He wanted to start a journal, found an organization. Neurath was the great activist. For him, knowledge and thinking were always only a means to action, which for him, *a la longue*, was revolution … Through Feigl and Carnap I quickly got into Schlick's seminar, and even though I acted pretty much like an *enfant terrible* there, Schlick seemed to take a liking to me for some reason, and in the winter of 1927/28, when I was in my 3rd semester, he invited me to his exclusive evening meetings that would later come to be known as the 'Vienna Circle.' (Neider 1977, 21)

Together with Feigl, Natkin, and later Rose Rand, the young Neider formed the "student group" of the Circle. Sociologically speaking, this was a significant feature of the Vienna Circle: it featured participants from three generations who all had equal standing (professors, lecturers, students, and members of the extra-university public) and, even if less pronounced, men *and* women.[18]

This openness was consciously promoted by growing international participation and, from 1929 on, became a crucial element of communication. Apart from the Berlin group around Hans Reichenbach, Kurt Grelling, and Carl Gustav Hempel named in the manifesto, one also finds the German mathematicians Adolf A. Fränkel, Hasso Härlen, and Viktor Lenzen. Further foreign guests were the American Dickinson Miller, the Finnish professor of philosophy Eino Kaila, possibly also Frank P. Ramsey, Wittgenstein's English friend, and the Hungarian mathematician John von Neumann.[19]

Since its international atmosphere was not created just by reading texts, but also through personal contacts, joint publications, and meetings, all forms of "national science" were avoided even though the influence of the Austrian tradition remained strong. The first public appearance of the Vienna Circle and the Berlin Society for Scientific Philosophy in 1929 represents convincing self-presentation which included diffusion and the will to popularization through a separate learned journal, special book series, and a public society.

If we take a general look at the non-public phase from 1924 to 1929, the following global developments can be traced. By reference to the works of Einstein, Russell, Poincaré, Duhem, and Wittgenstein, the "new Positivism," which had already emerged after the turn of the century, was further developed and differentiated. The conventionalistic understanding of scientific theories, Russell's theory of types and relational logic, Wittgenstein's theory of atomic sentences (philosophy of ideal language), Hilbert's formalist program with implicit definitions, Einstein's General Theory of Relativity as well as his *Geometrie und Erfahrung* (*Geometry and Experience*) (1921), they all became elements of the new philosophy and the scientific world conception of the Vienna Circle, which in its own eyes stood at the

[18] The role of women in the Vienna Circle has not been adequately taken into account yet. It would be worth a separate study to deal with the scientific significance of women who have been given a marginal position in the relevant literature: Olga Hahn-Neurath, Rose Rand, Käthe Steinhardt, Maria Kasper, Marie Reidemeister, Olga Taussky-Todd, Hilda Geiringer-Mises, Else Frenkel-Brunswik, Susan Stebbing, Marja Kokoszynska-Lutman, Janina Hosiasson-Lindenbaum, Izydora Dambska, Dina Sztejnberg, and others in and around the Vienna Circle. Some first attempts can be found in Korotin 1991, 1997 and Neurath and Nemeth 1994.

[19] Cf. The bio-bibliographical information on those named in the second part.


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Fig. 3.1 Publisher's announcement of the Journal *Erkenntnis*

"turning point of philosophy" (Schlick 1930–1931), perhaps even in the midst of a "revolution in philosophy" (Ayer 1956).

Philipp Frank related this revolutionary intellectual movement to the political events of the times when he wrote in retrospect:

> The new movement started about the time when the first world war ended (1918). New democratic republics were established in Central Europe: Austria, Czechoslovakia, Poland and the Weimar experiment in Germany. They offered a favorable soil for the evolution of a scientific world conception. A similar situation seemed to arise in Russia after the overthrow of the Czarist regime (1917). It is interesting to note, how the turn from democratic start to the establishment of a new authoritarianism was accompanied by a turn from the philosophy of the new positivism to a philosophy which was nearer to the Aristotelian and Kantian tradition. The first peak of the Central European movement toward a scientific world conception was reached about 1920. We can characterize it by three books: M. Schlick *General Theory of Knowledge* (1918); H. Reichenbach, *Theory of Relativity and Cognition apriori* (1920); and L. Wittgenstein, *Tractatus Logico-Philosophicus* (1921). The link between these books and Einstein's theory is Schlick's small book *Space and Time in Contemporary Physics* (1917), in which the author attempts an integration of the new positivism with the ideas that have grown out of Einstein's new science. (Frank 1949a, 26)

In the context of this modernized epistemology—knowledge as correspondence between empirical facts and a system of symbols—Carnap was able to systematically use the new logic to begin work on his *Logical Structure of the World* and,

in the 1930s, to lay the foundations for an anti-metaphysical unified science together with Neurath. The latter characterized this transformation as follows:

> The Vienna Circle invested a lot of efforts in extracting the logical core from the *Tractatus* which had been so highly praised by Russell, so as to free it from its metaphysical shell. Directly and indirectly, this yielded extremely noteworthy results, in particular the one that logic was now understood as the syntax of language. Logic and mathematics supply analytic statements, the 'tautologies' that are needed in the sciences to rephrase sentences about reality. It was inevitable that resistance was voiced against Wittgenstein's metaphysics from within the school; many of his theses did not meet with general approval… whereas Wittgenstein himself had jettisoned 'sentences about sentences,' further and more detailed studies prompted the adherents of the school to also incorporate the 'sentences about sentences' in the scientific language. It became clear that in logic and empirical science one is confronted with systems of sentences on the possible form of which one must reach an understanding. In this way, the final element was obtained that Logical Empiricism was still lacking before it could become a comprehensive empiricist conception…. (Neurath 1981, 697)

By 1927, the Vienna Circle understood itself as philosophical movement in its own right—notwithstanding individual differences (Feigl 1969, 639). Yet already before them we can discern various initiatives to reach a wider public outside of academia. Although work by individual members of the Vienna Circle was regularly featured in Austrian and foreign publications, first steps were taken to find a common platform for scientific philosophy with an adequate organizational structure. Hans Hahn, Herbert Feigl, Viktor Kraft, Béla Juhos, and Moritz Schlick gave regular lectures at the Philosophical Society at the University of Vienna, which also became the local Viennese group of the Kant Society (Reininger 1938; Fisette 2014). This participation, however, was insufficient, measured against the intentions of the Logical Empiricists, and too disparate. Thus there were early plans to establish a separate department for empiricist philosophy within the Philosophical Society, but soon these were abandoned, allowing a more pronounced form of philosophical autonomy to emerge.[20]

Similar considerations gave rise, from the 1920s on, to attempts to launch a separate journal. In 1930 *Annalen der Philosophie*, edited by Hans Vaihinger, was taken over and successfully re-launched as the journal *Erkenntnis*. Rudolf Carnap and Hans Reichenbach were commissioned by the Society for Empirical Philosophy to publish the journal along with the Verlag Felix Meiner, after Schlick had withdrawn because of a difference of opinion.[21] The original initiative to launch a new journal had already been taken by Schlick, Reichenbach, and the German gestalt psychologists Wolfgang Köhler and Kurt Lewin. In 1924, Köhler announced his plan to edit a "journal for psychology and related sciences," and one year earlier Lewin had suggested the launch of a new philosophical organ.[22] At the same time, Reichenbach

[20] Letter from Schlick to Hofrat Ganz, 3-2-1934 (Vereinsarchiv Bundespolizeidirektion Vienna).

[21] On the history of *Erkenntnis* see Hegselmann and Sigwart 1991; Thiel 1993; Kamlah 1993; Danneberg 1993; Peckhaus 1993.

[22] On the history see Schlick's correspondence at WKA Haarlem: Köhler to Schlick, 4-19-1923; Reichenbach to Schlick, 3-8-1923; Schlick to Reichenbach 1-23-1924/6-19-1924; Helmuth Plessner to Schlick, 2-2-1923; Schlick to Meiner, 5-18-1930.

proposed a new journal for exact philosophy to the German publishing house Springer, naming Einstein, Hilbert, Russell, Huntington, Köhler, Wertheimer, Cassirer, Lewin, and, surprisingly enough, Karl Jaspers as possible collaborators. The correspondence concerning the initiatives extended over a whole year and then petered out, since Springer pulled back and differences in opinion emerged. In this context it is interesting to note that a similar initiative was taken by the German phenomenological philosopher Helmuth Plessner, who tried to launch a new quarterly because he believed that the journals existing at the time did not meet scientific standards. Only the closure of the journal *Annalen der Philosophie* (for which Schlick found only few words of praise), made possible the realization of the project that had been planned for many years. Now the Vienna Circle and its intellectual collaborators finally had found their specific organ of publication. Questions concerning the profile of the new journal continued to be the subject of heated debates on different levels, even thought the basic line of the journal corresponded to the positions of the circles in Vienna and Berlin.

Chapter 4
The Public Phase of the Vienna Circle: From 1929 Until the "Anschluss"

4.1 The Internal Development of Logical Empiricism

The discussions of the Schlick circle most likely reached their zenith, in terms of intensity and number of participants, around 1930, the beginning of its public phase. It was also at this time that the first departures by Feigl (1930) and Carnap (1931) occurred, that Schlick (1931–32) and Menger (1930–31) spent time abroad, and that Menger started his Mathematical Colloquium, a discussion circle that competed to a certain extent with the Schlick circle, and that integrated Gödel into its periphery. Occurring long before 1934, the year of Neurath's emigration and the death of Hahn, these events must count as the first signs of disintegration. At the same time, interest in Wittgenstein decreased (as it had since 1929) and the concern for public effectiveness (through the Ernst Mach Society and international conferences) increased. Both of the latter phenomena contributed to the diffusion of the intellectual centre that had become established in the Boltzmanngasse.

We can use the autobiographical reports of ex-members to gain a preliminary picture of the content and form of the discussions during this phase within the Vienna Circle, and then compare them with the discussion protocols of the time. For instance, we may note that Carnap's recollection concerning Neurath's role in the Vienna Circle is factually correct when he says, "One of the most important contributions made by Neurath consisted in his frequent remarks on the social and historical conditions for the development of philosophical conceptions" (Carnap 1963, 22). Yet as we can see from the discussion protocols reproduced below (Sect. 4.1.1.3), this recollection can only refer at best to the infrequent meetings of the 'inofficial Circle' or to discussions outside of the regular Schlick circle. Similar conclusions can be drawn concerning the general acceptance of the thesis of the physicalist unity of science. In its fully mature form, expressed as the overcoming of the outmoded mechanistic and dialectical forms of philosophical materialism, this thesis was by no means an uncontroversial element in the shared consensus of the Vienna Circle.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_4

Neither the idea of the unity of science nor the principle of verification—often used to stand for the whole of the Circle's philosophy—constituted the universally accepted dogmas of the Schlick circle discussed by most histories of Logical Empiricism.

The decline in Wittgenstein's influence during the public phase was described by Carnap as follows (cf. Chap. 5):

> The thinking of our Circle was strongly influenced by Wittgenstein's ideas, first because of our common reading of the *Tractatus* and later by virtue of Waismann's systematic exposition of certain conceptions of Wittgenstein's on the basis of his talks with him. At the same time, in the course of our discussions through the years, some divergences became more and more apparent. Neurath was from the beginning very critical of Wittgenstein's mystical attitude, of his philosophy of the 'ineffable,' and of the 'higher things' (das "Höhere"). (ibid., 28)

Upon comparison with the valuable document "Development of the Circle's Theses" (Sect. 4.1.1.5), this estimation is confirmed—but only with regard to those members who had already emerged in the 1920s as critics of Wittgenstein: Neurath, Carnap, Hahn, and Frank (with decreasing vehemence).

The other influences reported by Carnap are sufficiently well-known, especially the Berlin group around Reichenbach and the Warsaw group around Tarski, whose influence upon his own intellectual development Carnap judged in extremely positive terms:

> Tarski gave a lecture in our Circle on the metamathematics of the propositional calculus. In the subsequent discussion the question was raised whether metamathematics was of value also for philosophy. I had gained the impression in my talks with Tarski that the formal theory of language was of great importance for the clarification of our philosophical problems. But Schlick and others were rather skeptical at this point. (ibid., 30)

And Carnap continued, "My talks with Tarski were fruitful for my further studies of the problem of speaking about language, a problem which I had often discussed, especially with Gödel. Out of these reflections and talks grew my theory of logical syntax" (ibid.; cf. also Carus and Awodey 2007).

Carnap's discussion partners Gödel and Tarski, the latter representing the new Vienna-Warsaw axis that eventually complemented the Vienna-Berlin-Prague triad, were of great importance for the composition of his *The Logical Syntax of Language*. As regards the outside contacts to Popper, which began in the early 1930s, Carnap confirmed the sympathy of the Vienna Circle towards the author of *The Logic of Scientific Discovery* and noted that the latter stressed their real differences far too strongly (ibid., 31; cf. Chap. 7).

Carnap was also deeply impressed by his Prague colleague Philipp Frank, who regularly came to Vienna for the Circle discussions, especially by his comprehensive knowledge of the history of science and the sociology of the practice of science.

> Both because of his historical interest and his sound common sense, he was often wary of any proposed thesis that seemed overly radical, or of any point of view that seemed too formalistic. Thus, in a way similar to Neurath, he often brought the abstract discussion among the logicians back to the consideration of concrete situations. (ibid., 32)

This impression was confirmed by Frank himself. Frank stressed as decisive turning points for the public history of Logical Empiricism, besides the programmatic pamphlet of 1929, Blumberg and Feigl's paper of 1931 and Schlick's "The Turning Point in Philosophy" (1930), as well as *The Logic of Modern Physics* (1927) by the American pragmatist and operationalist P. W. Bridgman (Frank 1949a, 44). In addition, Frank described the remarkable continuity of the Vienna Circle's concern with metaphysical conceptions as they emerged in the debates regarding quantum theory:

> Remembering our old arguments in the Vienna coffeehouses around 1907 about Abel Rey, Ernst Mach, and Henri Poincaré I devoted some work to applying the newly developed 'scientific world conception' to overcome the new crisis. I tried to show that there is not the slightest reason to see in twentieth century theory an argument for an idealistic or spiritualistic world conception, and that this opinion only arises from a lack of scientific formulation of the new physical theories. This lack has its source in the poor training of physicists in philosophy, which makes them often faithful believers in the metaphysical creeds imbibed in their early youth 'from a nurse or a schoolmaster.' (ibid., 46)

Whereas Carnap attested to a decline in the influence of Wittgenstein on the discussions and views in the Circle, Gustav Bergmann (as quoted above) suggested, on the contrary, the dominance of Wittgensteinian ideas, as promoted by Schlick and Waismann. Here too one must object that his recollections overemphasize an undeniable polarization within the Circle and interpret it in favour of the anti-Wittgensteinian grouping, for the discussion of Wittgenstein's "Theses" (as rendered by Waismann) and their controversial evaluation is hardly sufficient grounds for the supposition of a comprehensive schism in the Circle. After all, there were also similar disagreements concerning other topics: verification, the problem of the empirical basis, metalogic, etc. It would be more correct to speak of a plurality of principled positions (represented by Wittgenstein, Tarski, Popper, and especially the wider international community of physicists), which seems wholly justified in view of the state of the discussion at the time. The broader encyclopedia movement, initiated in 1934 by the critics of Wittgenstein, may thus be understood as a conscious enlargement of the already existing framework under the heading of 'enlightened modernity,' characteristic of early Logical Empiricism.

One of the members of the Circle who made positive contributions to the long-standing issue of the supposed distinction between the *Geisteswissenschaft* and natural science (as did the regular visitor Felix Kaufmann) was Viktor Kraft. He emphasized the heterogeneity and dynamism of the Circle in the following terms: "The Vienna Circle was so lively that it always continued its development, so much so that it cannot be reduced to one determinate doctrine" (Kraft 1973, 17). We can discern this theoretical plurality in the broadly empiricist, strictly physicalist, and even phenomenological variants of 'the' Circle doctrine. Thus we may mention as a representative of the latter Felix Kaufmann, a follower of Husserl, and another regular visitor to the Circle, the high -school teacher Neumann (not to be confused with the only rarely mentioned Johann (John) von Neumann).

After his emigration to the U.S., Herbert Feigl only returned sporadically to Austria, during the summer recesses of 1931, 1932, and 1935, and so could no

longer contribute to the Circle's meetings. On the last occasion he also visited Schlick in Bolzano in Southern Tyrol. Feigl found Schlick in a rather depressed state of mind, due to the menacing letters Schlick received from his subsequent murderer as well as to his disagreements with Neurath and Popper (Feigl 1964, 3).

Karl Menger's gradual withdrawal from the Schlick circle and his simultaneous increased engagement with his Mathematical Colloquium will be dealt with in a different context (cf. Chap. 5). Menger's reminiscences, particularly of the 1930s, remain fragmentary and highly selective. According to him, discussions of the principle of tolerance, of the problem of the empirical basis, and of modifications of the conception of justification and confirmation were the most important since the publication of Carnap's *Aufbau* (1928a, b).

> In the course of the years, various modifications of the original plan had proved to be necessary, especially in connection with the Circle debates on verification and confirmation … But one tenet remained permanent: Psychological, sociological and economic entities could be and were to be constituted from sense-data by logical methods just like the entities of the physical world. (Menger 1994, ch. XIV)

In addition, Menger mentioned the topic of natural science versus the human sciences and the well-known preference for unified science, which he commented upon somewhat critically:

> For my part, I found what Carnap said about the special cases of methodological illusion or abuse to be fully convincing. Yet, apart from an instinctive aversion to monistic schemes of any kind, I feared that the idea of a unified science might possibly lead to the exclusion a priori of potentially valuable objects or methods of study … Science is being delimited – from what? from technology? from art? It is doubtful that this can be achieved except by arbitrary dictates; and it is even more doubtful that anything would be gained if it could be achieved. (ibid., 176)

In the end, Menger represented the unity-of-science project as a wholly justified response to the often fascist mentality of the German academic philosophy of *Geisteswissenschaften*—albeit a response that came too late and proved inadequate. This again is Menger as the classical liberal thinker. Fighting against all formulas for a 'planned' solution of social problems and conflicts of world views, even under extreme conditions he placed his faith in the victory of rationality in an unfettered competition of opinions—although he himself had been utterly repelled by the political situation since 1933. He recalled Schlick's last years as follows:

> In 1933, the year of Hitler's coming to power in Germany, there were periods when life in Vienna was almost intolerable … Schlick's position became precarious. He was not and, as far as I knew, never had been politically active. His political views can probably best be described as those of a British-style liberal. But this was far from satisfactory to the nationalistic professors and students … In 1933/34, the university was closed for extended periods of time. Both Schlick's Circle and my Colloquium, however, met regularly though Schlick, Hahn, and I, being the only members with keys to the deserted buildings, had to let the others in. Upon entering one had the feeling of having reached a quiet oasis. (ibid., 194–96)

Amongst the students and followers of Schlick, the philosopher and educationalist Josef Schächter (1901–1995), whom Schlick invited to participate in the Circle, stands out in several respects. Besides his activities as a rabbi and teacher of the Talmud at

the *Hebräische Pädagogium* in Vienna, he studied philosophy, primarily with Schlick, under whom he completed his dissertation about Nicolai Hartmann in 1931. From the mid-1920s until the murder of his teacher, Schächter participated in the discussions at the Boltzmanngasse. Schächter also was the only one of Schlick's students who published a monograph, *Prolegomena to a Critical Grammar* (1935), in the series *Schriften zur wissenschaftlichen Weltauffassung* (edited by Schlick and Frank). After his emigration to Palestine in 1938, Schächter wrote mainly in Hebrew about the connections between philosophy, religion, and world views, employing a logical analysis in the spirit of Schlick, Waismann, and Wittgenstein. In an unpublished paper of 1943, "Lehre und Irrlehre" (Teachings and False Teachings), he described the important influence of his teacher Schlick, to whose memory the paper was dedicated.

Walter Hollitscher (1911–1986) was a student of Schlick's who represented a total contrast to Schächter with respect to political opinions and world view. Hollitscher completed his dissertation, *Über Gründe und Ursachen des Streites um das Kausalprinzip in der Gegenwart* (On the Reasons and Causes of the Contemporary Dispute about the Principle of Causality), in 1934 and regularly attended the meetings of the Circle until 1936. As can be seen from his correspondence, he was in intense contact with Otto Neurath at the same time. (Klahr Gesellschaft 2003) Yet later on Hollitscher described these contacts and his relation to the Vienna Circle very sketchily—most likely due to the necessity of maintaining a party-political distance towards the 'positivism' to which he felt committed (he was an ex-functionary and theorist of the Austrian Communist Party). Instead, Hollitscher stressed his position as an outsider:

> As a matter of fact, I am most probably … the only student of Moritz Schlick, who ever declared himself for Marxism and Communism – one who did so even since the time when he became the student of his teacher: in the winter semester of the year 1929, when the teacher was forty-one years old [sic!] and the student eighteen. (Hollitscher 1977, 197; in fact, Schlick was forty-seven years old in 1929)

Hollitscher's retrospective view underscored Schlick's tolerance, stressed his anti-fascist habitus as his "bourgeois enlightenment radicalism," and noted the advantages of his position between materialism and realism as a philosopher of nature. Typically, Hollitscher focused more on the head of the Circle than the Circle itself:

> Even after I completed my examinations and received my doctorate our relations remained unaltered. I continued to attend his extremely stimulating lectures and seminars and visited the 'Vienna Circle' and discussed with him my philosophical concerns and projects. Together we also went to the international congress for philosophy in Paris, where Schlick – who, amongst other things, there argued against Driesch in strongest terms – far from being afraid, was wholly delighted by my polemic against the racist historiography of philosophy, which already then had gained dominance in Germany. (ibid., 200)

Never questioning the Communist party line, Hollitscher wrote the following about Schlick's opposition in the Circle—Neurath:

> Compared to this topic [the concept of life-condition], our philosophical differences of opinion concerning the so-called protocol sentences – to which Neurath declared reducible all empirical statements and which found a (linguistically rather inelegant) expression in Neurath's neologisms about speech-thinking – were of a very secondary nature. The

> criterion of practice, as Engels understood and called it – 'the proof of the pudding is in the eating,' as an English *bon mot* has it – was never sufficiently considered by Neurath. Neurath did not doubt the reality of the external world, however, as he affirmed to me in many discussions in which he accused the Vienna Circle of subjective idealism or agnosticism and its epistemology of being foreign to actual practice. Every now and again he called himself a 'materialist' and thus tended to shock Moritz Schlick. (Hollitscher 1982, 55)

In order to relativize these impressions we need only note here that the communication between Neurath and Hollitscher, as documented in their correspondence, suggests much more of a teacher-student relationship, with a certain reverence exhibited by the latter. This correction finds support in an article about the Vienna Circle of 1946, in which Hollitscher, in the spirit of the new beginning after the war, provides a balanced description of the basic theses of the Schlick circle. Yet for theoretical and ideological reasons, Hollitscher was eager to increasingly distance himself from such a position over the following decades. This is shown by his failure to mention the Vienna Circle at all in his official autobiography (Hollitscher 1981).

From the beginning of the Vienna Circle's public phase, contact with foreign visitors also increased. We may mention Tscha Hung from China and the Italian Ludovico Geymonat as two pilgrims to the Mecca of the scientific philosophy of their time. Tscha Hung (1909–1992, properly: Hong Quian) came to Vienna in 1928 after studies in Germany, where he completed a dissertation *Das Kausalproblem in der heutigen Physik* (The Problem of Causality in Contemporary Physics) in 1935 under Schlick, and regularly participated in the meetings of the Circle from 1930 until the murder of his teacher. He reports as follows:

> At that time, there were only discussions about the nature of the protocol sentences and the concept of affirmations, that is, about the foundation of knowledge, and about physicalism and unified science, etc. In these discussions it appeared to me that Schlick and Waismann stood on one side and Carnap, Neurath and Hahn on the other. Occasionally Frank came from Prague to take part in the discussions. What he contributed did not express agreement with Schlick's, even less with Waismann's views. Kaufmann was more for Schlick than for Carnap and Neurath. Zilsel sometimes was for Neurath, sometimes for Schlick. Zilsel's neutral position in these discussions found sympathy and support. (Tscha Hung 1987, 10)

Here again we find a portrayal of the Circle as an open forum of discussion. It also becomes clear that claims of a split between left and right factions or a dominance of Wittgensteinian ideas in this phase of the Circle have to be revised to a considerable extent. Notably Tscha Hung also confirmed the often underestimated importance of Tarski for the Circle's discussions concerning metalanguages.

The philosopher and mathematician Ludovico Geymonat (1908–1991), a student of Peano, Enriques, and Vailati, who became the founder of the modern theory of science in Italy, was also a student in Vienna in the years 1934–35, mainly of Schlick and Waismann. He also attended the meetings at the Boltzmanngasse and of the Mathematical Colloquium (Geymonat 1991, 44–45) and found the views expressed in both groups congenial. He shared their realism as well as their attitude towards the unity of science and their historical orientation. Geymonat became Italy's most important proponent of a modernised materialism (later assuming a neo-Marxist orientation) and a pioneer of the philosophy of science in Italy (Geymonat 1980).

The Finnish philosopher and psychologist Eino Kaila (1890–1958) visited Vienna in the years 1929, 1932, and 1934. Through his participation in the discussions of the Schlick circle, and especially his monograph *Der logistische Neupositivismus: Eine kritische Studie* (1930), he initiated the dialogue between the Circle and the philosophers of science in Scandinavia (cf. Niiniluoto 2010, 2015; Siitonen 2010; Neuber 2012a, b). As can be seen from the protocols of the meetings, Kaila's engagement with Logical Empiricism was discussed extensively; Rose Rand even presented a talk on this topic. In his monograph Kaila—whose psychology of personality, incidentally, has been invoked by the film director Ingmar Bergmann—discussed Carnap's *Aufbau* from the perspective of Gestalt psychology and philosophical realism. Carnap replied with a review in *Erkenntnis* (vol. 2, 1931). Retaining the dualism of language and reality, Kaila later attempted to criticize both the phenomenalist and the physicalist, purely linguistically oriented versions of Carnap's views as well as Schlick's verificationism in his *Über das System der Wirklichkeitsbegriffe: Ein Beitrag zum logischen Empirismus* (1936). Introducing three levels of language and a system of different concepts of reality within the framework of a somewhat 'synthetic' philosophy, Kaila sought to promote an epistemological realism which approximated that of Viktor Kraft.

The connection to Vienna was maintained through his students, amongst them Georg Henrik von Wright, who visited Vienna in 1937, and the psychologist Kai von Fieandt, who attended the Bühler circle, which included Egon Brunswik, in 1935. Fieandt recalled the Schlick circle as follows:

> As far as I recall, I followed two entire meetings of the Vienna Circle. Moritz Schlick sat at the head of the table, the others around it, and the following took place. Everybody read a paragraph from a certain work – I think it was Wittgenstein – and continued where their predecessor had left off. After one round Schlick commented on the text. One was permitted to ask questions and to discuss matters … Schlick left a strong impression on me as a teacher and as a personality; one could clearly sense that he possessed a close relationship to those present for whom he represented a great authority and who revered him. (Fieandt 1986, 284–85)

These brief impressions present a vivid picture of the late phase of the Circle—after its heyday with Carnap, Hahn, and Neurath—and appear to corroborate Gustav Bergmann's description of the dominance of Schlick and Waismann, then deeply under the influence of the middle Wittgenstein. Even so, one should be wary of quick generalizations about the inner life of the Circle on the basis of reports by occasional visitors.

The testimony of the Norwegian Arne Naess (1912–2009) is in this context more authentic and relevant. He participated continually from 1934 to 1936 in the movement of Logical Empiricism. In 1936, as a result of his investigations of the theories of the Vienna Circle, he published his Oslo dissertation *Erkenntnis und wissenschaftliches Verhalten* (Knowledge and Scientific Behavior), a pioneering work of empiricist sociology of science. Naess describes the Vienna Circle in the following way:

> The central members and visitors of the seminar – about 10 people – were seriously engaged in one and the same great undertaking. There was an atmosphere of eager cooperation. Something very great was being built and any cooperation, however modest, was appreciated. There was room for all. Opinions differed, but then it was essential to ask: Is the

> difference serious? Exactly how serious? Perhaps minor, perhaps all to the good: there ought to be no *Gleichschaltung* [streamlining of opinions]. (Naess 1993, 11)

Besides this egalitarian attitude, Naess found further remarkable characteristics of the Circle: its style of discussion and its view of the relation between philosophy and ideology.

> A participant puts forth an opinion, using a sentence T. A second participant, probably thinking the opinion is not tenable, interferes, saying *'Würden Sie (würdest du) die Formulierung U akzeptieren?'* ['Would you accept the formulation U?'] … What struck me as *mustergültig* (worthy of being a model) about this procedure was the effort not to declare *lack of agreement* before careful verbal investigation so that undesirable effects of terminological idiosyncracies were eliminated, and the choice of conciliatory, building-up-the-other way of clarification. (ibid., 12)

As further elements of the Circle's method for dealing with differences of opinion, Naess mentioned the non-categorical formulation of the theoretical positions at issue ("So-and-so formulates his opinion this way: …") and what he deemed its appropriate allowance for the vagaries of everyday language.

> We often search for words to express our thoughts. We imply that the thought is already there, but that it is difficult to find a completely adequate and accurate verbal expression. Perhaps less often we wonder what exactly we meant, if anything, when we said so and so. The above features of communication in the Schlick seminar made it completely natural to doubt that we meant something very definite when we listened to our long strings of words. Fixing the attention on words, phrases or sentences, but not that-sentences, made it easy to admit at least for ourselves that we were not quite clear in our heads – that we in a sense only were vaguely aware of what we might be talking about. (ibid., 12–13)

This tolerance vis-à-vis uncertainty and the readiness for a careful, self-critical use of language surely constituted a unique form of communication, one that made the long and intense discussions on a single topic, often extending over several meetings, possible in the first place. We may view this as a sociological characteristic of the Vienna Circle that illustrates an interconnection of form (style of discussion) and content (conceptions and use of language). In retrospect this form of communication was christened by Naess a "Gandhian nonviolent approach" (ibid., 13). After his personal portrayal of different members of the Circle, Naess reached a remarkable judgment of the movement of Logical Empiricism as a whole:

> Looking back I feel sorry that the combined analytical and social initiative of the logical empiricists petered out. It constituted in the 30's a cultural force … When Quine and others took over the analytical leadership, the movement was largely robbed of its social and political aspects. (ibid., 21)

One of the reasons this came about, Naess suggested, was because the focus on empiricism with applied logic was jettisoned in favor of a focus on logical formalism, also affecting in due course the image of the Vienna Circle itself. Thus he concluded his personal reminiscences by remarking that "the logical empiricists were broader in their outlook than in their professional philosophy" (ibid., 22).

Carl Gustav Hempel (1905–1998), a student of Reichenbach's in Berlin, visited Vienna in the academic year 1929–30, prompted by his study of Carnap's *Aufbau*. He attended lectures and seminars by Schlick and Carnap as well as Neurath's more

popular public lectures in the Verein Ernst Mach (Fetzer 2000). Hempel described the general tenor of the Schlick circle—in contrast to Karl Popper's attempts to distance himself—as follows:

> For after all, there was no party doctrine to which the members of the group were committed. What those thinkers did share was a sense of dissatisfaction at the thought that, in contrast to the natural sciences, philosophy had so little success in its endeavors to solve certain problems that were widely viewed as deep and important – especially problems of metaphysics. Most members of the Circle shared the conviction that by means of precise analytical methods, informed by modern logic, such recalcitrant problems could either be solved or shown to be pointless 'pseudo-problems.' Finally, the thinking of the group was inspired by a basically empiricist conception of knowledge. (Hempel 1993, 5)

This minimal basic consensus of the group may be regarded as an active framework for the investigation and solution of concrete problems on different levels and in different fields. These problems included those of philosophy and of the foundations of the sciences as well as the investigation of concrete objects of research. Once the Circle is viewed in this light as a forum for open discussion, its more or less multi-theoretical and pluralist outlook on specific issues is easily explained. Almost as a matter of course, the background of the Circle's members common motivation (as just characterized by Hempel) was rarely verbalized. It seems characteristic that Neurath in his correspondence came to proclaim the "*Netto-Diskussion*" (discussions of the issues themselves) as their ideal. In Hempel's words, "While the members of the group shared an empiricist outlook and the rejection of metaphysics as cognitively meaningless, there were considerable differences between them concerning further specific issues, as well as marked differences in personality and scholarly style" (ibid.). Hempel added that there had already emerged the alternative of a "normative" (Carnap) and a "descriptive" (Neurath) methodology of science.

The visitors to the Circle in the 1930s who would prove most decisive for the dissemination of Logical Empiricism in Great Britain and North America were undoubtedly Alfred Jules Ayer and Willard Van Orman Quine.

The British philosopher Sir Alfred Jules Ayer (19010–1989) visited Vienna in 1932–33. Already a lecturer at Oxford and trained in the tradition of analytical philosophy (Moore, Russell, Ryle), he there gained the means, by attending the lectures and meetings of the Vienna Circle, to equip him to become a protagonist of the *Revolution in Philosophy* (Ayer 1956) by championing *Logical Positivism* (Ayer 1959). Together with Wittgenstein's return to England, it was his book *Language, Truth and Logic* (1936, 2nd ed. 1946) that provided the foundation for the effective transfer of knowledge from Vienna to Oxford and Cambridge. As a radical advocate of enlightenment and empiricism and as an admirer of Wittgenstein's *Tractatus*, Ayer took Schlick and Carnap as his main points of reference in the preface of the first edition. "Logical Positivism" was characterized by the tenets of comprehensive verificationism and the strict dualisms of facts and values and of analytic and synthetic sentences. In this respect Ayer was perhaps the most consistent interpreter of Wittgenstein as a philosopher of the ideal language and of the picture theory. Yet he also shared Neurath's and Ramsey's rejection of the mysticism of the "ineffable."

It was his teacher Gilbert Ryle, who, prompted by Schlick's visit to Oxford in 1930, had advised Ayer to spend a year of study in Vienna instead of in Cambridge with Wittgenstein. With only a passive mastery of German, Ayer then attended meetings of the Circle.

> The Circle met once a week in a small room in an Institute outside the University. We sat at a rectangular table with Schlick at the head and Neurath opposite him. Menger and Hahn sat on Schlick's right, and Waismann on his left. The others present, apart from Gödel, were mostly philosophers, of whom I remember Professors Reininger and Viktor Kraft, and among the younger men Bela von Juhos and Edgar Zilsel. The discussion appeared to centre week after week on the topic of what they called *Protokollsätze*, the basic deliverances of perception, with Schlick maintaining that they must be descriptive of sense-experiences, about which the subject could not be mistaken, and Neurath arguing against him that one must start at the level of physical objects, and that no beliefs were sacrosanct. There were, however, occasional diversions. Once, Reichenbach came from Berlin to deliver a long lecture on his favourite topic of the frequency theory of probability, and Quine gave us a talk on his current work in logic. Quine has an extraordinary gift for language and I was very much impressed by his fluency in German … My sympathies on the principal issue, had I been able to voice them, lay mainly with Schlick, though I did come to agree with Neurath that all our beliefs are fallible. (Ayer 1977, 133–34)

Together with the other autobiographical reports considered so far, Ayer's impressionistic report well illustrates the long-lasting and tenacious discussion of the problem of the empirical basis in addition to the no less controversial issue of the interpretation of probability (where Reichenbach ultimately was unable to win the day). Notably, Ayer referred to the participation of a second—now world-famous—foreign visitor, Quine, whose later work has been characterized as a "synthesis of Carnap and Neurath" (Koppelberg 1987; cf. also Creath 1990; Gibson 2004; Harman and Lepore 2014).

Quine's visits to Vienna, Prague, and Warsaw count amongst his most definitive experiences. In 1932–33, together with his wife Naomi, Quine travelled through 27 European countries:

> We spent five months in Vienna. I attended Schlick's lectures; also some meetings of the Vienna Circle. At one of these I summarised the revised version of my dissertation, and at another Waismann reported on Bridgman's *Logic of Modern Physics*. I came to know Ayer; newly graduated from Oxford, he was setting out on the Viennese path that was to lead to *Language, Truth and Logic*. I met Gödel, Menger, Hahn, and at a party in Schlick's flat I met Reichenbach. I gained a firm command of German, and that was a boon. It prepared me for what proved to be the intellectually most rewarding months I have known, namely, my six weeks in Prague and six in Warsaw. (Quine 1986, 12)

Quine's subsequent visit to Carnap in Prague and their intensive discussions of the manuscript for *The Logical Syntax of Language* (1934) represented a crucial intellectual experience for him and marked the beginning of the long friendship between the two philosophers. It also served as Carnap's 'entrance ticket' for his final move to the U.S. several years later.

This meeting of minds from Central Europe and North America was to be profitable for both sides and made possible the gradual transfer of the scientific philosophy from Vienna, Berlin, Prague, and Warsaw. In the U.S. it met with convergent traditions and inviting conditions, whereas in the Old World it remained a

more or less exotic figure in German-language academia—at least in the view of Americans like the young Ernest Nagel (1901–1985). He reported in his "Impressions and Appraisals of Analytical Philosophy in Europe":

> I did get a glimmer of insight into the sociological motivations at Vienna. Professor Schlick's lectures were delivered in an enormous auditorium packed with students of both sexes, and in his seminar a stray visitor was lucky if he did not have to sit on the window sill. The content of the lectures, though elementary, was on a high level; it was concerned with expounding the theory of meaning as a mode of verifying propositions. It occurred to me that although I was in a city foundering economically, at a time when social reaction was in the saddle, the views presented so forcefully from the *Katheder* were a potent intellectual explosive. I wondered how much longer such doctrines would be tolerated. (Nagel 1936 qtd. in 1956, 196)

As we know today, it was to take only a few more years until the expulsion of this flourishing scientific culture in Austria was completed. The "German spirit" ended up triumphant over scientific reason (Stadler 1987–88; Stadler and Weibel 1995).

4.1.1 The Schlick Circle—Overview and Documentation of Its Scientific Communication

4.1.1.1 Preliminary Editorial Remarks

During the whole of the winter semesters of the academic years 1923–24 and 1924–25 Moritz Schlick conducted, within the framework of his seminars in philosophy, weekly colloquia on the *Tractatus Logico-Philosophicus*. According to Kurt Reidemeister, in addition to Schlick the participants were Hahn, Neurath, Kaufmann, Waismann, Feigl, and Carnap.[1] In a letter to Wittgenstein dated December 25, 1924, Schlick reported that Reidemeister gave a lecture outlining the contents of the *Tractatus*.[2]

These colloquia were the precursors of the later regular meetings in the Boltzmanngasse that became known as the meetings of the Vienna Circle. Thus Reidemeister reported, "The Vienna Circle constituted itself properly only after my move to Königsberg" (Reidemeister followed the call to Königsberg only in the spring of 1925).[3]

Carnap, according to his autobiography, first discussed the plan for and the methodology of his *Aufbau* with the Vienna Circle on the occasion of a short visit in 1925 (Carnap 1963, 20).[4] Detailed discussions of his first manuscript for this book took place only after his relocation to Vienna in 1926. Carnap also reported about the

[1] Questionaire Kurt Reidemeister, Materials Henk Mulder, Wiener-Kreis-Archiv Haarlem (WKA), Rijksarchief Noord Holland.

[2] Correspondence Moritz Schlick, WKA, Nv. Nr. 123.

[3] Reidemeister op. cit.

[4] Carnap 1993, 32.

Circle that at the beginning of his Vienna period "a large part" of the *Tractatus* "was read aloud and discussed sentence by sentence" (ibid., 24). As Karl Menger's reminiscences also show, from 1927 onwards Wittgenstein's ideas concerning numbers, infinity and probability, atomic sentences, and the picture theory of language ("showing" and "saying")—transmitted by Schlick and Waismann—were discussed with great intensity.[5] This detailed reception of Wittgenstein is confirmed by a list of topics reconstructed on the basis of entries in Carnap's diary (cf. Sect. 4.1.1.2).[6] Gustav Bergmann's report adds that around 1930 Waismann explicated Wittgenstein's "Theses" in the Schlick circle (Bergmann 1988, 171). This means that we can date a first *Tractatus* phase in 1925–27 with a further reading after Carnap's arrival in 1926—and a second phase in 1929–1931.

The discussion protocols of the Schlick Circle, which are here reproduced in their still extant entirety for the first time, represent the only original and authentic testimony of the intensive and productive culture of communication that developed in the course of the meetings in the Boltzmanngasse. Unfortunately they are incomplete. They come from the *Nachlass* of Rose Rand (1903–1980), who participated regularly in the meetings and was officially designated to take minutes (Iven 2004). However fragmentary they are, we would not possess them even in their present form had it not been for Otto Neurath's efforts to secure them under unfavorable circumstances. From his exile in Holland he convinced Rose Rand to produce a copy and a summary documentation of the Circle protocols from her personal records.

Details of this poignant episode can be gleaned from the correspondence between Rose Rand and Neurath from the years 1934 to 1945.[7] In a letter dated June 29, 1937, Neurath wrote from The Hague to Rand in Vienna:

> There is very much to do at present, as you can see from my paper on the Encyclopedia, which I sent you. I am very much counting on your help, for you are one of the few who know the history of the Vienna Circle. Already now I have several concerns. Unfortunately we do not have much money … First of all I would like to have a copy of the Circle protocols that concern my own contributions – of course including the remarks of the others which concern my own. Would you not consider selling your copy of the protocols? We are starting an archive of the Unity of Science Movement. I know that you are currently very busy, otherwise I would have asked you to produce for me a short summary about the 'coherence theory' in modern English philosophy. I would also appreciate it if you could put together which people ever participated in the Circle and when, etc. These are matters that will be soon forgotten but could have some historical importance.

Rand lived at subsistence level in Vienna and had just submitted her dissertation on the philosophy of Kotarbinski to Robert Reininger (her advisor after the murder of Schlick). In her answer dated July 11, 1937, she wrote, "I am not going to sell my [original] copy; one could make a copy of it only of you want the entire protocol." Rand, an unemployed and stateless philosopher of Jewish descent, had to scrape a

[5] Cf. Chap. 5 and Menger 1994.

[6] Diary Rudolf Carnap, Archives of Scientific Philosophy, Special Collections, University of Pittsburgh (ASP), as transcribed by Karl H. Müller.

[7] Correspondence Otto Neurath-Rose Rand, WKA Haarlem (44 letters).

tedious living in a hostile Vienna from occasional translation jobs and the writing of some articles and small projects (amongst others as an assistant of Otto Pötzl at the psychiatric hospital) and asked for "three shillings per hour of work" (ibid.). As *postscriptum* she added a list of the participants from memory: Juhos, Schächter, Natkin, Nelböck (sic!), Kasper, Bergmann, Taussky, Menger, Beer, Hung, Lindemann, Hollitscher, Neider, Gödel, and (crossed-out) as foreign visitors Lutmann, Tarski, Kaila, and Hempel. Neurath's commission from The Hague followed in early September: "I would also suggest right away that for 45 shillings you produce excerpts from Polish journals, proceedings of conferences and, exceptionally, monographs." Neurath also asked how much copying the entire manuscript of protocols numbering approximately 100 pages would cost, given a rate of three shillings per hour. In the end, Rand received the commission for a payment of 45 shillings. Already endangered by the political circumstances, Rand worked on the protocols from the beginning of 1938 and at the same time attempted to secure a study grant for the U.S. in order to be able to leave Austria.

On February 21, 1938, Neurath confirmed, "Circle protocols received with thanks. It is very interesting to refresh all memories in this way. Do there exist any other notes? Or is this all?" Neurath had received, together with the Circle protocols, the synopsis "Development of the Theses of the Vienna Circle," which Rand had worked on for the period of November 1932 until March 1933 and which is reproduced below also for the first time. Rand did not send other materials.

After the "Anschluss" Rose Rand's situation became extremely precarious. As an unemployed hospital assistant she fought for permission to leave Austria with the help of Neurath, Carnap, Naess, and others. On September 19, 1938, she wrote to Neurath: "Here is my curriculum vitae. I was born 14.6.1903 in Lvov in Poland; since 1914 in Vienna, now without nationality. University qualification 1924. Doctor of Philosophy 1938." In June of 1939 Rand was able to leave for England (helped by Susan Stebbing), but this was not the end of her travails.[8]

The overview below of the discussions in the Schlick circle (4.1.1.2) is a reconstruction from the diaries of Rudolf Carnap. For making their transcription available I wish to thank Karl H. Müller (Vienna); for permission to use them I wish to thank the Vienna Circle Foundation Amsterdam/Haarlem and the Archives of Scientific Philosophy, Special Collections, University of Pittsburgh.

The documents reproduced thereafter—the protocols of the Schlick circle (4.1.1.3), the summaries of the positions of individual members (4.1.1.4), the "Development of Theses" (4.1.1.5)—are held in the Wiener-Kreis-Archiv Amsterdam/Haarlem, now on Rijksarchief Noord-Holland in Haarlem (catalogue nos. Zirkelprotokolle WK1-16, WK39-44, WK 38a, b). For permission to reproduce them I wish to thank the Vienna Circle Foundation in Amsterdam, especially Henk Mulder, the founder of the Archive (sadly passed away in the meanwhile), Anne J. Kox, and Peter Polak as well as Robert Kaller on the part of the Institute Vienna

[8] See Korotin 1991, 1992, and 1997. Other way stations after England were Israel and the U.S. (Princeton), where she died without ever having had the chance of academic employment. Her *Nachlass* is at the University of Pittsburgh, ASP. On the life and work of Rand: Iven 2004.

Circle. The text of the Circle protocols consists of Rose Rand's typescript. It is reproduced here virtually authentically in form and content in order to retain the documentary character of these records of the inner life of the Circle. Obvious spelling mistakes have been corrected in order to facilitate the reading of the ongoing discussions. Additions and deletions of unreadable passages are marked by square brackets. The protocol-style syntax and the specific notations of the logical language have also been intentionally retained.[9] One part of these protocols—Carnap's three talks on metalogic—have recently been published with a Spanish translation by Jesus Padilla Galvez (1995) and other selected quotations have leavened the work of some Vienna Circle scholars for some time (e.g., Haller, Uebel). Below we can see the Circle's discussions in, as it were, real time.

The basis for the summaries of the positions of the individual members of the Vienna Circle (4.1.1.4) are provided by hand-written notes by Rose Rand. They provide further important information about the theoretical profile of the Vienna Circle. The selections are intended to represent the 'hard core' of the Circle. This also holds true for the subsequent reproduction of the document "Development of the Theses of the Vienna Circle" (4.1.1.5). On the one hand, it is intended to trace the reception of Wittgenstein's teachings; on the other hand, it is intended to visualize in overview the plurality of philosophical opinions in the Circle as far as the main issues of discussion are concerned. The colors used in the original in order to mark the five pre-given possibilities of answering (yes, no, meaningless, missing, indeterminate) have here been replaced by corresponding symbols (+, −, x, o, ?).

The "Theses" (or "Waismann's treatise") referred to repeatedly are an at the time unpublished manuscript by Friedrich Waismann about the philosophy of Ludwig Wittgenstein (33), which has since been published in *Wittgenstein and the Vienna Circle*, edited by B. McGuinness (1967, trans. by B. McGuinness and J. Schulte).

The regular member referred to as "Neumann" is not the Hungarian mathematician Johann (John) von Neumann, but—according to Feigl (1964)—a Viennese high school teacher of biology. R. Neumann also appears as signatory of a letter to Moritz Schlick dated April 2, 1929, written on the occasion of the call for Schlick to the University of Bonn in order to convince Schlick to remain in Vienna (Mulder 1968). This letter was also signed by Hans Hahn, Rudolf Carnap, Viktor Kraft, Friedrich Waismann, Herbert Feigl, Felix Kaufmann, Kark Menger, Maria Kasper, Rose Rand, Eugen Lukacs, Gustav Bergmann, Heinrich Neider, Kurt Gödel, Gustav Beer,

[9] As far as possible, original ambiguities of anaphoric references have been retained. To avoid the intrusion of undue interpretations, the manuscript has also been strictly followed in its erratic use of quotation marks and in the differential employment of *Satz* (sentence), *Aussage* (statement) and *Behauptung* (assertion); in the case of *Sinn* (sense) and *Bedeutung* (reference), the anodyne "meaning" seemed preferable with indications of the original. Except in a small number of cases, editorial clarifications of dark passages and odd terms have not been attempted. The use of titles in the identification of contributors, varying even for the same person across different protocols, has been streamlined by dropping them entirely. Underlining for stress has been replaced by italics; very occasional abbreviations in the Circle protocols have been completed without express notification, unlike the frequent ones in Rand's summaries of individual positions. Some paragraph ordering has been introduced for ease of reading. *Trans.*

Theodor Radakovic, Amalie Rosenblüth, Otto Neurath, and Olga Neurath. Johann (John) von Neumann did, however, participate occasionally in the Mathematical Colloquium (cf. Chap. 5) and also at the conference in Königsberg in 1930. In the U.S. he was in regular contact with individual ex-members of the Vienna Circle, especially Carnap. According to the records at hand, von Neumann did not attend the Schlick Circle.

4.1.1.2 The Schlick Circle: Overview of the Discussions 1927–1932

Date	Speakers and topics
1927	
7 July 1927	Discussion by Carnap and Hahn about Carnap's arithmetic and Wittgenstein's objections against Ramsey's definition of identity
1928	
10 May 1928	Waismann: Foundations of mathematics
24 May 1928	Discussion of Waismann's view of mathematics
21 June 1928	Carnap: Axiomatics
5 July 1928	Carnap: Axiomatics II
8 Nov 1928	On Reidemeister's "Exaktes Denken" (Exact Thinking)
13 Dec 1928	Gomperz: Realism
1929	
24 Jan 1929	Carnap: Reading of Ramsey
7 Feb 1929	Discussion with Neumann on the reality of other minds
21 Feb 1929	Carnap on real numbers and the foundations of mathematics
7 Mar 1929	Carnap on correspondence with Reidemeister
16 May 1929	Discussion with Kaila on the concept of probability
30 May 1929	Waismann: Probability
6 June 1929	Waismann: Probability II
13 June 1929	Waismann on the nature of language
21 June 1929	Waismann on atomic sentences
27 June 1929	Kaufmann on decidability
9 July 1929	Hahn: Essay on empiricism; Schlick on America
7 Nov 1929	Carnap: Independence of axioms, system of truth functions, letter of Kaila to Carnap and Feigl
14 Nov 1929	Dr. Gut (?) on quantum mechanics
21 Nov 1929	Discussion with Dr. Gut on the indeterminacy relation
2 Dec 1929	Carnap (?) on terminology
1930	
23 Jan 1930	"Inofficial Circle": Neurath on Marxism (with among others Kaufmann and Neumann)

30 Jan 1930	Menger: Intuitionism
3 Feb 1930	"Inofficial Circle": Neurath on Marxism
6 Feb 1930	Carnap: Terminology II
13 Feb 1930	Schlick: internal/external relations, meaning in Wittgenstein
21 Feb 1930	Tarski: Metamathematics of the propositional calculus
27 Feb 1930	Carnap on Tarski and the importance of metamathematics
6 Mar 1930	Carnap (?) on "Orange lies between red and yellow"
13 Mar 1930	Carnap (?) on colors
20 Mar 1930	"Inofficial Circle" for Prof. Jacobson (Goeteborg): Carnap on the theory of constitution
8 May 1930	Waismann on Wittgenstein's philosophy against Russell
15 May 1930	Waismann on numbers (against Russell)
22 May 1930	Waismann: (continuation)
12 June 1930	Waismann on the programme of the Königsberg conference
19 June 1930	(no further entry)
26 June 1930	Waismann (no further entry)
3 June 1930	Waismann (no further entry)
6 Nov 1930	Hahn: Foundations of mathematics (Königsberg lecture)
13 Nov 1930	Kaufmann on his main ideas
4 Dec 1930	Carnap on his visit to Warsaw, discussion of Schlick's essay "Kausalität" (Causality)
11 Dec 1930	Rand on Kaila's "Der logische Neu-Positivismus" (The Logical Neo-Positivism)
1931	
5 Feb 1931	Schlick on Frank's Prague lecture; Carnap: Schrödinger's "Naturwissenschaft und Ethik" (Natural Science and Ethics); discussion of Waismann's "Theses"
12 Feb 1931	Discussion by Hahn and Waismann on atomic sentences
19 Feb 1931	Discussion by Hahn and Waismann on atomic sentences (continuation), among others with Neumann and Kaufmann
26 Feb 1931	Carnap: Physicalism, construction of a syntax
28. 2. 1931	(no further entry)
5 Mar 1931	Carnap on physicalism (behaviorism)
12 Mar 1931	"Inofficial Circle": Carnap on the theory of constitution
7 May 1931	Carnap: Preface, on Waismann's "Theses"
21 May 1931	On Waismann's "Theses"
3 June 1931	Schlick reads Bavink and Weyl; Waismann's "Theses" on identity
11 June 1931	Carnap: Metalogic
18 June 1931	Carnap: Metalogic II
25 June 1931	Carnap: Metalogic III
2 July 1931	Discussion of Carnap's Metalogic IV
1932	
14 Jan 1932	Carnap, Frank partly on Carnap's essay "Metaphysik" (Elimination of Metaphysics)

1936

(March)	(Naess: Logic and scientific behavior)
March 2	Leon Chwistek: Überwindung des Begriffsrealismus (Overcoming of Concept Realism)

4.1.1.3 Protocols of the Schlick Circle (4 December 1930 to 2 July 1931)

4 December 1930

Discussion of the lecture by *Schlick* "Über Kausalität" (On Causality). Remark in a letter from Einstein: Einstein cannot agree on three points with the remarks by Schlick. He is of the opinion 1. that even quantum theory in its most recent development includes statements of a non-statistical nature, e.g., the law of energy is not understood statistically; 2. that a statistical law is not a contradictory concept; 3. statements about temporal matters, insofar as they are statements about relations which refer to what can be experienced in time, are not more distinguished than other statements about relations. The whole view of Schlick is too positivistic. Physics is the attempt at a construction of the real world and its lawfulness. To be sure, we must start with the relations between sense-data, but the meaning of physical sentences is not exhausted in determinations about these. One will not be able to be satisfied with the theories of Schrödinger and Heisenberg, for they do not provide a model of the real world but only statements about the connections between the probabilities of experiences.

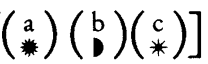
Neumann says that, [ad] 1., Schlick has shown that all universal sentences are postulates; he himself has also always demanded as necessary one postulate, namely the lawfulness of the world. Causality, according to Schlick, is not empirical, in his view it contains a verifiable element, like all laws that can be applied to reality. *Schlick* stresses that, of course, causality concerns something empirical, not the verification of a sentence, but the confirmation of the usefulness of a rule.

Neumann: [ad] 2. According to Schlick, facts cannot be indeterminate; if there obtains an imprecise relation then this means only that the spatio-temporal determination of the facts is insufficient. But this is a realistic point of view. According to the point of view of *Hahn* this appearance disappears when one considers that spatio-temporal determinations do not belong among the data. Then *Neumann* opposes, [ad] 3., Schlick's claim that because of the minuteness of the deviation from determinism the new conception of causality does not have any significance for the so-called freedom of the will, since we do not know which atomic processes are of importance for the molar ones (relais effects). *Schlick* concedes the correctness of the last part of the above argument (small causes – large effects), but notes that there one is concerned with relations between physical systems, not with ones between the physical and the mental.

11 December 1930

Rand reported on Kaila's critique of Carnap's theory of constitution in his book *Der logische Neupositivismus*. Then someone moved to discuss his criticism. Concerning Chapter 1, "On the direction of a relation and the unidirectionality of time," it was stated that Kaila believes that according to the thesis of extensionality both xRy and yRx denote the class (x, y) and that one requires the unidirectionality of time to be able to distinguish the meanings of the relations xRy and yRx.

On this point *Carnap* reads out a remark in a letter of *Hempel*: "An n-place relation R (x_1 x_2 x_3 … x_n) has been 'introduced' or determined whenever it has been determined of every ordered n-tuple d_1 d_2 d_3 … d_n of elements of the domain whether replacing the empty places of the relation R by the signs in this sequence produces a true or a false sentence. Therefore Kaila is only able to say that the introduction of n-place relations presupposes the concept of an ordered n-tuple. This is right, as far as I can see, but one should not think that because of this such complicated concepts like those of the concept of ordinal number enter into the foundations of the theory of relations. For one can write the ordered triple a, b, c without the use of the here easily misleading number symbols, namely by using in place of the ordinal numbers 1, 2, 3 arbitrary meaningless symbols like ✹, ◗, ✳. Then one can represent the triple as follows:



Synonymous with this complex of symbols are another five which result from permutation. Thus it seems to have been shown that no use need be made of the concept of sequence, which is intuitively related to the idea of directionality, in its intuitive experiential sense. Rather, the substantive presuppositions made in introducing relations are much more elementary. They seem to amount to this, that one can distinguish between differently formed symbols, which symbol is combined with which other one. But these apparently are metamathematical presuppositions, without which no theory whatsoever could be developed; they are considerably more elementary than the presupposition, postulated by Kaila, of the concept of directionality."

To this *Gödel* remarked: One can reduce the theory of relations to a theory of classes of higher orders. Thus one can represent, e.g., an ordered pair a, b by the class of pairs [(a) (a, b)].

Concerning Chapter 2: "Can the time (space) of experience be constituted by quasi-analysis?" Kaila's theory may be characterized as follows: from a limited number of elements one cannot construct an infinite number of them.

Carnap: The infinity of the space of perception is not an actual infinity, but a potential infinity. *Hahn* asks *Carnap*: What does your constitution of time look like? *Carnap*: phenomenal time is a series of finitely many discrete experiences from

which the physical space-time continuum is constructed. The elements of the physical space-time continuum thus correspond to those of experiential time, just as, according to Russell, the real numbers correspond to the natural ones.

Hahn: How can continuous variables be introduced? *Carnap*: By adding the laws of nature. Kaila's objection holds against Whitehead and Russell. The continuity of space and time is for me no sentence, but a convention. We attempt to coordinate quadruples to observed qualities (leaving open the possibility for future correction) and find the simplest form of ascription for that which has not been observed. In contrast to Hahn and Whitehead I do not think it is possible to develop postulates for the phenomenal world. We do not possess sequences of embeddings which are strictly convergent. Thus we cannot do, in the system of Whitehead, without fictions.

Hahn: Besides the observed events I assume fictitious ones, which have the desired structure and which can be coordinated in part to the observed ones. *Carnap*: That is also my method. Against Kaila we may have to admit that one should take account of the openness of phenomenal space and phenomenal time for the construction of the phenomenal language. Once we introduce experiences as manifolds into the phenomenal language it becomes problematic whether one should assume the visual field to possess two or three dimensions.

Hahn: The remarks by Husserl and Kaila concerning the fleeting character of experiences cannot be verified since this quality, after all, is supposed to hold for all experiences. This opinion finds general agreement. *Kaufmann* comments that, according to Husserl, in order to regard something as a thing we must presuppose recognizability. *Carnap*: This means that the thing is original and not constituted. But just this is the problem. *Neumann*: The extension of time is given phenomenally just as the extension of space. Time does not have one but many dimensions. *Carnap*: According to Kaila, it is possible to determine, besides the temporal extension, also the fleeting moment. Perhaps several dimensions can be attributed to experiential time if a dimension is coordinated to every gestalt-like experience which of course represents a certain manifold. The one-dimensional physical time would then be constituted on the basis of correspondences between these dimensions of experience.

Concerning Chapter 9: "The epistemological presuppositions." Kaila's thesis: "The principle of analytical equivalence cannot be upheld because this would exclude from science statements about the future and statements about what has not been observed."

To this *Carnap* remarks: Of course such statements appear in science, but their meaning [Sinn] is indicated by their truth conditions. Concerning Kaila's assertion that from Carnap's standpoint one cannot distinguish a current content from a past content, the latter remarks that this holds true as a matter of course. *Kaufmann*: One important objection against the principle of analytical equivalence states that it does not say anything about things but only about ways of denoting them.

5 January 1931

About noncontradiction and decidability in axiomatic systems. Questions and answers (about the report by *Gödel*).

Kaufmann asks about the decidability of sentences of partial systems.

Gödel responds that, as far as it can be proven, this proof must employ means which cannot be formalised within the partial system itself. This would be in agreement with his proof.

In response to a question by *Hahn*, *Gödel* once again recalls the principal thought of his proof of the impossibility of a proof of noncontradiction. If the noncontradiction of a system is added to the system itself—and this extension can be formally effected—then an originally undecidable sentence becomes decidable in this extended system; it follows that the noncontradiction of a system cannot be shown in the system itself.

In response to a question by *Schlick*, *Gödel* formulates the speculation of von Neumann: If there exists a finite proof of noncontradiction, then it can also be formalized. Thus Gödel's proof involves the impossibility of a proof of noncontradiction in general.

Hahn asks about the application to the axiomatic system of Heyting. *Gödel*: The system of Heyting is more restrictive that that of Russell. If it is ○-noncontradictory, then one can state undecidable sentences for it.

Hahn points to the fact that, since Cantor's use of the diagonal method, one of the basic thoughts of the proof "There does not exist a meaningful whole or totality of what can be constructed" has played a decisive role in set theory. *Gödel* remarks that the application of this thought also renders questionable whether the totality of all intuitionistically acceptable proofs can be fitted into *one* formal system. That would seem to be the weak point in Neumann's argumentation.

Kaufmann asks about the noncontradiction of sentences which do have a pair of concepts in common or the Peano axioms. There exists a first, there exists a last number. *Gödel* replies that the concepts as such are not important for the proof of noncontradiction. It is not at all a matter of noncontradiction in the sense of material [inhaltliches] thinking. In response to the interjection by *Kaufmann*, that proofs of substantive noncontradiction are not excluded, *Gödel* clarifies: Such 'insights' do not represent proofs in the sense of a formalized theory.

Neumann asks whether there exist systems which are so simple that the concrete form of the undecidable sentence can be given in a transparent manner. *Gödel* replies that it is a question of the system in which it is to be represented. He recalls the decisive technical means of his procedure[:] the isomorphic representation of the forms of argument from sequences of numbers f_1 to sequences f_2, which alone makes it possible to formulate provability. E.g., if $S(f_2)$ denotes a form of argument, $l(f_2)$ the 'length' of the associated chain, then the provability of f_1 is written as follows:

$$\text{Bew.}f_1 \equiv (\exists f_2)\left\{S(f_2) \,\&\, f_2\left[1(f_2)\right] = f_1\right\}$$

Then one can either rest with that or analyze the symbol S further.

Hahn draws attention to the book by Lusin, "Sur les ensembles analytiques." Concerning the existence of proofs for Borel's sets of higher orders, Lusin distinguishes carefully whether the diagonal method works or not. Then *Hahn* asks whether the diagonal method can be dispensed with in Gödel's proof. *Gödel* answers that the undecidable formula which he indicates is really constructible. Its content is finite like that of Goldbach's conjecture or Fermat's theorem. Concerning a remark by *Kaufmann*, *Gödel* replies finally that according to the views of Brouwer intuitionism is not touched by his work, because it is not intended to be contained in a formal system.

5 February 1931

Schlick reads a remark in a letter from Heisenberg concerning the thesis of Born that "quantum mechanics has shown that physics is not applicable to biological processes." In Heisenberg's opinion, this thesis refers to Born's view that according to the new results of quantum theory the proof of psycho-physical parallelism would be impossible and the thesis itself thus be meaningless. Since we must coordinate physical processes with elementary psychical processes in order to prove the parallelism, it is required that it be possible to observe atomic processes without disturbing them. But this is not the case according to the newest physical results. *Schlick* remarks about this that in this case one has to coordinate the disturbed physical processes to the psychical ones in order to obtain psycho-physical parallelism. In a similar fashion it had been objected since Comte that it was particularly the psychical processes that would be disturbed by observation. If this were true, then parallelism would appear even clearer after the new results. However, the entire problem is solved by a detailed analysis of the concepts 'psychical' and 'physical.'

Carnap refers to a notable essay by Schrödinger in the *Vossische Zeitung* of 25 December 1930, "Natural Science and Ethics," where he regards it as necessary to assume an ethical foundation for natural science. This foundation does not obtain within the realm of theory but consists in a "personality assumption" that is provable only in the ethical realm. It says that the other humans are, like me, feeling, thinking, sensuous beings. Only under this presupposition was it held to be possible for natural scientists to trust the results of the experiments and calculations undertaken by other people and to base their own work on them.

Schlick notes that Frank's lecture in Prague provided an occasion for many a misunderstanding, as by Bavink, due to having placed the pragmatistic and the positivistic concept of truth into too close a proximity. The positivist does not speak of the "invention," but of the "discovery" of truth, like what Frank calls "school philosophy." *Hahn* asks *Waismann*, whether in his opinion theories are not discovered but invented. *Waismann*: It is theories that are invented, but not the true sentences. *Hahn*: Theory enters into every statement of everyday language. *Schlick*: It does not enter into the elementary sentences. Nevertheless, the pragmatistic misunderstandings are understandable, since the subtle distinction between true sentences and

instructions which have the apparent form of sentences had not been known in earlier times.

In addition, *Schlick* notes that Frank's assertion is misleading, [namely] his remark that truth consists in the noncontradictoriness of the sentences of a theory. The following passage as well was formulated unhelpfully. "It is totally wrong to say that agreements concerning 'h' are most naturally explained by the hypothesis of the real existence of the quantum of effect." For Frank had said earlier: "Just like the word irrational number is only an abbreviation for a convergent series of rational numbers, so the concept of the real existence of, e.g., the quantum of effect h only is […] through the agreement of the entire group of experiences with the associated system of signs."[10] Thus this formulation gives the right interpretation of the concept "real existence of h" but does not show that one cannot speak of the reality of the quantum of effect.

5 February 1931 [Continuation]

The *Wittgenstein-Waismann* thesis says that in principle one must be able to reach to atomic sentences and names. Logic demands the existence of atomic sentences. If there were no atomic sentences, the sentences would have no *meaning* [Sinn]. The assumption of atomic sentences does not refer to an ideal language but to any language that claims to describe states of affairs [Sachverhalt]. By contrast *Hahn* thinks that the sentences of everyday language, of which one thinks that they describe the immediate given and that they are immediately verifiable, are vague and cannot bear logical precision. Logical precision is gained only by introducing theories, but then verifiability is lost. He does not know whether there are atomic sentences, but he thinks it probable yet by no means logically necessary. All reasoning which proceeds from the necessity of such a form of language is therefore false.

Waismann then gives expression to the thesis that the form of the element is the possibility of the structure of a sentence. The form of the element is shown by the elements, it is given to them. That red and blue cannot appear together is due to their given form. By contrast, *Hahn* thinks that the so-called elements (like yellow, blue, the tone a, etc.) are not what is immediately given, but they are isolated by construction from what is immediately given (the total complex of instantaneous experience). Their form is a function of the type of construction employed. It also follows from the type of construction that red and blue cannot coexist. The type of construction is not uniquely determined by the given. Thus it cannot be held that the given has a particular determinate structure. *Waismann* thinks that it depends in a certain sense upon experience what systems of elements we do have. For he distinguishes between the experience of the "that" and the experience of the "how." Only the experience of the "that" provides us with new elements. It finds expression in that the words of our language have a certain meaning [Bedeutung] and obey certain rules of syntax. All the words for which the same rules of syntax hold form a system.

[10] This sentence is corrupted; the ellipsis indicates a missing predicate. *Trans.*

That therefore the elements form systems is due to the experience of the "that." The experience of the "how" is the experience of states of affairs. It is without importance for the formation of systems of elements. Since colors have a form, one arrives at a system of colors without one having to have had experiences of states of affairs.

12 February 1931

Waismann gives a systematic description of *Hahn's* arguments.

The first argument is: The concepts of daily life are imprecise. The second argument is: The logical analysis of states of affairs is not unequivocal. The third argument is: The rules of syntax can be derived from the construction of the elements. Concerning the first argument, Hahn thinks that the concepts of daily life are imprecise. One does not know precisely, e.g., when concepts like heap of sand, baldness, etc., can be used. The vagueness of the visual field, the colors which become less distinct at its margins, is also only describable by vague concepts.

Waismann thinks that one does not establish by counting whether something is a heap of sand but by looking at it. Numbers do not play a role for the concept of a heap of sand. The concept of a heap of sand is therefore not indeterminate. Indeterminacy only obtains once we try to define the concept by means of the system of arithmetic. I can see one, two, three strokes, but not one hundred. The visual system and the system of arithmetic have a different multiplicity. [11] Concerning the visual system we speak of one, two, three, many. The imprecision of concepts only comes about if two different languages are mixed with each other. This confusion of languages also happens when we describe the visual space. There exists a connection between the Euclidean space and the visual space. The language intimates this difference by the word "imprecise." The question arises whether it is possible to develop a symbolism with the help of Euclidean geometry that is able to reproduce the syntax of the words "straight," "curved," "equal," "parallel" as used for visual space. *Waismann* thinks that this is possible by means of determining a relation of impreciseness "e," which is a function of visual space. This "e" is a conventional determination. By contrast *Hahn* thinks that it is impossible to determine an interval that would specify this vagueness. Between language and the given there lies an unbridgeable chasm. In no way can it be turned into a congruence. Thus *Hahn* opposes the main thesis of Wittgenstein's philosophy which claims that it is in principle possible to build such a bridge.

Waismann proposes that a definition of what is to be understood by an adequate language be given before its possibility is affirmed or denied. By an adequate language he understands a language which allows one to describe everything in such a way that the truth or falsity of the description can be ascertained. Employing this

[11] "Multiplicity" (Multiplizität) is an expression that refers to the number of features that a mode or vehicle of description must be able to distinguish in order to be able to describe its object. Compare the conversation with Wittgenstein, 2 January 1930, and section 3 of Waismann's "Theses," in McGuinness, ed., 1967, 75 and 240 of Engl. transl. respectively. *Trans.*

definition *Hahn* denies the possibility of such an adequate language. When it comes to descriptions of the phenomenal realm neither their truth nor their falsity can be affirmed. This cannot be explained by reference to attention, for if somebody states, e.g., that he did not pay attention to whether two straight lines are equal in length or unequal, then the given just was not given clearly. *Waismann* thinks that one forgets what one has seen, but in the moment of seeing, e.g., two straight lines, one *cannot* doubt their sameness or differences. *Hahn* admits that it possible to forget until the time of passing the judgment, but this only provides further support for the contention that language works with unclear concepts.

The discussion of the first point is broken off. –

Hahn's second argument denied that the logical analysis of a state of affairs is unequivocal. It is us who import the structure into the states of affairs, this structure is something that is constructed by us, somewhat like the laws of physics. It also depends upon experience what laws (constructions) we end up with, e.g., experience shows us that color and sound can separated. If they always were to appear together, we would not arrive at the same constructions.

At the second to last meeting *Schlick* voiced the opinion that the structure does not depend on the amount of experience. Even if sound and color would always appear together, the possibility of separating them would be given. By contrast *Waismann* thinks that we are only confronted with a structure when we see it. Every structure is a visible structure. The ear can be trained so that the overtones of a note played on the violin can be heard separately. But it cannot be said that we now see the structure more clearly before us; instead we are confronted with a new phenomenon, with a new structure. It is not the case that, when a color-blind person becomes able to see colors, the individual colors have split, but that his system has changed (become enlarged). If up to one point one has experienced sound and color together, and designated them by one sign, and then perceives the sound and the color on their own, then one has gone over to a new system. The view of empiricists is the following. We have a state of affairs which we describe by the sentence "p," then we have a new experience and now reach the *same* state of affairs, describable by the two sentences q and r. But *Waismann* thinks that the sentence "p" describes a different state of affairs than the product q times r. For the symbols with which the sentences have been formed belong to a different system than the ones with which the sentence "p" is formed. Between the different systems of elements there exist relationships as between natural numbers and integers.

Hahn's third argument was that the rules of syntax can be derived from the type of the construction of the elements. That red and green cannot appear in the same place is expressed by a prohibition in syntax. And this prohibition of syntax is supposed to follow from the type in which the elements are derived. The question arises where the guarantee for the validity of the syntax come from.

Waismann thinks that the question is incorrectly posed. The syntax cannot be justified by means of language. The rules of syntax cannot be gained from experience or

by derivation. The rules of syntax are conventions [Festsetzungen]. A rule of syntax can be postulated, demanded, fixed, like the axioms of mathematics. If one wanted to construct a language in the purely formal sense, then one could say that syntax is a game. The play becomes serious as soon as it is applied. As soon as we apply the syntax it must allow us to form sentences which describe reality. The prohibition of syntax that blue and red cannot appear together can be justified in that its violation leads to the formation of sentences which do not describe anything. Concerning syntax we can only ask whether it is applicable, but not whether it is true or false. The syntax of our natural language is not yet in order, for it allows us to form sentences which are not verifiable. It should be made clear. One could ask now how we can know that the syntax will remain applicable in future. Is the grammar of language also based on induction? No, for we could not describe with our present linguistic means how it would be if the syntax would not hold. The syntax is not necessary, for we do not understand its rationale; the syntax is not accidental, for we cannot think it differently. The type of validity which syntax possesses is explained by my world being limited from within. We cannot describe a world in which our syntax would not hold.

Hahn is of the opinion that a rule of syntax, e.g., like that red and blue do not appear together, obtains because red and blue look differently and they look differently because the type of isolation of elements from the complex given gives us the right to speak of them looking differently. *Waismann* thinks that what is real are states of affairs, therefore complexes. The difference between the two views consists in this: that Hahn assumes an arbitrary isolation of elements; yet he himself is of the opinion that an analysis into elements is not a convention. Moreover, Hahn wanted to justify the validity of syntax. Yet it cannot be justified, one can only see whether it can be applied. This seeing is only possible because the world is a closed system. *Kaufmann* agrees and says that this represents a pre-syntactical insight. *Carnap* remarks that Husserl's opinion is different from Waismann's. Husserl believes that such insights are synthetic a priori. Waismann describes the phenomena as they are given and says nothing about the future. *Neumann* adds that Husserl too only speaks of a priori insights under the condition of a closed system of the world.

Carnap presents two questions for both of the views here represented here.

Are color concepts original signs [Urzeichen] or defined ones? If they are derived, then their form would be given by the type of their derivation. Suppose the color concepts are original signs. Is their syntax determined by the phenomena or are we able to determine it ourselves?

19 February 1931

Schlick remarks that Bohr has noted that the biological problem has been placed in a new light through quantum theory. According to Pauli, Bohr's remark does not represent the standpoint that there obtains a fundamental difference between physical and biological research but concerns the purely empirical question whether, if a psychical process takes place within a human being, one can observe a change in his

brain. Here there now is supposed to obtain an influence on what is observed by the observation such that one can speak of a parallelism only with restrictions. *Hahn* thinks that, according to Heisenberg, biological processes, in contrast to physical ones, involve the effectiveness of very few quanta. –

Then [*Hahn*]: concerning the question how the elements like red, blue, … are produced logically, it is to be answered that the clarification of what we mean by a certain color is pre-logical and pre-syntactic. The same holds for the constructions which lead to such elements. The same type of construction leads to "red" and "blue." For this reason both elements cannot appear at the same place at the same time. *Waismann*: One does not first determine a syntax and then ask for its applicability. We already have a language in which we subconsciously apply the rules of syntax. To the question of how we know that the rules of syntax are applicable the answer is that we understand the meaning [Sinn] of the sentences that are formed in accordance with it. *Hahn*: We cannot ascribe two different lengths to an object because both determinations are gained in the same way. *Waismann*: A sentence is always part of a system of sentences. E.g., we hold the entire ruler with all its markings next to the object to be measured. We employ the entire scale of colors when we wish to ascribe a certain color to an object.

Kaufmann: Is it important to reduce the meaning of sentences to the syntax? *Waismann*: The meaning depends only on the verification. The method of verification determines the syntax. There are no elements in isolation. The possibility of an element occurring in a state of affairs consists in its form. By comparing different states of affairs we single out one element. If the things of a manifold have the same form, then they form a system. *Kaufmann*: Form seems to be the same as the general in Husserl, that which is independent of the here and now. *Waismann*: "Red" and "blue" do have the same form, but they still are distinguished by their content which cannot be communicated. *Kaufmann*: In this case form corresponds to Husserl's highest genus. *Carnap*: Sameness of form shows itself in the possibility to replace one symbol by another one. *Kraft*: The possibility of the occurrence of an element in a state of affairs is an empirical question. *Carnap*: For an element there exists only one form of its occurrence. *Hahn*: The elements are not given independently. Their syntax must be intelligible from the way in which we isolate the elements. *Waismann*: We determined a circle by definition. From it follows its syntax. *Hahn*: In this case this is something that takes place within logic. *Waismann*: The general principle is this. If one knows how a statement can be verified, then one must know the syntax. The syntactical rules follow from the method of verification. *Carnap*: It should be asked whether the elements are prescribed for us by the phenomena or whether they are conventionally determined. *Hahn*: This is not a case of either-or. It is rather like the case of physical laws in which what is prescribed by the phenomena and what is conventional is combined. If we would experience a certain color always with a certain tone, then we could separate them in principle, but we would not be compelled to do so. *Schlick*: We should not interpret the question psychologically. There is an order which is independent of the phenomena and independent of our conventions. Syntax concerns that about language which is common to all languages.

Carnap: Is the syntax of elementary sentences not prescribed by the phenomena and does not the conventional moment play a role only for complicated sentences? *Hahn*: Every language possesses a conventional moment. Elementary sentences, by contrast, do not yet form a language. The universal invariant cannot be expressed in a language. *Waismann*: If the means of representation possess the same multiplicity as the object, then one does not need a syntax. There is no advantage in doing without a syntax. What matters is the right multiplicity. *Hahn*: The multiplicity is right if an exact language is possible at all. But isolating and constructing means do violence to the facts and therein lies the difficulty. *Schlick*: The form of the facts is mirrored in the language. *Hahn*: There is no connection here unless it is artificially constructed. For the rules of syntax a logical justification cannot be given because it is only there that logic begins. "Red," "blue," etc., are results of the same process of isolation. To belong to the same system means to be created by the same process of isolation. *Carnap*: Can we understand how elements are gained if the assumption is made that something that is not structural stands at the beginning[?] *Waismann*: Already the possibility of memory presupposes that something structural is given. *Hahn*: That the phenomena have a structure only means that we can talk about them. *Carnap* asks whether the language changes what is given by isolation or whether it describes a feature of the given. *Schlick*: We would only speak of a language in the latter case. *Neumann*: It is an empirical matter whether a certain syntax is applicable or not. *Waismann*: There exist two different concepts of experience. The sentences of logic do not depend on a particular way in which reality is constituted, but on there being a world at all. In this sense logic is empirical. *Neumann*: The syntax is empirical in a totally different sense than logic. *Carnap*: The empirical sentences depend on the content of experience, the syntax on the form of the latter. Some content can be expressed through a sentence, but not the form.

Hahn: Is the sentence "this is red and blue at the same time" false or meaningless? *Waismann*: It is only possible to test a sentence in comparison with a thinkable state of affairs for its truth or falsity. The above sentence, written as a logical product in the schema of a truth function, shows that the first line of the schema, in which both sentences are considered as true, represents a logical impossibility and thus must be deleted. The syntax forbids us to assign any truth value whatsoever to the first line of the schema. The reduced truth function can then be considered as a contradiction. *Carnap*: In the above case it is better to speak of its being contradictory rather than meaningless, for otherwise the replacement by a symbol of the same form would turn a sentence empty of meaning into a meaningful one. *Schlick*: Originally Wittgenstein believed that the sentence "This is red and blue at the same time" was a contradiction. "This is red" would have been a complete description to which nothing could be added. *Waismann*: The rules of logic are connected to the rules of syntax.

26 February 1931

Hahn completes his earlier remarks about the imprecision of the given. Earlier he said that two straight lines given in perception could not with certainty be called equal or unequal. *Waismann* replied to that: It is conceivable that this determination

is impossible as far as memory is concerned but not perception. *Hahn* remarked about this that our language only ever refers to memory not to the given. To speak of the latter seemed to him impermissible.

Carnap responds to an objection from Gödel. *Gödel* asked how the discussion about logical questions was to be justified, since by engaging in it one does not utter meaningful sentences but only elucidations. The question thus arises how the permissible elucidations are to be distinguished from the metaphysical pseudo-statements. *Carnap* responds to this that the activity of a philosopher always aims for the construction of a usable syntax. Those elucidations are permitted which are suitable to bring out the structure of a usable syntax, even if they do not deal explicitly with the syntax. These elucidations are not sentences but only legitimate elucidations in contrast to elucidations about ontology. *Schlick*: Only natural science has an ontological character, philosophical elucidations never concern the phenomena but only the syntax. *Neumann*: One can speak whenever this leads to success. *Carnap* agrees. *Waismann* thinks that considerations of the meaning [Bedeutung] of a word are also legitimate. By contrast, *Carnap* thinks that we do not give elucidations about the meaning of an isolated word, but only about its place in the syntax. *Hahn* thinks it an open question, whether there might be a language about language.

[*Hahn*] asks Waismann whether, given that the language is in order, one must elucidate the application of the language to somebody ignorant or whether this person would understand it by himself. *Waismann*: It is not possible to say whether a language is in order. Elucidations always concern the proper use of language. If somebody knows how to use the language then no elucidations are needed. *Hahn*: Our activity thus consists in hints about the use of language. *Carnap* adds: but not in hints about the use of individual words. The consideration of the question of whether the original given is already structured shows the problematic nature of this entire discussion. Maybe here already the limits have been transgressed of which was spoken earlier. One needs to remain aware that the elucidations only represent proposals for the construction of the syntax, even if they seem to concern something else. *Kaufmann*: Our activity is always a clarification, perhaps already at the pre-syntactic stage. What Wittgenstein really says about the syntax of language is really nothing but the clarification of thoughts. The termini "language," "syntax" are only intermediary concepts that have to be understood historically in relation to that tradition of philosophical dogma in which Wittgenstein is located. *Neumann* remarks that for Wittgenstein it is always a matter of the correspondence of the structure of the language and the structure of reality. We can relate all statements to two kinds of bases. We do not only state the structure of the language, but also the structure of reality. *Schlick* thinks that there is only one structure. *Hahn* too thinks it impermissible to speak of the structure of reality. *Kaufmann* asks how it is possible to combine the thesis that "the content [Sinn] of a thought is the existence or non-existence of a state of affairs" with the Wittgensteinian conception that the meaning [Sinn] of a statement is its verification. *Waismann*: Verification is the stating of states of affairs whose existence or non-existence is at issue.

Hahn: How can the language picture states of affairs or facts[?] It is by no means the case that the language pictures really give structures. If certain movements are prescribed by linguistic instructions, what then is the meaning of the assertion that the relevant movements possess the same multiplicity as the descriptive language[?] Are we to understand by multiplicity something like geometrical coordinates? Or anything of this sort? If movements are to have the multiplicity with which I speak about them, then they possess a different multiplicity depending upon whether I describe them by an Archimedean or some other geometry. What are we to understand as movement here? And what as multiplicity of movement? There is no such thing as a multiplicity of movement at all. *Carnap*: Here we must distinguish two moments. First, a state of affairs that consists, e.g., of elements, must be denoted by a language with the same number of degrees of freedom. Second, if we speak of colors, e.g., then the system of signs for colors must have the same multiplicity as the ensemble of colors. *Hahn*: This involves a differentiation between an independent reality with a determinate structure and a language with a determinate structure. *Carnap*: By the picturing of the structure of a state of affairs by the language we need only understand that by applying an imperfect language, e.g., with only two signs for colors, we would end up with incongruities. *Hahn*: Agreed. By contrast, the assertion is wrong that we are forced by the colors to employ a language of a very particular structure. The facts only exclude some languages of a certain structure as inapplicable. *Schlick*: Even if this is admitted as well, the fact is not thereby impugned that the language must have the same multiplicity as that which it designates. *Kaufmann*: The given, that is that which can be designated, exercises a certain compulsion on the structural form of the system of signs that we use. This compulsion just cannot be denied. *Hahn*: It is true, to be sure, that something is given, but nothing with a determinate structure that is only describable by a language with a certain structure. That would be ontology. *Schlick*: In this connection a rectification and precision of the use of language is indeed necessary. We must not forget that by means of the assertion that the language possesses the same multiplicity as the states of affairs designated we mean nothing more than that we can make do by applying the language at issue and do not end up with incongruities. This and only this is meant when we ascribe a structure to the given.

Hahn: The unusability of a language is decided by the nature of the given, but because of this we must not ascribe to the given a determinate, independent structure. *Waismann*: The thesis that a sentential sign and a state of affairs must possess the same multiplicity will be made more precise by the subsequent theses and must be understood in the context of these later explanations. *Neurath*: Reference to the given is in any case superfluous. There are only statements, namely protocol statements and physicalist statements. In these statements the given does not figure. If one speaks of multiplicity, then we should understand by this only the multiplicity of statements. It is only permissible to compare statements with each other, to investigate them and bring them into agreement. It is impermissible to confront statements with the given. *Schlick*: Statements too are facts. If then one only compares statements with each other, the given is referred to after all. *Carnap*: The difference

between the views of Wittgenstein and Neurath consists in the following. For Wittgenstein there are statements and then elucidations of statements. The latter one could call improper statements about sentences. They are the ones that aim to clarify the relation between statements and the given. For Neurath there does not exist the latter type of statements, they are superfluous. There are only protocol statements and physicalist statements. The so-called elucidations must either be transformable, in a behavioristic sense, into statements about the behavior of those who make statements or, if this is not possible, they do not belong to science but to metaphysics. *Schlick*: The elucidations are not statements but actions. Perhaps it is possible that they could be described in a behavioristic fashion. *Carnap*: This would have grave consequences. If there are only statements and if one cannot explain the meaning of sentences but only can make statements about linguistic signs (that is, the voice, the behavior of the person, sentential signs, etc.), then the problem of picturing the given by statements falls away.

Hahn: The given does not have the structure of the language. The language has its logical structure by means of which it represents the given. *Neurath*: It is impossible to speak of the given. We have to stay with the statements, that is, on the same level. *Carnap*: Neurath's view is the following: besides the proper language we have syntactic elucidations, i.e., what we call logic. Since the syntax is fixed in this way, the sentences of logic have the character of tautologies. These then involve formal considerations; they do not depend on empirical facts. Neurath says by contrast that also the considerations concerning the syntax can and must be formulated behaviorally. The properties of the syntax would then be conceived empirically, as better means of communication. Then one would say: these and these connections of sentences have this and that effect and thus one could show by reference to the reactions what is true and false. One should therefore not confront sentences and states of affairs at all. There are in addition only protocol statements and I only compare one of these with another; these statements can be those of the same or different persons. The divergent protocol statements would be deleted as false. In this the term "state of affairs" does not figure at all.

Neumann: If two such protocol statements are to be confronted with each other, I need a syntax for that. *Schlick*: It is the same whether I write that down or whether I speak about it and state true or false states of affairs. *Neurath*: If it is the same, how does this cohere with what Carnap says? *Carnap*: What I said was only expressed more strictly. *Neurath*: How does all this relate to Waismann? *Waismann*: On p. 3 I say that we make pictures of facts for ourselves.[12] The content [Sinn] of a thought is the existence or nonexistence of a state of affairs. *Hahn*: We also make pictures for ourselves of states of affairs which are not facts. *Waismann*: The existence of a fact is the existence of a state of affairs. The state of affairs is what is simple, the fact what is complex. *Carnap*: We have molecular sentences, atomic sentences, and facts. *Waismann*: We have determined the difference between states of affairs and

[12] The page reference is to the manuscript of Waismann's "Theses"; compare p. 235 of the Engl. transl. in McGuinness, ed., 1967. *Trans.*

facts on p. 1 in this fashion for reasons of convenience.[13] *Neurath*: Why do you speak of an "inner picture"? *Waismann*: We have here the psychological processes which obtain. A fact is not a picture. I do not find pictures as given, I must view the fact as a picture. A thought assumes a standpoint. *Neurath*: Thought is then a psychological moment. Are we allowed to speak this way? Is this still the behavioristic standpoint which we defend? *Waismann*: I do not speak from an absolutely behavioristic standpoint. *Schlick*: Me neither. In any case not in the sense in which it was formulated by Carnap earlier. But of course I can always reformulate the psychological sentences later and employ the physical language. *Carnap*: When we tell the psychologists that they must not speak introspectively they will not agree. *Waismann*: We better leave this for later since I will write about this. *Neurath*: Carnap and I, we find this embarrassing outside since I always said that here in Vienna one has adopted a behavioristic standpoint. That is why I want to know what your view is.

Attempt to reformulate the first six sentences of Waismann's treatise.

Hahn: Let's rather stick to Wittgenstein. *Neurath*: I suspect that 90 % can be reformulated behaviorally. *Hahn*: I suspect that none of this is essential. *Neurath*: All this avoids the issue. *Carnap*: I believe that behaviorism has little to do with the "Theses." I would like to clarify the issue of behaviorism first. Bühler for one pursues introspective psychology. *Schlick*: The psychological language is always translatable, if it is correct.

5 March 1931

Carnap defends the following thesis of physicalism: the physical language is *the* language of science. This means that the physical language is set against the phenomenal one. The latter deals with atomic states of affairs and the like whereas the physical language refers to constructed structures. Their construction proceeds as follows. First, a four-dimensional continuum is being postulated which will be referred to as the continuum of space-time points. To these points then certain physical state magnitudes are ascribed, or, in colloquial language, things, since it is clear that these can at all times be replaced by terms of the strict physical language. The language of science must be intersubjective, i.e. it must serve the communication from subject to subject. A sentence of the intersubjective language is only meaningful [sinnvoll] if it is intersubjectively verifiable. The sentences of the phenomenal language can only be verified by me and so can only be understood by me. The phenomenal language, in contrast to the physical intersubjective language, is a monological one. The sentences of the physical language become verifiable only after translation into the phenomenal language. The phenomenal language is not suited to be the language of science, however, since the sentences of the latter must be both intersubjectively valid and intersubjectively verifiable. The physical language is not only intersubjective but also intersensual, since it is independent of the

[13] The page reference is to the manuscript of Waismann's "Theses"; compare p. 233 of the Engl. transl. in McGuinness, ed., 1967. *Trans.*

individual sense modalities. This assertion can be tested by every individual in their own case. In addition we demand still further of the language of science that it be universal compared to the partial individual languages, like those of political economy or chemistry. We must show that the language of physics is a universal language. The main question is whether the language of psychology also is translatable into the physical language. In general it is not denied that the sentences about other minds can be translated. The main objection amounts to this: that the sentences about the autopsychological are not translatable. But there we must consider what sentences like "I am angry" mean for science. For science only that is important which is intersubjectively verifiable, thus only the bodily reactions of the speaker. At the present time I call the initial basis for the constitution system no longer the autopsychological and employ the term "autopsychological" only for constructed systems. Therefore the psychical in psychology is only an abbreviated form of speech for physical processes. Difficulties seem to arise in the construction of the language, since the speech movements of humans are not conceived of differently than other reactions, i.e., as physical movements. But physical processes cannot be separated into meaningful and meaningless ones, since they are all of one sort. Yet we can apply the formal considerations of syntax to arbitrary sequences, say sequences of chairs. There are only practical reasons for the restriction to sequences of speech movements.

Schlick: Agrees with the results of Carnap and other behaviorists. But does not see clearly whether behaviorism is based upon empirical facts or is the result of logical analysis. *Carnap*: If one understands the concept of the empirical very widely, then behaviorism depends on empirical facts. In any case, it does not, as Neumann believes, depend on the impossibility of telepathy. *Schlick*: One could imagine that there existed no space and thus no physics. One should not separate self-understanding [Eigenverständigung] and communication with others [Fremdverständigung] in such a principled way. For self-understanding the recourse to physical processes is determined by the arbitrariness of the properties of reality. *Neurath*: If a statement like "I feel anger" is of the same type as "I see blue," then all sentences which are expressed in the phenomenal language must be transformable into physical sensations as is possible in the case of statements about sense impressions. *Waismann*: The phenomenal language can only be translated into the physical language if certain empirical connections obtain.

Carnap: If it is possible that an observed individual has different experiences while he has the same outer and inner physical states and reactions, then how can such a difference be established, how could such an assertion be verified? *Schlick*: Such a difference in experience cannot be established in principle. Physically everything remains the same but phenomenally I experience something different in both cases. *Neurath*: Can we even say such a thing? Is it possible even to express such a fact by a sentence? If not then in such cases we take the position of solipsism and cannot communicate. *Carnap*: If it possible to express an assertion in speech or in writing about a fact, then the whole problem is moot, since there obtains a physical reaction. *Schlick*: In the cases envisaged by me we cannot even express an assertion, since a

reaction by means of other names or linguistic signs would be impossible. *Hahn*: So matters seem to be as follows. We can think of a case where despite total identity of physical states and reactions I nevertheless experience something different and some secret force prevents me from expressing the difference of my experience through my reactions. *Neurath*: If it is held to be permissible to speak of such states, then this means that inexpressible experiences as such, which are not intelligible for everybody, have a legitimate place in science. *Carnap*: That would be metaphysics. There would exist things which are not real in the sense of physical science, about which I cannot speak by means of the physical language, but which nevertheless exist in some other fashion and are real. *Schlick*: No, nothing metaphysical is involved here. There would only obtain empirical facts which cannot be expressed by a certain language system. But there would then exist two realms, each with its own language, between which there cannot be communication. Both realms would have their own system of cognitions. Neither of them must be called metaphysical, both would be empirical science. *Neurath*: The two realms would thus be described in two different types of books. *Carnap*: The two realms could not be described in books, for then for both domains of facts there would obtain physical reactions and a unified type of description would be possible. *Schlick*: The physical and the psychical would both belong to a separate system of science. From this standpoint the question arises whether behaviorism is necessary on the basis of logical principles or whether the necessity of behaviorism is dependent upon the empirical principles of the world. Is it not possible to think of a world in which communication by means of the behavioristic language would not be possible? *Carnap*: Communication is possible only where it is possible to denote different experiences with different names. To experience something different and not be able to denote this by different names would have to be considered as caprice. Such a thing is logically unthinkable. The inability to distinguish different experiences by different physical symbols would even make monological science impossible. *Hahn*: That is not necessarily the case. If it were common that we could not denote different experiences by different names, we would not call such cases capricious. We could imagine a useable language even in this case. It is certainly correct that the everyday experiences can be expressed in the language of behaviorism. Whether this possibility of transformation holds also for the statements of scientific psychology can be decided only once there is available an exact and precise concept of the physical.

Neurath: Every statement of psychology, biology, sociology, etc., must be translatable into physical statements. Is a non-translatable sentence meaningless? *Schlick*: Yes, if a statements is not transformable in a behavioristic fashion, then it is meaningless. But from this it does not follow that it is not possible for us to denote the facts at issue by means of the language of psychology and be able to do with that. *Neurath*: The thesis which Carnap and I have defended in public is the following. All statements must be transformable into physical statements. *Kaufmann*: What is meant by "transformable into the physical language"? *Neurath*: A statement is transformable into a physical one if it is translatable into spatio-temporal concepts. Thus Driesch's entelechy, e.g., is a meaningless concept, since it is supposed to be

something only temporal but not spatial. *Neumann*: The example is inappropriate because Driesch intends entelechies to be spatio-temporal.

Waismann: Every linguistic expression can be considered with regard to two respects, as a physical expression and as the bearer of a meaning. According to the conception of behaviorism, language is nothing else but a reaction in a causal sense, like every other physical process. I.e., we have understood the meaning of a word if we react to the impression of blue with the word "blue." This conception does not lead anywhere. We do not understand a language if we have only described it. This becomes clear in the case of the deciphering of unfamiliar linguistic signs, e.g., of cuneiform writing. How do we verify the correctness of the deciphering? Only by means of the success in applying the rules we have discovered. *Neurath*: This assertion is wholly agreeable to behaviorism. The success in applying the rules of language can be described in terms of the behavior of speakers. *Waismann*: That is not correct. If it would be possible to describe the understanding of a language, the meaning of words and sentences by statements, then this would mean that it is possible to express the meaning of one statement by a second statement. For this second statement the case is the same. One could express the meaning of this second statement by a third. Thus one reaches an infinite regress. Escape from this circle is possible for us by conceiving of the understanding and therefore language as the bearer of meaning as not a purely physical process, not a reaction to physical processes. *Neurath*: It is correct that one can speak about a language only by means of another language, etc. But such a hierarchy of infinitely many languages does not amount to a principled objection against behaviorism.

Schlick: Waismann's objection is certainly right, but it belongs to a deeper scientific level. To understand the meaning of a language does not mean to describe any old facts—such a description must, after all, be understood itself—but it means to do something, to perform an action. That is the presupposition of every science and cannot become the object of a science. On the other hand, Carnap is right that psychology as an intersubjective science is only possible as behaviorism. But whether the language of physics is a universal language depends on whether psycho-physical parallelism obtains, thus on empirical conditions. I can understand myself without the physical language, e.g., when I verbalize certain processes as memories. *Neurath*: We can only find a context for sequences of words if we can discern their physical order. *Carnap*: The essential thing about the physical language is that it renders us independent of individual sensory modalities. *Schlick*: But we can imagine the situation where, e.g., a child is put to bed by the mother each evening and the child says every time "I am glad." Here it is possible that the child has a different feeling than that of joy and only designates the general situation in this way. Now the child could relate two different meanings to the expression. All along we assume that the configuration of the brain is the same each time. *Carnap*: I think that, e.g., as soon as I feel anger it is connected with this and that reaction. But if no such reaction obtains and I do not have such a feeling, there could still be such a reaction by means of a statement. *Schlick*: This is already one step too far. I do not know yet how I form the concept "anger." *Carnap*: Is it possible to demask a consistent malin-

gerer? *Hahn*: "Consistent malingerer" is meaningless. In a phenomenal sense there cannot be malingerers. *Schlick*: All the questions that I have in mind here have something to do with parallelism. *Neurath*: Do you mean I have the feeling of anger and I do not know it? *Schlick*: We have not got to the anger yet. *Beer*: If I simulate anger, then I do not find anything different in the brain than in the case of actual anger. I can verify it physically and psychologically. *Carnap*: All this only makes sense in your own solipsistic language. *Beer*: What I do is hide the anger. *Carnap*: Then you could say "I am angry," thinking you speak the truth, but this could not be. *Beer*: Another could never establish this.

Hahn: Schlick speaks of a case where all people have two words coordinated to a physical complex. Anger could be denoted by this expression and by an arbitrary word. *Schlick*: I make certain utterances and I look angry. So I am angry. Now another person asks what "angry" means. Then one says[:] all the physical things plus the anger. Let this happen repeatedly. I thus learn that, e.g., the pain in the foot is not part of this. So now I have the same experience but I have also in addition another feeling. Does the other feeling belong to the anger or not[?] Do I understand the physical situation by it or also the feeling[?] *Carnap*: Those outside say the word "angry." *Schlick*: But now the sentence has a double meaning. In retrospect I can distinguish both cases. But physically both are the same. *Carnap*: Is it possible that two bodies with the same micro-structure behave differently? *Schlick*: My case holds if parallelism holds. *Neurath*: The autopsychological belongs to the monological language. *Schlick*: But I experience something different. *Carnap*: Then we must give up causality in physics. *Neumann*: I do not think so. We have included the psychological in the domain of physics. *Hahn*: All matter consists of the same atoms. Nevertheless, there exist atoms of iron and gold, etc. So there might be atoms of anger and joy. That would be one possible picture of the world. *Schlick*: What is observable would remain the same. Only a new dimension, the psychical, would be added.

12 March 1931

Carnap: Altered views in comparison to *Der Logische Aufbau der Welt* (The Logical Structure of the World [hereafter: *Aufbau*]).

I. Logical questions. Little change, only no longer a distinction between the propositional function and the correlated relation. Now there are only functions (of the relevant type). The thesis of extensionality is valid in the sense of the formulation of p. 59 [p. 73 of George's translation]. Related to the thesis of extensionality is the question about sense [Sinn] and reference [Bedeutung]. The term "sense" in the old meaning [Bedeutung] falls away. There is nothing that lies between the proper logical content and the purely psychological representational content. "Sense" can now also be used for the logical meaning of a sentence. A new distinction is now made: two sentences p and q have the same truth value if $p \equiv q$ is true. By contrast, they have the same theoretical content (sense), if this formula is a tautology. Analogously for propositional functions: if $(x)\ f(x) \equiv g(x)$ is valid then f and g have the same extension (Umfang), they have the same content (Gehalt), if this formula is a tautology.

II. Substantive questions. The question of the basis is problematic (form of the atomic sentences). The standpoint of methodological solipsism remains for me the only possible one. Different possibilities for the type of atomic sentences.

1) Elementary experiences as elements, as also in the *Aufbau*, but today I do not believe anymore that one basic relation suffices. 2) Certain definite isolated sensations as elements (Mach), e.g., this individual blue here. There are a number of possibilities of how the atomic sentences could be formed. An atomic sentence could encompass the entire visual field of a moment, not only the individual blue here, or not the visual field but the whole experience, or the atomic sentence [could be] the entire phenomenal process of a person. 3) The possibility lying between Carnap and Mach, e.g., a gestalt in the visual field. 4) The three-dimensional things of the perceptual field are the elements of the atomic sentences. Previously the objection seemed to hold that the two-dimensional given exists, what is three-dimensional is constructed. But is it not things that we see? The objection suggests itself that deception is frequent. The first sentences must be free of error. The description of the visual field is what is certain. Rejoinder: An atomic sentence expresses only the content of an experience. It cannot be declared false. One can only say that the sentence of the physical language that has been correlated to this sentence is false. One must distinguish between the corresponding sentences of the physical and phenomenal languages. Similar distinction between things. In this simple form the objection cannot be upheld. Perhaps the view of Kotarbinski is to be understood like this. In any case, he does not admit any other sentences but those about things.

III. Question of basic functions. Either similarity relations as basic functions, then the qualities are to be constructed in the fashion of quasi-analysis. Or the qualities are themselves represented by basic signs, then the names are not arbitrary, but already given such they form a systematic order. The names of two colors, e.g., already make clear whether they are similar or not, similarity is then an internal relation. Difficulty: in order to erect a system of basic signs, before one can utter atomic sentences, a processing must have taken place. A method similar to quasi-analysis, but pre-lingual, aiming at a systematic assignation of names.

The remaining construction seems to retain the same order (solipsistic). The form of the constitution of the physical world remains the same. The laws of nature belong to the rules of the construction as well. A four-dimensional continuum to which numbers are ascribed. … This gives expression to the strongly conventional character of laws of nature (rules of evidence).

IV. On the concept of reality. It is no longer possible to speak of real and unreal objects (in the empirical sense). The concept of reality coincides with the concept of existence. Since existence can only be attributed to functions, not to proper names, the same holds also for the concept of reality. We cannot speak of what is unreal. That we do it despite it all is due to bad language. E.g., the sentence "I have dreamt of a red house" does not deal with a red house, one cannot therefore ask whether the dream dealt with a real or an unreal red house.

Waismann: One must be clear that two different problems have to be distinguished: the description of the constitution, which is represented in the construction, and the idea of a constitutional system. The efforts to develop a constitutional system are also shared by Wittgenstein. All the differences concern how the idea is realized, not the idea itself. Our aim (as Carnap has formulated it) is "the development of a syntax" and this is nothing but the attempt to develop a constitutional system. All the considerations could be called a logical preparation for the development of constitutional system. Acquisition of the tools for dealing with these problems. Distinction between what shows itself in the language and what can be said. Distinction between external and internal relations, external and internal properties. This distinction will become more and more important. The memory relation shows the distinction particularly clearly (the prototype of an internal relation). In the *Aufbau* it is a basic relation, according to our view it is not expressible in language. With the theory of types one can achieve much less for the analysis of reality than Russell thought. All of type theory does not advance us one step further. It requires altogether different methods to move on from elementary sentences. Also the question about the elementary sentences is rather problematical from the standpoint of Wittgenstein. What is shared is the idea to begin with some determinate elements [bestimmte Elemente]. One should no longer hold on to Wittgenstein's thesis that all sentences are truth functions of the elementary sentences. An entirely new principle of construction: the hypothesis, which connects the aspects to each other and which cannot be expressed by a truth function. The logical structure of sentences is related to the nature of hypotheses. How this is to be formulated I do not know yet.

Carnap: I have already been aware of the points of difference: internal and external relations. In principle in full agreement with the separation of the signs of the language and the signs of the syntax by means of which we speak of about this language. E.g., "tautological" (the mistakes of Lewis and of modal logic depend on the failure to make the distinction). Two points that do not seem entirely clear to me: what takes the place of the theory of types? *Waismann*: The theory of types does not have the same importance as with Russell, but it remains in place in principle.

Carnap: I still want to hold on to the thesis that sentences of a higher order are truth functions of the atomic sentences. With the physical sentences we find something different before us than with the simple sentences which we designate as true or false, for in them there is an inductive moment. One should try to find an interpretation. Either a physical hypothesis is not a sentence at all or if it is a sentence (true or false) then it is a truth function. To every hypothesis there properly corresponds a sentence of which we can say that its empirical truth can be taken as the occasion to utter it (singular physical sentence). Some part of our knowledge is the basis to which we refer when we make hypotheses. A certain truth function stands in a relation of correspondence to these hypotheses. One should verify the logical type of hypothesis more closely.

Hahn: The remarks by Carnap and Waismann sounded as if there is only one standpoint for the theory of constitution. My view is entirely different. There is no cause

for there to be only *one* possible foundation for a constitutional system. Must the atomic sentences really be of a very determinate sort? *Carnap*: Essentially there can be only one sort, but in practice there are different forms which can easily be transformed into each other. But of the possibilities sketched only one seems possible. *Hahn*: I believe that there are different possibilities which cannot be transformed into each other. Our language is not the primordial beginning, but logical and prelingual considerations precede it, from which those of syntax flow. The rules of syntax flow from the way in which concepts are formed. I proceed arbitrarily in the process of naming and then pronounce the internal relations as rules of syntax. *Carnap*: One must draw a distinction; to be sure, one must be clear about the form before one can speak [about it]. But here a different kind of preliminary work is possible, namely one which leads to systematic naming. It is not necessary if one takes the choice of signs to be totally arbitrary. *Hahn*: In choosing the signs red and green, which do have a relevant structure, the rules of syntax are so chosen that "Here is now red and green" is excluded syntactically. This syntax is already a consequence of the process of naming: names for situations which are mutually exclusive. The rules of syntax must be fixed because I proceed arbitrarily in naming. A hypothetical element enters into all sentences which we utter to a greater or lesser extent. Thus our ordinary sentences can never be completely verified. *Carnap*: One can speak of verification in an extended sense if one points to the observations which give a sufficient reason for uttering the sentence as hypothesis. *Hahn*: But this is an entirely different verification from that of Wittgenstein. *Waismann*: By our sentences we mean two things: that which we observe (that is verifiable) and something not verifiable. *Hahn*: The same is the case in analysis: tautological transformations of sentences which are not verifiable in a proper sense. *Carnap*: One should rather say that the analysis is a theory of forms. It does not care for what really is the case. *Hahn*: That is the constructivist standpoint, but set theory goes beyond what is constructible. *Carnap*: I do not think that the common conception of the nonconstructible is defensible. It seems to me that one can give an interpretation to the calculus. *Hahn*: But a hypothetical one, it seems to me.

Kaufmann: The constitutional system, which puts things at the beginning, seems to me to merit our preference. Certain pre-linguistic considerations seem to show this. Our language, which has created the noun, seems to have grasped this correctly. (Views of Husserl about the foundational contexts [in] *Logische Untersuchungen.*) In earlier times Carnap defended very strongly the view that every hypothesis has to be formulated finitely, that the hypothesis is also an assertion which can be verified, which must be delimited in a finite domain, in order to be meaningful. The subjective expectation which is contained in the hypothesis plays no part in this. It does make sense to give an non-finite character to hypotheses. There are no sentences which go beyond what is verifiable. Rather, the presuppositions are not explicitly specified. That one should reach, like Reichenbach, a principle of induction is absolutely precluded. *Carnap*: Only the verified sentence of a physicist has a real meaning. We have to distinguish between the law of nature and the corresponding sentence about observations. If this correspondence is a very close one, then we tend to say that the law of nature has been proved by these observations.

Neurath: I find it problematical to talk of pre-linguistic considerations. Similarly the affinity to the Husserl group. All these remarks, like expectation accompanying representation, I declare to be incorrect. The attempt to reduce the system of statements of science to pre-linguistic moments is, I think, highly problematic. Our work consists in taking the system of statements of science as our starting point. By moving things around in the system we get to elements which then are not "pre-" but "post-." As long as we move inside of the system everything is in order, everything which goes beyond this is to be rejected. The affinity with the Husserl group lies precisely in what goes beyond this. Suspicion against the idea of a *tabula rasa* with which to begin. *Carnap*: It is not to be thought that we could start from a *tabula rasa*, that is only a methodological construction. Thus we can ask in mathematics how we would have to start if we had no numbers, whereas we already have all our mathematical knowledge. We express pre-logical considerations in the ordinary language, as bad as it might be, in order to attempt to build a more correct language. The everyday language only serves as a means of communication. *Neurath*: One cannot go back behind the language. If one wants to build the good language by means of the bad then I do not believe one will arrive at atomic sentences. *Schlick*: There is after all a strong contrast between us and Husserl. For Husserl it is the main postulate that one can reach knowledge with the help of phenomenological analysis. But that is not what we believe.

7 May 1931

Passage in Waismann's "Theses," p. 6 [of ms.]: "… Specifying the form of a sentence hence includes laying down the values over which a variable is allowed to range."[14]

Hahn: How is this specification effected? Waismann says by enumerating the words. *Waismann*: There exist not one subject-predicate form of the sentence and one form of relations, but a considerable number of such forms. Rules of syntax must be specified, which tell us what may replace x in xRy and what may replace y. E.g., for "sweeter than" and "higher than" these rules are totally different. In the first case x and y can be replaced by something quite different than in the second case. *Carnap*: We are in substantive agreement. Only I would not postulate different rules of substitution for the variable x but would take different letters as variables. For every variable it would be fixed for once and all to what genus of constants it refers. *Waismann*: The form of the sentence is not yet determined by xRy. The rules of substitution for the variables are still part of the form of the sentence. *Carnap*: In my formulation of syntax the relations "sweeter than" and "higher than" would carry different variables with them. The sentences with these relations would then have

[14] Here the McGuinness and Schulte translation of Waismann's ms. is followed broadly, with additions suggested by Rand's protocol (compare McGuinness, ed., 1967, Engl. transl. p. 238). To be noted especially is that Rand's protocol reads "Worte" instead of "Werte," an apparent misprint. (As it happens, Carnap's copy of the typescript of Waismann's "Theses" shows the relevant letter e to be badly printed and easily mistakable for the letter o.) *Trans.*

different forms, even without us having to specify for every sentence the rules of substitution. The paradox of the seemingly same form would disappear. *Waismann*: Still another point seems important: how the value-range of a variable is to be delimited. Either [by] an enumeration or so that, e.g., x is allowed only to mean a color. What is the genus "color"? *Carnap*: I would employ the second type of specification, but in such a way that only the type of sign is made reference to, as already Frege emphasized. *Waismann*: The relation "brighter than" can only exist between colors. When I state "x brighter than y" I must not say that x and y can only be colors. Colors are a chapter heading in the logical grammar. What could be called genus here is limited by the rules of syntax which hold for it. *Carnap*: In general I am in agreement with this. My detailed views on what a syntax looks like (metalogic) I wish to present later during the summer semester. *Hahn*: The relation "brighter than" demands colors. Perhaps it is possible to form the syntax so that, if I replaced [the variables] by [names of] mammals instead of colors, we could call it not meaningless but false. If this would not lead to contradictions then such a logic would be admissible and it would have the advantage of great simplification, the minimization of the number of basic categories. Not every nonsense shows up in the form of contradictions. E.g., the pseudo-sentences of metaphysics. It is the main task of philosophy to separate the meaningless from the meaningful. Contradictions are only an accidental symptom of nonsense. *Carnap*: The syntactical word "false" would have two meanings for Hahn, false-1 would be false in the accustomed sense, false-2 would be nonsensical. I find it more to the point to represent both metalogical concepts by the same sign. *Hahn*: This is merely a question of expediency. The mixing of individuals and symbols for classes leads to contradictions. This does not happen in the case of these two concepts of falsity. *Waismann*: Would you also distinguish between two concepts of truth? *Carnap*: The nonsensical sentences would be either true-2 or false-2, the negated nonsensical one would be called true-2, the affirmed nonsensical ones false-2. *Neumann*: It is possible to have a syntax where to a noun there corresponds a certain category, to an adjective another, and where one would end up with much fewer basic categories. *Hahn*: It is possible that the very possibility of a theory of relations depends on this question. The question is whether a different specification, which does not lead to formal contradictions, would not be more practical for some cases. These are just matters of expediency, maybe the syntax which I have proposed is practical for formal theories, say, for those of mathematics. *Carnap*: In logic we had better keep the words "true" and "false." We must pay attention to the difference between a merely formal calculus and logic.

Passage of "Theses," p. 7 [of Waismann's ms.]: "… An expression can combine with other expressions only so long as it is unsaturated."[15]

Hahn: In the propositional calculus we can combine proper sentences with each other. Thus it is possible to combine saturated expressions as well. *Waismann*: But

[15] The McGuinness and Schulte translation of Waismann's ms. is followed here (compare McGuinness, ed., 1967, Engl. transl. p. 238). *Trans.*

in a wholly different fashion. *Hahn*: There is a difference between the sentence "the rose is red" and the assertion that the rose is red. *Waismann*: We do not distinguish between sentence and assertion. Frege's assertion sign cannot give the sentence its meaning [Sinn], it does not have a logical but a psychological importance. I cannot add anything to a saturated sentence. I cannot make a statement about a statement. The view that there are sentences about sentences leads to viewing them under two points of view, one as saturated and one as unsaturated. The sequence word-sentence cannot be continued beyond the sentence. *Carnap*: I will show in my metalogic in what sense sentences about sentences are possible. The problem is that we wish to speak metalogic, e.g., to say of a sentence that it follows from another one. *Hahn*: I do not wish to exclude the possibility of speaking about sentences. But then this is a different language in which the sentences of the first language appear as individuals. *Carnap*: In a certain sense [it is] the same language. More on this later. *Hahn*: The difference between our views is that Waismann speaks in the spirit of Wittgenstein of an universal language which I do not believe in. *Waismann*: But the thesis is this: a sentence can appear in a sentence only as the argument of a truth function.

Carnap and Hahn agree with this.

Neumann: Do Wittgenstein's remarks apply to a specific language or to arbitrary languages? *Hahn*: What is said here applies to all languages in a similar sense to that in which there are statements in Russell's logic which apply to all types. *Schlick*: It would lead to an antinomy to say: this holds for all languages. *Hahn*: The connecting link from the language, which Wittgenstein has in mind, to the world does not belong to the language. *Waismann*: A language of the second order I would call a calculus. *Hahn*: A large part of what has been said applies to languages and calculi. I focus on what languages and calculi have in common.

21 May 1931

In connection to the previous protocol:

Hahn: I say "The color a is brighter than the color b." One can take the view that in this sentence there are three terms which express different contents: the color a, the color b, and the experience of the relation "brighter." If one thinks of it in this way then the sentence "The number 4 is brighter than the number 2" is not to be regarded as meaningless but as false. The main question would be: are such relation words like "brighter" coordinated to an experiential quality, just like the color a and the color b or a sensation of smell? The sentence "The smell of salt is brighter than the smell of the rose" is possible because the experience "brighter" can occur also with the smell of salt and the rose. *Neurath*: What would then still be an example of meaninglessness? *Hahn*: The confusion of types which finds expression in leading to contradictions. *Neurath*: Would the confusion of spheres no longer be excluded? *Carnap*: I believe it still would be. The sentence with "brighter" could be formed only if colors and smells belong to the same sphere. But then it would not amount to a confusion of spheres.

Neumann: One remark concerning the protocol. It appears to me to be essential that the view outlined by Hahn is not only perhaps possible but definitely so. One should not speak there of "true-1" and "true-2." There is only one kind of "truth" and one kind of "false" and "meaningless." In Hahn's case truth is fully determinate, because the type of verification is in all cases the same in principle. You always ask how concepts are constructed syntactically, what the colors really mean, etc. I think it is a mistake to believe that there can be only one possible sort of construction for the world of concepts. It seems to me that the formulae of logic can be cast over the world in very different ways so that they fit. And one of the possible views seems to me to be Hahn's.

Waismann: What Hahn has explained has to with the question of whether there can be experiences of relations. I do not believe this. Every relation statement is an imprecise description. E.g., the sentence "In this room it is warmer than in the other" is a more imprecise expression for "In this room the temperature is so-and-so, in the other it is such-and-such." *Hahn*: But this does not express the sensation that I have when I go from one room into the next. *Waismann*: It depends on what the form of the elementary sentences is. Do they have the form of subject-predicate sentences or of two-place relations? I believe that there does not exist such a thing as an experience of relations, set apart from the terms of the relation. Whether there can obtain an experience of a relation depends on the contents of consciousness. *Hahn*: That I do not believe. In the end the question is whether relations between smells, colors, tones are a material a priori or of empirical nature…

On the passage of "Theses," p. 8 [of Waismann's ms.]: "What a picture must have in common with what it depicts is its form, i.e. the possibility of structure."[16]

Carnap: Here structure in the strict sense is meant. *Waismann*: This follows Wittgenstein's use of language. One could say "multiplicity" in place of "form." *Neumann*: But more is surely meant. *Hahn*: "Multiplicity" is here not to be understood in the sense of mere cardinality but more in a topological sense. *Neurath*: Should we not discuss the metaphysics that is contained in these sentences? Should we simply accept the mythological elucidations? *Carnap*: If one sees in the way something is formulated only the private accompanying representations, then there is not much to discuss. But if it is believed that a sentence is so full of metaphysics that it is not meaningful anymore, then one should discuss it. *Neurath*: In my view the comparison between, e.g., fever and the temperature curve is meaningless. One can only compare statements with statements. *Hahn*: In the context of this discussion we should not discuss such objections so that we get more quickly to concrete matters. What we are engaged in at present are preparations for our goal to understand clearly Wittgenstein's views on mathematics, colors, etc.

[16]Again the McGuinness and Schulte translation of Waismann's ms. is followed broadly, albeit with the omission suggested by Rand's protocol (compare McGuinness, ed., 1967, Engl. transl. p. 239). *Trans.*

On the passage of "Theses," p. 8 [of Waismann's ms.]: "A description by means of verbal language, on the other hand, can be nonsensical. I can say, for instance, 'A is to the north of B, and B is to the north of A.'"[17]

Hahn: It is already assumed that the places a and b are given with their geographical longitude and latitude. But in any case, the sentence is contradictory, not meaningless. *Waismann*: The multiplicity of statements must be reigned in by a rule of syntax. What is meaningless [here] is the first truth possibility "TT," which occurs in the schema. Once I have deleted it (by means of syntax), the rest is a contradiction.

A n B	B n A	
T	T	T
T	F	T
F	T	T
F	F	T

What is essential is this. Such a sentential symbol has a greater multiplicity than the reality. The rule of syntax therefore demands a deletion, here in the first line. *Hahn*: That that sentence is a contradiction follows from the axioms of geometry. *Waismann*: Yes and no; it depends on how one conceives of geometry. One can bring it about that it corresponds to the rules of syntax or that the sentences of geometry are descriptive of something, like the sentences of physics. *Hahn*: I have in mind something like Hilbert's geometry. *Waismann*: Hilbert's geometry is calculus, not application.

On the example of the map, p. 8 [of Waismann's ms.].[18]

Waismann: The example is used to show that the task of syntax is always the same: to give language the right multiplicity. *Neumann*: It is false that the map does not allow any logical reasoning: one can reason from part of the map to how the neighbouring areas must look like. *Hahn*: If the map employs geometry, then of course the entire syntax presupposes the geometry. *Waismann*: One cannot represent something meaningless by a map, only something false. *Carnap*: Yes, because the map and the surface of the earth are two-dimensional. Meaninglessness is only possible once we represent something two-dimensional by something three-dimensional or the other way around. *Hahn, Neurath, Waismann*: The examples of the map, the musical notation, etc., are ill-chosen, because they possess a syntax.

Neurath: Is it not metaphysics to say "The sentence is a picture of reality"? *Carnap*: We can reinterpret this; we say "comparison with reality" when we mean "comparison of the physical sentences with the primary (phenomenal) sentences." Reininger's

[17] Again the McGuinness and Schulte translation of Waismann's ms. is followed (compare McGuinness, ed., 1967, Engl. transl. p. 239). On Waismann's reasoning compare his contribution to the conversation with Wittgenstein and Schlick, 2 January 1930 (see ibid., p. 79 of the Engl. translation). *Trans.*

[18] Compare McGuinness, ed., 1967, p. 239. *Trans.*

views of the primary statements: they are spontaneous reactions, one cannot justify them theoretically. *Neurath*: In a certain sense I am in greater agreement with Reininger than with Hahn. In opposition to Reininger, H[ahn] thinks that one needs these things for elucidations. *Hahn*: No this is not what I mean. *Neurath*: I thought that we are doing metaphysics with our "elucidations" because it is necessary. Reininger is doing it because he likes it, not because he needs it for construction. *Hahn*: The question which interests me is why a physicist makes experiments. *Neurath*: But Hahn speaks of experiments and of statements. *Hahn*: Statements go into books, experiments become part of the activity.

On the passage of "Theses," p. 9 [of Waismann's ms.]. "The fact that the form of the system of signs can deputize syntax is important, for it shows us that the rules of syntax describe nothing."[19]

Neumann: But not every system of signs can deputize for every syntax. Therefore the rules of syntax tell us about the spheres. The fact that the language of things has such-and-such rules tells us about the form of the object sphere of which we speak. *Waismann*: A form is represented, not described. It can be the case that one syntax is no longer needed when one language is being translated into another, because the form of the second language replaces it. The rules of syntax can find expression in various ways, but statements can only be pictured by statements.

On the passage of "Theses," p. 9 [of Waismann's ms.]. "You need not first invent an 'ideal language' in order to depict reality. Our ordinary language already is a logical picture as soon as you know how each word signifies."[20]

Waismann: A language is a language only insofar as it respects these demands. *Carnap*: For us this is a matter of course, but for other readers the deficiencies of the ordinary language should be pointed out more clearly. *Hahn*: If one says in our circle that Wittgenstein means the ideal language then we mean this mainly with regard to the theory of elementary sentences, which after all do not show up in our language.

On the passage of "Theses," p. 11 [of Waismann's ms.]. "Where symmetry means *logical* symmetry it cannot be expressed by writing (x, y)xRy ⊃ yRx for that already presupposes the xRy has a different sense from yRx. That proposition describes empirical symmetry."[21]

Carnap: I agree with the substance of this but I cannot follow the justification given. *Hahn*: If we have a case of logical symmetry, then the said formula is a rule of syntax,

[19] The McGuinness and Schulte translation of Waismann's ms. is followed here (compare McGuinness, ed., 1967, Engl. transl. p. 240). *Trans.*

[20] Again the McGuinness and Schulte translation of Waismann's ms. is followed broadly; Rand's protocol deletes an emphasis (compare McGuinness, ed., 1967, Engl. transl. p. 240). *Trans.*

[21] Again the McGuinness and Schulte translation of Waismann's ms. is followed broadly; the emphasis is added in Rand's protocol (compare McGuinness, ed., 1967, Engl. transl. p. 242). *Trans.*

if it is an empirical one, then it is a sentence of the language. In the case of a logical symmetrical relation the symbolism xRy has superfluous multiplicity, which must then be reduced by a rule. *Carnap*: This rule can be formulated in two ways: 1) "the formula (x, y)(xRy ⊃ yRx) is a tautology," or 2) "from xRy follows yRx." *Hahn*: I can also write the formula as an axiom of the relevant discipline. *Carnap*: The specification of an axiom happens by writing down a formula and adding that it is to be an axiom. *Neurath*: Can we say that axioms replace rules for signs? *Carnap*: Only for formal axioms, not in the case of axioms of an empirical theory. *Neurath*: Then one could make the axioms disappear by means of the relevant rules for signs? *Hahn*: Yes, e.g., the axiom "Two points specify a straight line" becomes superfluous if one picks a symbol for the straight line which contains the relations between two points. *Waismann*: The propositional calculus is an instructive example. It is indeed the case that if we move to a language with a different multiplicity (denotation by truth functions) then the axioms become superfluous. *Neurath*: Is it possible to push ahead with this process of reduction so far that all axioms can be made to disappear? *Carnap*: That depends on what happens to the rules at the same time. The minimal multiplicity of language could be called the multiplicity of the world just as, generally, the invariants with regard to the changes of syntax [could be called] the "characteristics of reality." *Neurath*: Then the concept of minimal multiplicity can serve to make metaphysics disappear. *Carnap*: Let's rather say: since we can define the concept "multiplicity of reality" and similar ones in this way we are not here dealing with something metaphysical. *Neurath*: Is the idling of statements by itself deleterious for science? *Waismann*: Yes, e.g., in the case of identity.

3 June 1931

Remarks on the previous protocol:

Schlick: One can only experience external relations, not internal ones. *Hahn*: Is the experience "brighter" between two different colors an external or an internal relation? *Schlick*: In the case of external relations one can have an experience, but between two colors there exist internal relations. *Neider*: Then there exists no experience "brighter"? *Schlick*: "Brighter" is an internal relation and cannot be experienced therefore, just like the relation "on the right hand side of." *Carnap*: Is position an external relation? *Hahn*: The experience "red" is correlated to a process in the retina and when I speak of "brighter" there could be correlated to it some corresponding chemical process in the brain; in this case there would exist no difference between "brighter" and "red" and "brighter" would be an external relation. *Carnap*: When I say something is brighter than something else, then I have a certain chemical process in the perceptual center of the brain. But this is obvious, for otherwise there could not be any movements of the mouth. So this is not sufficient, for there would not exist any internal relations. *Hahn*: [Relations between] numbers are internal. *Carnap*: When I say "smaller" with regard to numbers, then I have a certain process in the speech center too. *Hahn*: The color "red" corresponds to the process in the retina, but the number "2" does not [correspond] in the same sense to a brain process. *Schlick*: What matters is that that which happens possesses a certain structural gestalt. If there

obtains an internal relation, then it becomes apparent through the gestalt of the whole process. If one sees a brighter or a darker color, then this is a whole process, of which "brighter" is a part not given like the individual colors. *Carnap*: The internal relation is not a partial process, but a certain specification, a characteristic of the whole process. *Kaufmann*: If I see two blues of which one is brighter than the other, then this is an internal relation. Does the "brighter" of which I speak not refer to an isolating abstraction? Surely it is a relation which also obtains with regard to other classes of colors and what I can show here I can also show there. It is an invariant of the whole process. *Hahn*: The experience "pleasant," which is not an internal relation, is related to some colors, also to smells and tones. Could there not exist an analogous experience "brighter" when confronted with two colors? *Schlick*: No, there does exist a difference. The mistake is that one thinks of the external stimulations when one thinks of the experiences, and in the case of the latter the experience "brighter" is not added in addition, but already given. *Hahn*: This also holds of "pleasant." *Schlick*: It does not matter at all whether the experience obtains, for one can perceive two colors without comparing them. *Hahn*: If the experience of the relation is missing, then we cannot speak of "brighter" and if one does so anyway, then that is only memory and interpretation. *Schlick*: When I speak of experiences of relations I have in mind that I had this experience next to this one. Concerning internal relations experiences of the relation do not matter since they are already given. They do not enter into the sentence itself but show themselves in its form and they are ineffable. *Hahn*: In the case of colors this is very clear. *Schlick*: It is wrong to ask whether one has an experience "brighter" in addition to other experiences.

Hahn: I wish to make a remark about symmetrical relations. Waismann says that we cannot express a logical symmetry by writing (x, y)(xRy ⊃ yRx). *Carnap*: This formula does not say that there obtains a symmetry, because it is tautological and thus cannot say anything. One can specify it and consider it true, but it does not express that R is symmetrical. Only the metalogical sentence "This formula is a tautology" expresses this. *Hahn*: If I wish to express a symmetrical relation by means of the sign R, then I have a superfluous multiplicity which according to Waismann I have to remove by means of a convention concerning symbols. This removal of superfluous multiplicities, however, is not always possible without further ado, for it might be that it only becomes clear after difficult investigations that the relation is symmetrical. Example: the quadratic law of reciprocity. *Carnap*: This means only that a certain formula has been specified as a tautology and sometimes this shows itself directly and at other times it has to be deduced from the axioms first. *Hahn*: So it shows itself in a tautological fashion that there obtains a symmetry. *Carnap*: That an expression is symmetrical can be described in different ways: 1) by the sentence "R … is symmetrical." This way should be removed. 2) By specifying the metalogical description of the formula (or the formula in quotation marks, as in Frege) and adding that it is a tautology. 3) By "xRy follows from yRx." *Hahn*: I just cannot see why one should not be able to write the formula (x, y)(xRy ⊃ yRx) as in the *Principia. Carnap*: It can be written down alright, but it does not express the symmetry of R. That only becomes expressible by metalogic. *Hahn*: I am in agreement with this; so we agree fully that the style of the *Principia*, (x, y)(xRy ⊃ yRx), separates the empirical and the tautological.

"Theses," p. 12 [of Waismann's ms.] "This rule consequently does not speak of reality. … It is a stipulation about the use of those signs."[22]

Hahn: This objection by Waismann only holds against the standpoint of Russell who presupposes that we have an overview of the domain to be symbolized. But there is still another standpoint against which this objection does not hold and which in the following sense remains formally the same as Russell's definition of identity. Suppose a domain of objects is given and a range of propositional functions over those objects. Now it must be defined that two of these objects are identical for the science in question if they agree with regard to all propositional functions. So here we have a relative concept of identity, which depends on the range of the propositional functions which are assumed. Example: two geographers have seen two mountains in Africa that are two different individuals. But they have to be described as identical since all propositional functions about them are identical. Each geographer has described one individual and then they are rendered identical by means of a definition. *Carnap*: Do we here have to deal with the quantitative or the qualitative characteristics of objects? *Hahn*: That depends on the propositional functions about the objects, which we wish to assume. I define that two individuals, which agree in the truth values of two statements, are identical. *Carnap*: This is a confusion of positional relations and qualitative characteristics. Both are so different that they cannot be represented by the same propositional function and also cannot appear in the same sentence form. Agreement in as many qualitative characteristics as possible does not yet make for identity; rather, identity obtains if the place relations agree and if the qualitative characteristics do not then agree as well, then they are wrong. Identity is fixed only by positional relations. *Hahn*: This is yet another point of view which is also possible. *Schlick*: This seems to me to be Wittgenstein's view as well. *Carnap*: This view makes sense. I think it is essential that positional relations are distinguished from qualitative characteristics. *Hahn*: Carnap's view already presupposes a developed theory. From an earlier standpoint it is rather a matter of what is to be considered as identical at different times. *Carnap*: But this is gen-identity, which is not at issue here. *Hahn*: According to my standpoint, as in Russell's, there is no absolute identity. Identity is always a special case of identity. For me, two different individuals can be identical for one science and distinct for another. E.g., I consider the individuals "Carnap now" and "Carnap now" to be identical.

"Theses," p. 13 [of Waismann's ms.]: "By the same token Russell's attempt at defining by means of identity which class consists, e.g., of two things a and b, is also a failure."[23]

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[22] The McGuinness and Schulte translation of Waismann's ms. is followed. The ellipsis of Rand's protocol replaces: "It does not say that the objects referred to by 'a' and 'b' stand in the mutual relation of identity; it deals with those signs themselves." (Compare McGuinness, ed., 1967, Engl. transl. 242–3) *Trans.*

[23] The McGuinness and Schulte translation of Waismann's ms. is followed (compare McGuinness, ed., 1967, Engl. transl. p. 243). *Trans.*

Hahn: According to my point of view, we must first have a definite system of propositional functions before we can formulate the concept of identity. I reject the absolute concept of identity. That is essential for the definition of natural numbers. This definition stays a formal one for me, like the Russellian one. *Carnap*: Do you include both the positional relations and the qualitative characteristics in the definition of identity? *Hahn*: It depends. *Carnap*: So it could happen that one position is both red and blue? *Hahn*: That is an altogether different question. *Carnap*: I believe that we always, already in everyday matters, have to deal with relations of order and with attributions of qualities. *Hahn*: That has nothing to do with logic and comes up only at a later stage of theorizing. *Schlick*: According to your point of view, if we discounted various things, we could declare, e.g., two chairs to be identical. *Hahn*: Yes. *Carnap*: But this requires the change of syntax. *Hahn*: That is correct. For the police, e.g., two persons with the same documents are identical. *Kaufmann*: That only means that the police conjecture that the persons with the same documents will also agree in respect of other qualities. *Hahn*: Such a conjecture only comes up when one wishes to consider an enlarged system of propositional functions. *Schlick*: According to Hahn's view it is possible to consider identical, for certain purposes, all objects with four legs. *Carnap*: This is the formal concept of equivalence, therefore something entirely different. I think that for descriptions we always need coordinates and qualities. *Hahn*: For the usual descriptions this is the case, but that has nothing to do with logic. *Carnap*: I believe it does. Descriptions always require a system of ordering, even if not necessarily space and time. *Hahn*: Even if there were no space and time there would be logic. I still have the system of orderings, but in a more primitive form than space and time. The mountains in the previous example must also be given somehow. *Carnap*: But not through qualities like red, blue, … but it must always be stated how one came to arrive there. *Hahn*: That must not always be so. *Neumann*: Paleontology would make a good example here, since its orderings proceed entirely by means of qualities. *Hahn*: I have a better example still: the song that consists of 25 notes, which can be regarded as identical in several respects. On a first count which only considers the pitch, we only get five notes, for another count which considers the temporal sequence there are 25. If you then consider the timbre and duration, you get still another number of notes. *Schlick*: Your definition of identity is only a definition of sameness by abstraction. *Hahn*: I do not care what you mean by this. What I wanted to show was that Waismann's assertion that it is impossible to define a class by means of the two elements a and b and identity is incorrect. *Carnap*: In this case one should always say: "identical with regard to such and such propositional functions, specified in the beginning." *Hahn*: Yes. *Carnap*: That would be inconvenient in practice. *Hahn*: I believe that Russell's theory of number can be upheld with my interpretation, even though I reject Russell's absolute identity. *Carnap*: Place relations and qualities cannot be placed side by side in a correct syntax. *Neumann*: Perhaps the correct syntax is defined only by this. *Hahn*: That is what I fear as well. The main difference between Carnap's view and mine is this. Carnap wants to describe the world and for that he needs absolute identity. For me everything is relative and logic always applies to a fixed chosen

system. *Schlick*: Your identity is not the one that is meant here; I do not believe that numbers can be defined in this fashion. *Carnap*: In my syntax the formula, which defines identity, cannot be written down at all, because it contains a universal quantifier which ranges over properties. *Hahn*: Why should this be impermissible? E.g., if the properties are enumerated concretely, say the pitch, the timbre, etc., depending on the delimitation of the properties a different cardinality is obtained, but in each case the meaning is precise. So there is no change in Russell's formulae nor in his symbols. But that something comes to five individuals is absolute for Russell, for my point of view it is relative to the propositional functions which are given in the beginning and which we apply.

11 June 1931

Carnap's first lecture on metalogic.

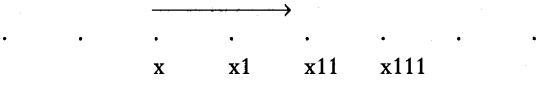
By metalogic I understand the theory of the forms which appear in a language, thus the representation of the syntax of language. In it one must not—to follow the formulation of the Warsaw group—make reference to the meanings [Bedeutung] of the signs. The interest that led to these considerations is twofold. 1) Which changes of the Russellian language are practical? 2) Form of metalogic: are there sentences about sentences, what meaning do they have, are they empirical sentences or tautologies, will there result a hierarchy of languages? Our objects are the sentential signs of a certain language.

Signs:

P(a) Predicate attributed to things;
Q(a,b) Relation;
$\&, \rightarrow, \equiv, \sim, \vee, [x], [\exists^x]$

Our sentences shall meet the following requirements: 1) the "All" and "There are" sentences are only verifiable if they are specified for a finite domain. The syntax is meant to force the specification of this domain. 2) Individual and specific generality shall be distinguished; individual [generality] is empirical, specific [generality] concerns postulations which are of a general nature and are not based on empirical values. Individual generality shall be expressed by operators, specific [generality] by free variables. 3) Qualitative and place relations shall be distinguished syntactically.

"Description" (representation of an empirical finding) is effected by attributing qualities (or state magnitudes) to places in a domain. For the sake of simplicity, we consider a discrete schema of places. From the name of a place we can already see in which relations it stands to others (example: house numbers; names for objects such that from their ordering follows their place in the schema). Limitation to a one-dimensional directional schema.



We introduce signs which we call numerals:

"0," where "x0" has the same meaning as "x" (if 0 stands in front of or behind a place name it is intended to mean the same as if it is left out), and "1." Number signs are constructed from 0 and 1; thus we get the specification of a series of number signs: 01, 11, 111, 1111, …

The specification of the domain of a universal operator [or quantifier][24] is effected by specifying only the upper limit of the domain: [n]111 (p(xn)). Such a universally quantified sentence means the conjunction of the sentences P(x) & P(x1) & P(x11) & P(x111).

If determinate number signs serve as the limits of the domain then a description by conjunction is always possible. But when the domain is specified by a variable: [n]m (P(xn)), then we get a conjunction with indefinitely many (but finitely many) members: P(x) & … & … & P(xm). So the introduction of the universal operator into our language is essential.

Similarly, the analysis of an existential sentence into a disjunction is possible if the domain is specified by number signs; if it is specified by a variable, then there results a disjunction with indefinitely many members.

$$\left[\exists^{n}\right]111\left(P\left(xn\right)\right)$$
$$P\left(x\right)\vee P\left(x1\right)\vee P\left(x11\right)\vee P\left(x111\right)$$
$$\left[\exists^{n}\right]m\left(K\left(xn\right)\right)$$
$$P\left(x\right)\vee\ldots\vee\ldots\vee\ldots\vee P\left(xm\right)$$

Our number signs occur as 1) place names, 2) relative place designators.

.	.	.	.	.	.	.	.	.
0		$\underbrace{111}$		x	$\underbrace{x1}$			
		place name			relative place designators			

The metalogic primarily has to provide answers to the following questions:

1) what signs do occur?
2) which series of signs are formulae?

We consider the signs as objects, which are collected into kinds and geni. Two signs "x" in a formula are not the same sign but belong to the same kind, for which we introduce the sign $\mathfrak{x}$.

As object variables we take small Latin letters:

$\underbrace{x,\ u,\ n,\ \ldots}$	
$\mathfrak{X}$	metalogical name of the genus
$\overbrace{\mathfrak{x}',\ \mathfrak{x}'',\ \ldots}$	metalogical name of the kinds of this genus

[24] The terminology has been rendered so as to agree with that of Carnap's *Logical Syntax of Language* (compare Engl. transl. §6). *Trans.*

In addition there is the genus of qualities.

$\underbrace{P, Q, R, \ldots}$ designations of qualities (properties, relations)

genus: $\mathfrak{G}$

kinds: $\overbrace{\mathfrak{G}', \mathfrak{G}'', \ldots}$

Similarly there is a genus of arithmetical predicates ($\mathfrak{Ap}$) and a genus of arithmetical functions ($\mathfrak{f}$) which also divide into kinds.

The individual signs $\sim$, $\vee$, $\&$, $\rightarrow$, $\equiv$,
non od und imp aeq

(,), [,], , $\exists$, 0, 1
$\mathfrak{Kl}$ $\mathfrak{Kl}'$ $\mathfrak{O}\mathfrak{Kl}$ $\mathfrak{O}\mathfrak{Kl}'$ $\mathfrak{Ko}$ $\mathfrak{E}\mathfrak{x}$ $\mathfrak{Nu}$ $\mathfrak{E}$

correspond to kinds which do not belong to geni.

Metalogical description of a formula:

P(x, y) $\vee$ Q(0)

$\mathfrak{G} - \mathfrak{Kl} - \mathfrak{x}' - \mathfrak{Ko} - \mathfrak{x}'' - \mathfrak{Kl} - \mathfrak{od} - \mathfrak{G}' - \mathfrak{Kl} - \mathfrak{Nu} - \mathfrak{Kl}$

These we call "description of a kind"; if we leave out the indices, so that it is no longer the kinds but geni that are specified, then we call the description a "description of a genus."

$\mathfrak{G}\,(\mathfrak{x}', \mathfrak{x}'')\ \mathfrak{od}\ \mathfrak{G}'(\mathfrak{Nu})$

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What is the point of the introduction of these signs?

In a metalogical sentence about a formula we must not write down the formula itself, but only its metalogical description.

Example of a metalogical sentence: "A formula of the form $\mathfrak{G}\,(\mathfrak{x}', \mathfrak{x}'')\ \mathfrak{od}\ \mathfrak{G}'(\mathfrak{Nu})$ is an elementary formula of disjunction." Now, is this sentence analytical, empirical or synthetical a priori?

Hilbert's view: synthetical a priori on the basis of pure intuition; perhaps this view arose because the formula and its description have not been clearly distinguished. The above metalogical sentence is analytical: for it follows from the metalogical definition of the concept "elementary disjunction" that a formula, which has such and such a description, is an elementary disjunction; by contrast, the sentence that the formula on the board here is an elementary disjunction is an empirical sentence.

A metalogical sentence shall contain no logical formula (as a proper part). The use of a formula in a metalogical text is ambiguous (without special precautions); we do not know how we can vary this formula.

The problem of *identity*:
Following Russell: $(x = y) =_{Df} (F(x) \rightarrow F(y))$

Wittgenstein rejects this definition: x=y is not a sentence form, a=b is not a sentence.

It is possible that two objects have all their properties in common and still are two objects. In order to understand the sentence "a=b" we must already know the meaning of the names and if we know it then we know whether they designate the same object, that is, whether "a=b" is true or false.

Lewis wrongly criticises the *Principia* for employing only a sign for implication but not one for strict implication (*consequence relation*). The consequence relation is a metalogical concept. The confusion between implication and consequence relation is very common. If the consequence relation is valid, then the implication relation is always valid as well, but not vice versa.

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Definition of a few metalogical concepts:

$\mathfrak{Zi} =_{\text{Df}} \mathfrak{Nu}$ oder $\mathfrak{E}$	an object is a *numeral*, if it is a zero or a one.
$\mathfrak{Zi}\ \mathfrak{R} =_{\text{Df}} \mathfrak{Zi}$ oder $\mathfrak{Zi}\ \mathfrak{R} - \mathfrak{Zi}$	a sequence is called a *sequence of numerals* if it consists either of an individual numeral or of a sequence of numerals and a numeral.
$\mathfrak{Z}\ \mathfrak{El} =_{\text{Df}} \mathfrak{Zi}$ oder $\mathfrak{X}$	an object is called a *numerical element* if it is a numeral or a variable.
$\mathfrak{Z}\ \mathfrak{A} =_{\text{Df}} \mathfrak{Z}\ \mathfrak{El}$ oder $\mathfrak{Z}\ \mathfrak{A} - \mathfrak{Z}\ \mathfrak{El}$	a sequence is called a *numerical expression* if it consists of a numerical element or a numerical expression and a numerical element.

Suppose we wish to express that in some arbitrary domain a certain relation P holds for all true (i.e., non-identical) variables. If the relevant domain has not been definitely specified, e.g., [p] n [q] n (R (xp, xq)), then we cannot express with the signs we have introduced so far that the general sentence is to be limited to true pairs. In order to express this we have to introduce new signs.

Russell writes this as follows: $(p \neq q) \rightarrow R\ (xp, xq)$

Russell's definition cannot be given in our language, since it employs the higher calculus of functions, whereas we do not have predicate variables, let alone universal operators for them.

What possibilities are there then if we are not to admit identity as a proper relation?

Wittgenstein: if there occur in a formula two different variables, then this shall always be so understood that in case of their replacement two different constants have to be used. This determination is impractical, however, since one would have to introduce still further signs and complicated rules, for the replacement of all variables need not take place at the same time; therefore it would be possible to forget the restriction on replacements unless it had been expressed explicitly by the signs written inside the formulae.

Earlier I attempted the following solution which also did not prove practical: we express the restriction to true pairs by upper indices:

[p] n [q]	$n^{p,q}$	(R (xp, xq))
[q]	$n^{1,q}$	(R (xp, xq))

The rules for the handling of the indices are, however, very complicated. It is simplest to retain the traditional symbolism, after all; therefore we write:

$$\sim (p = q) \rightarrow R\,(xp, xq)$$
$$\text{or} \qquad (p = q) \vee R\,(xp, xq)$$

Here we take "=" to be an undefined basic sign (like Behmann). Only we interpret [it] differently: a formula of the form "p=q" does not count as the representation of a state of affairs but as an auxiliary formula, which occurs as a non-independent part of a sentence or as part of a proof.

We distinguish then between the proper and improper formulae, the improper formulae being treated formally mostly like proper ones; but in some cases the distinction is required.

If we replace [the variables] in the formula above with the same constants, even though it is to hold only for distinct ones, we get a tautology.

$(1 = 1) \vee R\,(x1, x1)$

By replacement with different elements we get, e.g.,

$(1 = 11) \vee R\,(x1, x11)$

or $\sim (1 = 11) \vee R\,(x1, x11)$

From this we can prove, according to the rules of implication, by means of the formula $\sim (1 = 11)$: R (x1, x11). Thus we can derive precisely those singular sentences from the general sentence above which agree with the assumed empirical state.

Hahn: The designation of individuals by ordinal numbers is very simple. But by means of other ordering schemata it becomes much more complicated. *Carnap*: I have chosen the mathematical part to be as simple as possible, because I am concerned particularly with the sentences of the language that have content. The introduction of a multidimensional ordering schema would be very simple; but the employment of a continuum would import all the difficulties associated with real numbers.

18 June 1931

Carnap's second lecture on metalogic.

Continuation of the *definition of metalogical concepts*:

Besides the basic concept of identity I(p,q), the genus of arithmetical predicates contains, e.g.:

Ge (m, n) $\equiv [\exists^R]$ m (~ I (k, 0) & I (m, kn)).

Tlb (m, n) $\equiv [\exists^R]$ m (I (m, prod (k, n)))

Prim (m) $\equiv [\exists^R]$ m (I (k, 0) $\vee$ I (k, 1) $\vee$ I 8k, m) $\vee$ ~ Tlb (m, k))

The arithmetical functions are in part defined recursively, so that the signs introduced in this fashion are essential ones, i.e., they cannot be eliminated and do not have the value of abbreviational conventions.
sum (m, n) = mn

1) prod (m, 0) = 0
2) prod (m, n1) = sum (prod (m, n), m)

Skolem too introduced the various predicates and functions by means of recursive definitions. The argument places in our predicate sentences are so far always filled by "numerical expressions"; if we employ also functions we speak of "arithmetical expressions." This requires more complicated definitions. For this reason I will for purposes of this presentation renounce the use of arithmetical functions and give definitions as if only numerical expressions were involved.

Elementary series of arguments: $\mathfrak{El}\ \mathfrak{Arg}\ \mathfrak{N} \equiv \mathfrak{ZA}$ oder $\mathfrak{El}\ \mathfrak{Arg}\ \mathfrak{N} - \mathfrak{Ko} - \mathfrak{ZA}$

Here it is important that the sign of the definiendum that occurs in the definiens refers to a smaller part than in the definiendum.

Predicate: $\mathfrak{P} \equiv \mathfrak{Q}$ oder $\mathfrak{Ap}$

Elementary formula: $\mathfrak{El}\ \mathfrak{for} \equiv \mathfrak{P}\ (\mathfrak{El}\ \mathfrak{Arg}\ \mathfrak{N})$

Universal operator: $\mathfrak{A}\ \mathfrak{Op} \equiv [\mathfrak{x}]\ \mathfrak{Z}\ \mathfrak{A}$ in which no variable occurs which is of the same kind as the variable bound by the operator.

Existential operator: $\mathfrak{E}\ \mathfrak{Op} \equiv [\mathfrak{E}\ \mathfrak{x}\ \mathfrak{x}]\ \mathfrak{Z}\ \mathfrak{A}$ in which …

Operator: $\mathfrak{Op} \equiv \mathfrak{A}\ \mathfrak{Op}$ oder $\mathfrak{E}\ \mathfrak{Op}$

Formula: $\mathfrak{for} \equiv \mathfrak{El}\ \mathfrak{for}$ or $\mathfrak{non}\ (\mathfrak{for})$

or	(for)	od	(")
"	(")	und	(")
"	(")	imp	(")
"	(")	aeq	(")
"	Op (for)		

By means of the concept "formula" we can define "bound" and "free variables" by first defining "operand." If a formula has the form $\mathfrak{Op}\ (\mathfrak{A})$, where $\mathfrak{A}$ is a formula, then $\mathfrak{A}$ is an operand. A *variable* which stands at some place in this sequence is called "*bound*" in this sequence, if it occurs either within an operator or within an operand and is of the same type as the variables which occur in the operator of the operand. A *variable* is called "*free*" within a sequence if it is not bound in it.

Derivations. Unless we limit ourselves to trivial domains (e.g., propositional calculus) where there exists a decision procedure, the method according to which it is decided whether a formula is acceptable, whether it is a provable formula, must proceed by means of initial formulae and rules of transformation; everything which

can be derived by finitely many transformations from the initial formulae shall be called true. The formulae which we place at the beginning we shall call "*primitive sentences*" [Grundformeln, literally: basic formulae],[25] not "axioms," since they are something quite different from the axioms of an axiomatic system where logic is already presupposed. For the system sketched here 15 primitive sentences are required.

1) The four primitive sentences of the propositional calculus. Since we do not wish to employ propositional variables, however, we cannot express Hilbert's (X ∨ X) → X in this form, but must say: all formulae, which have such and such a form will be called primitive sentences of the first kind. Therefore we define:

$\mathfrak{Gr}\ \mathfrak{for}\ 1 \equiv \big(\big((\mathfrak{A})\ \mathfrak{od}\ (\mathfrak{A})\big)\ \mathfrak{imp}\ \mathfrak{A}\big)$ where $\mathfrak{A}$ is a formula.

Example for a basic formula of the first kind:

(P (x1) ∨ P (x1)) → (x1))

$\mathfrak{Gr}\ \mathfrak{for}\ 2 \equiv \big((\mathfrak{A})\ \mathfrak{imp}\ \big((\mathfrak{A})\ \mathfrak{od}\ (\mathfrak{B})\big)\big)$ where $\mathfrak{A}$ and $\mathfrak{B}$ are formulae

$\mathfrak{Gr}\ \mathfrak{for}\ 3 \equiv \big((\mathfrak{A})\ \mathfrak{od}\ (\mathfrak{B})\big)\ \mathfrak{imp}\ \big((\mathfrak{B})\ \mathfrak{od}\ (\mathfrak{A})\big)$ where $\mathfrak{A}$ and $\mathfrak{B}$ are formulae

$\mathfrak{Gr}\ \mathfrak{for}\ 4 \equiv \big(\big((\mathfrak{A})\ \mathfrak{imp}\ (\mathfrak{B})\big)\ \mathfrak{imp}\ \big(\big((\mathfrak{C})\ \mathfrak{od}\ (\mathfrak{A})\big)\ \mathfrak{imp}\ \big((\mathfrak{C})\ \mathfrak{od}\ (\mathfrak{B})\big)\big)\big)$ where $\mathfrak{A}$, $\mathfrak{B}$ and $\mathfrak{C}$ are formulae

The two axioms of Hilbert's calculus of functions are derivable in our system, so we need not specify them as primitive sentences. Rather, we introduce the universal and the existential operator by means of definitions, through formulae of equivalences:

1) ([x] 0 (F (x))) ≡ (F (0))
2) ([x] n1 (F (x))) ≡ (([x] n (F (x))) & F (n1))
([∃] n (F (x))) ≡ (~ ([x]n (~ (F (x)))))

Formulae of this kind we call primitive sentences of the eighth, ninth, and tenth kind. In order to define them we need the concept of substitution.

Substitution: We say: a formula $\mathfrak{A}$ is transformed into another formula $\mathfrak{B}$ by substitution of a for x, if the expression a replaces x in all places where x occurs freely in $\mathfrak{A}$. As our first rule of derivation we will later specify the rule of substitution: every formula may be transformed by substituting an arbitrary arithmetical expression for any kind of variable.

$\mathfrak{Gr}\ \mathfrak{for}\ 8 \equiv \big(([\mathfrak{x}]\ \mathfrak{Nu}\ (\mathfrak{A}))\ \mathfrak{imp}\ (\mathfrak{A})\big)$ where $\mathfrak{A}$ is an arbitrary formula.

Analogously for the primitive sentences 9, 10. The primitive sentences 5, 6, 7 are the definitions for $\mathfrak{imp}$ $\mathfrak{und}$ $\mathfrak{aeq}$. In principle, 5, 6, 7, could be left out, if one would not mind complicated notations. But they cannot be specified as definitions afterwards, since our rules for the specification of definitions only admit definitions of predicates and arithmetical functions.

[25] The terminology has been rendered so as to agree with that of Carnap's *Logical Syntax of Language* (compare Engl. transl. §§10-11). *Trans.*

On the basis of our definitional formulae 8, 9, 10 for universal and existential operators, we can, with the help of the principle of complete induction, derive those formulae which Hilbert takes as the axioms of the calculus of functions.

The other primitive sentences are of an arithmetical nature. Hilbert specified the following two axioms of identity:

1) x = x
2) (x = y) → (F (x) → F (y))

Amongst our rules of derivation there is a rule of identity which is defined somewhat differently than is common. It emerges that in this case we need only specify the first of Hilbert's formulae as a primitive sentence. Commonly one formulates: if there is a formula of the kind $\mathfrak{a} = \mathfrak{b}$ and $\mathfrak{a}$ occurs in $\mathfrak{A}$, then $\mathfrak{A}$ may replace $\mathfrak{A}\ \mathfrak{b}$ in $\mathfrak{a}$. By contrast, our rule of derivation only allows the transformation in formulae of a certain form. It says: if there is a formula of the form $(\mathfrak{a} = \mathfrak{b}) \to \mathfrak{C}\ (\mathfrak{a})$ then we may transform it into $(\mathfrak{a} = \mathfrak{b}) \to \mathfrak{C}\ (\mathfrak{b})$

Er for $11 \equiv (x = x)$

Er for $12 \equiv \sim (0 = ml)$. An arbitrary variable may take the place of m. This formula corresponds to the axiom of Peano according to which 0 is not the successor of a number.

Er for $13 \equiv ((m1 = nl) \to (m = n))$. Our space is not so constituted, that it cannot bifurcate upfront. That a bifurcation behind does not occur is already expressed by the notation "m1."

Er for $14 \equiv (01 = 1)$. This is in effect the definition of the numeral 1 as an independent number sign.

Er for 15 I will not specify this in detail. This primitive sentence is required for introducing a certain operator for which we write: [Kx] n (F(x)). This is intended to mean: the smallest number x to n, which has the property F (or 0 if there is no such number). This is a name. The whole thing is not a formula but an arithmetical expression. It is not an abbreviation: what is expressed by means of this operator cannot be written by means of other signs.

Hahn: Do you not need primitive sentences for the properties of addition, e.g., the associative law, etc.? *Carnap*: The notation mnp for (m + n) + p makes an associative law superfluous. The other laws, as well as the corresponding laws for functions sum (m, n) (including the associative law) can here be proved with the help of the principle of complete induction.

The four rules of derivation:

1) Rule of substitution, already mentioned.
2) Rule of implication, as usual. $\mathfrak{A}$

$$\frac{\mathfrak{A} \to \mathfrak{B}}{\mathfrak{B}}$$

3) Rule of equality (rule of identity), already mentioned.
4) Rule of complete induction. If we have two formulae with free variables:

$$\frac{F(0) \qquad F(n) \rightarrow F(n1)}{F(n)}$$

then it shall be permitted to state the formula by itself.

The principle of complete induction here looks formally like it is normally expressed, but the objections often raised do not apply anymore. No longer is there any talk of the "totality of numbers."

That free variables occur in the general arithmetical formulae expresses that it is specific generality that is at issue here. A formula of the form f(n), e.g., $m \cdot n = n \cdot m$ is a quasi-formula, like our arithmetical formulae in general, which only allows us to derive certain formulae. E.g., from F(n) we can derive F(111). This derived formula serves to derive proper sentences from others. E.g., we can derive, with the help of F(111), from $F(111) \rightarrow P(x, y)$ the sentence P(x,y).

I wish to say something else about the *general arithmetical sentences*: In our notation, in contradistinction to Russell's, $m \cdot n = n \cdot m$ has no universal operator. That has the following consequences for the formal treatment of the formula: we cannot negate the expression (that something is not valid for every pair cannot be expressed); this corresponds to the view of the intuitionists, that general arithmetical sentences cannot be negated. The invalidity can only be expressed by giving a counterexample or specifying the domain in which a counterexample occurs. We write this:

$$\left[\exists^{x}\right] \text{----} \left[\exists^{y}\right] \text{---} \left(\sim\left(\mathfrak{A}\ y\ (x,y)\right)\right)$$

But we do not agree with Brouwer in rejecting the law of the excluded middle. To be sure, we cannot say by assuming the negation sign that a general arithmetical sentence is not correct, for $\sim P(x, y)$ does not express the denial of P (x, y), but that there are no P-pairs at all. Despite this the formula $P(x, y) \vee \sim (P(x, y))$ is valid. It corresponds to the law of the excluded middle.

Other rules of derivation, which occur in other logics, e.g., Hilbert's rules of displacement for operators, are for us derivable with the help of the principle of complete induction. This follows because for us the universal operators are always applied to numbers and because the universal operators are recursively defined.

Another remark concerning the *formulation of the rules of derivation*.

One tends to say: "A rule of derivation is something that determines practical actions, therefore it is not a theoretical expression but a rule for experience." What does this mean? Certainly a rule of derivation is not a command but a permission. But the concept of permission, of being allowed to, should not be used here. It is a matter of explaining theoretically by the means of metalogic that if two formulae of the form $\mathfrak{A}$ and $\mathfrak{A} \rightarrow \mathfrak{B}$, which are primitive sentences, or stand in a certain relation

to primitive sentences, have a certain character, then $\mathfrak{B}$ always has this character as well. This character we designate by the metalogical concept "provable." We formulate the rules of derivation so that they form a metalogical definition of the concept "direct consequence." Then we define "proof": a given sequence of series of signs is called a proof if each one of these series is either a primitive sentence or is the direct consequence of one or two formulae which precede it in the sequence.

What is called "*provable*"? This is not a correct concept unless the length of the proof is limited. We must say: "$\mathfrak{A}$ is provable in so many stages," more precisely, "$\mathfrak{A}$ is provable by a proof consisting of so and so many signs." Such a concept is correct and surely must be defined metalogically. But the definition of this concept also presents notable difficulties. All our previous concepts have been defined in the following way: those structures that were being referred to occurred as parts of the structures to be evaluated. (See the definition of $\mathfrak{for}$) By contrast, the situation with the concept "provable" is this: $\mathfrak{A}$ is a formula provable by a thousand signs, if there are other formulae, which together with $\mathfrak{A}$ form a proof for $\mathfrak{A}$ that contains at most 1000 signs. But these other formulae are not contained as partial formulae in $\mathfrak{A}$. The expression "if there are other formulae of this and this kind" makes reference to the empirical state of the contents of the world, whereas it must be a matter of the inner constitution of $\mathfrak{A}$ alone, whether $\mathfrak{A}$ is provable by 1000 signs or not. Here we must not say "if there really are these and these formulae" but "if these and these formulae are possible," and this we cannot express with the means so far at our disposal. Here we have a metalogical concept that is doubtlessly a correct concept and yet remains indefinable by our methods of definition so far. It seems to me that here we must employ the method of the arithmetization of metalogic which was employed by Gödel in his latest work. We want to express that certain combinations of signs are possible, which stand in certain formal relations to the given combination of signs. This can be expressed by arithmeticization. We correlate numbers to the kinds and geni. Then we can specify arithmetical definitions for certain arithmetical properties of series of numbers, which correspond to the metalogical properties of the corresponding series of signs.

The difference between arithmetical metalogic and metalogic as presented so far is this: the arithmetical metalogic deals not with the empirically given but with the logically possible structures. Our metalogic so far has been the descriptive theory of certain given structures, as it were, the geography of the forms of language, but the arithmeticized metalogic is the geometry of the forms of language.

25 June 1931

Carnap's third lecture on metalogic.

A singular sentence of metalogic says that at such and such a place there occurs a series of signs of a certain kind. More important than these are the conditional sentences of metalogic. A formula is a one-dimensional series of discrete objects of different kinds, thus a structure that we can describe in our language. The metalogical concepts of kinds correspond to the qualities of the physical language. $\mathfrak{Nu}\,(\mathrm{x})$ means "at the place x there occurs a sign for zero." Later we will no longer attribute qualities but numbers.

Example of a description of the formula "P(0)":

𝔓	(a)	&	𝔎l	(a1)	&	𝔑u	(a11)	𝔎l'	(a111)
	a			a1			a11		a111

If one replaces a with a variable and adds → 𝔈𝔣 𝔣𝔬𝔯 (x,111), then we get a metalogical conditional sentence which says in translation: "If the above four qualities occur at places x to x111, then there occurs an elementary formula at those places." Sentences of this sort are analytical and follow from the definition of "elementary formula."

The metalogical definitions considered so far only refer to what is contained within the formula. Matters are different, e.g., for the concept "provable." "Provable by one thousand signs" is definable only by arithmeticization.

In the ordinary language we attribute qualities or numbers (values of state magnitudes) to the places. So far we only have introduced letters for qualities. What does a formula look like when we attribute state magnitudes, i.e., numbers, to the places? We limit ourselves first to one state magnitude, whose values shall be natural numbers. Therefore we assume a one-dimensional, discrete series of qualities, say the notes on the piano. We designate the state magnitude by σ; σ (x) = n shall mean: "at x σ has the value n." σ is an empirical, not an arithmetical numerical function. This way of expression is analogous to that in physics.

This is now applied to metalogic: to the signs of the language we coordinate numbers in an arbitrary but one-to-one fashion [term-numbers].[26] To the variables [we coordinate] the prime numbers, to the qualities the squares of the prime numbers, to the arithmetical predicates the cubes of prime numbers, and to the functions the fourth power [of prime numbers]. The remaining numbers are assigned to the signs for negation, brackets, operators, etc.

E.g.

~	∨	&	→	≡	(	)	,	0
6,	10,	14,	15,	18,	20,	21,	22,	26

1	[	]	∃	k	I	σ
28,	30,	33,	34,	35,	38,	39

Whereas previously the metalogical description of the formula "P (0)" was written 𝔓 (a) & 𝔎l (a1) & 𝔑u (a11) & 𝔎l' (a111) we now write:

(σ (a) = 4) & (σ (a1) = 20) & (σ (a11) = 26) & (σ (a111) = 21)

and more simply if we place the values of the state magnitudes after each other: 4, 20, 26, 21.

In order to determine more easily whether a formula that is written in this way possesses a certain metalogical property we coordinate to it one-to-one a certain

[26] The terminology has been rendered so as to agree with that of Carnap's *Logical Syntax of Language* (compare Engl. transl. §19). *Trans.*

series-number, so that from every series number the term-numbers and their ordering can be derived. The series-number is formed by taking the prime numbers in order, raising them to the power of the term-numbers and forming the product of these magnitudes, thus e.g. $2^4 \cdot 3^{20} \cdot 5^{26} \cdot 7^{21}$. The series-number of, e.g., an elementary formula, must meet certain conditions and because of this we can say whether a given number is the series-number of a given formula.

Example: we called what is a variable, a "0" or a "1" a numerical element and we now define the arithmetical property "numerical element": "Zel(m) = Prim(m) ∨ (m = 26) ∨ m = 28)". A series that consists of numerical elements we call a numerical expression. A number is the series-number of a numerical expression if the term-numbers which it contains represent numerical elements. The nth term-number of the series-number x is defined in the following way:

st (n, x) = [Ky] x (Tlb (x), pr (n, x)^y & ~ (Tlb (x, pr (n, x)$^{y+1}$).

(The number, which occurs in the nth place of the series, whose series-number is x, is "the smallest y to x, for which holds: x is divisible by the nth prime number contained in x raised to the power of y and not divisible by the nth prime number contained in x raised to the power of y + 1.") Then we get a purely arithmetical definition for the series-number of a numerical expression:

$$\mathrm{ZA}\,(\mathrm{x}) \equiv [\mathfrak{P}]\ \mathrm{x}\ \big((\mathfrak{P} \neq 0) \rightarrow \mathfrak{Z}\ \mathfrak{El}\ (\mathrm{st}\ (\mathfrak{P}, \mathrm{x}))\big)$$

From this we can form the arithmetical concept "numerical expression": "between the places x and k there occurs a numerical expression" is to mean "the series-number σ (x, k) is the series number of a numerical expression", thus

$$\mathfrak{Z}\ \mathfrak{A}\ (\mathrm{x}, \mathrm{k}) = \mathrm{ZA}\ (\sigma\ (\mathrm{x}, \mathrm{k}))$$

Gödel is able to make do with the arithmetical concepts, since he is only concerned with arithmetic. But since we wish to describe the physical structures, i.e., the combinations of signs, we also have to specify such empirical concepts. Since we describe only physical structures, namely series of linguistic signs, we are able to express metalogic in our ordinary speech, namely in such a way that does not contradict the views of Wittgenstein. We are concerned here not with sentences about a type of sentences, but with in part singular, in part conditional sentences about physical structures.

In Russell's supposedly intentional sentence "A believes that p" the metalogical description of the sentence p must replace "p" and through this every appearance of intentionality disappears.

Neumann: Are the cases of "thinking," "believing" not different from "saying"? *Carnap*: No, the sentence "A believes that p" also says that in A there is a certain sequence of processes taking place. *Hahn*: That there is no principled difference between "A believes that p" and "A says that p" becomes clear when "A believes that P" is expressed as follows: "A believes that a certain sentence (to be described

metamathematically) holds true." Is the analysis, which you have given for "A believes that p," not the same as that in the second edition of the *Principia*? *Carnap*: Essentially, yes. *Neumann*: I think that the sentence "A believes that p" is equivocal. The same sign is used for different things. This has nothing to do with behaviorism.

Carnap: I would like to add a remark on the role of the concept of cardinality in my system. In this we first have the ordinal numbers. From these it is possible to define recursively the cardinality of a concept. There is agreement with Frege to the extent that cardinality can only be attributed to a concept, but for me there is only the cardinality of concepts restricted to finite domains. It is impossible to ask how many blue things there are, but only how many blue things there are in this room.

Hahn: Is it not possible to say: "There exists precisely one even prime number"? *Carnap*: Yes, in the following way: "2 is an even prime number and every even prime number is identical with 2." *Hahn*: Just that is what I mean when I say "There exists precisely one prime number." It would be possible then to define in this way (Russell's) the number 1. So there obtains only a terminological difference between us. *Carnap*: It would be possible to render the definition thus, but this would yield an impractical syntax, because in the case of empirical concepts the cardinalities make sense only for finite domains.

Feigl: What about the hierarchy of languages? Is that disposed of in your system? *Carnap*: Yes. I would like to add an overview of the different types of sentences in our language. A sentence is to be called "abstract" if it contains a free variable, "concrete" if it does not contain one, "descriptive" if it contains empirical concepts, "arithmetical" if it does not contain any. In addition we have to distinguish between decidable and undecidable sentences and, as regards the decidable ones, between those which are part of the calculus and those which are decidable by means of metamathematical investigations. Definitions are axioms which can be added at will, because their form ensures noncontradiction. We get the following table:

	Decidable in the calculus	Decidable outside of the calculus	Undecidable with new signs	Undecidable without new signs
Descriptive abstract	Red (n) ∨ ~ Red (n) General tautologies or contradictions	Constructible by Gödel's method	Definitions of physical concepts	Natural laws
[Descriptive] concrete	R (17) ∨ ~ R (17) Concrete tautologies or contradictions	0	Definitions of geographical names	Contentful sentences
Arithmetical abstract	m + n = n + m	Gödel's theorem	Definitions of mathematical concepts	? (Fermat's theorem)
[Arithmetical] concrete	1 + 1 = 2	0	Definitions of 2 = 1 + 1	

Hahn: Of which type are metalogical sentences? Are they tautologies? *Carnap*: They are partly empirical, partly tautological. E.g., the sentence "In this place there occurs

an elementary formula" is empirical. The sentence "If at some place a sign for 0 occurs in brackets after a predicate sign, then there occurs an elementary formula there" is tautological. *Neumann*: What does it mean to say that the metalogic is expressible in the original [ursprünglich] language? As soon as the language is comprehensive enough, everything is expressible by means of it, and so also the physical description of the formulae expressible in it. *Carnap*: Yes, but it turns out that all the questions of syntax, which we are discussing here in the circle, can be dealt with by means of these physical descriptions of formulae. Even the assertion that certain sentences, say Heidegger's, are meaningless can be expressed in an exact fashion by a metalogical sentence. *Neumann*: So the consequence obtains that there exists only one language? *Carnap*: Yes, there are sentences of very different sorts (as the table above shows), but all [sentences], even the metalogical ones, belong to one language. *Hahn*: Do we really need the term "metalogic," i.e., are the metalogical sentences different in principle from the others? *Carnap*: No, it is only for the sake of convenience that a set of sentences is collected under the name "metalogical sentences." *Neurath*: So we are dealing with a concrete selection of sentences. *Carnap*: Yes. *Neurath*: Is it possible to express the metalogic of metalogic back in the original language? *Carnap*: Yes, we can arrange it so that this is the case.

2 July 1931

Carnap: I would like to briefly comment on a few problems connected to metalogic and a few examples of its application. 1) the concept of probability: I totally agree with Waismann that this is a metalogical relation between sentences and that one cannot express it in the language, as Reichenbach tries to, by a sign like $\rightarrow \vee$. 2) The concepts of axiomatics must be conceived of metalogically, as already Tarski has demanded, because they are metalogical concepts. This is related to the following problems: if one employs the extended calculus of functions in axiomatics, as I did previously, then one can express directly or by corresponding concepts many of the things that otherwise are only expressible metalogically. 3) Concepts appearing in empirical sentences can be clarified easily by means of my simplified model language. a) Gen-identity: since qualities and place relations have already been distinguished, it is possible to define gen-identity logically. We cannot here speak of time and space but only of places. That two concepts are gen-identical means something like "this thing at two different points in time." In a two-dimensional schema we call two continuous areas, which are not too small and not too far away from each other, gen-identical if the same qualities are attributed to them. b) The differences between kinds in geometry: mathematical geometry is the syntax of a system of places. It is the hypothetical theory of the distribution of state magnitudes in a system of places, i.e., the hypothetical theory of physical geometry. By means of gen-identity we can then develop the physical geometry proper. c) The difference between an empirical universal sentence and a law of nature: the empirical universal sentence refers to a restricted domain. If we delete the operator in it and the specification of the domain, then we obtain a law of nature with a free variable, which can no longer be verified. The law of nature is not derived from the empirical universal sentence, however, but is postulated conventionally on the occasion of certain sentences. The different kinds of laws

of nature (statistical and probabilistic laws) should be characterised from this point of view as well and even the question, whether space and time can occur in them is to be treated metalogically. For them to occur explicitly would mean that everywhere there is a constant behind an empirical predicate or a state magnitude. 4) The kinds of definition. Reichenbach distinguishes between definitions of concepts and coordinating definitions. The first reduce concepts to others and the second lead from concepts to something real. For these, however, no examples can be given and in truth it is such that in the one case the definiens contains a quality, in the other a place relation. Both then are conceptual definitions, without reduction to reality.

Neumann: If place relations are included in the definitions, one leaves the conceptual domain. *Hahn*: The assignment of coordinates to reality can only be effected by ostension. *Carnap*: That we already possess coordinates is presupposed, of course. *Kaufmann*: Every determination of place in the end leads back to me. *Carnap*: I can mark a point in the desert, which itself does not give any markers for orientation, in two ways: either I stand still or I stick a flag into the sand and assume that it is the only flag of its kind in the desert. *Hahn*: Now we are returning to identity. I am always saying that one has to start from a certain domain of objects and a certain set of statements about these objects. Two objects are identical if they agree in all propositional functions. *Carnap*: Places and qualities have to be distinguished. *Hahn*: That is not necessary. *Carnap*: But I do believe it is, for the propositional functions are very different. *Hahn*: Logic can abstract from that.

Feigl: For Reichenbach, the conceptual definition implicitly is an axiom of connectability and the coordinating definition [is one] explicitly so and these must always end in concrete definitions. So there is a clear difference between the two: definitions of the first kind define variable and the others [define] constants. *Carnap*: For Reichenbach it looks like as if in the case of coordinating definitions there no longer occur concepts in the definiens. If one speaks of the meaning [Sinn], better the content of a formula, one has to formulate this metalogically: the meaning of formula lies in the possibility to derive other formulae from it. The meaning of, e.g., $n \cdot m = m \cdot n$ is, e.g., $2 \cdot 3 = 3 \cdot 2$; amongst other things, the empirical sentences with empirical tasks are derivable from the formula. If one wants to speak of "the ultimate meaning of a formula" then this can mean only the concrete sentences which we can derive from the formula. Two sentences have the same content if one can derive the same [consequences] from them, i.e., if one is derivable from the other and vice versa. One must not say "X is provable" but always only "X is provable by a certain proof Y, i.e., with reference to a certain proof-number which is assigned to this proof." Moreover, one must distinguish between the logical and the physical content of an empirical sentence. Y is logically contained in X if it is derivable from X. If Y is derivable from X and a certain system S of laws of nature, then the physical content of Y is contained in X and if in addition X is also derivable from Y, then X and Y have the same physical content. *Kaufmann*: But then Y is logical, even though contained in X and S. *Carnap*: Here there is only difference in the use of language. In this sense we just have to imitate the ways of thinking of a physicist, without losing the logical precision. Sentences which seemingly contain something intentional are expressible metalogically, so that every semblance of intentionality disappears.

In the sentence "Because of p, so q" p and q, which both are meant to be sentences, do not occur themselves but only in their metalogical description. "If p then q" is valid because q is the logical consequence of p or because it is a physical consequence of p. It is convenient for the investigation of concepts to create a model language and study the concepts in this way. Metalogic is a framework for the activity of explaining concepts.

Kaufmann: I have a number of principled objections against this way of conceiving of metalogic. A proof is not an embodiment of visual things. What matters is what remains invariant and that is the rules with which we operate. These rules themselves already make up the calculus and therefore I cannot see a difference between logic and metalogic. *Carnap*: Without metalogic we cannot even specify the rules or state what it is like. *Kaufmann*: The rule is the embodiment of the specifications of how a formula is provable. This embodiment is the calculus, the proof itself. *Carnap*: We must draw a distinction between the language, which we speak, and the rules. *Kaufmann*: The language is the application of rules. The embodiment of the rules is the schema. The form and the individual proof is the special case that follows logically. There does not exist a) the proof, b) the talking about it, for the proof is nothing visual but the embodiment of the specifications. The language is not a class of complexes of sounds, but an embodiment of rules about the fact that the sounds mean something. In this case there is no talking about the language like about a person or about a house. It is the logical analysis of combinations of signs. This is also the view of Wittgenstein. In his work Carnap is attempting to analyse what one does when one is engaged in mathematics; but a separation into two can never result from this. *Carnap*: I do not understand this. After all, it is a different thing whether we simply apply a rule (pre-scientific state) or whether we merely analyse it. The mode "Barbara" is, after all, distinct from its application. *Kaufmann*: In this case no significant difference obtains. *Carnap*: But I do think there is. *Neumann*: 1) In your view metalogic is part of the description of visual objects, but what is at issue is what is the case for linguistic signs as bearers of meaning [Bedeutung]. This problem of logic cannot be disposed of in this fashion. 2) Are your concessions to intuitionism, namely the non-admittance of variables for functions and the restriction of operators to finite domains, not also necessary for an ideal language?

Hahn: The main problem is whether there obtains a circle if we afterwards add to the complete system of propositional functions the metalogical stuff. *Gödel*: Do you mean that then the epistemological antinomies would obtain? *Hahn*: Whether it is just those that would occur I do not know, but the entire procedure makes me feel somewhat uncomfortable. *Carnap*: In metalogic one could also replace quality "(x)" by "red" and then this surely is expressible in the same language. If one can give descriptions at all, then one can also describe the individual signs. *Hahn*: You assume that we possess a language in which we can express everything, but that is pretty uncertain. By introducing a language one brings new facts into the world and expands it. My worry is whether it does not become circular if one speaks with the language one has introduced about this language. *Gödel*: Well, it has been proven that certain metamathematical concepts are definable in the same language, e.g., "formula," "provable formula" and in general all the concepts which, e.g., Hilbert uses. By

contrast, there are other metamathematical concepts, which cannot be defined in the same language; i.e., if one were to use them, it would lead to a/n circle/antinomy. One example for this in your system is the concept "correct numerical formula." *Kaufmann*: What requires the distinction between logical and metalogical if concepts can be expressed in the same language? *Carnap*: "Caius is mortal" and the metalogical description of the corresponding metalogical derivation are different.

Hahn: I do not believe that one could provide foundations for analysis in this way. *Carnap*: How the real numbers are to be specified I do not know yet, but apart from this I do not see any new difficulties. *Hahn*: You presuppose a one-dimensional discrete world. The problem with the foundations of mathematics has not been touched upon at all by this, it only begins with the real numbers. *Carnap*: Here I was concerned with the justification of the arithmetic of natural numbers, but I think that the theory of real numbers also should be conceived of metalogically. Real numbers would have to be defined as expressions of the form {n, t} (P(n), K(t)), where P(n) is a sequence of rational numbers and K(t) is the corresponding convergent function. In addition certain formulae concerning P(n) and K(t), which guarantee the convergence, must be provable. *Hahn*: This is precisely the procedure of Brouwer, but for the foundations of mathematics this leads us astray. *Carnap*: I think that along this way we can prove Weierstrass' law of the upper limit.

Hahn: This sounds plausible to me. Concerning the question by Neumann: the prohibition of the calculus of higher functions is arbitrary. One could number the propositional functions and then operate with the numbers they have been assigned. *Carnap*: This is only possible with the greatest of difficulties, but it is very hard to say what makes it so difficult. Given f(x) and g(x) I can form a new expression f(x) $\vee$ g(x), but given f(a) and f(b) I cannot form f(c). *Hahn*: I cannot see the difficulty here, for I always create a new sequence by renumbering finitely many propositional functions. *Carnap*: But there is a significant difference between the domains of individuals and of propositional functions, for whereas the domain of individuals is complete, in the domain of propositional functions it is always possible for me to construct new ones that are not yet contained in it by means of the diagonal method. *Neumann*: One could imagine that the qualities are constructed from primordial qualities. These primordial qualities would have be treated like individuals. *Gödel*: I think that the introduction of the calculus of higher functions, proposed by Hahn, is fully possible for your standpoint, but then completely different sentences would be valid in the calculus of higher functions than would be for Russell. *Carnap*: Sentences with variables for functions seem problematic to me. *Gödel*: By Hahn's procedure we can always transform the sentences with function variables into sentences in which function variables no longer occur. *Carnap*: In that case, what do we need variable qualities for? After all, all tautological implications with variable qualities can be expressed metalogically. *Neumann*: Are we allowed to speak about language? *Carnap*: As long as you understand by language signs, sounds, chalk marks, etc., you can speak about language; but about "meaning" [Bedeutung] you cannot speak.

4.1.1.4 Summaries of the Positions of Individual Members of the Vienna Circle (Rudolf Carnap, Hans Hahn, Felix Kaufmann, Otto Neurath, Moritz Schlick, Friedrich Waismann). Compiled by Rose Rand

RUDOLF CARNAP

[Content: Excerpts from Circle protocols and the following] *Essays*:

I. The Elimination of Metaphysics by the Logical Analysis of Language. (*Erkenntnis*, vol. 2)
II. The Physical Language as the Universal Language of Science (*Erkenntnis*, vol. 2)[27]
III. Psychology in Physical language (*Erkenntnis*, vol. 3)
IV. Protocol Sentences (*Erkenntnis*, vol. 3)[28]
V. Introduction of "Semantics"[29]

[…] The activity of philosophy
The activity of a phil[osopher] aims at the construction of a usable syntax, but only those elucidations are permissible which are suitable to make apparent the structure of a usable syntax.

[…] Verification
In the case of hypotheses there is verification in an extended sense, for they are not conclusively verifiable. One speaks of a verification of a hypothesis if there obtains *closeness* between the hypothesis & the sentence about observation that corresponds to it.

Structure & form of sentences
The specification of the form of a sentence requires also the laying down of the values over which the variables are allowed to range.[30] In place of different rules of substitution one can take different variables. – Then it needs to be specified for every variable which genus of constants it represents.
Carnap also accepts Waism[ann's] proposal to speak of multiplicity instead of form. – The minimal multipl[icity] o[f the] language can be called the multipl[icity] o[f the] world.

Rules o[f] syntax & their dep[endance] o[n] experience
The syntax dep[ends] o[n] the form o[f] experience.
Study o[f] language & study o[f] reality. (Pictur[ing])

Study o[f] language & structure o[f] reality (Pictur[ing])

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[27] The proper English title is "The Unity of Science" (1934). *Trans.*

[28] The proper title is "On Protocol Sentences." *Trans.*

[29] "Semantics" was another early name for Carnap's logical syntax project. Carnap's *Introduction to Semantics* (1942) is not meant here. *Trans.*

[30] See the first note for the protocol of 7-5-1931; the same replacement of "Wert" and "Wort" applies and is corrected here. *Trans.*

A state of aff[airs], which consists of elem[ents], must be designated by a language with the same numbers o[f] degrees of freedom – & e.g. a system of colors must be designated by a system o[f] color signs, that has the same multi[plicity as the color solid.

By the picturing of the structure of a state of affairs by language one only needs to understand that the employment of an imperfect language would lead to [incongruities]. – One compares a sentence with reality if one thinks that we compare phys[ical] sentences with the phenom[enal] sentences.

Law of nature

The empirical universal sentence refers to a limited domain. If one deletes in it the operator & the specification of the domain, one gets a law of nature with a free variable that can no longer be verified. The law of nature is not derived from an empirical universal sentence but is postulated on the occasion of certain sentences.

The … kinds of laws of nature (statistical and probability laws) are to be characterised from this standp[oint] & similarly the question whether space and time are to occur in them explicitly is to be treated metalogically. –

If time and space were to occur explicitly, then a *constant* would stand behind an empirical pred[icate] or a state magnitude.

Elementary sentences & complex sentences

In order to reach the complex sentences fr[om] the elementary sentences one must assume classes and rel[ations]. – The rules for the use of classes & relations are given b[y] Russell with the theory of types. Carnap retains the thesis that all *sentences* are truth f[unction]s o[f] elementary sentences. In this case, however, the laws of nature as hypotheses would *not* be *sentences*.

Atomic sentences

Form of the atomic sentences

Different forms o[f] a[tomic] s[entences] can be considered. (Which ones one should choose is not being decided. –)

1. Elementary exp[erience] as elements, & one or more basic relations.
2. Isolated sensations as elem[ents].
3. The entire visual field of a moment.
4. The whole experience of a moment.
5. The phenomenal process of [a person].
6. A gestalt in the visual field.
7. The three-dim[ensional things] of a visual space.

Primitive concepts

… rel[ation of] similarity, then one can constitute the qualities by way of quasi-analysis. – Then the sim[ilarity] relation is external. – If, however, the relations are derived & the qualities are primitive concepts, then the names are given in a system[atic] order, so that the relations are given internally. – Then the simil[arity] rel[ation] is internal.

But there is the difficulty to erect a system o[f] primitive signs before the a[tomic] s[entences] have been specified. This is only possible by a [pre-linguistic] procedure like quasi-analysis. The pre-linguistic considerations are only taking place in the everyday language. The tabula rasa is a method[ological] construction.

Meaning [Sinn]

The meaning of a formula ("metalogic" in the circle) or the content of a formula lies in the possibility to derive other formulae from it. The "ultimate meanings" are the concrete sentences which one can derive from them. – Two sentences have the same content if the same [consequences] can be derived from them.

Identity – gen-identity

We have a case of *identity* if the place relations (which need not be those of time and space) agree a[nd] if the qualitative rel[ations] still do not do this, then they are false. –

Two objects are gen-identical means: "This object at two times."

Two areas are gen-identical if the same qualities are attributed to them.

Kinds of def[initions]

Both coordinative def[initions] and word def[initions] are def[initions] of concepts. The difference: In one case the definiens contains a quality (conceptual def[inition]), in the other case a designation of a place (coordinative def[inition]).

The problem of reality

One should not speak o[f] real & unreal objects (also not in an empirical sense) The concept of reality does not coincide with the concept of knowledge. – Since existence cannot be attributed to proper names, but only to functions, the same holds for the concept of reality.

Phenomenal & physic[al] language

The physic[al] language is the language of all of science. The phenomenal language speaks of atomic states of aff[airs]. The physic[al] language speaks of constructed structure. – The sentences o[f the] physic[al] language are verified only after [their] translation into the phenomenal language. The starting point is the continuum of space-time points & to these points physic[al] states of magnitude are ascribed, also things.

Superlanguage [Übersprache]

One can speak about how language is to be used.

Metalogic

Besides the calculus of logic other rules are required. – To merely apply a rule and to analyze it are two different things. The modus Barbara is something different than its application: e.g., "if all men are mortal…" Metalogic is also language, for if one can describe at all, then one can also describe the individual linguistic signs.

Carnap's *Phil[osophy] in Extracts from the* Essays *in Systematic Order (see cover)*[31]

I. The Activity o[f] Phil[osophy]

The activity o[f] phil[osophy] consists in the clarification of the concepts & sentences o[f] sci[ence]. The method o[f] phil[osophy] is logical analysis.

The negative activity o[f] phil[osophy] is the elimination o[f] meaningless words & pseudo-sentences.

Aim o[f] phil[osophy] is unified sci[ence].

Thesis o[f] unified sci[ence]: All sentences can be expressed in one language.

All *"things"* are of one kind. There is only one method. –

Field o[f] phil[osophy]: logic & epistemol[ogy]

Logic

Task o[f] logic: To clarify the form of sentences without consideration of their content. Logical sentences are of the type [of] tautol[ogical sentences]. Tautol[ogies] are rules for the transformation o[f] contentful sentences.

Logic & linguistic gramm[ar]

The linguistic grammar is not suited for logical purposes, because, e.g., it does not allow the delimitation of kinds o[f] nouns, which leads to confusion of types. Confusion of types is only excluded by logic.

Task of the theory of knowledge

The th[eory of] kn[owledge] clarifies the logical relations between certain concepts. Thus it clarifies the *meaning* [Sinn] o[f] sentences & the *meaning* [Bedeutung] o[f] the words occurring in them.

II. Language

Characterization o[f] language

Formal: A language consists of vocabulary & syntax. The vocabulary is a set of words which have meaning [Bedeutung]. Syntax consists of the rules for the formation o[f] sentences.

Substantive: The sentences o[f] language describe, etc.

Meaning [Sinn] & Content

A sentence is meaningful [sinnvoll] if its words have meaning [Bedeutung] & are combined according to syntax (1st def[inition]). The cont[ext] of derivation of a sentence from the pr[otocol] s[entences] makes for the content of a sentence (2nd def[inition]).

The types o[f] meaningful sentences

1. logical & math[ematical] s[entences]
2. empir[ical] sentences

Sameness of content

Two sentences have the same content (are mutually translatable), if the same can be derived from them, indep[endently] of what ideas occur with the two sentences.

[31] Compare the beginning of the summary of Carnap's position. *Trans.*

Meaning [Bedeutung] of a word

A word has meaning if the following two cond[itions] are fulfilled. 1) The syntax of the word must […], i.e., the type of its occurrence in the simplest sentence form in which it can appear. (Simplest sentence form is called elementary sentence.) 2) [It] must be stated from which sentences the elementary sentence is derivable & which sentences are derivable from it. – In principle, this derivation must be stated as far as the pr[otocol] sentences. It takes place by ref[erence] [Ref[erenz]].

Definitions

A definition is a rule o[f] transformation within the same language.

Types o[f] def[initions]

1. Nominal def[inition], e.g., an elephant is an animal with such and such characteristics.
2. Ostensive def[inition]: Elephant is an animal of the type of animal at such & such a spatio-temporal position.

The definitions are vehicles o[f] verification.

Verification

[Form] o[f] verification: It is not a single sentence that gets verified but a system o[f] sentences or a partial system.

Method o[f] verification: The verif[ication] happens by means of the prot[ocol] sentences, not by m[eans of] experiences. –

Experiences

To speak o[f] experiences is senseless [unsinning] … One can only say that there are observation sentences.

State of affairs

To speak o[f] states of affairs in phil[osophy] is incorrect. For phil[osophy] is analysis of language.

Meaningless [sinnlos]

In the non-strict sense, the unfruitful sentences, but also the contradictions, belong to the meaningless sentences.

In the strict sense, a sequence of words is meaningless if it does not form a sentence within a certain given language (pseudo-sentence)

Types of pseudo-sentences

1. Sentences in which meaningless words occur.
2. Combinations, contrary to syntax, of words, which have a meaning. (Example: conf[usion] of spheres)

A pseudo-sentence is not a hypothesis, since hypotheses too must obey the rules for meaningful sentences.

Examples for meaningless sentences are provided by

Metaphysics

Metaphysics is meaningless[ness] [Unsinnig[keit]] in principle, because it wants to speak about what cannot be experienced in principle. Neither is it possible to reach metaphysics by particular derivations.

Types of metaphys[ical] sentences
1. Sentences which are gained by pure thought, by intuition.
2. Sentences which are gained by particular derivations (entelechy, thing i[n] i[itself]). Also the negation of such sentences.
3. Sentences about values [Wertsätze].

III. The […] Types of Sentences
1. Protocol sentences 2. Sentences 3. Laws

1. The Protocol language
consists of protocol sentences

The protocol language & its derivation from the physic[al] language
The derivation of the prot[ocol] s[entences] from the phys[ical] language happens by reduction of its sentence to sentences or bodily states. E.g., a sees red = such and such stimuli are followed by such and such reaction. (Pointing with a finger.) Even prot[ocol] sentences which speak about *things* are first reduced to the bodily state & then suitable laws of nature are added. – (B. & T. rules. B. rules: rules about the bodily state, T. rules: rules about things; by means of the B. and T. rules the words of the prot[ocol] lang[uage] are translated.)

Protocol sentences & their belonging to the language of sci[ence]
The prot[ocol] s[entences] can be made part of the system language; if not, special rules of translation must be given.

The form of the prot[ocol] s[entences]
If the prot[ocol] s[entences] are taken to occur outside of the system language, then they are *signals*, namely of all sorts. These signals, however, are treated as sentences, because rules of coordination are given. – But really [they are] signals & as such neither true nor false.

The Content o[f] pr[otocol] sentences
is to be assumed arbitrarily, according to Carnap; it is not determined whether the pr[otocol] s[entences] contain words for sensations or words about visual gestalts or visual fields or words about the entire experience of a moment. He thus opposes Neurath, who assumes a determinate content, namely words which refer to observations.

Necessity o[f] prot[ocol] s[entences]
for verification

Elimination o[f] the prot[ocol] sentences
takes place, if the prot[ocol] sentences are translated into the system language a[nd] contradictions are arrived at.
The type of elimination is
1. the elimination of the sentence of the system that is coordinated to the pr[otocol] s[entence]
or 2. [alteration of] other sentences of the system
or 3. alteration of the rules of translation.

Prot[ocol] sentences of oneself & of others
… are of the same standing in the form [of] signals. The translation of one's own pr[otocol] s[entences] happens like this: "If S_1, the prot[ocol sentence] of S_1 …"

Intersubjectivity o[f] pr[otocol] sentences
… if, given at least two bodies, [the] sentences occur as reactions to each other, otherwise they are [monologic]

The absoluteness o[f] pr[otocol] sentences
… is *denied*.

[2.] Sentences of the system
They consist *formally* of
1. singular sentences
2. laws of nature

A. The content o[f] the system language = physic[al] language
Every sentence o[f] the system language, including the sentences of psychology, are reversibly translatable into the physic[al] language. For this reason the physic[al] language is universal.

B. The intersubj[ectivity] of the phys[ical] language for multiple subjects & their intersensuality
a. for its *sentences* can be verif[ied] by prot[ocol] sentences of several subjects.
b. the concepts are quantitative, abstract & intersensual, i.e., to a phys[ical] concept there are coordinated words of the pr[otocol] lang[uage] *of different sensory modalities*. Or better; to one *class* of physic[al] concepts there correspond concepts of the pr[otocol] language of *different sensory modalities* & several persons.

C. Protoc[ol] language & physic[al] language
The prot[ocol] language can be derived from the system language as well.

ad A: Psychology & phys[ical] language
a. *Forms of psych[ological] sentences*
Singular psych[ological] sentences: 1. a determinate [description] is given.
General psych[ological] sentences: 2. gen[eral] conditional sentences.

b. *Behaviorism*
Other minds: The statements o[f] others are nothing but verbal behavior & as such can be expressed phys[ically]. – To be sure, not directly, but indirectly, by statements o[f] the observer about the observed.
Thesis: The content of a sentence about other minds is equal to the content of a phys[ical] sentence.
P_1 = A is excited = phys[ical] s[entence] P_2 about phys[ical] processes of the body of A.
The verif[ication] of these sentences P_1 & P_2 proceeds by means of pr[otocol] s[entences] of the form
a. A is excited
plus law of nature

b. behavior o[f] A

P_1 does not have the same content as a, because the law of nature is required to deduce P_1 from a.

The intuitive procedure

a is first transformed into a phys[ical] system sentence, then the law of nature is added "If someone has such & such a bodily state, given such & such stimulations, then the statement a follows" & then P_2; $P_2 = P_1$. Thus P_1 does not mean more than P_2.

The rational procedure

Sentence about the behavior o[f] A (b), transformation into the system sentence, then comes the general sentence given above & then P_2, then $P_2 = P_1$.

The argument against behav[iorism], "because we are dealing with *statements of another*, we cannot give only a physic[al] interpretation to them" must be rejected. For they are also physic[al] processes, even if they have the same form as system sentences.

Similarly the attempt to get to "other minds" by means of *arguments from analogy* is to be rejected.

Not "I am angry" but "now anger."

Then only the following can be deduced:

1. if angry behavior – anger now
2. body o[f] the other, like my body
3. the body o[f] the other shows angry behavior
4. anger now.

The conclusion "You are angry" cannot be drawn anymore, because the form "I am angry" is equivalent to "anger now." The conclusion "Anger now" is false, however.

The autopsychological

The autopsycholog[ical] of the past[:]

P1 = I was excited yesterday

P1 = I was excited

P2 [=] description of the state of the body

P1 = P2 = a body was in such & such state yesterday

The autopsychological in the present[:]

"I am excited now" is translated just like past psych[ological sentences].

The method of introspection

… admitted, like black coffee, but: the results o[f] the "method" must be interpreted physic[ally].

Betw[een] experience & verbalization o[f] the experience there exists only a difference in the form of expression.

1. A sees red [=] P_1
2. A says now "I see red" [=] P_2

From P_1 one cannot derive P_2 but only a [conditional sentence].

Laws
are
1. explanations
A law is an explanation, if with its help a known singular sentence can be derived from other sentences [based] upon a protocol.
2. predictions
By laws one reaches a prediction if one can derive an unknown sentence from it.

Form o[f] the laws
… they are general sentences & [they] have, with regard to the character o[f] hypotheses, concrete sentences.[32] They are tested by verification of the concrete sentences that are derivable from them.

Physic[al] & psych[ological] laws
The general sentences o[f] psych[ology] are translatable into the phys[ical] language after all. But whether they are derivable from the physic[al] laws is questionable.

OTTO NEURATH

Contents:
I. Excerpts from the essays:
I Sociology in Physicalism (*Erkenntnis*, vol. 1)
II Protocol Sentences (*Erkenntnis*, vol. 2)
III Physicalism [*Scientia*, 1931]
IV Socio-Behaviorism (*Sociologicus*," 1932)
[II. Excerpts from Circle protocols]

Picturing; the comparison of fever & temperature curve is meaningless. One can only compare statements with statements. – Reference to the given is in every sense superfluous. There are only statements, namely
1. protocol statements
2. phys[ical] statements. In these statements the given does not figure. Multiplicity must only be ascribed to the statements. – It is impermissible to confront statements and the given. It is metaphysics to say: a sentence is a picture o[f] reality.
Neurath finds it incorrect to let the system of statements turn on pre-logical moments. – The system of statements o[f] sci[ence] should be taken as starting point. – By playing around with the system one can arrive at the elements. – One does not start from a tabula rasa.

Behav[iorism] & language
If one were to assume an autopsychological language, there would be inexpressible experiences.

Neurath: Excerpts from the essays:
(system[atically] ordered) (see cover)[33]

[32] This sentence is corrupted: the second verb is missing. *Trans.*

[33] Compare the beginning of the summary of Neurath's position. *Trans.*

The activity o[f] phil[osophy]:
… to establish cross-connections, connect sentences of the sci[ences] with each other, namely in the form of a unified language.

Point o[f the] unified language
… make predictions

Characteristic of unified language
… univers[al] slang, in which imprecise terms, cluster terms ["Ballungen"], are contained.

Language
… is a physic[al] structure, an ordering o[f] sentences.

Sentence
[A] sentence is a linkage o[f] hills of ink on paper or a linkage o[f] vibrations in the air; under certain circumstances such linkages can be equated. These link[ages] happen in response to stimulations or provoke reactions.

Equivalent sentences
Two sentences are equiv[alent] if they succeed the same reactions or of they are caused by the same stimuli.

Meaningless
Three types of meaninglessness:
1. pseudo-sentences [glossogenes S[innloses]]
2. contrary to syntax
3. contradictions

True, false
True is freedom from contradiction.
False is contradiction.

Types of sentences
Protocol sentences
… belong to the unified language & cannot therefore be eliminated.

Form o[f the] pr[octocol] sentences
Quotation: Otto's protocol at 3 hrs.17 "Otto's speech-thinking at 3 hrs.16 was," ""In the room there was at 3 hrs.15 a man perceived by Otto o[f] 187 cm [height]""

Characteristic o[f] prot[ocol] sentences
.... speak o[f] phys[ical] processes, i.e., spatio-temporal coo[rdinates] occur in them.

Validity o[f] prot[ocol] sentences
The prot[ocol] sentences are not [more primordial] than other sentences, they can therefore also be false. Protocol sentences are valid intersubjectively.

Language of empirical science [Realwissenschaft]
Not only the prot[ocol] s[entences], but also all empirical sentences [Realsätze] are formulated in spatio-temporal terms.

Validity of empirical sentences
The empirical sentences are meaningful if they […] reduce to pr[otocol] sentences.

Reality statements
… are presented [to us] when spatio-temporal changes outside o[f the] human being are taken to be given by this statement.

Hallucination statements
… are presented [to us] if only certain processes (e.g., brain changes) [occur] within the human being.

Lies
… are given to us if only the speech center & the words play a part in this statement.

Tautologies
Sentences which, if added to other sentences, e.g., orders, do not change them, [e.g.] the order.

Laws
… are instructions for the formation o[f] predictions concerning individual events.

Induction
We arrive at laws by [means of] induction, i.e., by a decision.

Language & reality
The totality o[f the] statements, with which the new statement [is confronted], is put in place of the reality. Not even in elucidations can one speak o[f] reality. – One must distinguish betw[een] *material & formal* modes of speech. The material mode speaks of the occurrence of the reality of certain essences, the formal mode of speech o[f] the legitimacy o[f] sentences.

Language & language
One can speak about language, namely by means of language. – The theory of language is related to the theory o[f] physical [structures].

HANS HAHN

[Contents: Excerpts from Circle] protocols & personal conversation (Winter 1932–33)

Language
The demand for elementary sentences is what is designated as *ideal language*.

Imprecision of concepts
The concepts of everyday life are imprecise. E.g., heap of sand, bald head; the visual field, the colors. – Two straight lines given in perception cannot with certainty be declared as equal or unequal, because our language does not refer to the immediately given but only to [memory].

Logical analysis

… of a state of affairs is not univocal. The structure is somet[hing] constructed & not simply found given. Even though it also depends upon experience. If sounds & colors were always to appear together, then one could not separate them. Experience changes as well & new experiences bring [innovations].

Verification

Our sentences can never be completely verified. For a hypothetical element enters into all the sentences to which we give expression. This a different [kind of] verification than Wittgenstein's.

Form & structure o[f] sentences

The elements are not given but constructed. The form results from the type of construction [undertaken]. The type of construction is not uniquely determined by the given.

Sentences about sentences

A distinction has to be drawn between the sentence "The rose is red" & the assertion that the rose is red. Thus a statement about a statement is possible. If one does not assume a universal language, then one can speak with sentences about sentences.

The rules o[f] syntax

The rules o[f] syntax can be derived from the construction o[f the] elem[ents]. A rule o[f] syntax, e.g., "red and blue do not occur together," [obtains] because red & blue look differently & they have a different look because the type o[f isolating] the elements from the given bestows the right upon us to speak of […] look.

The isolation (construction) is pre-logical & pre-syntactical. What is presupposed before the starting point is pre-logical. Depending on how the starting point is chosen, one can think of concepts as pre-logical constructions or not. E.g., colors are concepts of the everyday language which, as far as the language of everyday is concerned, have already been constructed pre-logically.

As far as the logical language is concerned, e.g., concepts like "chair" are constructed, but not as far as the everyday language is concerned. The "chairs" are not constructions.

Validity o[f] logical rules

For the rules of logic one cannot give a logical justification – because logic only starts there.

The rules of syntax are partly conventional, partly determined b[y] experience.

Form o[f] the system of signs & the rules o[f] syntax

The language does not picture structures that are really given. What does it mean that the language has the same multiplicity as the movements? If one would alter the geom[etry], then different multiplicity. Anyway, is there [such a thing as] a multiplicity o[f] movement?

The given does not have the structure o[f] language, language has its own logical multipl[icity] through which it represents the given.

Representation means the possibility o[f] applying the language. However, not [just] one language o[f a] certain structure is able to describe the given.

The facts only exclude some language of a certain multipl[icity]. To assume *one* determinate structure would be *ontology*.

Meaningless

Meaningless can mean[:] purely formally contrary to syntax. But not all concepts which are not contrary to the syntax are meaningful. Therefore a different criterion has to be given for this. The verifiability of a concept would, e.g., provide such a criterion. But disposition concepts or the concepts o[f the] atom, o[f] gravity are not directly verifiable. One can only give rules for the translation by which sentences in which these concepts occur can be transformed into sentences which can be verif[ied]. If one provides a rule o[f] translation that deals in observable properties, then one can legitimately employ such concepts. – But one must not simply say, e.g.: "There are atoms." One can give such rules of translation also for "God"; in that case "God" is a concept that occurs in verifiable sentences. "At such & such a time, when the cross is beaten thrice, one will see such & such an apparition." This sentence is verifiable. But not "God is a being that makes unintelligible decisions." Since no verifiable properties have been specified here, the concept "God" is not admissible in this sense.

Atomic sentences

The existence o[f] a[tomic] s[entences] is not required logically in order to make possible the verification of sentences. For the verific[ation] is lost in the face of logical precision.

Colors: external, internal

"Brighter" is just an experience as colors are. If one sees two colors and there would not be an experience of the rel[ation], then one could not say the sentence "a is brighter than b."

But "brighter" & [the] rel[ations] between [smells], sounds are of an empirical nature (external) and [do] not [constitute] a material [a priori] (=internal). – The word "warmer" can after all be spoken without precise [knowledge] of the temperature of two rooms.

Characteristic o[f the] atomic sentences

Whether experiences, obj[ects], cross-sections of consciousness are to be taken as the primordial objects is difficult to decide: the question is put badly.

Identity

Suppose a domain o[f] obj[ects] is given & a set of statements […] about these obj[ects.] Ident[ity] is a relative concept which depends upon the domain of obj[ects] & [the] pr[opositional] f[unctions] one assumes. Two objects are ident[ical] if all propositional functions about them are in agreement.

The types o[f] def[initions]

The last definitions contain, within the definiens, designations of places. The coordination of the coo[rdinates] to the real[ity] can only be effected through ostension.

The concept of reality
"I see a bended stick." This sentence is true, but it is not really the case. Not everything that is seen is real, but that which is agreed by the others as well. – "Reality" is relative. (Thus halluc[inations] not real.)

Types o[f] reality
There is no reason why the expressions "This is fun" should be translated into the physic[al] language. Why should they be distinguished from perceptions[?]
If one can operate with them, then one does not have to eliminate them.

About language
… is possible.

Metalogic
The question arises whether there obtains a [vicious] circle if we *add* the metalog[ical] things afterwards to the complete system of propositional function.

FELIX KAUFMANN

[Contents: Excerpts from Circle] protocols & personal conversation (Winter 1932–33)

Task o[f] phil[osophy]
Phil[osophy] has the task to clarify what is confused. The clarification consists in making clear to oneself what is really meant by what is thought. A methodologically important example is the elimination of accompanying representations. Another example is thinking o[f] numbers. One can calculate even if one does not have additional representations.
Concepts do not have a clear meaning [Bedeutung].

Meaning [Sinn]
That is meaningless [sinnlos] which cannot be understood in its essence. But what is meaningful need not always be verifiable.

Atomic sentences
The a[tomic] s[entences] are not apodictic. For no empirical sentence is verified completely, even though the last constituents are substances. Thus we can speak o[f] atomic objects, even though not really of apodictic at[omic] s[entences]. For every judgment is related to every other judgment. The assertion that something is the case requires an infinite series of confirmations.

The verification
need not only be *intersubjective*, but also *intrasubjective*.

Form o[f the] atomic sentences
The constitutional system which begins with things should be preferred. Language seems to speak for this, since it created the noun.

Laws of nature
There are no sentences which go beyond what is verifiable. Hypotheses must not have an infinite character.

The problem of reality

Concerning the *autopsychological*: There is inner experience. It is another question whether the autopsychological should be employed in the structure of science. That is not yet possible.

Concerning *other minds*: As regards other minds inner experience does play a role. If one speaks about other minds, one does not only speak about *bodies* as such, but one also recurs to the autopsychological, which one places into an analogy for the other mind. This analogy is to be treated like the thesis that world is regular. I can experience other minds through the autopsychological. That other minds are located elsewhere is an indirect experience.

Behaviorism

against the thesis o[f] behav[iorism]

About language

Elucidations are meant to clarify thoughts. – No difference between logic & metalogic, for the rules are already given by the calculus. – A rule is the essence of the specifications concerning how a formula can be proved, but that is already the calculus, the proof.

There does not exist [separately] 1. the proof [and] 2. talk about it.

For the proof is nothing visual. There is no speaking about language as there is about a human being or a house.

MORITZ SCHLICK

Content:

1. from the Circle protocols
2. from the essay "Positivism and Realism"

The activity o[f] phil[osophy]

Elucidations do not deal in phenomena but only in syntax.

Language

One cannot speak of the structure o[f] language a[nd] about the structure o[f] reality. – For there is only one structure. A state of affairs consisting of elements must be designated by a language with the same degrees o[f] freedom. – A system o[f] colors must be designated by a system o[f] color signs which has the same multiplicity as the color solid. By the picturing of the structure of a state of affairs by the language we only understand that by selecting an imperfect language, e.g., with two-dim[ensional] color signs, we would end up with incongruities; so Carnap says and Schlick agrees with him.

Even if several languages can be employed for a [description], they still possess the same multiplicity as the given. For multiplicity does not mean anything other than the same number of degrees of freedom.

Atomic sentences

external & internal relations

One can only [experience] external rel[ations], not internal ones.

"Brighter than" is an internal, "to the right of" an external rel[ation]. "Brighter than" is already part of the color.

If an internal rel[ation] is given, then it occurs as the gestalt of an integrated process. E.g., if one sees a brighter & a darker color, then this is an integrated process, of which one part is brighter and not given as the [other] individual colors. – It does not matter whether "brighter" occurs as an experience, for one can perceive two colors without comparing them. Even if the internal rel[ation] is not being experienced, it is nevertheless given with the elements. But one cannot speak about it, it shows itself in the form of the sentence.

Identity

Schlick agrees with Carnap when the latter says: "We have a case of identity if the place relations agree a[nd] if the qualitative ones still do not do this, then they are false."

But Schlick opposes the view of Hahn according to which it is also possible to consider different obj[ects], e.g., those the four-legged ones, as identical for a certain purpose.

The problem of reality

Behaviorism: The autopsychological & other m[inds]

Behav[iorism] rests on the empirical. – One can express oneself psychol[ogically] without paying attention to empirical contingencies (namely the psych[ological]-phys[ical] coordination). Nothing metaphysical would be involved.

There would then be two realms, each one with its own language. For both realms there would be an independent system of sci[ence]. I can also communicate with myself.

Behaviorism & language

To understand the meaning of a language does not mean to describe certain facts, for such a description must also not be understood, but to understand a statement means to perform an action. Understanding is the presupposition of every sci[ence] a[nd] cannot be made the ob[ject] of a sci[ence].

Excerpt from the essay "Posit[ivism] & Real[ism]"

The activity o[f] phil[osophy]

… is to seek and clarify the meaning [Sinn] of assertions & questions.

Method o[f] phil[osophy]

Analysis: but this is not a special phil[osophical] method.

Verification

1. It can be impossible in principle: then the sentence is contradictory.
2. It can be empirically impossible: then still thinkable.

Language & Experiences

Communication would be possible, even if the quality o[f the] experiences attached to [persons]. Only the structure [Ordnung] matters. – All reality statements, those about psych[ological] & those about phys[ical] objects, are verified in the same way.

The verification of a statement *about a past feeling* can be effected either by something physical or by a memory. – [The] form of such a verif[ication] is [this:] if certain experimental conditions are met, e.g., the focusing of attention, then an experience with certain describable qualities occurs, e.g., similarity with an experience occurring under certain conditions.

The verif[ication] of a statement about a present feeling happens in a similar fashion.

The content of a reality statement must be integrated into a perceptual context.

Verifiability

A sentence or a question is verifiable if it is meaningful. A question or an assertion is meaningful if they can specify the precise conditions under which they are to be answered with yes or no. These conditions must be provable. The way there is given by the def[inition] o[f the] words. The meaning [Bedeutung] o[f the] ultimate words must be shown by ostension.

True, false

A sentence is true, if under determinate conditions, which are specified by the def[initions], certain states, arrangements obtain.

A sentence is false, if under determinate conditions, which are specified by the def[initions], certain states, arrangements do not obtain.

But the occurrence of a certain individual experience does not yet suffice, but it depends on the law-governed context of the occurrences.

Hallucinations-illusions

In the case of hall[ucinations] & illusions no law-governed contexts can be pointed to.

Meaning [Sinn] of a phys[ical] sentence

… will only be exhausted by the specification of indefinitely many possible verifications.

Form of a physic[al] sentence

"If the conditions 'x' are given, then the states 'y' occur, where x can be replaced by indefinitely many conditions & the sentence still remains correct."

Reality

E[xistence] is not a quality.

Something is real if through appropriate manipulations I can point to what is given, e.g., to tactile or visual sensations. But it is not necessary that one be able to point directly to sens[ations] of the object, only that one can deduce the effects o[f the] object & the reality o[f the] object.

"Absolute reality"

… means nothing but certain emotional states. Besides this there is nothing to be said ab[out] the abs[olute] r[eality], for what is said would have to be verif[ied], which, however, is not possible given the def[inition] of "abs[olute] r[eality]"?

Independence o[f the] external world

An obj[ect] is independent of us if it is still there when we do not look at it. But one has to give reasons for its continued existence.

Object of phys[ics]
… not sensations, but laws. But the sentences about bodies are not translatable into sentences about sens[ations].

Other minds
That […] individuals experience the same only means that the statements show a certain agreement, i.e., that there obtains sameness between two systems of order. One can only speak o[f the] sameness o[f] reactions.

FRIEDRICH WAISMANN

[No indication of contents]

The activity o[f] phil[osophy]
Phil[osophy]has the task, e.g., to determine what the *meaning* [Bedeutung] of a word is.

Language
a. Ideal language
In order to picture reality one does not need an ideal language. The everyday language suffices, as soon as one knows how all the words are to be used.

b. Imprecision o[f] concepts
The imprecision o[f the] concepts "heap of sand," "baldness" comes about by wishing to employ the system o[f] arithm[etic] for these concepts. But the visual system and the system o[f] arithm[etic] possess different […] multiplicities. The indeterminacy o[f] concepts is brought about by the confusion of two […] languages. One also confuses the description of the visual space with the description of the Eucl[idean] space. With the help of a rel[ation] of imprecision one could arrive at a symbolism which would reflect the syntax o[f the] words straight, equal, curved, parallel. The sameness of two straight lines can always be stated as long as they are immediately given, only in memory it cannot be stated.

c. Logical analysis
A certain state of affairs cannot be […] described, depending on our constructions & our experiences, but given […] experiences […] states of affairs obtain. The states of affairs do not change, but one moves over to a new system.

d. Verification
Our sentences mean two things: something observable & something not verifiable.

e. Form & structure o[f the] sentences & o[f the] elements
The form o[f the] *element* is the possibility o[f the] structure o[f the] sentence. The form o[f the] element shows itself in the elements. It is given along with them.
That red & blue cannot occur together is due to their inherent form.
All the words for which the same rule of syntax holds form a *system*. The formation of a system of elements only depends on the experience of the "that" & not of the "how." – If one has a color, then only the experience of the "that" matters, a[nd] then one reaches the entire system.
The rules o[f] syntax are determined by the form.

The elements never occur in isolation.
By the comparison […] state of affairs one stresses the elements.
The form of a *sentence* is determined by the form o[f the] element. The specification o[f the] form o[f a] sentence does not only include the logical form, but also the determination of the values over which a variable is allowed to range.[34] This determination happens either by enumeration or by the specification of the genus designated by the variable.
The *structure* of a sentence is determined by the form of a certain element plus the skeleton of the sentence.
The form of a sentence is determined by the specification o[f the] values over which a variable is allowed to range plus the skeleton of the sentence.[35]
There is not only the subj[ect]-pred[icate] form of sentences a[nd] the relational form, but a variety o[f] forms, which develop through the replacement of words for variables. The mere difference of variables does not determine, over which values a variable is allowed to range.[36] It is necessary to specify rules of substitution.
In place of form one can also say multipl[icity].

f. Sentences about sentences
If an expression is saturated then it cannot be combined with other expressions. One cannot make a statement about another statement.
The *assertion* only has a psychol[ogical] significance [Bedeutung].
A second language is only a calculus.

Rules of syntax
The language cannot be justified by language. Neither by logical deductions nor by experience. A rule o[f] syntax is a linguistic convention [Festsetzung]. In the formal sense syntax is a game. But if a rule o[f] syntax is to be applied, then the justification consists in this: that it leads to sentences which describe something. The prohibition "blue & green must not occur together" is to be justified by this: that its violation leads to sentences which describe nothing. If syntax is not to be a game but is to be applicable, then one cannot think differently about it.

Form of the system of signs & the rules o[f] syntax
If the means of representation possess the same multiplicity as the objects, then one does not need a syntax. The form of a system of signs can take the place of syntax. This shows that the rules o[f] syntax give no prescriptions. E.g., the propositional calculus is made to disappear once one employs truth f[unction]s.

Task o[f] syntax
… to assign the appropriate multiplicity to language. – This is effected by the rules o[f] syntax.

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[34] See the first note to the protocol of 7 May 1931; the text has been amended accordingly. *Trans.*

[35] See previous note. *Trans.*

[36] See second-to-previous note. *Trans.*

Atomic sentences […]

Logic demands the existence o[f] at[omic] sentences. If there were no atomic sentences, then sentences would have no meaning [Sinn]. For the meaning of a sentence is the method o[f] verif[ication]. The assumption of a[tomic] s[entences] does not apply to an ideal language but to all languages that claim to describe states of af[fairs].

External-internal relation[s]

If one specifies: "x is brighter than y," then one must not add that x & y are colors. The relat[ion] "brighter" only exists betw[een] colors. – "Color" is only a chapter heading in the logical grammar. That which could be called the genus "color" is circumscribed by the rules o[f] syntax. Waism[ann] does not believe that there exist experiences of relations, distinct from their terms. Every rel[ation] statement is an imprecise description. E.g., "In this room it is warmer than in the other" is an imprecise expression for "In this room there is such & such a temperature and in the other room such & such one."

Form o[f the] atomic sentences

is not specified in detail. – I.e., none of the possibilities mentioned b[y] Carnap has been chosen or rejected (see *Carnap*).

Basic functions [Grundfunktionen]

Wittg[enstein's] view is [that the] rel[ation of memory] is a purely internal one.

Identity

The rule o[f] ident[ity] does not speak o[f the] reality, but it is a convention [Festsetzung] concerning the use o[f] signs.

The problem of reality

Behav[iorism] & language.

In the view of behav[iorism] language is reaction in a causal sense.

But language can be considered under two aspects, as phys[ical] expression & as bearer o[f a] meaning [Sinn]. Behav[iorism] considers language as phys[ical] expression, therefore the view that ling[uistic] expressions are reactions & stand in a causal nexus.

4.1.1.5 Development of the Theses of the Vienna Circle. Edited by Rose Rand, November 1932 to March 1933

[Legend:]

yes: +; no: –; meaningless: x; missing: o; indeterminate: ?; no comment: (?).

b. TLP: before *Tractatus*; TLP: *Tractatus*; a. TLP: after *Tractatus*.

S.: Schlick; W.: Waismann; C.: Carnap; N.: Neurath; H.: Hahn; K.: Kaufmann.

Theses

Theses			S.	W.	C.	N.	H.	K.
1. By specifying rules philosophy wants to clarify the concepts and rules of science.	b	TLP	+	○	○	○	○	?
		TLP	+	+	+	x	+	+
	a	TLP	–	–	+	x	+	+
2. Philosophy wants to clarify the concepts and sentences of science and everyday life, not by *prescribing* the rules for the use of words, but by *laying out* the rules of the use of a word and by drawing attention to the *logical consequences* of a rule. More precisely: philosophy does not *demand* a certain use of a word but it *prohibits* the confusion of the consequences of the rules adopted and the disregard of them.	b	TLP	–	○	○	○	○	○
		TLP	–	–	–	x	–	–
	a	TLP	+	+	–	x	–	–
3. Language pictures reality.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	x	+	+
	a	TLP	+	+	x	x	?	+
4. Language is a system of sentences which are compared with each other. It is impermissible to speak of picturing reality, for this would introduce a metaphysical concept.	b	TLP	○	○	○	○	○	–
		TLP	–	–	–	+	(?)	–
	a	TLP	–	–	+	+	?	–
5. A sentence is a configuration of words which is determined by its syntax.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	+	+	?
	a	TLP	+	+	+	+	+	?
6. A sentence pictures a state of affairs.	b	TLP	○	○	○	○	○	+
		TLP	+	+	+	x	+	+
	a	TLP	+	+	x	x	x	+
7. The meaning [Sinn] of a sentence is the method of verification.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	+	+	+
	a	TLP	+	+	+	+	+	+
8. The method of verification consists in the definition of the words that occur in the sentence. Words in the definiens are to be defined further.	b	TLP	+	○	○	○	○	○
		TLP	+	+	+	+	+	+
	a	TLP	+	+	+	+	+	+
9. The verification is concluded when one has reached ostensive definitions, which define a word by ostension to the given.	b	TLP	+	○	○	○	○	+
		TLP	+	+	+	x	+	+
	a	TLP	+	+	x	x	?	+
10. There is only one kind of definition, namely definition by means of words. The definition by reference to experiences is impossible since it is impermissible to speak of experiences.	a	TLP	x	○	○	○	○	x
		TLP	x	x	x	+	–	x
	b	TLP	x	x	+	+	+	x
11. A definition is a convention.	b	TLP	+	○	○	○	○	○
		TLP	+	+	+	?	+	+
	a	TLP	+	+	?	–	?	+
12. A definition is a member of a causal nexus and nothing else. Either of a causal nexus between two word structures or between a word structure and a reaction or between a stimulus and a word structure.	b	TLP	○	○	○	○	○	○
		TLP	x	x	x	+	?	–
	a	TLP	x	x	?	+	?	–
13. There are sentences which cannot be analyzed and which contain words that can only be defined by means of ostensive definitions: these are the atomic sentences.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	x	–	–
	a	TLP	?	?	x	x	x	–

(continued)

14. If an observation sentence describes a state of affairs, then it is true, otherwise false.	b	TLP	+	○	○	○	(?)	+
		TLP	+	+	+	x	+	+
	a	TLP	+	+	x	x	?	+
15. Truth is *only* freedom from contradiction; falsity is contradiction.	b	TLP	–	○	○	○	○	–
		TLP	–	–	–	+	–	–
	a	TLP	–	–	+	+	?	–
16. The atomic sentences have the form of a relation, e.g., the relation of memory between two names, which designate experiences.	a	TLP	○	○	○	○	○	○
		TLP	–	–	+	x	?	?
	b	TLP	–	–	x	x	?	?
17. The atomic sentences describe states of affairs, i.e., they represent by their structure the structure of the state of affairs. The state of affairs cannot be described by a name therefore and one also cannot speak about the relational form of atomic sentences, where the relation obtains between two names which designate states of affairs.	b	TLP	○	○	○	○	○	○
		TLP	+	+	–	x	?	?
	a	TLP	–	–	x	x	?	?
18. The form of atomic sentences is not and cannot be specified. (Here atomic sentence = simply ultimate sentence, without characterization, e.g., whether it concerns experiences or not.)	b	TLP	○	○	○	○	○	○
		TLP	–	–	–	–	?	?
	a	TLP	+	+	?	–	?	?
19. The singular sentences of empirical science are *truth functions* of the first sentences.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	+	+	+
	a	TLP	+	+	+	+	+	+
20. The singular sentences of empirical science are truth functions of protocol sentences. These are the first sentences of science. Their verification is not effected by a comparison with reality but only by comparisons with each other.	b	TLP	○	○	○	○	○	○
		TLP	–	–	–	+	–	–
	a	TLP	–	–	+	+	?	–
21. Laws are instructions for the formation of sentences.	b	TLP	○	○	○	○	○	○
		TLP	?	?	–	?	?	?
	a	TLP	+	+	+	+	+	?
22. Laws are truth functions.	b	TLP	○	○	○	○	○	○
		TLP	?	?	+	?	+	?
	a	TLP	–	–	–	–	–	–
23. Thesis of *physicalism*: all sentences contain spatio-temporal termini.	b	TLP	○	○	○	○	○	○
		TLP	–	–	–	+	–	–
	a	TLP	–	–	+	+	(?)	–
24. Only that is real which is described by true sentences.	b	TLP	○	○	○	○	○	○
		TLP	+	+	?	x	?	+
	a	TLP	+	+	x	x	?	+
25. To speak of "reality" is metaphysics. True sentences are sentences which agree with other sentences.	b	TLP	○	○	○	○	○	○
		TLP	–	–	–	+	–	–
	a	TLP	–	–	+	+	?	–
26. One cannot speak about language, because language is to picture states of affairs and the picturing function of language constitutes a state of affairs.	b	TLP	○	○	○	○	○	○
		TLP	+	+	+	x	–	+
	a	TLP	?	?	x	x	?	+
27. The pure metalogic speaks about language in analytical sentences, descriptive [metalogic does so] in empirical-synthetic ones. The "superlanguage" [Übersprache] belongs to language as well.	b	TLP	○	○	○	○	○	○
		TLP	–	–	?	○	○	○
	a	TLP	–	–	+	+	○	–

4.2 The External Development of Logical Empiricism Until the "Anschluss"

4.2.1 The Ernst Mach Society (1928–1934)

The first concrete step towards establishing a society was taken by the *Österreichischer Freidenkerbund* (Austrian Freethinkers' Association) by sending the statutes of an *Allgemeiner Naturwissenschaftlicher Bildungsverein Ernst Mach* (Ernst Mach Society for the Promotion of Scientific Education) to the relevant municipal authorities of Vienna on April 11, 1927.[37] The proponent was Carl Kundermann, longstanding secretary of the Freethinkers' Association and an employee of the Vienna School Board. An active organizer and promoter of the freethinkers' movement, in future years he was to impose a political orientation on the Society's educational activities, conflicting with the scientific ambitions of some Vienna Circle members, especially Schlick. According to its statutes, the Ernst Mach Society was founded to

> promote the ideas and findings of natural science by offering courses, presenting lectures and papers, organizing guided tours and excursions and providing scientific literature.[38]

The society to be established was modeled on the principles of Vienna's adult education movement, and it is interesting to note that no member of the Vienna Circle had any prominent involvement at that stage. While the Society's interests were initially limited to natural science, it probably was the collaboration of Otto Neurath that was decisive in adding social science to the agenda. This emphasis on socio-economic issues was also reflected in the Museum of Society and Economy in Vienna, established by Neurath in 1925, where he successfully employed the Vienna Method of Picture Statistics in the social education of the masses (cf. Chap. 9). Thus, Neurath's increasing participation in the Ernst Mach Society may be explained by his interest in adding a popular-theoretical approach to his adult education activities in his museum and developing his idea of a unified science—a dual goal that also led to the cooperation of the two institutions.

It was about two months after the first draft of statutes had been officially accepted before the Society engaged in any activities and informed the police authorities of its new address, which was identical with that of the freethinkers.[39] In late 1928 the Verein Ernst Mach initiated its activities with a lecture by Philipp Frank, who discussed "Travel Impressions on the Scientific World Conception in Russia"; an impressive audience of 200 was reported to the police directorate.[40]

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[37] For a detailed description of the Ernst Mach Society see Stadler 1982b, part 2. Unless stated otherwise, all the following unpublished documents have been taken from the relevant materials on the *Verein Ernst Mach*, the *Wiener Stadt- und Landesarchiv* (WStLA, Archives of the City and Province of Vienna) and from the archives of the *Vereinsbüro* (the office in charge of associations, clubs and societies) of the *Bundespolizeidirektion Wien* (Federal Police Directorate of Vienna) (VB, BPDion).

[38] Statutes of the *Verein Ernst Mach*, ibid.

[39] Letter from Carl Kundermann to *Polizeikommissariat Wien* (Vienna police authority), dated June 3, 1927. VB, BPDion.

[40] Ibid., January 4, 1928.

Frank had been on several lecture tours in the Soviet Union, upon the invitation of the Russian Society of Physics, among others.[41] The relationship between the scientific world conception and dialectic materialism was to remain one of his interests (Frank 1931, 1949a, b). As an active freethinker in Prague he had publicly criticized, for example, theology's claim to a scientific nature.[42] The Society's final establishment in November 1928 marked the beginning of more than four years of activities in adult education.

On the handbills that also functioned as invitations to the society's founding meeting, held on November 23, 1928, in the assembly hall of Vienna's former town hall (situated in Wipplingerstraße in the city's first district), the modified subtitle "Society for the Promotion of the Findings of the Exact Sciences" had been added. One item on the meeting's agenda, apart from general organizational matters, was a programmatic lecture by Otto Neurath on "Ernst Mach and Exact World Conception."

The Society was thus founded due to the initiative of the Freethinkers' Association, yet at the first meeting Moritz Schlick was elected chairman. He held this position—unenthusiastically but conscientiously—until the Society's dissolution in 1934.

During the founding phase of the Society the freethinkers' journal *Der Pionier* regularly published information and appeals, the contents of which were, consequently, characterized by the ideas of scientism and enlightenment (*Der Pionier* 11 [1928], 2 f.). Relying on the slogan "knowledge is power," they optimistically promised that studying scientific ideas and results would not only give people complete control of nature, but also "immunize" them against backwardness, superstition, blind obedience, and intolerance. The promotion and understanding of the natural sciences and accounts of the "miracles of modern technology" were to free the working masses from their ignorance and lack of independence. This technophile, progressive ideology based on empiricist rationalism was one of the main features of the adult education movement of the time.[43]

A report on the first meeting (*Der Pionier* 12 [1928], 9 f.) stated that "a society to develop and promote an exact scientific world conception was founded by leading scientists and protagonists of adult education, and Moritz Schlick was elected as its chairman." The list of board members included the following names: as vice-chairmen, Hans Hahn and Heinrich Vokolek; as treasurers (with deputies), Bruno Schönfeld and Franz Ronzal; as keepers of the minutes (with deputy) Otto Neurath and Rudolf Carnap; as secretaries, Carl Kundermann and Josef Jodlbauer (who also acted as librarian at Neurath's Museum of Society and Economy); as members of the board, Julius Tandler, Hans Thirring, Edgar Zilsel, Steffi Endres, Josef K. Friedjung, Josef Deisinger, Josef Sommerauer, Karl Bechinie, Heinrich Löwy, Bernhard Blatt, Adolf Vetter, Ferdinand Mayer, and Emil Machek; as auditors,

[41] Frank to Schlick, September 21, 1928 (WKA Haarlem).

[42] Cf. "Wissenschaft und Theologie" (Science and Theology), in: *Freier Gedanke* 4 (1920); "Theologische Elemente in den exakten Wissenschaften" (Theological Elements in the Exact Sciences), in *Prager Tagblatt*.

[43] Cf. Chap. 9. For an overview of adult education in Vienna see Kutalek and Fellinger 1969; Knittler and -Lux (eds.) 1987; Filla 1991; Stifter 2005; Filla 2014.

VEREIN ERNST MACH

SEKRETARIAT: WIEN I.
WIPPLINGERSTRASSE 8

Wien, Datum des Poststempels
Telephon U 24-3-10

An alle Freunde wissenschaftlicher Weltauffassung!

Wir leben in einer kritischen geistigen Situation! Metaphysisches und theologisches Denken nimmt in manchen Gruppen zu; dort mehren sich astrologische, anthroposophische und ähnliche Bestrebungen. Auf der andern Seite: umso bewußtere Pflege wissenschaftlicher Weltauffassung, logisch-mathematischen und empirischen Denkens.

Der Verein Ernst Mach will wissenschaftliche Weltauffassung fördern und verbreiten. Er wird Vorträge und Veröffentlichungen über den augenblicklichen Stand wissenschaftlicher Weltanschauung veranlassen, damit die Bedeutung exakter Forschung für Sozialwissenschaften und Naturwissenschaften gezeigt wird. So sollen gedankliche Werkzeuge des modernen Empirismus geformt werden, deren auch die öffentliche und private Lebensgestaltung bedarf.

Der Verein Ernst Mach weiß sich dabei eins mit vielen führenden Geistern unseres Zeitalters, die ferne von einander leben und wirken, er weiß sich aber auch eins mit breiten Kreisen, die wissenschaftlicher Weltauffassung vertrauensvoll gegenüberstehen. Wir laden alle ein, welche die Wichtigkeit dieser wissenschaftlichen Bestrebungen einsehen, dem Vereine als Mitglieder beizutreten.

Niemand schließe sich aus!

Obmänner: Univ.-Prof. Moritz Schlick, Univ.-Prof. Hans Hahn, Bezirksschulinsp. Heinr. Vokolek
Schriftführer: Museumsdirektor Otto Neurath, Univ.-Doz. Rudolf Carnap
Kassiere: Oberlehrer Ronzal, Rechtsanwalt Schönfeld
Sekretäre: Stadtschulrat Kundermann, Kustos Jodlbauer

Dem Verein Ernst Mach ist es gelungen, folgende Vortragende zu gewinnen:

Rudolf Carnap, Univ.-Doz.:
Scheinprobleme der Philosophie (von Seele und Gott)
Herbert Feigl:
Metaphysik in der Physik
Philipp Frank Univ.-Prof.:
Ernst Mach und die Philosophie der Gegenwart
Moritz Schlick, Univ.Prof.:
Bedeutung wissenschaftlicher Weltauffassung fürs Leben
Hans Hahn, Univ.-Prof.:
Mathematik, Logik und Empirie
Heinrich Löwy, Priv.-Doz.:
Bedeutung physikalischer Forschung für die Technik
Karl Menger, Univ.-Prof.:
Mathematik für Nichtmathematiker
Wladimir Misar, Prof:
Probleme der Astronomie
Hans Thirring, Univ.-Prof.:
Die gegenwärtige Krise der Physik
Fritz Waismann:
Das Wesen der Logik

Otto Bauer:
Das Weltbild des kapitalistischen Zeitalters
Bortkiewicz, Univ.-Prof.:
Bedeutung mathematischer Kritik für statistische Fragen
Otto Neurath, Museumsdir.:
Antimetaphysik und Sozialwissenschaften
Edgar Zilsel, Prof.:
Soziologische Grundlagen der modernen Wissenschaft
Josef Frank, Architekt:
Moderne Weltauffassung und moderne Architektur
Heinz Hartmann, Univ.-Assistent:
Psychoanalyse und Empirismus
Josef Friedjung, Univ.-Doz.:
Unwissenschaftliches in der Erziehung
Emil Machek:
Lebensmechanik
Otto Neurath, Museumsdir.:
Soziologische Graphik und wissenschaftl. Weltauffassung
Heinrich Vokolek, Bezirksschulinsp.:
Begabungsproblem und Vererbungslehre

Heinrich Gomperz, Univ.-Prof.:
Empiristische Weltauffassung in der Antike
Heinrich Löwy:
Popper-Lynkeus als Philosoph
Philipp Frank, Univ.-Prof.:
Reiseeindrücke über wissenschaftl. Weltauffassung in Rußland
Moritz Schlick, Univ.-Prof.:
Reiseeindrücke über wissenschaftliche Weltauffassung in U. S. A.

Hier abtrennen!

Beitrittsanmeldung

An den Verein Ernst Mach, Wien, I., Wipplingerstraße 8
Ich trete dem Verein Ernst Mach bei als:

Mitglied (Jahresbeitrag)	Förderer (Jahresbeitrag)	Gründer (einmaliger Beitrag)
Einzelperson S 3·—	Einzelperson S 20·—	Einzelperson S 100·—
Organisation S 30·—	(Begünstigungen werden jeweils bekanntgegeben)	Organisation S 250·—

Name ..... Beruf .....

Adresse .....

Ich übersende anbei meinen Beitrag — Ich bitte um Einsendung eines Erlagscheines

(Nicht zutreffendes streichen)

Form Nr. 177. 10.000. I./1929. S. I.

Fig. 4.1 Announcement of the founding of the Ernst Mach Society with membership application

Anton Österreich and Ewald Schild. This list reflects a shift of dominance from the freethinkers to the Vienna Circle and some representatives of the social-democratic cultural movement with close affiliations to Vienna's local politics (such as the city councilors Julius Tandler and Josef Karl Friedjung). Although it is true that this shift enabled the Vienna Circle to gradually assume control of the Society and to shape it

according to its own ideas, it is necessary to correct the view, often found in the literature, that the Ernst Mach Society was undertaken simply to popularize the ideas of the Vienna Circle. While organizational matters were still left to the free-thinkers after the Society's foundation, the Vienna Circle gave it a sound scientific impetus and contributed to a broader, more intensive program of lectures.

In his speech at the first meeting, which is reported to have attracted quite a large audience, Neurath set forth the objectives of these new activities for the promotion of enlightenment, describing—from a historical point of view, in a Comteian fashion—the transformation of modern empiricism from a "*weltanschauung* based on the natural sciences" to a "world conception based on the exact sciences" and proposing the latter as the basis for the physical and sociological disciplines (ibid., 10). The lectures and publications planned were to present the most modern tendencies of empiricist rationalism based on Mach, Popper-Lynkeus, Avenarius, Poincaré, and Russell.

An excerpt from the minutes of the first meeting and the newly-adopted statutes were sent to and approved by the municipal authorities. This marked the end of the formal, legal founding phase from 1926 to 1928.[44]

The Society's first activities were a lecture series on the scientific world conception, the organization of meetings and working groups, and the preparation of publications. Neurath, Hahn, and Carnap, in particular, planned the publication of a booklet for the public presentation of the Vienna Circle and organized a meeting to discuss the situation of the exact sciences. This plan was to form the basis of the 1929 manifesto *The Scientific Conception of the World. The Vienna Circle*, which was presented at the First Conference on the Epistemology of the Exact Sciences in Prague in September 1929. The manifesto is interesting in various respects: first, as a document which reflects the self-understanding of the logical-empiricist movement of the time (especially that of the group around Neurath, Carnap, Hahn, Frank, Feigl and Zilsel) and contains references to the early history and tradition of empiricist philosophy and scientific world conception, and second, as a precise definition of the position, aims, and long-term program of the Ernst Mach Society. In this respect, the history of the manifesto shows the overlapping of the internal development of the Vienna Circle and the external history of the Ernst Mach Society.

4.2.2 The Manifesto The Scientific Conception of the World. The Vienna Circle *(1929)*

The plan to publish a manifesto was conceived when Moritz Schlick received a lucrative offer from the University of Bonn in early 1929 (Mulder 1968; Uebel 2012). Aware of Schlick's importance as the leading figure of the emerging philosophical movement and as an academic proponent of scientific philosophy, a number of members of the Ernst Mach Society and the Vienna Circle and some of Schlick's followers drew up a public declaration of sympathy in order to prevent

[44] Kundermann to Magistrat (municipal office), December 5, 1928 (WStLA).

him from leaving. The board of the Ernst Mach Society turned to its chairman and members with a very personal letter dated April 2, 1929:

> The Ernst Mach Society congratulates its chairman, Prof. Schlick, on the honor rendered to him by his call to the University of Bonn. At the same time it would also like to ask him to take into consideration the ideal aspects of the matter which might be in favor of his remaining in Vienna: the adherents of a world conception based on exact science would find themselves bereft of their intellectual leader, their respected representative at the university, if Prof. Schlick were to leave Vienna, and there is no-one who might be able to fill the gap thus left in the intellectual life of Vienna. The world conception propagated by the Ernst Mach Society, in the closest intellectual rapport with its chairman, would suffer a profound and grievous loss indeed. (Mulder 1968, 387 f.)

The letter achieved its purpose, as Schlick decided—after thorough consideration and with a heavy heart[45]—to yield to his friends' urging and stay in Vienna, thus securing the continued existence of both the Ernst Mach Society and the Vienna Circle. The letter's decisive influence on his decision, made in spite of the demonstrative indifference displayed by the Ministry of Education, becomes evident from a letter Schlick sent to the Ministry in Berlin and to the Austrian Ministry of Education on May 29, 1929:

> In keeping with my promise I have taken a decision on the offer from Bonn before leaving for America. It was a very difficult decision to take. Since many ideal reasons spoke for Bonn and Germany and since, furthermore, the current Austrian government has not proven as willing to cooperate as might have been expected, I would have decided to accept the honorable nomination, had it not been for my colleagues and also my students who managed to convince me, at the last minute, that this very situation in Vienna still holds some very urgent philosophical tasks for me, to which the opportunity offered by Bonn would not have been fully equivalent. (ibid., 388)

Immediately afterwards Schlick left for the United States to assume a visiting professorship at Stanford, California, while his adherents drafted a letter of gratitude, dated June 13, which was signed by Hans Hahn, Rudolf Carnap, Viktor Kraft, Friedrich Waismann, Herbert Feigl, Felix Kaufmann, Karl Menger, Robert Neumann, Maria Kaspar, Rose Rand, Eugen Lukács, Gustav Bergmann, Heinrich Neider, Kurt Gödel, Gustav Beer, Theodor Radakovic, Maria Rosenblüth, Otto Neurath, and Olga Neurath (ibid.).

Schlick's decision to stay in Vienna stimulated work on the planned booklet as well as preparatory activities for the Conference on the Epistemology of the Exact Sciences. This event, sponsored jointly by the Ernst Mach Society and the Berlin Society for Empirical Philosophy, took place in Prague on September 15–17, concurrent with the fifth meeting of the German Physical Society and the German Mathematical Union.

The manifesto *Wissenschaftliche Weltauffassung. Der Wiener Kreis* (*The Scientific Conception of the World: The Vienna Circle*) (1929), published one month before the meeting, was—though signed jointly by Carnap, Hahn, and Neurath—probably first written by Neurath and then revised by Carnap.[46] Neurath coined the term Vienna

[45] Schlick to Ministry of Education, February 29, 1936; General Administrative Archives of the Republic of Austria (AVA, *Allgemeines Verwaltungsarchiv*), BfU, 46 Philos. 1936, 7894.

[46] According to a reconstruction based on the diaries of Rudolf Carnap.

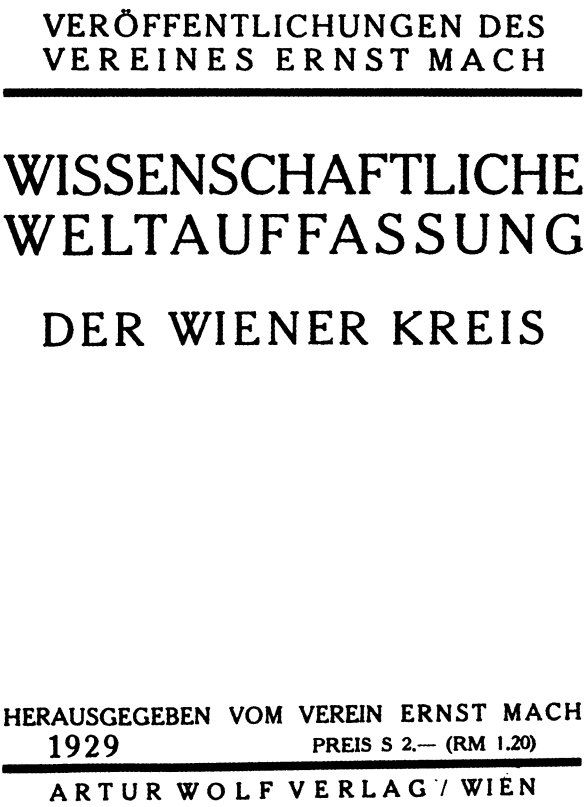

Fig. 4.2 Frontispiece of the Vienna Circle's manifesto *The Scientific Conception of the World: The Vienna Circle* (1929), ed. by the Ernst Mach Society

Circle (Frank 1949a, 38) and probably also "scientific world conception," while the other members and adherents were asked for comments and contributions (*The Scientific Conception of the World: The Vienna Circle*, in Neurath 1973, 318). The term "world conception" was chosen in place of the term "world view," which was rejected because of its metaphysical connotations and its role in the separatist conception of the *Geisteswissenschaften* held by Dilthey and Windelband. The new term was to indicate the movement's alternative philosophical and scientific orientation (Neurath 1930–31, in Neurath and Cohen (eds.) 1983, 33).

The manifesto's preface underlines the Circle's recurrent principles of this-worldliness, practical relevance, and interdisciplinarity. The pursuit of anti-metaphysical empirical research promoting a scientific world conception is described as the continuation of the work of Leibniz, Bolzano, the English empiricists and their successors, American pragmatism, and, especially, Vienna's "liberal movement" (Neurath 1973, 301). The self-conscious continuation of the tradition of the Viennese adult education movement is emphasized, as are the empiricist predecessors Mach, Popper-Lynkeus, Boltzmann, and Brentano and his students. Similarly, the mentions of the liberal "school of marginal utility theory" (Carl Menger)

and Austromarxist political economy and sociology (Otto Bauer, Rudolf Hilferding, Max Adler, Friedrich Adler) hardly come as a surprise. The historical backdrop is completed with a list of predecessors in the monistic tradition, such as Comte and Mill (representing positivism and empiricism), Helmholtz, Poincaré, Enriques, Duhem, and Einstein (representing an empiricist methodology of science), and Epicurus, Marx, and Feuerbach (representing positivist sociology).

In daily activities the pure ideal of bourgeois enlightenment, with a value-free scientific world conception and the synthesis of empirical and logical-mathematical disciplines, coexisted with a more anti-metaphysical attitude as an ideological catalyst. At first, this tension only became manifest in the discussion of problematical relations of "Theoretical Questions and Practical Decisions" (Carnap 1934b) in the Circle's so-called "left" wing, where an interrelation with the "endeavours toward a new organization of economic and social relations, toward a reform of school and education" was postulated (Neurath 1973, 304 f.; see also Siegetsleitner 2010 and 2014).

The partially normative ambition to instigate social change and engage in concrete educational work had also led to the gradual take-over of the Ernst Mach Society as a mouthpiece for the promotion of the scientific world conception. This is why the Society's principles were specifically mentioned in the Manifesto, which optimistically anticipated its activities, described as follows:

> organize lectures and publications about the present position of the scientific world-conception, in order to demonstrate the significance of exact research for the social sciences and the natural sciences. In this way intellectual tools should be formed for modern empiricism, tools that are also needed in forming public and private life. (ibid., 305)

In this spirit the Ernst Mach Society intended to „form intellectual tools for everyday life, "especially to ensure practical access to a science devoid of metaphysics (ibid.). In accordance with the goal of the rational reorganization of the social and economic order the scientific world conception promoted the emancipation of „intellectual workers" and the masses—a vision which must be examined within the context of Vienna's cultural movement and its model of the "New Man."

Even though the Manifesto represents the Vienna Circle's "radical" wing and Moritz Schlick, on behalf of the "moderate wing," criticized its content and diction because of its advertisement-like style and its dogmatic formulations (Mulder 1968, 390), the accuracy of its pointed self-presentation can be assessed by comparison with the actual history of the Vienna Circle and, especially, of the Ernst Mach Society. Typical elements of the socialist cultural movement (reform, progress, a scientific approach, technophilia, an educational ethos) can be discerned there alongside purely philosophical reform tendencies. The manifesto gives evidence of the Society's intentions and practices and of its euphoric pioneering spirit. The enthusiastic appeal "To All Friends of Scientific World Conception" was printed at the end of the Manifesto as well as distributed as a handbill.[47] A previously distributed handbill contains a planned list of speakers, only some of which were in fact to give a speech ultimately, namely Carnap, Feigl, Philipp Frank, Schlick, Hahn, Löwy, Menger, Waismann, Neurath, Zilsel, Josef Frank, and Heinrich Gomperz.

[47] Verein Ernst Mach, WStLA, loc. cit.

Apart from members and adherents of the Vienna Circle this list also included Wladimir Misar, Hans Thirring, Otto Bauer, Heinz Hartmann, Josef Karl Friedjung, E. Machek, and H. Vokolek.

The lectures were announced regularly and, beginning in 1930–31, were summarized in the journal *Erkenntnis*. In the journal's first volume, co-edited by the Ernst Mach Society, the tireless Neurath presented the new society to the philosophical audience (1930–31, 74); what is notable is the text's style, which is more serious than that of the handbill and the manifesto and is addressed to a scientifically-oriented audience. Once more the conflict between the goals of neutral, scientific research and socio-critical educational work becomes evident.

4.2.3 The First International Meeting—Prague 1929

The First Conference on the Epistemology of the Exact Sciences, held in Prague from September 15–17, 1929, fully conformed to the new objective of advancing public understanding of the overspecialized sciences, but it may also be viewed as marking the international establishment of the Vienna Circle.[48]

Philipp Frank, who—as a full professor in Prague—played a vital role in the meeting's organization, later reported that he faced opposition against the scientific world conception from the established scientific associations (serving as co-organizers) as well as general bewilderment concerning the completely new perspective on the relationship between modern science and philosophy (Frank 1949a, 39 ff.). Given the wide-spread dominance of speculative-idealist philosophy, especially at German universities, this kind of reaction was by no means surprising (cf. the report by Hook 1930–31). In his introductory speech at the meeting, the special focus of which was "Causality and Probability" and "The Foundations of Mathematics and Logic," Frank referred to Prague's (experimental-)scientific tradition (with Bolzano and Mach) and advocated the emancipation of physicists from traditional philosophy (*Erkenntnis* 1930–31, 1:93 ff.).

In his lecture Hans Hahn sought to stress the „Significance of the Scientific World Conception particularly for Mathematics and Physics „ (ibid., 96 f.) by pointing to the improvement of empiricism through the new logic and mathematics. He stressed the opposition between the scientific world conception and the more metaphysical spirit of the time. A similar argument was given by Otto Neurath, who explored the "Ways of the Scientific World Conception" and introduced his idea of a "unified science." Convinced of the dichotomy of metaphysics and science, he described the development of human thought from magic to religion and philosophy to the latest stage of materialistic empiricism by way of a historical-sociological excursus. These concerted efforts were rounded off by Philipp Frank himself, who provided a description of the contemporary theories of physics with their fundamental concepts of space, time, and causality as in full agreement with the requirements of the epistemology of the scientific world conception (ibid., 126 f., 157).

[48] Detailed documentation of the meeting is provided in *Erkenntnis* 1 (1930–31): 93–339.

Hans Reichenbach (Berlin) discussed his favorite topic, "Causality and Probability," and also turned to quantum mechanics before upon expounding his heatedly debated theory of induction (ibid., 158–61). The lectures by Richard von Mises and Paul Hertz also dealt with the problem of causality (ibid., 189 f., 212 f.), while Friedrich Waismann and Herbert Feigl presented their respective views on the concept of probability in relation to logic and empirical knowledge (ibid., 229 f., 249 f., 360 f.), sparking off another vehement discussion.

Problems of mathematics and logic were the focus of the lectures by the German mathematician Adolf Fraenkel, who addressed the contemporary foundational crisis of mathematics, and Rudolf Carnap, who commented on general axiomatics and which was followed by the final discussion (ibid., 287 f., 303 f.). All these topics continued to be extensively discussed in the Thursday evening meetings of the Vienna Circle as well as in the other groups, and these debates were also reflected, to some extent, in subsequent publications. For the *Erkenntnis* report, Neurath added some "Historical Remarks" with a detailed bibliography of lecturers, speakers, and related authors, specifically of the Warsaw Circle of Polish logicians (ibid., 311 f.).

As concerns the contents and the historical relevance of the meeting, it has to be said that the quality and depth of discussions was much higher than that of the monistic contributions to individual freethinkers' journals and other organs of the adult education movement, which often ran the risk of leaning towards a trivializing kind of half-education and an ideal-typical approach to all non-metaphysical sciences.

The First Meeting on the Epistemology of the Exact Sciences in Prague
September 15–17, 1929

In connection with the 5th Meeting of German Physicists and Mathematicians.
Society for Empirical Philosophy, Berlin.
Ernst Mach Society, Vienna.
Physical Institute of the German University of Prague.

Philipp Frank: Inaugural Speech

I.

Hans Hahn: The Significance of the Scientific World Conception for Mathematics and Physics, in Particular
Otto Neurath: Ways of the Scientific World-Conception
Philipp Frank: What Is the Significance of Present Physical Theories on General Epistemology?

II.
A. Probability and Causality

Hans Reichenbach: Causality and Probability
Richard von Mises: On Causal and Statistical Legitimacy in Physics

Paul Hertz: On the Concept of Causality in the Macroscopic, Particularly in Classical Physics
Friedrich Waismann: A Logical Analysis of the Concept of Probability
Herbert Feigl: Probability and Experience
Discussion on Probability

B. Fundamental Questions of Mathematics and Logic

Adolf Fraenkel: The Present Differences in the Foundations of Mathematics
Rudolf Carnap: A Report on the Studies on the General Axiomatics Concerning Fundamental Questions of Mathematics and Logic

III.

Otto Neurath: Historical Comments

Source: *Erkenntnis* 1 (1930–31): 89–340; *Annalen der Philosophie* VIII (1929), 113. With a bibliographical appendix on
the speakers and the participants in the discussions: Wilhelm Burkamp, Rudolf Carnap, Walter Dubislav, Philipp Frank, Kurt Grelling, Hasso Härlen, Paul Hertz, Richard von Mises, Otto Neurath, Hans Reichenbach, Friedrich Waismann, Edgar Zilsel;
authors closely associated with the speakers and the participants in the discussions: Albert Einstein, Kurt Gödel, Eino Kaila, Viktor Kraft, Karl Menger, Frank Ramsey, Kurt Reidemeister, Bertrand Russell, Moritz Schlick, Ludwig Wittgenstein;
Bibliographical notes on the Warsaw Circle and related groups in Poland: Tadeusz Kotarbinski, Stanislaw Lesniewski, Jan Lukasiewicz, Alfred Tarski, Leon Chwistek, Adolf Lindenbaum, M. Pressburger, Kazimierz Ajdukiewicz.

4.2.4 The Lectures Presented at the Ernst Mach Society 1929–1932—A Commentary on the Popularization of the Scientific World Conception

1929

Josef Frank: Modern World Conception and Modern Architecture
Hans Hahn: Superfluous Essentialities (Occam's Razor)
Heinrich Vokolek: The Problem of Talent and the Theory of Heredity
Rudolf Carnap: On God and the Soul. Pseudo-Questions of Metaphysics and Theology

1930

Otto Neurath: Unified Science and Marxism
Moritz Schlick: On the Scientific World Conception in the USA

Wladimir Misar: Problems of Astronomy
Herbert Feigl: The Laws of Nature and Free Will
Edgar Zilsel: The Genius Cult, a Sociological Problem
Josef Karl Friedjung: Unscientific Aspects in Education
Otto Bauer: Industrial Rationalization and Science

As part of the "Studiengruppe für wissenschaftliche Zusammenarbeit" (Study Group for Cooperation in Science) in the Vienna Chamber of Labour, in cooperation with the Ernst Mach Society, direction: Rudolf Carnap:
Herbert Feigl: Statistical Legitimacy
Ludwig Bertalanffy: The Problem of Entropy and the Concept of Norms in Biology
Wilhelm Marinelli: Statistical Methods in Biology
Edgar Zilsel: On Induction
Hans Zeisel: Business Cycle Statistics
Karl Polanyi: Economic Statistics
Heinz Hartmann: Psychoanalysis and the Problem of Illusions
Richard Strigl: Economic Categories
Egon Brunswik: Gestalt Psychology with Demonstrations
Wilhelm Reich: The Theory of Drives of Psychoanalysis
Otto Halpern: On the Concept of Causality in Quantum Theory

1931

Otto Neurath: Magic and Technology
Josef Gicklhorn: Cellular Physics
Philipp Frank: Physical and Biological Legitimacy
Otto Neurath: Empiricism in Pedagogics
Moritz Schlick: Problems of Causality

As part of the lecture series "Probleme der Einheitswissenschaft" (Problems of Unified Science), organized by the *Wiener Volksbildungsverein* (Vienna Association For Adult Education) together with the Ernst Mach Society:
Otto Neurath: Unified Science and Empiricism Today. Sociology in the Language of Physics
Rudolf Carnap: The Language of Physics. Psychology in the Language of Physics
Friedrich Waismann: Logic, Language, Philosophy (basis for the posthumously published *The Principles of Linguistic Philosophy*)
Hans Hahn: Mathematics and Science

As part of the weekly seminar "Moderne Wissenschaft" (Modern Science), organized by the Ernst Mach Society:
Hans Hahn: Inaugural Lecture
Friedrich Waismann (head of the "physics" division)

As part of the lecture series "Physikalismus" (Physicalism) of the Ernst Mach Society:
Otto Neurath: Empiricism Past and Present. Psychology and Sociology in the Language of Physics
Hans Hahn: The Language of Physics
Friedrich Waismann: Logic and Language
Hans Hahn: Mathematics and Science

1932

Philipp Frank: Philosophical Trends in the Soviet Union
Otto Neurath: The Other-Mind Problem in Sociology
Hans Hahn: Appearance and Reality
Moritz Schlick: Philosophical Trends in the USA
Hans Hahn: Logic and Reality

Planned lectures in cooperation with the "Verein für angewandte Psychopathologie und Psychologie" (Association for Applied Psychopathology and Psychology):
Heinz Hartmann: Empiricism in Psychoanalysis
Martin Pappenheim: Reflexology
Otto Neurath: Unified Science and Psychology
Heinrich Gomperz: The Development of Atomistics

Source: *Erkenntnis* (1930 ff.). In 1933–34 no lectures are reported in *Erkenntnis*, although – according to sources in the Society's archives – lectures obviously continued to be presented until the Society was dissolved in February 1934.

The list of speakers and of topics clearly illustrates the interdisciplinary approach and the collaborative style practiced in the Circle's popularizing organ. It showed, for example, the affinity of the scientific world conception to modern architecture, especially to the functionalism of the Bauhaus, where Otto Neurath, Rudolf Carnap, and Herbert Feigl presented a number of papers.[49] According to the personal accounts of contemporaries, audiences at the Ernst Mach Society did not exceed those of lectures at adult education centers.[50] On average, therefore, there were no mass audiences, but Neurath and Carnap often managed to fill the auditorium. In 1930 the Society's 22-member board included Schlick, Hahn, and Vokolek, and, along with a number of freethinkers, Neurath, Carnap, Zilsel, Julius Tandler, and Hans Thirring. Schlick remained the Society's chairman until its dissolution, even though he sought to dissociate himself from "propagandist" and political activities.[51] Apart from promoting an empiricist (physicalist) unified science, the Society also attempted, from 1930 onwards, to integrate psychoanalysis into its overall scientific approach on a behaviorist basis, albeit with fairly limited success. Still

[49] Cf. Wingler 1975, 170; and the relevant correspondence of Carnap, Feigl, Neurath, and Schlick (WKA Haarlem); Galison 1990; Dahms 2004.

[50] Information received from Paul Neurath (Vienna/New York) and entries in Carnap's diary.

[51] Correspondence of Schlick 1934 (WKA Haarlem).

Heinz Hartmann and Josef Karl Friedjung gave lectures geared towards establishing collaboration with a related scientific community (Jahoda 1981, 1982). Similarly, Otto Bauer (1976) spoke on rationalization in a lecture which appears to have been suggested in the discussion group of Bauer, Neurath, and Zilsel.[52] Little significance has been attached so far to the Study Group for Cooperation in Science, which was set up as part of the Ernst Mach Society and organized a regular working group of renowned scientists around Rudolf Carnap, meeting in the Chamber of Labor. Its objective was

> to contribute to bringing the special sciences closer together and to clarify their position in the context of science as a whole … through lectures followed by discussions, especially on more recent methods, problems and concept formations in the individual disciplines. (*Erkenntnis* 1930–31, 1:79)

This study group included the biologists Ludwig Bertalanffy and Wilhelm Marinelli, the sociologist Hans Zeisel, and the economists Karl Polanyi and Richard Strigl, as well as the psychologists and/or psychoanalysts Egon Brunswik, Else Frenkel-Brunswik, and Wilhelm Reich, together with the members of the Vienna Circle: some of these participants later became authors for the series of monographs *Foundations of the Unity of Science* (Neurath, Frank, Carnap, Zilsel, Feigl, Brunswik). In this context we may also note the relations between the Vienna Circle and the founders of empirical sociology in Austria (Paul Lazarsfeld, Marie Jahoda, Hans Zeisel), which involve not only personal connections, but also epistemological and methodological affinities (Zeisel 1968, 17; Lazarsfeld 1978, 20).

One notable project was the lecture series "Problems of Unified Science," organized jointly by the Vienna Association for Adult Education and with the Ernst Mach Society. This series may be regarded as a precedent for the series "Unified Science" (1933 ff.) and as an attempt to popularize the more academic "Writings on the Scientific World Conception" which had been published since 1929 (Neurath 1933–39; Frank and Schlick 1929/-37). In the summary of his contribution Neurath declared, with typical defiance,

> The ultimate consequence of empiricism: Science without philosophy! The liberation from the pressure exerted by metaphysics and theology, as a parallel phenomenon to the liberation from the pressure exerted by social conditions: Empiricism and unified science together with social behaviorism and social epicureism, signifying the present. Clarity, strictness, closeness to life. All scientific activity recognized as a function of the social situation… . (Neurath 1932, 311)

In addition to the regular lecture program there was also a weekly seminar of the Ernst Mach Society, entitled "Modern Science." 1931 showed a general tendency towards emphasizing and rendering accessible scientific aspects of theory, along with a trend towards a more "neutral" scientific world conception and a de-emphasis of the politically and ideologically inspired freethinking attitude, as also became evident in the lecture series "Physicalism" in autumn 1931 (Neurath, Hahn, and Waismann).

[52] Conversation with Eduard März (Vienna) and Margarete Schütte-Lihotzky (Vienna).

In 1932 Philipp Frank and Moritz Schlick spoke about philosophical movements in the Soviet Union and the U.S. respectively, while in conjunction with the Association of Applied Psychopathology and Psychology the optimistic unification efforts were continued by Heinz Hartmann, Martin Pappenheim, and Otto Neurath. Heinrich Gomperz, the skeptic, once again expressed his criticism of the Vienna Circle's criterion of meaning in his lecture on Greek atomistics.

There are no direct reports on lecture activities in the years 1933-34—one of the consequences of the destruction of Austrian democracy on February 12, 1934. In the country's tense political atmosphere (Nazi terror, anti-Semitism, the incapacitation of parliament by the right-wing parties, the dissolution of the *Republikanischer Schutzbund* [Republican Defense Alliance], the foundation of the *Vaterländische Front* [Patriotic Front],…), the dissolution of the Ernst Mach Society had been in the offing ever since the Dollfuß administration had enforced the dissolution of the Freethinkers' Association on June 19, 1933, on the grounds of "transgression of its sphere of activities" (*Wiener Zeitung*, June 23, 1933). The Society's last list of board members still included, along with Schlick, Hahn, Neurath, Neider, Carnap, Philipp and Josef Frank, Zilsel, and Löwy, four members of the Freethinkers' Association.[53] After the banning of the Social Democratic Party (SDAPÖ) and its sub-organizations the new authoritarian rulers issued a police decree to stop the Society's activities and a petition to dissolve the Ernst Mach Society. The action was officially explained with reference to the ban on the Social Democratic Party ("the Ernst Mach Society is known to the authorities as having acted in the interests of this party").[54] In his capacity as the chairman of the dissolved Society, Moritz Schlick wrote two letters of protest in which he stated—in accordance with his liberal-conservative self-image and his apolitical attitude—his objections to the authorities' actions and pointed to the (in his opinion) purely scientific activities and the entirely apolitical character of the lectures.[55] This statement corresponded to Schlick's idealistic support of the Patriotic Front, which he considered a useful bulwark against the emerging German National Socialism.[56] The various authorities of the repressive *Ständestaat* assessed the actual role played by the Ernst Mach Society from the perspective of their anti-democratic ideology of a "new Austria" and categorically refused Schlick's requests. A second letter of protest by Schlick (March 23, 1934), seeking to confirm the neutrality of the Society's activities in relation to politics and religion and offering a declaration of solidarity with the Dollfuß regime, also failed to achieve its purpose, and it is typical of the Vienna Circle's divisions that Schlick's line of reasoning was criticized from abroad by Carnap and Neurath.[57] Neurath, who was forced into emigration as one of the

[53] Vienna *Vereinsarchiv*, October 20, 1933 (BPDion Vienna).

[54] Ibid., Zl. 1152/34.

[55] Schlick to Hofrat Ganz, March 2, 1934 (ibid. and WStLA).

[56] Schlick's correspondence and Schlick 1952.

[57] Diary of Carnap, loc. cit.

victims of the new route, summed up his irritation at Schlick in the drastic slogan "With Dollfuß against Unified Science."[58]

Schlick's ambivalence primarily consisted in the fact that his Socratic ethos led him, in good faith, to try and save pure science and philosophy even in a political situation where it was exactly this scientific world conception that was made the ideological enemy. His permanent struggle for an improvement of the teaching and studying conditions at the Philosophical Institute against opposition from conservative and nationalist professors and students and the anti-positivist ministerial administration (cf. Chap. 9), as well as the hostile reactions of a large part of the public after Schlick's murder on June 22, 1936, however, clearly illustrate that the Vienna Circle, one of the last and already destabilized symbols of independent science in (Austro-)fascist Austria had already been forced into a marginalized, defensive position (Weinzierl 1981).

To sum up, the founding phase of the Ernst Mach Society (1926–1928) was marked by strong intellectual and organizational ties with Vienna's adult education movement, finding expression mainly in its relations with freethinkers, monists, and representatives of the Ethical Movement. (Romizi 2012) The growing influence of members of the Vienna Circle after 1928 became manifest in the increasing emphasis on a scientific approach and the elimination of an ideology of cultural struggle; in the face of the political shift to the right this led towards the neutralization of the contents and terminology of the scientific world conception by 1934. The Society's organizational and socio-cultural origins in late enlightenment tendencies, together with its "liberal-socialist" image, formed the reason for its quick dissolution after the events of February 12, 1934 (on Schlick's role cf. Chap. 8).

This is not to say, however, that the Society was the private popularization enterprise of some "leftist" members of the Vienna Circle; it was rather a typical institution of Vienna's cultural movement without which, after all, its existence and activities would not have been possible. Thus, its social frame of reference and target groups, i.e., the working class and liberal-progressive bourgeoisie, are as evident as the self-image and patterns of identification in the Vienna Circle's educational work, which contributed significantly to adult education activities and the school reform movement (cf. Chap. 9). The scientific world conception played a major role in courses at adult education centers and, independently, the Vienna Circle also described "scientifically oriented people's education" as a related movement (as stated in the 1929 manifesto, in Neurath 1973, 317), which was complemented by the concrete activities of Herbert Feigl, Friedrich Waismann, Edgar Zilsel, Viktor Kraft, Otto Neurath, and others at adult education centers (cf. Sect. 9.1). A similar solidarity and commitment characterized the efforts of Hans Hahn, Edgar Zilsel, and Otto Neurath for the theoretical and practical promotion of Glöckel's school reform movement—fueled by the awareness that they were helping to establish a better system of living and to create a more humane, democratic society. A special achievement of Otto Neurath in this context is the Museum of Economy and Society; based on the Vienna Method of Picture Statistics,

[58] Neurath to Carnap, July 18, 1934 (WKA Haarlem).

it offered a new and successful approach both to education at school and to adult education in cooperation with the school reform movement, and remains an attractive model of a museum of society even today (Stadler 1979b, 1982a, c; Kraeutler 2008; Sandner 2014).

The substance of the program of unified science— conforming only to a certain extent with the Vienna Circle's activities in their entirety—foreshadowed the encyclopedism of the Unity of Science movement, later expanded in exile, as an open model of science with a similar educational impulse which, however, was no longer aimed at a large audience.

The scientific world conception is relevant today as the basis for cooperative, interdisciplinary work governed by an overall theoretical examination of the specialized individual sciences. The objective of a humane popularization of science to promote enlightenment, without undue simplification, in a transparent process so as to counter unaccounted for technology and uncontrollable "big science" alienated from everyday life and common sense is more topical than ever. Such humanization, however, would also have to reflect—as was the case then, to a limited extent—the social and political conditions of scientific activities. Based on the efforts of the Vienna Circle and on an integrated conception of the world and our knowledge of it, this would mean (following the example of French encyclopedism) the realization of the concrete utopia of a mutual permeation of science and everyday life—very much in the spirit expressed by the Vienna Circle slogan: "The scientific world conception serves life, and life receives it."[59]

4.2.5 Internationalization and Emigration Since 1930

4.2.5.1 The Second Conference on the Epistemology of the Exact Sciences in Königsberg 1930

After the first successful international appearance of logical empiricism in Prague the decision was made to organize another international meeting in the following year. This took place—in conjunction with the 91st Assembly of German Natural Scientists and Physicians and the Sixth German Meeting of Physicists and Mathematicians—as The Second Conference on the Epistemology of the Exact Sciences in Königsberg (now Kaliningrad, Russia). The main subjects of this joint event during September 5–7, 1930, organized largely by Kurt Reidemeister, were the foundational debates in mathematics and quantum mechanics (*Erkenntnis* 1930–31, 1:80). Hans Reichenbach, who was also involved, related,

> The close connection of mathematical, physical and philosophical thinking attracted a lot of interest, also and particularly among the representatives of the special sciences who were holding their meetings at the same time. (ibid., 414)

[59] *The Scientific Conception of the World. The Vienna Circle*, 1929, in Neurath 1973, 318; Stadler/Uebel 2002.

Looking at the report on this Second Conference (*Erkenntnis* 1931, 2:87–190), we can discern a theoretical division. On the one hand, it marked the first international appearance of Kurt Gödel with his (then hardly known) revolutionary results for the foundational debate in mathematics between logicists, intuitionists, and formalists; on the other hand, Friedrich Waismann spoke about his and Schlick's conversations with Wittgenstein, specifically on "The Nature of Mathematics: Wittgenstein's Position." It is difficult to tell which of these two contributions had the more profound impact (Köhler 1991). As Waismann had not handed in his manuscript on time, we can only try to reconstruct his contribution indirectly on the basis of the minutes of discussions (*Erkenntnis* 1931, 2:135 ff.; McGuinness 1967, 19 ff.); it was primarily concerned with formulating the verification principle in connection with mathematics:

> The meaning of a mathematical concept is the way of its application; the meaning of a mathematical theorem is the method of its verification. (ibid., 19; cf. also Dahms 1981)

What is left of the lost manuscript is only the basic outline of contents: 1. The Nature of Numbers, 2. The Idea of the Infinite, 3. The Concept of the Set, 4. The Principle of Complete Induction (ibid.).

Program of The Second Conference on the Epistemology of the Exact Sciences in Königsberg
September 5–7, 1930

I.

Rudolf Carnap (Vienna): The Logicist Foundations of Mathematics
Arend Heyting (Enschede): The Intuitionist Foundations of Mathematics
Johann von Neumann (Berlin): The Formalist Foundations of Mathematics
Friedrich Waismann (Vienna): The Nature of Mathematics. Wittgenstein's Position
Kurt Gödel (Vienna): On the Completeness of the Logical Calculus
Arnold Scholz (Freiburg): On the Use of the Term Holism in Axiomatics

II.

Otto Neugebauer (Göttingen): On Pre-Greek Mathematics

III.

Discussion on the foundations of mathematics (*Hahn, Carnap, von Neumann, Scholz, Heyting, Gödel, Reidemeister*, with a supplement by *Kurt Gödel*)
Literature on the foundations of mathematics

IV.

Hans Reichenbach (Berlin): The Physicalist Concept of Truth
Werner Heisenberg (Leipzig): Causal Law and Quantum Mechanics

V.

Discussion on Causality and Quantum Mechanics (*Herzberg, Heisenberg, Frank, Meyer, Steinhausen, Hamel, von Neumann, Grelling, Reichenbach*)

Literature on Causality and Probability

Source: *Erkenntnis* 2 (1931): 87–190, with the texts of all contributions listed above, except for Waismann, Gödel and Scholz.

The discussion of the foundational debate in mathematics, virulent since the so-called foundational crisis, was conducted on a professional level, but a consensus was far from being reached. It would appear that this debate has either been ignored so far or still cannot be regarded as settled (R. von Mises 1939, 1968 (1st edition 1951); Mehrtens 1990; Mancosu 1997). Thus, Carnap initiated the debate with the following words:

> The problem of the logical and epistemological foundations of mathematics has not yet been completely solved. This problem vitally concerns both mathematicians and philosophers, for any uncertainty in the foundations of the "most certain of all sciences" is extremely disconcerting. Of the various attempts already made to solve the problem none can be said to have resolved every difficulty. … Since I wish to draw you a rough sketch of the salient features of the logicist construction of mathematics, I think I should not only point out those areas in which the logicist program has been completely or at least partly successful but also call attention to the difficulties peculiar to this approach. One of the most important questions for the foundations of mathematics is that of the relation between mathematics and logic. *Logicism* is the thesis that mathematics is reducible to logic, hence nothing but a part of logic. Frege was the first to espouse this view (1884). In their great work, *Principia Mathematica*, the English mathematicians A. N. Whitehead and B. Russell produced a systematization of logic from which they constructed mathematics. We will split the logicist thesis in two parts for separate discussion: 1. The *concepts* of mathematics can be derived from logical concepts through explicit definitions. 2. The *theorems* of mathematics can be derived from logical axioms through purely logical deduction. (Carnap 1931, 91 f., cited from Benacerraf and Putnam (eds.) 1964, 31).

Carnap's Fregean approach resulted in a conciliatory suggestion that combined his logicism with the two alternatives: with the constructivist tendency in the concept formation of intuitionism and with the formalistic method according to which "*inside the system* the chains of deductions and of definitions are carried through formally as in a pure calculus, i.e., without reference to the meaning of the primitive symbols" (ibid., 41).

In contrast to this approach, Arend Heyting described the objective of intuitionist mathematics, based on the ideas of his compatriot Brouwer, the founder of intuitionism. The intuitionist mathematician

> proposes to do mathematics as a natural function of his intellect, as a free, vital activity of thought. For him, mathematics is a production of the human mind. He uses language, both natural and formalized, only for communicating thoughts, i.e., to get others or himself to follow his own mathematical ideas. Such a linguistic accompaniment is not a representation of mathematics; still less is it mathematics itself. (Heyting 1931, 106, cited from Benacerraf and Putnam (eds.) 1964, 42)

Heyting concluded, much more apodictically, with the irreconcilable statement "that intuitionism contains no arbitrary assumptions. Still less does it contain artificial prohibitions, such as those used to avoid the logical paradoxes. Rather, once its basic attitude has been adopted, intuitionism is the only possible way to construct mathematics." (ibid., 115; Benacerraf and Putnam, 49).

Against the background of these two basic positions Johann (John) von Neumann presented formalism, taking as an example Hilbert's proof theory:

> Even if the statements of classical mathematics should turn out to be false as to content, nevertheless, classical mathematics involves an internally closed procedure which operates according to fixed rules known to all mathematicians and which consists basically in constructing successively certain combinations of primitive symbols which are considered "correct" or "proved." This construction-procedure, moreover, is "finitary" and directly constructive. (von Neumann 1931, 116 f., cited from Benacerraf and Putnam (eds.) 1964, 50 f.)

Without realizing that Hilbert's program had been refuted by Gödel at the meeting, von Neumann already cautiously reacted to criticism of the Hilbertian system:

> The validity of a non-finitary, not purely constructive mathematical system has been established through finitary constructive means. Whether someone will succeed in extending this validation to the more difficult and more important system of classical mathematics, only the future will tell. (ibid., 54)

The next day's discussion on the foundations of mathematics helped to reach clarification, but not general agreement between the various positions. Hahn summed up the problem as a question concerning what rendered an empiricist standpoint compatible with the applicability of logic and mathematics to reality (Hahn 1931, 135 f.). According to Hahn, neither intuitionism nor formalism could meet this requirement, whereas logicism did: if logic only referred to the way one speaks about the world, then it would be compatible with the empiricist standpoint (as is logicism in Carnap's reading).

Rejecting formalism, Gödel already stated one of his major findings in this discussion: "(Assuming the consistency of classical mathematics) one can even give examples of propositions … that, while contentually true, are unprovable in the formal system of classical mathematics" (Gödel 1931a, 203). Upon the request of the editors of *Erkenntnis* Gödel presented a first summary of his "On Formally Undecidable Theorems of the 'Principia Mathematica' and Related Systems," previously published in *Monatshefte für Mathematik und Physik 1* (1931b), where he answered both the question of the completeness of formal systems in mathematics and the question of the consistency proof in such systems:

> For all formal systems for which the existence of undecidable arithmetical propositions was asserted …, the assertion of the consistency of the system in question itself belongs to propositions undecidable in that system. … For a system in which all finitary (that is, intuitionistically unobjectionable) forms of proof are formalized, a finitary consistency proof, such as the formalists seek, would thus be altogether impossible. (Gödel 1931a, 205)

With his papers of 1930–31 Gödel caused a classic paradigm shift in the foundational debate of mathematics and logic, demonstrating the fundamental openness of all mathematical systems and their non-closure with regard to the consistency proof. These findings were only gradually adopted and their relevance was only slowly acknowledged by the scientific community. It is astounding, for example, that—ten years after the Königsberg discussions—the renowned mathematician Richard von Mises still favored intuitionism because of its empirical orientation, but postulated the theoretical equivalence of the three fundamental positions at the same time

(Mises 1968, 128). For Mises, mathematics consisted of a tautological and a non-tautological (also non-evident) part which formed an application-based connection with empiricism:

> In agreement with the empiristic conception of science, intuitionism holds that the source of mathematics is the insight which we intuitively comprehend from experience of the external world, but which cannot once and for all be collected in a closed system of axioms. (ibid., 129)

Like Gödel, Mises distanced himself from formalism, as in his opinion "the coordination between mathematics (its tautological side) and reality cannot be reached by a mathematized doctrine and certainly cannot be settled by a consistency proof" (ibid., 134). But logicism also represented a limited perspective because it was concerned only with the tautological and deductive part of mathematics. Consequently, Mises, the proponent of applied science which was also regarded with a lot of skepticism at that time, concludes:

> None of the three forms of mathematics … is capable of completely rationalizing the relation between tautological systems and (extramathematical) experiences, which is its very purpose, i.e., to make this relation a part of the mathematical system itself. (Mises 1968, 135)

The other contributions to physics, including quantum mechanics, at the Königsberg meeting seem to have been overshadowed by this foundational debate. For instance, Hans Reichenbach's observations on the physical concept of truth aimed at a philosophical exploration of the sense and the meaning of cognitive operations leads to the priority of a (non-causal) concept of probability over the concept of truth in modern physics, for example in the application of Heisenberg's uncertainty relation. Reichenbach concluded,

> There is no truth for physical assertions; probability is all that is attainable. If we nonetheless wish to use the concept of truth, it can play in physics only the role of the limiting case in which the probability is equal to 1. Truth, then, is a special case of the concept of probability. (Reichenbach 1931, 182; cited from: 1978, vol. 1, 354 f.)

Werner Heisenberg's own remarks on "The Law of Causality and Quantum Mechanics" abstained from a clear answer concerning the validity of the law of causality, but still demanded a revision of the concept of causality. Contemporary nuclear physics created an entirely new situation, prompting the following summary by Heisenberg:

> That, firstly, the classical formulation of the law of causality has turned out to be empty and physically inapplicable. That a partial determinism remains, however, for example in nuclear physics, which may be formulated in approximately the following way: 'If a system is known in all its determining parts at any given time, then there may be experiments on this system at any later time, the results of which will be precisely predictable.' (Heisenberg 1931, 182).

Philipp Frank felt confirmed in his empiricist interpretation of modern physics by Heisenberg's lecture, while Reichenbach made a consensual statement at the end of the discussion: "there is indeed an objective world, yet the interpretation of this

'objectivity' is much more complicated and requires much more caution than has been common in physics so far" (ibid., 188).

Despite all these summaries one thing remained clear: research and controversy concerning truth, causality, and probability were not to disappear again from the agenda in the next decade, remaining a permanent subject of discussion for almost all members of the scientific community in the "statistical age" of the "probabilistic revolution" that could already be felt since the turn of the century (Krüger, Gigerenzer, and Morgan 1987).

4.2.5.2 The Preliminary Conference of the International Congresses for the Unity of Science in Prague 1934

The "Preliminary Conference of the International Congresses for the Unity of Science" was one of the last appearances of logical empiricism (which had by then turned into an international movement) in Central Europe and also marked its debut as the Unity of Science movement. It took place in Prague from August 31 to September 2, 1934, as a preconference to the Eighth International Congress of Philosophy, with the purpose of preparing the planned International Congresses for the Unity of Science, specifically the one in Paris in 1935. The starting point for this preliminary conference was explained with respect to the growing need for specific cooperation to promote anti-metaphysical empiricism:

> After some isolated attempts to establish closer contacts (for example the Erlangen meeting in 1923 with Carnap, Reichenbach and others), the Berlin Group and the Vienna Circle organized the first 'Meeting on the Epistemology of the Exact Sciences' in Prague in 1929, which attracted a considerable number of friends of a consistent scientific world conception. After this event the above-mentioned men were put in charge of the journal 'Erkenntnis' … The links with the Warsaw School and with the representatives of a logicizing empiricism in Scandinavia, England, America, France were intensifying constantly, and so Paris, Berlin and Prague sought to realize the idea of an international conference which was to unite all those who shared approximately the same opinion and were willing to present their views to each other and to a wider audience. It was the logical foundations of the entire area of science which were to be discussed, not only those of mathematics and physics. (*Erkenntnis* 1935, 5:1)

The "Preliminary Conference of the First International Congresses for the Unity of Science"
Prague, August 31–September 2, 1934
(All listed contributions were delivered in German)

Scientific Man (Chair: *Philipp Frank*)
Philipp Frank: Introduction
Charles Morris (Chicago): Scientific Empiricism
Otto Neurath (The Hague): The Unity of Science as a Mission
Kazimir Ajdukiewicz (Lviv): The Limits and the Value of a Scientific Perspective of the World

A Modern Line of Thought (Chair: *Otto Neurath*)
Louis Rougier (Besançon): Modern Logic and Scholastic Thinking
Rudolf Carnap (Prague): The Object of Our Studies – The Logic of Science
Kazimir Ajdukiewicz (Lviv): Positivism in Poland
Discussion

Physics, Probability, Biology (Chair: *Louis Rougier*)
Philipp Frank (Prague): Are There Any Spiritualist Traits in Modern Physics?
Hans Reichenbach (Istanbul): Many-Valued Logic
Edgar Zilsel (Vienna): Jordan's Attempt to Save Vitalism through Quantum Mechanics
Discussion

Logic (Chair: *Rudolf Carnap*)
Kasimir Lukasiewicz (Lviv): The History of the Propositional Calculus since Antiquity
Jørgen Jørgensen (Copenhagen): Some Main Lines of Modern Logic since Boole
Alfred Tarski (Warsaw): Methodological Studies on the Definability of Terms
Discussion

Induction (Chair: *Jørgen Jørgensen*)
Hans Reichenbach (Berlin): Discussion chairman. Discussion.

Source: *Erkenntnis* 5 (1935): 1–204. Contains reports on the talks given, with additions and discussion contributions and biographies of conference participants, on scientific philosophy in the U.S. and Poland.
Reports on the lectures presented by *Janina Hosiasson*, *Ernest Nagel*, and *Moritz Schlick* at the following Eighth International Congress of Philosophy.

The Eighth International Congress of Philosophy
Huitième Congrès International de Philosophie
Prague, September 2–7, 1934
Lectures by Vienna Circle members and supporters
(G indicates German titles)

Séance plénière: Les frontières des sciences naturelles
Philipp Frank (Président)

L'importance de l'analyse logique pour la connaissance, I
Rudolf Carnap (Président)
Jan Lukasiewicz: The Importance of Logical Analysis for Cognition (G)
Moritz Schlick: On the Concept of Holism (G)
Jørgen Jørgensen: The Logical Foundations of the Sciences (G)

Problèmes psychologiques
Egon Brunswik: Psychology in Terms of the Subject-Matter (G)
Karl Bühler: Language Theory and Philosophy (G)

L'importance de l'analyse logique pour la connaissance, II
Charles Morris: The Concept of Meaning in Pragmatism and Logical Positivism
Otto Neurath: Unified Science (G)
Rudolf Carnap: The Method of Logical Analysis (G)
Henryk Mehlberg: Temps physique et extra-physique

La méthode des sciences naturelles et des sciences morales, I
Philipp Frank (Président)

L'importance de l'analyse logique pour la connaissance, III
Louis Rougier (Président)
Hans Reichenbach: The Importance of the Concept of Probability for Cognition (G)
Kasimir Ajdukiewicz: On the Applicability of Pure Logic to Philosophical Problems (G)
Sigmund Zawirski: The Importance of Many-Valued Logic for Cognition and its Connection with the Calculus of Probability (G)
Ernest Nagel: Reduction and Autonomy in the Sciences
Eino Kaila: On Universal Propositions (G)
Janina Hosiasson: Probability and Conclusions from Partial Premisses (G)

L'importance de l'analyse logique pour la connaissance, IV
Felix Kaufmann: The Importance of Logical Analysis for the Social Sciences (G)
Julius Kraft: The Humane Sciences as Natural Sciences (G)
Åke Petzäll: Project of a Bureau of Philosophical Information

Source: *Actes du Huitième Congrès de Philosophie à Prague 2–7 Septembre* 1934 1936. Prague: Orbis.

The "Preliminary Conference of the International Congresses for the Unity of Science," organized mainly by Carnap and Frank in Prague and by Neurath, who had already emigrated to the Netherlands, eventually appointed a committee to organize the big congress in Paris in 1935, the main topic of which was going to be "Scientific Philosophy." The committee consisted of Carnap, Frank, Jørgensen, Lukasiewicz, Morris, Neurath, Reichenbach, Rougier, and Schlick, with Neurath's Mundaneum Institute in The Hague already serving as an organizational platform.

Two aspects of this event in Prague were of special scientific significance: it represented the first systematic cooperation with the Polish school of logic in Lemberg (Lviv) and Warsaw and with the American neo-pragmatism of Charles W. Morris, and it led to the concrete formation of the Unity of Science movement following the contributions of the Vienna participants on physicalist unified science. Furthermore, the personal contacts which were established with American philosophers proved extremely useful in conjunction with the beginning emigrations, especially those of Morris and Quine, playing a decisive role. For Frank and others like him the extra-theoretical dimension of the intellectual situation was also obvious: it was no coincidence that the development from a fledgling democracy to totalitarianism was accompanied by a regression to the old philosophy. Therefore, the promotion of an anti-metaphysical, scientific orientation within the confines of the scholastic world of philosophy was also designed to help shore up the democratic social order. Thus it was demanded—with the understanding "that human action is

guided more by unconscious drives than by conscious scientific thinking"—"that these emotions and drives … also be taken seriously as a subject-matter of science" (Frank 1935b, 5), in order to establish an alternative to irrationalism and "pseudorationalism," but also to present a philosophy based on research as a positive paradigm.

Amidst the political crisis Frank pointed to Prague's empiricist tradition since Mach and, concluding his lecture, quoted a remark from Nietzsche on the critical examination of philosophic history:

> I make exception of a few skeptics, the decent type in the history of philosophy; but the rest does not know the first requirements of intellectual uprightness. (ibid., 5)

Charles Morris presented "A Thesis on the Complementary Character of American Pragmatism and Logical Positivism," which was to have a decisive influence on all his subsequent semiotic works for the *Encyclopedia of Unified Science* and on his involvement with the organization of the Encyclopedia project. As is well known, the primary force behind this project was Otto Neurath, who postulated the "Unity of Science as a Task" in Prague:

> As *scientific* people, we are prepared to check all our tenets by observation statements, but also – far removed from every absolutism – to alter the principles on which the checking is based, when this seems necessary. But for our attempt at a common procedure *uniformity* is needed. Is this uniformity the logical consequence of our program? It is not; I stress this again and again; I see it as a *historical fact* in a sociological sense. (Neurath 1935a, 16; cited from 1983, 115)

His commitment to relativism and theoretical pluralism—"The system is the great scientific lie" (ibid., 116)—became Neurath's fundamental principle in pursuing his encyclopedic program; aiming at the integrated diversity of scientific theorizing and forecasting, it constituted a reformulation of the holistic program of science: "The whole of science is basically always under discussion" (ibid., 118). The theory-ladenness of empirical propositions and the indeterminacy of all terms were further elements of this pragmatic and historical conception of science that were diametrically opposed to the common image of "positivism."

Accepting the systematic differentiation of the theory of science into psychological, sociological, historical, and logical dimensions, Carnap also conceded the tripartition of semiotics as the common future agenda early on, concentrating, of course, on his own *Logical Syntax of Language* (1968). With the distinction made by the logic of science, one based on the strict differentiation between analytic and synthetic propositions, between formal and the empirical sciences, however, Carnap failed to improve on an earlier proposal by Neurath (Creath 1990). Since the formal sciences do not possess any objects, their separation from empirical science does not fundamentally question the unity of science (Carnap 1935, 36). Similarly, Moritz Schlick's lecture on the idea of the whole marked a radical rejection of all metaphysical applications and ideologies concerning holism, which, incidentally also formed part of the vocabulary of emerging fascism:

> The term 'wholeness' is one of the most misused terms in contemporary philosophy. Fundamental questions of biology, sociology, or psychology are apparently solved with its

> help – yet apparently only, for a closer examination of the suggested solutions reveals that none of them employs the term 'wholeness' with the precision that would be required for the sentences containing the word to have a clear meaning. (Schlick 1935, 52)

Via the linguistic and logical analysis of the concept of sums Schlick arrives—starting from the origins of gestalt psychology since Ehrenfels—at a cogent criticism of the then prevalent holism, postulating that questions of *meaning* constitute the task for philosophy, as opposed to questions of *fact*.

The related question of whether the emerging biological science could be founded on a physicalistic or a vitalistic basis was answered by Edgar Zilsel, as well as with a critique by Pascual Jordan, as a principally open problem, even though Zilsel favored the empirical-biological position against the attempt to support vitalism with the findings of quantum mechanics. In addition, Zilsel gave an externalist explanation for the virulent problem of vitalism, for:

> Obviously, there are some very distinct emotional, historical and social conditions today which make vitalism appear as something pleasant, and the physical conception of life as something unpleasant. (Zilsel 1935, 64)

Philipp Frank offered a similar analysis of the spirit of the time, portraying spiritualist interpretations of physics as being externally motivated and not conducive to legitimation by the revolution of quantum mechanics:

> If expressions with a spiritualist tinge are in wider use now than they were in the 19th century, this has got nothing to do with a 'crisis of physics' or with a 'new physicalist worldview,' but rather with a crisis of human coexistence caused by very different processes. (ibid., 79)

Finally, the two reports of Charles Morris and Kasimir Ajdukiewicz on the status of scientific philosophy in the U.S. and Poland respectively offered additional perspectives on the general problem in the history of science: how to account for the synergy of related schools of thought in different countries. While Morris stated that, after the first contacts with U.S. pragmatism—when William James, John Dewey, and Charles S. Peirce had been in contact with Mach—this exchange had now been revived by the Vienna Circle and the Polish school of logic, Ajdukiewicz gave an account of the "logical anti-irrationalism" in Poland, inaugurated by Brentano's student Kazimierz Twardowski and furthered by Jan Lukasiewicz in Lemberg (Lvov) and Warsaw (Szaniawski 1989; Wolenski et al. 2010).

In the controversial discussion that followed, special attention must be given to the debate between Reichenbach, Neurath, and Popper, for it was to polarize future scientific communication for many decades. Popper gave a brief presentation of his principal objections to induction, which he had treated as a major fundamental problem of epistemology in his *Logik der Forschung* (*The Logic of Scientific Discovery*) (1934). After rejecting Reichenbach's theory of induction and his concept of probability, he reached the following categorical conclusion, based on his falsificationism:

> We will have to get used to conceiving science not as a 'system of our knowledge,' but as a system of hypotheses, i.e., of principally unfoundable anticipations which we keep using as

> long as they prove corroborative, without being able to qualify them as 'true' or even 'more or less true' or 'probable.' (Popper 1935b, 172)

It is characteristic of the ensuing schism concerning the problem of induction that Reichenbach, the editor of *Erkenntnis*, devoted an entire article to Popper's *Logic of Scientific Discovery* in the same volume, especially to its treatment of the problems of induction and probability. He called the findings of the book "completely untenable"—a verdict which was also directed against Carnap's favorable review in the same volume (Reichenbach 1935a, 267–84). The matter was far from being settled, however, as the following International Congresses for the Unity of Science and further publications by the protagonists were soon to prove.

4.2.5.3 The First Congress for the Unity of Science in Paris 1935 (Congrès International de Philosophie Scientifique)

Following the decision made at the Preliminary Conference in Prague, the first International Congress for the Unity of Science—entitled "philosophie scientifique" to accommodate the French audience—was held on September 16–21 at the Sorbonne in Paris and attracted a number of prominent participants, even though the outline of this initial main event of the new scientific philosophy in exile served more as a rough proposal than as a fixed program. In late 1933 Neurath had already conducted preliminary talks—then still on behalf of the Ernst Mach Society—with Marcel Boll and Louis Rougier in Paris to establish the structure of the preliminary conference in Prague and the first outline of the congress in Paris.[60] In January 1935, Hempel, G. E. Moore, and A. J. Ayer attended an informal meeting on logical positivism in London, which resulted in a still rather skeptical statement on the common points of Vienna and Cambridge, as Susan Stebbing relates.[61]

In his brief report on the Paris congress (*Erkenntnis* 5:377–428), Neurath already gave a very positive account:

> The first of the International Congresses on the Unity of Science … was a success for logical empiricism in front of a wider public. The popular title 'Philosophie scientifique' attracted a lot of interest in France. The press reported extensively on the congress. Papers and magazines featured sketches and interviews. This was all the more remarkable as the congress was, as Rougier and Russell stressed in their introductory statements, a meeting devoted to science without emotions. About 170 people from more than twenty countries had come to the conference and demonstrated their willingness for constant cooperation. At the opening of the congress in the rooms of the Institute for Intellectual Cooperation, the speeches by Rougier, Russell, Enriques, Frank, Reichenbach, Ajdukiewicz, Morris, left one with the vivid impression that there was in fact something like a scholars' republic of logical empiricism. (ibid., 377)

[60] Cf. the minutes "Bericht über die Besprechungen am 21. and 22. Nov. 1933 in Paris," Vienna, Nov. 28, 1933. Otto Neurath, Materialien Internationale Konferenzen (WKA Haarlem).

[61] L.S. Stebling, "Notes on an Informal Conference on Logical Positivism, held at Belsize Park London, 5-6th January, 1935" (ibid.).

This philosophical event organized by anti-fascist scholars was indeed noted by the public—Robert Musil tried to get an invitation, the "Frankfurt school" sent Walter Benjamin, Bertolt Brecht expressed his interest in collaboration in a letter to Neurath[62]—and also stimulated the cooperation between Paris and Vienna (Soulez 1993; Nemeth and Bonnet 2015), which eventually was maintained mainly by Neurath from his Dutch exile. The meeting of American pragmatists (Morris), the English analytic philosophers (Stebbing), logicians from Warsaw (Ajdukiewicz), and representatives of Italian scientific philosophy (Enriques) did not only serve to demonstrate the unity of the empiricist-rationalist scientific community, but also to internationalize the project of the *Encyclopedia of Unified Science*.

Associations like L'Institut International de Cooperation Intellectuelle, the Comité d' Organisation de l'Encyclopédie Française, the Cité des Sciences, the Institut de l'Histoire des Sciences et des Techniques, and the Centre International de Synthèse provided an institutional platform for this congress, the proceedings of which were published a year later in eight volumes of the series Actualités scientifiques et industrielles by the Paris publishers Hermann & Cie.[63] As the congress papers were printed without the ensuing discussions, Neurath addressed some of these in his report.

A year later Bertrand Russell, who had held his laudatio of Frege in German, wrote,

> The congress of Scientific Philosophy in Paris in September 1935, was a remarkable occasion, and, for lovers of rationality, a very encouraging one. My first impression, on seeing the opening session, was one of surprise: surprise that there should be in the world so many men who think that opinions should be based on evidence. My second impression, on hearing the papers and discussions, was one of further surprise, to find that the opinions advocated actually conformed to this rule: I did not discover any of the signs of unfounded and merely passionate belief which, hitherto, has been as common among philosophers as among other men … I was glad that Frege and Peano received due honours; for to them ultimately, the movement which gave rise to the Congress is mainly due. At a previous congress in Paris, in 1900, at which I first made acquaintance both with Peano and with his work, I was struck by the fact that he avoided errors of syntax which, at this time, were almost universal, such as confounding the number 0 with the null-class, and the relation of membership with that of class inclusion. The importance of syntax in philosophy has since been developed to its fullest extent by Wittgenstein, and by the Vienna school (it must be understood that 'Vienna' is a term of psychology, not of geography), which contributed a number of interesting papers. The Polish school of logicians, also, showed great vigour and originality. (Russell 1936, 10 f.)

Russell's review perfectly illustrates the international context of the already exiled "Vienna school," and particularly its encyclopedic rational-empiricist spirit in a Leibnizian tradition:

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[62] Cf. Stadler 1982a, in *same* (Hg.) 1982, 10 ff.

[63] Cf. the relevant overview of the program of this first congress with references.

> In science, this combination existed since the time of Galileo; but in philosophy, until our time, those who were influenced by mathematical method, were anti-empirical, and the empiricists had little knowledge of mathematics. Modern science arose from the marriage of mathematics and empiricism; three centuries later, the same union is giving birth to a second child, scientific philosophy, which is perhaps destined to as great a career. For it alone can provide the intellectual temper in which it is possible to find a cure for the diseases of the modern world. (ibid., 11)

Whether scientific philosophy was able to fulfill Russell's hopes is not for us to decide. Still his statement remains an impressive document of an atmosphere of optimism and awakening—one of the last ones before the war in Europe amidst a constantly growing tendency towards totalitarian "(final) solutions."

The two poles addressed by Russell, logic and empiricism, were also commented on by Neurath as omnipresent topics of the congress and viewed from the perspective of the Encyclopedia project: "The individual sciences are to be put together through a direct demonstration of concrete relationships, and not indirectly by relating all of them to a vague common conceptual system" (Neurath 1935a, quoted after Haller and Rutte 1981, 381). Thus Neurath sought to address the Encyclopedia project, which had not yet advanced very far, heuristically by portraying the unity of science as something nascent and by denying the claim to sole authority of any particular system of the sciences. Semiotics as the *novum organon* was to form the terminological instrument for this purpose.

Neurath was able to use the favorable situation to achieve concrete results: Charles Morris successful proposed that "the Congress approves of the Encyclopedia planned by the Mundaneum Institute The Hague and declares its readiness to cooperate in this project" (ibid., 407). Second, a decision was made to standardize logical symbolism; the execution of this plan was put into the hands of an international committee (Behmann, Bernays, Carnap, Neurath, Scholz). Third, a large international committee for the International Congresses for the Unity of Science was formed, consisting of M. Boll, P. W. Bridgman, H. Bonnet, N. Bohr, R. Carnap, E. Cartan, J. Clay, M. R. Cohen, F. Enriques, Frank, M. Frechet, F. Gonseth, J. Hadamard, Janet, H. S. Jennings, J. Jørgensen, H. Kelsen, T. Kotarbinski, Lalande, Langevin, K. S. Lasley, C. I. Lewis, J. Lukasiewicz, R. von Mises, C. W. Morris, O. Neurath, C. Nicolle, C. K. Ogden, J. Perrin, H. Reichenbach, A. Rey, C. Rist, L. Rougier, B. Russell, M. Schlick, L. S. Stebbing, and H. Woodger. Finally, the congress elected an organizing committee, which consisted of Carnap, Frank, Jørgensen, Morris, Neurath, Reichenbach, Rougier, and Stebbing and was charged with the annual organization of an international congress. The congress report ended with a detailed biography of all speakers. Yet despite this impressive assembly of respected scientists it was by no means certain that this encyclopedic community would achieve "intellectual victories," which Neurath optimistically expected (ibid., 406).

The First Congress for the Unity of Science
Congrès International de Philosophie Scientifique
Sorbonne, Paris 1935

I. Philosophie scientifique et Empirisme logique
(G indicates German titles)

Introduction
Avant-Propos *Louis Rougier*

Allocutions

Allocution d'ouverture du Congrès, *Louis Rougier*
The Congress of Scientific Philosophy, *Bertrand Russell*
Allocution de *Federigo Enriques*
Allocution inaugurale, *Philipp Frank*
Address at the welcoming meeting of the Paris Congress, *Hans Reichenbach* (G)
Allocution, *Kasimir Ajdukiewicz*
Opening speech, *Charles W. Morris* (for the American Delegates)

Rationalisme empirique et Empirisme logique
Philosophie scientifique, *Federigo Enriques*

Fig. 4.3 First Congress for the Unity of Science. Paris, Sorbonne, September 16 to 21, 1935. In the centre (with a hat): Bertrand Russell talking with Rudolf Carnap

L'empirisme logistique et la désagrégation de l'apriori, *Hans Reichenbach*
From Epistemology to the Logic of Science, *Rudolf Carnap* (G)
Semiotic and Scientific Empiricism, *Charles W. Morris*
Individual Sciences, Unified Science, Pseudo-Rationalism, *Otto Neurath* (G)

Physicalisme et critique de la métaphysique
Fundamental Ideas of Pansomatism, *Tadeusz Kotarbinski* (G)
On Universalism, Reism and Anti-Irrationalism, *Adam Wiegner* (G)
La lutte contre l'idealisme, *Léon Chwistek*

II. Unité de la Science

Biologie
L'abîme entre les sciences physiques et biologiques, vu à la lumière des théories physiques modernes, *Philipp Frank*
Sur l'unité de la méthode dans les sciences physiques et biologiques comparées, *Lecomte du Noüy*

Psychologie et Sociologie
Psychology as an Objective Science of Relations, *Egon Brunswik* (G)
La science économique. Méthodes et Philosophie, *Gibrat*
Man and Society in Science, *Otto Neurath* (G)
L'importance logique de la notion de type, *C. G. Hempel* et *Paul Oppenheim*
Prolegomena of an Axiomatics of the Social Sciences*, Emil J. Walter* (G)

Encyclopédie
Une Encyclopédie internationale de la Science unitaire, *Otto Neurath*
On the Universal Language of Science. Logical Remarks on the Project of an Encyclopedia, *Rudolf Carnap* (G)
Remarks on the Proposed Encyclopedia, *Charles W. Morris*
Remark in the Discussion on the Encyclopedia, *Philipp Frank* (G)

III. Langage et Pseudo-Problèmes

Sémantique
Foundations of Scientific Semantics, *Alfred Tarski* (G)
Syntax, Semantics and the Logic of Science, *Marja Kokoszynska* (G)

Langage et Logique
Les formes de pensée déterminées par la structure de la langue arabe, *Louis Massignon*
Les préfixes verbaux en indo-européen et leur influence sur la logique, *Paul Masson-Oursel*
Réflexions sur la logique, *Jules Richard*
Les transformations que subit le langage en devenant scientifique, *Claude Chevalley*
Classes et pseudo-classes, *Alessandro Padoa*
Signification des Symboles Logiques, *Thomas Greenwood*

Pseudo-problèmes
Pseudo-problèmes résolus et soulevés par la logique d'Aristotle, *Louis Rougier*
Les pseudo-problèmes philosophiques, *Georges Matisse*
Sense and nonsense in scientific realism, *Herbert Feigl*
Les énoncés non scientifiques sont-ils dénués de sens?, *Gén. Vouillemin*

IV. Induction et probabilité

Induction
Induction as a Method of Scientific Cognition, *Hans Reichenbach* (G)
Are Natural Laws Conventions?, *Moritz Schlick* (G)
Truth and Corroboration, *Rudolf Carnap* (G)

Probabilité
The Logic of Probability as a Form of Scientific Thinking, *Hans Reichenbach* (G)
La logique de la probabilité, *Bruno de Finetti*
Les rapports de la logique polyvalente avec le calcul des probabilités, *Zygmunt Zawirski*
Law and Probability, *Moritz Schlick* (G)
La théorie des probabilités est-elle une logique généralisée? Analyse critique, *Janina Hosiasson*

V. Logique et expérience

Définition et expérience
The Definition, *Kasimir Ajdukiewicz* (G)
The Operational Definition of Suppositional Symbols, *A. Cornelius Benjamin*
Sur les définitions expérimentales, *Paul Renaud*

Formalisation de l'expérience
Mesure de la durée et construction du temps, *Gérard Petiau*
La notion d'espace physique, *Jean-Louis Destouches*
Remarques sur le formalisme des théories physiques et sur les mécaniques abstraites: la Métamécanique, *Jacques Métadier*
A Set-Theoretical Approach in Chemistry, *Eduard Habermann* (G)
Logical Observations on the Theory of Relativity, *Léon Chwistek* (G)

Enoncés protocolaires
Experience and the laws of nature, *R. B. Braithwaite*
On the Terminology of Perception Statements, *E. Tranekjaer Rasmussen* (G)
On the Theory of Perception, *Kurt Grelling* (G)

VI. Philosophie des Mathématiques

Logique, Mathématique et Réalité
La logique en tant que physique de l'objet quelconque, *Ferdinand Gonseth*
Mathématiques et réalités, *Albert Lautmann*

Logique et théorie des groupes
L'axiomatique et la théorie des groupes, *Gustave Juvet*
Quelques aspects de l'étude des propositions mathématiques, *Georges Bouligand*
Rôle des espaces abstraits en logique, stabilité des propositions, légalité et semi-légalité, *Jean-Louis Destouches*

Les Antinomies cantoriennes, la logique intuitioniste et le tiers-exclu
L'infini mathématique et l'évolution de la logique, *Basilio Mania*
Recherche sur le système de la logique intuitioniste, *S. Jaskowski*
La négation et le principe du tiers exclu, *Arnold Reymond*
Does Aristotle Contest the Validity of "Tertium non datur" for Statements on the Future? (On Chapter 9 of Aristotle's Hermeneutics), *Albrecht Becker* (G)
Leibniz et le principe du tiers exclu, *Paul Schrecker*

VII. Logique

Syntaxe logique
On the Concept of Logical Conclusion, *Alfred Tarski* (G)
A Few Remarks on the Syntax of Axiom-Systems, *Olaf Helmer*
Remarques sur les propositions interrogatives. Projet d'une logique du problème, *Eugeniu Sperantia*
Sur la simplicité formelle des notions, *Adolph Lindenbaum*

Logique mathématiques et Epistémologie
Questions concerning the Dependency and Dispensability of Axioms in Axiomatic Systems in which an Extremal Axiom Occurs, *F. Bachmann* (G)
Les extensions successives de l'ensemble des nombres au point de vue déductif, *Alessandro Padoa*
Le principe d'ordre comme nombre, rythme, symétrie, *G. Malfitano, A Honnelaitre* et al *bert Bollengier*
On the History and Critique of Isomorphic Mapping*, Hugo Bergmann* (G)

VIII. Histoire de la Logique et de la Philosophie scientifique

Histoire de la Logique
Classical German Philosophy and the New Logic, *Heinrich Scholz* (G)
Les bornes de la mathématique grecque et ses fondements spéculatifs, *Jasiniowski*
Points de contacts entre la logique stoicienne et la logique russellienne, *Antoinette Reymond*
The Scientific Legacy of Gottlob Frege, *Heinrich Scholz* and *Friedrich Bachmann* (G)
Ce que la logique doit à Peano, *Alessandro Padoa*
Anti-metaphysical Objectivism in Uppsala, *Einar Tegen* (G)

Histoire de la Philosophie scientifique
Logical Remarks on the Task of the History of Philosophy, *Walter Hollitscher* (G)
The Analytic Movement in Contemporary British Philosophy, *Alfred J. Ayer*
Sur l'étude de la philosophie scientifique en Grèce, *Zervos*

The Development of Empiricism in Scandinavia, *Jørgen Jørgensen*
Logicizing Empiricism in the Philosophy of the USSR, *Philipp Frank* (G)
Instauration Scientiarium, *Fritz Heinemann*
Allocution finale, *Louis Rougier*

Source: *Actes du Congrès International de Philosophie Scientifique*. 1935. Sorbonne, Paris. Vol. I-VII. 1936. Paris: Hermann & Cie (=Actualités scientifiques et industrielles 388–395).

4.2.5.4 The Second International Congress for the Unity of Science in Copenhagen, June 21–26, 1936: "The Problem of Causality—With Special Consideration of Physics and Biology"

In accordance with the decisions adopted in Paris, this second international congress focused mainly on the Copenhagen interpretation of quantum theory, taking place under the auspices of Niels Bohr. At his house the congress was opened with inaugural addresses by Jørgen Jørgensen (Copenhagen), Victor Lenzen (Berkeley), Lecomte du Noüy (Paris), Ferdinand Gonseth (Zurich), Tadeusz Kotarbinski (Warsaw), and Otto Neurath (The Hague) (*Erkenntnis* 1936b, 6:275–450). The tragic news of Moritz Schlick's murder was a profound shock to everyone at the meeting.[64] Philipp Frank held a short speech in commemoration of Schlick, and the congress sent an official telegram of condolence to Schlick's widow. Schlick's paper on "Quantum Theory and the Knowability of Nature" was read from the manuscript and received a warm reception from Bohr. Jørgensen, by then a member of the inner circle of the organizational committee for the encyclopedia and one of the first scientists to present an overall account of logical empiricism some years later (1951), spoke on the new international cooperation initiated in Vienna, which had already developed into a pentagonal between Vienna, Berlin, Prague, Warsaw, and Copenhagen and was disrupted only by the outbreak of World War II (Blegvad 1989). Pointing to the Copenhagen approach (Harald Höffding and Niels Bohr) Neurath, the sociologist, expressed his hope for an expansion of the empiricist program to include sociology:

> Some who are thrilled with the achievements of physics tend either to generally overestimate scientific thinking, to which sociological thinking belongs as much as astronomical thinking, or to regard only physics as science and not to take sociological investigations all too seriously. It will occasionally be the task of sociologists oriented towards the logic of science to point out analogues to the sociological shortcomings in the context of the non-sociological disciplines. (*Erkenntnis* 1936, 6:289)

[64] Cf. Ph. Frank, "Obituary of Moritz Schlick," in *Erkenntnis* 6 (1936): 291 f.: "When the news arrived that Moritz Schlick had been murdered everyone at the congress was deeply shocked. In a brief statement Philipp Frank commemorated … Schlick's importance for the rise of the Vienna Circle and his influence within logical empiricism. The congress sent a telegram to Schlick's widow, expressing its 'sense of an irreparable loss in the death of a beloved leader.' Schlick's paper was read from the manuscript. In warm words Niels expressed his deep appreciation for these reflections.

This relativization of the natural-scientific discourse was related to the contemporary discussion within physics (Desser 1991) of Heisenberg's uncertainty relation and Bohr's principle of complementarity and their possible consequences for philosophy and epistemology and for the new world views concerning causality and the freedom of the will which arose in the wake.[65]

The main lectures by Bohr and Frank sparked off several debates on the fundamental problems of physics, biology, psychology, and sociology, which were basically summarized in the congress report mentioned above. In the beginning Bohr had called for the traditional ideal of causality to be replaced by the "more general standpoint commonly referred to as 'complementarity'" (*Erkenntnis* 1936, 6:295). Frank, who held a critical view of "Philosophical Interpretations and Misinterpretations of the Quantum Theory" following the Copenhagen interpretation, was rather skeptical about the transferability of this principle ("It is impossible to measure the position and the speed of a moving mass particle simultaneously") to other disciplines such as biology and psychology. Once more he tried to raise arguments against premature analogies in favor of vitalistic biology and its corresponding ethic:

> It is evident from all of this that no argument to support the freedom of will or vitalism can be drawn from Bohr's theory of complementarity. Neither is it possible to gain from it a new conception on the relationship between the material object and the observing subject, if we understand the words 'object' and 'subject' in the sense in which they are used in empiricist science … In physics this language contains expressions like 'position of a particle,' taken in a loosely mechanical sense. As physics has shown, atomic processes defy any description in this language. In a profound analysis of modern physics, Bohr has now proved that some elements of the language of everyday life may still be used for experimental set-ups in the field of atomic processes, but for different experimental set-ups of different elements. The language of everyday life thus contains complementary elements which may be employed in the description of complementary experimental set-ups. (ibid., 316)

This analysis was in accordance with the views of Schlick, Frank's friend of many years, whose last manuscript contained the rejection of a strict *ignorabimus* based on his principle "that nothing in the world is principally unknowable":

> Where the quantum theory sets a limit to causal knowledge, when it tells us to abandon the search for further causes, this does not mean that the additional laws still at work must remain unknown to us; it means, rather, that additional laws do not exist and cannot be propounded, since the question about them would make no sense. It is enough that so many practical bounds are set to our knowledge; of a limit in principle we cannot speak. (ibid., 326; cited from Schlick 1979b, vol. II, 489 f.)

This confession appears like an unwitting testament rejecting the skeptical-irrational, metaphysical tendencies which accompanied the decline of Central Europe and which had already had fatal consequences for Schlick. Karl Popper, for example, who had delivered an ad -hoc lecture (not printed) on Carnap's *Logical Syntax* in Copenhagen, recalled incidents of identification with the aggressor taking place even then.[66]

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[65] Philipp Frank specifically dealt with this problem in his post-World War II works. On the position of Bohr in the context between Höffding, Mach and the Vienna Circle see Faye 1991.

[66] Interview with Karl R. Popper, September 1991 (cf. Sect. 7.5.).

Fig. 4.4 Second International Congress for the Unity of Science, Copenhagen 1936. Opening at Niels Bohr's home. Standing: Jørgen Jørgensen at the opening; to his right: Philipp Frank and Niels Bohr. Fourth row, left from the centre: Otto Neurath, to the right in the back Carl Gustav Hempel. In the middle of the fourth row: Karl R. Popper (with a tie)

The decisions adopted by the congress included the organization of a Third International Congress in Paris in 1937 which was to take place before the big Ninth International Congress of Philosophy (Congrès Descartes) and to be devoted to "The International Encyclopedia of Unified Science" and "The Unification of Symbolic Logic." Kotarbinski's invitation to a congress in Warsaw focusing specifically on sociology was thwarted when Hitler's troops began marching, as was an event planned for Oslo after the outbreak of the war.[67]

The Second International Congress for the Unity of Science
Copenhagen, June 21–26, 1936
"The Problem of Causality—With Special Consideration of Physics and Biology"
(G indicates German titles)

Niels Bohr (Copenhagen): Welcoming address

Jørgen Jørgensen, Victor F. Lenzen, Lecomte du Noüy, Ferdinand Gonseth, Tadeusz Kotarbinski, Otto Neurath: Speeches at the inaugural meeting

Philipp Frank: Obituary to Moritz Schlick (G)

[67] Cf. a reference in Næss 1993, 21.

I. Physics

Niels Bohr (Copenhagen): Causality and Complementarity (G)
Philipp Frank (Prague): Philosophical Interpretations and Misinterpretations of Quantum Theory
Moritz Schlick (Vienna)†: Quantum Theory and the Knowability of Nature (G)
Victor F. Lenzen (Berkeley): The Interaction between Subject and Object in Observation
Martin Strauss (Copenhagen): Complementarity and Causality in the Light of Logical Syntax (G)
Lecomte du Noüy (Paris): On Frank's lecture (G)
Ferdinand Gonseth (Zurich): On Frank's lecture (G)
Grete Hermann: On Schlick's lecture (G)
Konrad Marc-Wogau: On Schlick's lecture (G)
Poll (Berlin): On the lectures of Bohr, Schlick, Lenzen, Gonseth (G)

II. Biology

J. B. S. Haldane (London): Some Principles of Causal Analysis in Genetics
N. Rashevsky (Chicago): Physico-Mathematical Methods in Biological and Social Sciences
Georges Matisse (Paris): Les systèmes orientés et les êtres vivants
Poll (Berlin): On Haldane's lecture (G)
Lecomte du Noüy (Paris): On Rashevsky's lecture (G)
John Sommerville (New York): Discussion of Rashevsky
N. Rashevsky (Chicago): Closing statement (G)

III. Psychology

Marcel Boll (Paris): Determinisme, Contingence et Fatalité en Psychologie
Edward Chase Tolman (Berkeley): An Operational Analysis of "Demands"
Edgar Rubin (Copenhagen): Remarks on Our Knowledge of Other People (G)
Arne Næss (Oslo): On Tolman's lecture (G)

IV. Sociology

Otto Neurath (The Hague): Sociological Prognoses (G)
John Sommerville (New York): Logical Empiricism and the Problem of Causality in Social Sciences

V. General Questions of the Logic of Science

Paul Hertz (Hamburg): Regularity, Causality and the Direction of Time (G)
Ferdinand Gonseth (Zurich): L'idée de la loi naturelle
Zygmunt Zawirski (Poznan): On the Application of Many-Valued Logic in Empirical Science (G)
Carl G. Hempel (Brussels): A Purely Topological Form of non-Aristotelian Logic (G)
Karl Popper (Vienna): R. Carnap's Logical Syntax

Philipp Frank (Prague): Closing statement

Source: *Erkenntnis* 6 (1936): 275–442. Also published as an offprint by Leipzig: Felix Meiner; and Copenhagen: Levin & Munksgaard publishers 1937.

4.2.5.5 The Third International Congress for the Unity of Science—Encyclopedia Conference, Paris, July 29–31, 1937

Since the organizational committee of the encyclopedia (Carnap, Frank, Jørgensen, Morris, Neurath, Rougier) succeeded in finalizing the contract for the first two volumes of the *International Encyclopedia of Unified Science* with the University of Chicago Press,[68] this third congress was devoted exclusively to this ambitious project, while "The Unity of Science" became the subject of one of the six special departments at the subsequent Ninth International Congress of Philosophy.[69] This stimulated cooperation in the inner circle, the result of which was presented in 1938 in volume 6 of the series "Einheitswissenschaft/Unified Science/Science Unitaire"; edited by Neurath and published by van Stockum publishers in The Hague, it contained contributions by Otto Neurath, Egon Brunswik, Clark Hull, Gerrit Mannoury, and J. H. Woodger. This apparent harmony, however, obscures the essential disagreements on the content and form of the *Encyclopedia of Unified Science* which occurred between Neurath and Carnap—a conflict that was to intensify dramatically until Neurath's contribution "Foundations of the Social Sciences" (1944).[70] The official version, however, reads somewhat differently:

> The encyclopedia conference was opened by Louis Rougier; the last speech was given by Philipp Frank. Otto Neurath reported on the work on the encyclopedia and on the fundamental problems connected with setting it up Enriques (Rome) took a very active part in the debate, elaborating on the history of the sciences and also questioning the encyclopedia's 'program.' Egon Brunswik dealt with the problem of a uniform presentation of the different movements in psychology and of integrating the overall results into the framework of the sciences. Other participants in the discussion included Kraft (Utrecht), Mannoury (Amsterdam), Ness (Oslo) and Rubin (Copenhagen) … The encyclopedia conference also included a debate on the unification of logical symbolism, the main participants of which were Rudolf Carnap (Chicago), Heinrich Behmann (Halle/S.), Paul Bernays (Zurich), Olaf Helmer (Chicago), Heinrich Scholz (Münster), and Alfred Tarski (Warsaw). (*Einheitswissenschaft* 6, 3 f.)

And, referring to the conflict:

> Paris also saw two discussions devoted to settling undecided questions. One, introduced by Carnap and Neurath, dealt with the concept of truth; the other, introduced by Carnap and Reichenbach, with the concept of probability. (ibid.)

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[68] Cf. the content of the first and last two volumes in section II, chapter 11. The following authors scheduled for contributions do not appear in the publication: Manuel J. Andrade (linguistics), Arne Næss (psychology), Louis Wirth (sociology of science), Federigo Enriques (history of science), Jan Lukasiewicz (history of logic), Louis Rougier (rationalism/empiricism).

[69] Cf. the corresponding overview of the program on this subject in this chapter.

[70] Correspondence Carnap-Neurath 1934–45 (WKA/VCF Haarlem). Also see the report of Hegselmann 1985.

Generally speaking, the differences were mainly between Neurath's pronounced empiricism and the formal orientation of Carnap's semantics in the spirit of Tarski's correspondence theory; these differences also left their mark on the two men's correspondence after the conference (Hegselmann 1985).

The significance of Neurath's contribution "The New Encyclopedia" lies in the fact that it represents the essence of these discussions in formulating the—not entirely undisputed—objectives of the whole project. In the introduction Neurath stated defiantly:

> The latest phase of empiricism is leading to constructive scientific cooperation. By an "empiricist" we shall understand a person who on the basis of an all-embracing scientific attitude applies the same critical and constructive methods in all areas of research, argumentation, and analysis. ("The New Encyclopedia", 132)

Neurath likened this modern empiricism to a kind of jigsaw puzzle which was gradually assembled—with the help of conscious or unconscious contributions—to form a "mosaic of science." After one of his many digressions into philosophical history—from scholasticism to English empiricism and French rationalism and from the eighteenth-century French "Encyclopédie" to the Vienna Circle—this programmatic thinker arrived at a very cautious recommendation:

> We can start out from the "*encyclopedia*" as our *model*, and now observe how much we can achieve by way of interconnection and logical construction and elimination of contradictions and unclarities. The *synopsis of logical empiricism* will then be the order of the day. (*ibid*., 136 f)

This statement makes clear that the authors of the new encyclopedia were invited to contribute to a loose platform, without commitments to a specific common program but with the intention of forming a working team with a critical scientific attitude. As there was neither any sort of tabula rasa to offer as a starting point nor any binding rules for this criticism, the concrete task that remained was to display "the logical framework of modern science, thus complementing the major existing encyclopedias" (*ibid*., 1369). Correspondingly, the encyclopedia was to be arranged like an onion, around a core of two volumes with 20 introductory monographs, 19 of which were actually published (reprint Neurath, Carnap, and Morris 1970–71). After this "Foundations" section, a second section was to be devoted to problems of methodology, a third to an overview of the current state of the individual sciences, and a final one to discussions of the possible applications of scientific results and methods. Each of the sections was planned to comprise several volumes of 10 monographs each. In all, the Encyclopedia was to have comprised 26 volumes with 260 monographs in English and French, completed by a 10-volume picture-statistical supplement with global surveys as a sort of "visual thesaurus." Inspired by Diderot and d'Alembert, Neurath envisaged neither an apparatus to ensure a forced unification of the sciences nor a scholarly project detached from society:

> Since the modern logic of science has shown its distinctive character especially in the field of critical historical analysis, special attention will be devoted to both the history and the sociology of the sciences. We are much too ready to entertain the idea that science itself occupies a kind of absolute position, whereas it is an historical phenomenon like any other, whose dependence on sociological circumstances cannot be impressed strongly enough on one's mind. (*ibid*., 140)

What we find here is an explicit declaration of the intention to encourage the historization, sociologization and, ultimately, naturalization of the theory of science; after the death of Neurath, the project's driving and planning force, the only one to continue to promote it was Philipp Frank.

Neurath's project aimed at accommodating the reader and renounced any fixed common program for this reason:

> The basic idea that we have, finally, no firm basis, no system to fall back on, that we must always go on searching restlessly, and that we may experience the most unexpected surprises if we want to test the fundamental assumptions we have been using all along, this idea is characteristic of the attitude which may call "*encyclopedism*". It is opposed to the view which singles out certain theories and sentences as its starting-point and regards science, so to speak, as something given, as something that can be explored step by step like a foreign country; whereas on our view, we cannot count on a definite "limit" to our efforts, and we can neither "verify" nor "falsify", for all we can ever do is choose between several sentential wholes… But this scepticism need not have a crippling or a slackening effect, for in the end it leads us back to our course everyday experience which we can use now one way, now another in our scientific constructions. As empiricists, we shall always start from our everyday formulations, and as empiricists, we shall always test our theories and hypotheses with their aid. *These crude sentences with their many indeterminacies are for us the begin-all and the end-all of all science*. (*ibid*., 141)

With this unrealized utopian concept of science always keeping pace with everyday life, Neurath affronted all "architects of philosophical systems" and "acrobatic foundationalists" trying to ward off the danger of an ever increasing abstraction and formalization. In light of the development of the Encyclopedia after 1945, however, it looks as if he eventually lost the fight.

Agenda of the Encyclopedia Conference in Paris
Venue: Amphithéâtre de Geologie, Sorbonne
(G indicates German entries)

	Wednesday, July 28
5–7 p.m.	Opening meeting, speeches (G)
	Thursday, July 29
9–12 a.m.	The Encyclopedia of Unified Science (G)
3.30–6 p.m.	The Unification of Logical Symbolism (G)
	Friday, July 30
	The Unification of Symbolic Logic (G)
9–12.30 p.m.	Parallel meeting: Special discussions (G)
afternoon	free
	Saturday, July 31
	The Encyclopedia of Unified Science (G)
9–12.30 p.m.	Organization of Further Congresses and Cooperations (G)
	End of the Meeting

Published lectures (G indicates German titles):

Otto Neurath (The Hague): The New Encyclopedia (G)
Egon Brunswik (Berkeley): The Integration of Psychology into the Exact Sciences (G)
Discussion with *Carnap, Næss, Rubin*
Clark Hull (New Haven): Logical Positivism as a Constructive Methodology in the Social Sciences
Gerrit Mannoury (Amsterdam): Signifik
J. H. Woodger (London): Unity through Formalization

Source: *Erkenntnis* 7 (1937–38): 63 f., *Einheitswissenschaft/Unified Science/ Science Unitaire*. 1938. Eds. Otto Neurath and Jørgen Jørgensen. Vol. 6. 's-Gravenhage.

Neuvième Congrès International de Philosophie —
Congrès Descartes Paris 1937
Lectures by members and supporters of the Vienna Circle
(G indicates German titles)

L'Unité de la Science: la Méthode et les méthodes
Federigo Enriques: Le problème de la raison
Rudolf Carnap: The Unity of Science through a Unity of Language (G)
Ferdinand Gonseth: L'unité de la connaissance scientifique
Otto Neurath: Prognoses and Terminology in Physics, Biology, Sociology (G)
Hans Reichenbach: La philosophie scientifique: une equisse de ses traits principaux
Louis Rougier: La révolution cartésienne et l'empirisme logique
Moritz Schlick †: L'école de Vienne et la philosophie traditionelle
Maria Lutmann-Kokoszynska: Sur les élements métaphysiques et empiriques dans la science
Tadeusz Kotarbinski: Idée de la méthodologie générale de Praxéologie
Julius Kraft: On the Concept of Truth and the Foundational Problem of Knowledge (G)
Ludwig von Mises: The Logical Character of the Science of Human Conduct
Karl Dürr: Leibniz and the Idea of the Unity of Sciences (G)

Logiques et Mathématiques
Kurt Grelling: The Influence of Antinomies on the Development of Logic in the 20th century (G)
Carl G. Hempel: A System of Generalized Negations (G)
Heinrich Scholz: The Special Position of the Logical Calculi in the Field of Elementary Logicistic Calculus Research (G)
Paul Oppenheim: From Concepts of Class to Concepts of Order (G)
Léon Chwistek: La sémantique rationelle et ses applications
Z. Zawirksi: Importance des recherches logiques et sémantiques pour les théories de la physique contemporaine
Alfred Tarski: Sur la méthode déductive

Paul Bernays: Theses and Remarks on the Philosophical Questions and the Situation of Logical-Mathematical Basic Research (G)
Felix Kaufmann: On the Concept of Formality in Logic and Research (G)
Albert Lautmann: De la réalité inhérente aux théories mathématiques
E.-W. Beth: L'évidence intuitive dans les mathématiques modernes
Adolf Fraenkel: Discontinu et continu
Gerhard Gentzen: The Concept of Infinity and Consistency in Mathematics (G)

Causalité et Déterminisme en physique et en biologie
Philipp Frank: La physique moderne déplace-t-elle la limite entre sujet et l'objet?
Jørgen Jørgensen: The Philosophy of Niels Bohr

Analyse réflexive et Transcendance
Louis Rougier: Peut-il avoir une méthode de la transcendance: Evidence, cohérence et transcendance
Henryk Mehlberg: Sur quelques aspects nouveaux du problème psychophysiologique

Source: *Travaux du IXe Congrès International de Philosophie. Congrès Descartes*. 1937. Publiés par les soins de Raymond Bayer, Paris: Hermann et Cie (= Actualités scientifiques et industrielles 534 ff.).

4.2.5.6 Fourth International Congress for the Unity of Science Girton College, Cambridge (England), July 14–19, 1938

The last European meeting of scientific philosophy, which had already been exiled from Austria, took place in the framework of a larger Encyclopedia-oriented scientific community only a few months after Austria's "Anschluss" to national-socialist Germany.

In his inaugural address G. E. Moore pointed to the historical reference point of Cambridge philosophy, i.e., the *Principia Mathematica*, without mentioning Wittgenstein, however, who was not present at the congress. Oxford philosophy was represented by Gilbert Ryle, who discussed the practical and theoretical reasons for the "disunity of sciences." Finally, Susan Stebbing (London), host and initiator of the congress, spoke about "Language and Misleading Questions" in the spirit of Wittgenstein:

> Since the conference is meeting at Cambridge and since its topic is 'Scientific Language,' it seems to me not inappropriate to take for this inaugural address the subject 'Language and Misleading Questions.' For it is, perhaps, to Wittgenstein more than to any other philosopher that the conception of philosophy as 'the critique of language' is due. His influence has, so I understand, now so permeated Cambridge students of philosophy that to the outsider all their discussions appear to be concerned with investigation of language … I have learnt even more from studying Carnap's writings. I have felt the attraction of the view that: 'an die Stelle des unentwirrbaren Problemgemenges, das man Philosophie nennt, tritt die Wissenschaftslogik.' (Stebbing 1939–40, 1)

Referring to Heinrich Hertz's *Principles of Mechanics*, which contains a linguistic critique of (metaphysical) questions and answers, Stebbing concluded her paper with another Wittgensteinian thought:

> We want an answer to a question we have not asked. Our minds cease to be vexed when we find that the question is illegitimate; we no longer seek for an answer for there is no longer a question to be asked. (ibid., 6)

As can be seen from the congress report (*Erkenntnis* 1937–38, 7:135–422; *Erkenntnis/The Journal of Unified Science*r, 8:1–49), however, the program focused on logical-analytical questions, with many special contributions to the main topic of scientific language. On the occasion of Ernst Mach's centenary Philipp Frank described him as a pioneer of the Unity of Science movement, while Otto Neurath postulated many small scientific units as a logical starting point for the development of a unified science, once again directing polemical attacks against "the system" ("Encyclopedia versus Pyramidism"). So while the meeting was marked by intensive debates on the basic problem—unification through which language?—the International Committee of Congresses and the Organizational Committee of the Encyclopedia established themselves as an important forum of Western scholars.[71] Among the printed contributions Max Black's "Relations between Logical Positivism and the Cambridge School of Analysis" (*Erkenntnis* 8:24–35) is of particular significance, because it offers a profound discussion from a *British* point of view of what Wittgenstein, the Vienna Circle, and the Cambridge School have in common and what separates them (Skorupski 1993):

> When due allowance has been made for differences in local conditions, the development of the analytical movement in England and of Logical Positivism are found to have much in common. They have had, roughly speaking, the same friends and the same enemies. The teachings of Wittgenstein, Russell, Moore and the earlier English empiricists have been among the most important formative influences of both. If Logical Positivists have proclaimed their attachment to the advance of science more loudly, the English movement, intimately associated with one of the world's greatest centres of scientific research, has to some extent been permeated with the same values. There should be room for further fruitful interchange of opinions between the two movements. (*Erkenntnis* 8:33 f.)

Fourth International Congress for the Unity of Science
Cambridge (England), Girton College, July 14–19, 1938
(G indicates German titles)

G. E. Moore (Cambridge): Inaugural Address
Gilbert Ryle (Oxford): Welcoming Speech

I. Lectures

Olaf Helmer (Chicago): Languages with Expressions of Infinite Length
D. van Dantzig (Delft): Some Possibilities of the Future Development of the Notions of Space and Time

[71] Cf. section II, chapter 11.4.

Martin Strauss (Prague): Mathematics as a Logical Syntax – A Method to Formalize the Language of a Physical Theory
Carl G. Hempel: On the Logical Form of Probability-statements
Karl Dürr (Zurich): Propositional Logic in the Middle Ages (G)
Donald C. Williams (Los Angeles): The Realistic Interpretation of Scientific Sentences
J. Hadamard: The Language Crisis
Gerrit Mannoury (Amsterdam): A Signific Analysis of the Language of the Will as a Foundation of a Physicalist Synthesis of Language (G)
Louis Rougier (Besançon): Le Langage de la Physique est-il Universel et Autonome?
J. H. Woodger (London): The Formalization of a Psychological Theory
Arne Næss (Oslo): On the Function of Generalization (G)
Kurt Grelling and *Paul Oppenheim*: The Concept of Gestalt in the Light of the New Logic (G)
Heinrich Gomperz (Los Angeles): Interpretation
Emil Walter (Zurich): Unified Science as a Basis of the History of Science (G)
Karl Reach (Prague): The Name Relation and the Logical Antinomies
Otto Neurath (The Hague): The Departmentalization of Unified Science
Philipp Frank (Prague): Ernst Mach – The Centenary of His Birth
Victor F. Lenzen (Berkeley): Experience and Convention in Physical Theory
Alfred J. Ayer (Oxford): On the Scope of Empirical Knowledge. A Rejoinder to Bertrand Russell
Friedrich Waismann (Cambridge): Is Logic a Deductive Theory? (G)
R. B. Braithwaite (Cambridge): Two Ways of Definition by Verification
Jørgen Jørgensen (Copenhagen): Imperatives and Logic
Philipp Frank (Prague): Physics and Logical Empiricism (G)
M. Fréchet (Paris): Le Langage des Sciences
J. Clay (Amsterdam): The Regression of the Unstructural
Paul Hertz (New York): Language and Logic (G)
Maria Kokoszynska (Lviv): Remarks on Unified Science (G)
Janina Lindenbaum-Hosiasson (Warsaw): Remarks on the Reduction of Physical to Mental Concepts (G)
G. Malfitano (Paris): L'unité de l'expérience scientifique selon la positivité véritable conventionellement définie

II. Additions

J. Clay, On Hempel's lecture (G)
J. Clay, On Neurath's lecture (G)
R. W. Ditchburn (Dublin), Contribution to Discussion on Probability
R. W. Ditchburn (Dublin), Note on Gr. Williams' Paper
R. W. Ditchburn (Dublin), Contribution to the Discussion on Theories of Space-Time
K. Dürr, On J. Jørgensen's lecture (Imperatives and Logic) (G)

K. Dürr, On his own lecture (Propositional Logic in the Middle Ages) (G)
K. Dürr, On the lecture of Grelling and Oppenheim (The Concept of Gestalt in the Light of the New Logic) (G)
Kurt Grelling and *Paul Oppenheim*, Supplementary on the Concept of Gestalt
Carl G. Hempel, Supplementary Remarks on the Form of Probability-statements, suggested by the Discussion (Participants: Braithwaite, Clay, v. Dantzig, Ditchburn, Lindenbaum, Mannoury, Storer, Waismann)
Walter Hollitscher (London), On Arne Næss (G)
Janina Hosiasson-Lindenbaum, Discussion remarks 1. On Hempel's lecture, 2. On her own lecture (G)
G. Mannoury, Remarks on Hempel's lecture (G)
G. Mannoury, Additions to his own lecture (G)
G. Mannoury, Closing remarks (G)
Arne Næss, Remarks on the Overall Discussion on the lecture of Williams (G)
Arne Næss, On Woodger's lecture (G)
Arne Næss, On the lecture of Grelling/Oppenheim (G)
Otto Neurath, On the lectures of Black, Kokoszynska, Williams (G)
Friedrich Waismann, On Is Logic a Deductive Science? (G)
Arne Næss, On Kokoszynska's lecture on unified science (G)
Arne Næss, Invitation to Oslo
Arne Næss, Reply to a question by Hollitscher in a discussion (G)

Report of the Committee on the Unification of Symbolic Logic (G)
Heinrich Behmann, On the Unification of Logical Symbolism (G)
Paul Bernays, On the Question of the Unification of Logical Symbolism (G)
Heinrich Scholz, On the Question of the Unification of Logical Symbolism (Report on the Statement of the Münster Group) (G)

Philipp Frank, Summary

Source: *Erkenntnis* 7 (1937–38): 135–422.

4.2.5.7 Fifth International Congress for the Unity of Science, Harvard University, Cambridge, Mass. (USA), September 3–9, 1939

Two hundred scientists and philosophers from nine countries, most of them highly renowned, attended the last big congress of the Unity of Science movement, which coincided exactly with the outbreak of World War II. The congress, under the auspices of the Hague International Institute for the Unity of Science, was made possible by the support of the American Association for the Advancement of Science, the American Philosophical Association, the Philosophy and Science Association, the History of Science Society, and the Association for Symbolic Logic. Abridged versions and contributions were to appear in the ninth issue of *Erkenntnis/Journal*

of Unified Science, but this plan was thwarted by the war. In the end, only ten articles from this outstanding meeting appeared in the reprint of *Erkenntnis*.[72]

The inaugural lectures were held by James B. Conant (President of Harvard University), the later Nobel prize laureate P. W. Bridgman, Otto Neurath, and Charles Morris.

Aims and Methods for Unifying Science (Three Sessions)

George Sarton (Harvard): The Historical Basis of Philosophical Unification
W. Bridgman (Harvard): The Presuppositions of the Unity of Science
H. M. Kallen (New School for Social Research): The Meanings of "Unity"
Susanne K. Langer (Radcliffe College): The Scope of Problems as the Limit of Intellectual "Fields"
Herbert Feigl (Iowa State University): Unity of Science and Unitary Science
E. Nagel (Columbia University): Charles S. Peirce, Pioneer of Modern Empiricism
Jørgen Jørgensen (Copenhagen): Empiricism and the Unity of Science
Richard von Mises (Harvard University): On a Textbook of Positivism
Heinrich Gomperz (University of Southern California): Unified Science and Value

Scientific Method and the Language of Science (Four Sessions)

W. F. G. Swann (Bartol Research Foundation): The Significance of Scientific Theories
Rudolf Carnap (University of Chicago): Science and Analysis of Language
H. Reichenbach (University of California at Los Angeles): On Meaning
C. G. Hempel (College of the City of New York): The Logical Structure of Empirical Testing
Alexander Wundheiler (New York City): An Attempt at a Formal Methodology of Empirical Systems
J. Lindenbaum-Hosiasson: On Confirmation (Read by Title)
F. S. C. Northrop (Yale University): The Significance of Epistemic Correlations in Scientific Method
Donald C. Williams (University of California at Los Angeles): Designation and Empirical Certainty
K. Reach: Some Basic Features of a Universal Language (Read by Title)
James K. Senior (University of Chicago): The Laboratory Vernacular
F. Kaufmann (The New School for Social Research): Truth and Logic
J. Kraft (Utrecht): Metaphysical or Logical Interpretation of Logistic?
William Montague (Columbia University): The Illusion of Nominalism
A. C. Benjamin (University of Chicago): Some Realistic Implications of Operationalism

[72] The contributions of Heinrich Gomperz, Julius Kraft, Kurt Lewin and Karl Korsch, Hans Reichenbach, Alonzo Church, Jørgen Jørgensen, Kurt Goldstein, Hans Kelsen, Otto Neurath and F.S.C. Northrop were printed in the last volume of the reprint of *Erkenntnis* (8:386–437). Some of the unpublished contributions (Carnap, Frank, Morris, Zilsel) were published in Stadler (ed.) 1993.

W. V. Quine (Harvard University): A Logistical Approach to the Ontological Problem

Methodology of the Special Sciences (Four Sessions)

R. B. Lindsay (Brown University): The Meaning of Measurement in Physics
Louis Rougier (Paris): Les nouvelles logiques de la mécanique quantique et l'empirisme radical
Kurt Goldstein (Montefiore Hospital, New York City): The Task of Biology (Read by Title)
C. C. Pratt (Rutgers University): The Subject Matter of Psychology in Relation to General Science
S. S. Stevens (Harvard University): On the Problem of Scales for the Measurement of Psychological Magnitudes
Henry S. Leonard (Duke University): Gestalt Psychology and Physicalism
K. Grelling and *Oppenheim* (Brussels): Logical Analysis of "Gestalt" as Functional Whole
Ralph W. Gerard (University of Chicago): Organism, Epiorganism, and Science
Lawrence J. Henderson (Harvard University): A Relation of Physiology to the Social Sciences
Otto Neurath (The Hague): The Social Sciences and Unified Science
Charles W. Morris (University of Chicago): Semiotic, the Socio- Humanistic Sciences, and the Unity of Science
William R. Dennes (University of California): On the Relevance of Value Theory to the Social Sciences
John Somerville (Columbia University): Methodological Factors in the Advancement of the Social Sciences
Kurt Lewin (Iowa State University) and *Karl Korsch* (Boston): Mathematical Constructs in Psychology and Sociology
F. Greedy (Chapel Hill, North Carolina): A Mathematico-logical Theory of Society

Problems in Exact Logic (Two Sessions)

H. B. Curry (Pennsylvania State College): Remarks on the Definition and Nature of Mathematics
Barkley Rosser (Cornell University): The Introduction of Quantification into a Three-Valued Logic
S. C. Kleene (University of Wisconsin): On the Term "Analytic" in Logical Syntax
A. Tarski (New York City): New Investigations on the Completeness of Deductive Theories
Leon Chwistek: Infinitely Small Numbers and Their Application (Read by Title)
K. Grelling (Brussels): A Logical Theory of Dependence
Alonzo Church (Princeton University): Schröder's Anticipation of the Simple Theory of Types
Arthur H. Copeland (University of Michigan): The Role of Observations in a Formal Theory of Probability
Sergei Feitelberg (New York City): Threshold Perceptions and Probability
Henry Margenau (Yale University): Probability and Physics

Science and Society (Two Sessions)

Louis Wirth (University of Chicago): Some Problems in the Sociology of Science
E. Zilsel (New York City): The Social Roots of Science
John M. Brewster (United States Department of Agriculture): Society, Agriculture, Science, and Technology
Nicholas M. Oboukhoff (Oklahoma A. and M. College): Empirico- Logical and Teleological Factors in Engineering
A. V. Karpov (Pittsburgh): Is Engineering a Branch of Science?
Lee Byrne (Chicago): Attainable Gains to Education from the Unity of Science Movement

History of Science
(Three sessions, one of which was devoted to
an examination of Prof. *George Sarton's* materials
for the study of the history of science)

Werner Jaeger (Harvard University): Systematization and Unification of Science in the School of Aristotle
Estelle de Lacy (Palo Alto, California): Leibniz's Plan for the Unification of the Sciences
Karl Dürr (Zürich): The Development of the Idea of an Encyclopedia in the 17th Century (G) (Read by Title)
George de Santillana (Harvard University): The Encyclopedists
Talcott Parsons (Harvard University): Comte
Tenney L. Davis (Massachusetts Institute of Technology): The Identity of Chinese and European Alchemical Theory
Hans Kelsen (Geneva): Causality and Retribution
Philipp Frank (Harvard University): The Position of Einstein's Theory of Relativity in the Evolution of Science

Source: Vienna Circle Archives Amsterdam/Haarlem and *Journal of Unified Science* 8 (1939–40): 191, 264, 369.

4.2.5.8 Sixth International Congress for the Unity of Science, University of Chicago, September 2–6, 1941

Owing to the war, the sixth and last International Congress at the University of Chicago in the first days of September, 1941, was a much smaller event, after the realization of the above-mentioned plan of a congress in Oslo (a proposal of Arne Naess) had become impossible due to the German occupation of Norway.[73]

For those European participants who had planned to come to Chicago, but could not do so because of the war, Neurath—already in his English exile after a hazard-

[73] Estate of Neurath, International Congresses (WKA, Haarlem).

ous escape from the Netherlands—organized a small conference on "Terminology" (in cooperation with J. A. Lauwerys and Susan Stebbing) on October 2–5, 1941. We do not possess any published sources, but his publications on "Universal Jargon and Terminology" (1941) and "The Danger of Careless Terminology" (1941) provide us with some indirect information on Neurath's objectives. In closing Neurath once again refers to his boat metaphor:

> Our proposals lead to history and sociology of the sciences and to a stressing of the social implications of language and to a stressing of the social implications of language. This is particularly in accordance with the leading intentions of C. S. Peirce, G. H. Mead, John Dewey and others … We try to start as analysing scientists in the same empiricist way as we are accustomed to start in the practice of the sciences, which form a part of our social life. I cannot deny that many scientifically minded people do not like such a start full of vagueness; they would prefer – as I would prefer too, if I did not regard this wish as a utopian one – to start with exact initial definitions and atomic simple elements. Others who do not like scientific attitudes in comprehensive discussions are against our start because it is scientific and not a metaphysical one. That is as it may be. Finally we find ourselves all together in the same ship and are co-operating even when we think we are fighting one another. (Neurath and Cohen (eds.) 1983, 229)

General Session: The Task of the Unification of Science
Charles Morris: Empiricism of the Unity of Science
Otto Neurath: Aggregation Expressions of Physicalism (Paper to be read in his absence)
Herbert Feigl: Meaning, Meaningfulness, Reference, and Epistemic Reduction

Section A: Language and Personal-Social Orientation
Henry N. Wieman: Language and Democracy
Adolf Meyer: Theoretical and Practical Issues in the Status of Psychology in the Unity of Science
Alfred Korzybski: A Non-Aristotelian System, General Semantics, and the Unity of Science

Section B: Problems in the Unity of Science
Enos B. Witmer: Scientific Theory and a Monistic Conception of the Universe
Edward Haskell: Guye's Neglected Contribution to the Unification of the Physical and the Biological Sciences
Gustav Bergmann: An Empiricist Schema of the Psychophysical Problem

General Session: Logic and Mathematics
Rudolf Carnap: Can Logic be Formalized?
Haskell B. Curry: Mathematics, Syntactics, and Logics
Max Black: Necessary Statements and Conventions

Section A: Historical Topics
Heinrich Gomperz: Methods of Archaic Science
Sidney Rome: Berkeley's Semeiotic and Its Scottish Development
Milton B. Singer: The Development of Logical Syntax from Boole to Carnap

Section B: The Social Sciences
Fritz Schreier: Problems of Prediction in Psychology and Sociology
Oscar Lange: The Foundation of Welfare Economics
Natan C. Leites and *Ithiel Pool*: Analysis of Defeat Symbolism

General Session: Psychology and Scientific Method
Kurt Lewin: Defining the "Field at a Given Time"
Egon Brunswik: Organismic Achievement and Environmental Probability
Clark Hull: The Problem of Intervening Variables and of Intuitional Irrationality in Molar Behavior Theory

General Session: Contributions from European Members (Papers to be read in the absence of the authors)
Friedrich Waismann: Can a Surface Be both Red and Green?
T. H. Pear: The Scientist's Social Status and Its Effect upon the Social Sciences
Stefan Vajda: The Logical Foundation of Actuarial Science
H. G. Schenk: International Law and Empirical Sociology
Martin Strauss: Syntacto-Semantics

General Session: Problems in the Logic of Science
S. S. Stevens: A Classification of Scales of Measurement
Hans Reichenbach: On the Philosophical Situation of Quantum Mechanics
Louis Rougier: Unity of Physical Theories and the New Logics

Section A: Science and Ethics
Ralph Gerard: Science as Support for Ethics
Ray Lepley: The Identity of Fact and Value
Lewis Feuer: Ethical Statements and Ethical Theories

Section B: Fields of Application
Lee Byrne: The Criticism of Educational Theories
Frederick Creedy: The Psychological Analysis of Documents
Hillier Krieghbaum: The Newspaper's Role in Science
Vicente Ferreira da Silva: Integral Positivism and Qualitative Space

General Session: Science and Valuation
Hans Kelsen: Judgments of Value in the Science of Law
Edgar Zilsel: Science and the Humanistic Studies
Charles L. Stevenson: The Nature of Ethical Disagreement

Source: Unity of Science Papers, Vienna Circle Archives, Haarlem (NL).

Chapter 5
Karl Menger's Vienna Circle: The Mathematical Colloquium 1928–1936

Joining the Schlick Circle in 1927, Karl Menger (1902–1985) contributed decisively to the discussion of mathematics and logic in the Vienna Circle, and his own Mathematical Colloquium offered his student and assistant Kurt Gödel a forum from which to present his famous works on logic and mathematics.

Menger was born in Vienna to the renowned political economist Carl Menger, founder of the liberal theory of marginal utility. After World War I he studied mathematics, physics, and epistemology at the University of Vienna, obtaining his doctor's degree in 1924 with the thesis Über die Dimensionalität von Punktmengen (On the Dimensionality of Point Sets).[1] One year later he went to Amsterdam to work as an assistant and *Privatdozent* habilitation thesis on Grundzüge einer Theorie der Kurven (The Fundamentals of a Theory of Curves) with the renowned mathematician L. E. J. Brouwer until 1927. Having returned to Vienna he began to teach at the university, first as *Privatdozent* and, starting in 1928, as associate professor of geometry (as successor to Kurt Reidemeister) until his emigration to the U.S., where he had already held visiting professorships in 1930–31 and 1936 (the last one in Chicago). The final decision to emigrate had been taken during a trip to the U.S. after Austria's Anschluss to Germany.

In the early 1920s Menger had already established a reputation in the area of topology (the theory of curves and dimensions) in connection with set theory, statistics and the theory of functions, and the algebra of geometry. His work on the foundations of mathematics and the economic and ethical investigations were based on a formal-logical methodological orientation. In the inter-war years he wrote or edited approximately 120 publications, of which the books *Dimensionstheorie* (Dimension Theory) (1928) and *Kurventheorie* (Curve Theory) (1932) and the eccentric ethical work *Moral, Wille und Weltgestaltung* (*Morality, Decision and Social Organization* (1974)) (1934) shall be mentioned here.

[1] On Karl Menger's biography and works see the relevant biobibliography in section II. A scientific autobiography published posthumously is Menger 1994. For additional information see Menger 1974 and 1979. On the Vienna period see Einhorn 1985, 178 ff.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_5

The Mathematical Colloquium, which he organized, and the journal *Ergebnisse eines Mathematischen Kolloquiums* (Findings of a Mathematical Colloquium) (1931–37), which he edited, served to document the works of the international logico-mathematical avant-garde of the time. (A second series was published under the title *Reports of a Mathematical Colloquium* in the U.S. between 1937 and 1946.)

The influence of Karl Menger and his students and assistants on the Vienna Circle, from which he sought to keep a critical distance, becomes more evident in his autobiographical writings which—if one accepts his version—offer a number of important corrections of previous accounts, especially concerning the metamathematics and genesis of the "principle of tolerance" promoted by Carnap in his *Logical Syntax* (Menger 1979, Part I; Menger 1980, 1981, 1982, 1994; see also Uebel 2009).

According to his account, Menger was introduced into the Vienna Circle by Hahn in the fall of 1927, after Schlick and Carnap had expressed a keen interest in Menger's works on dimension theory. The intensive, controversial exegesis of the *Tractatus* in 1926–27 incited discussions of the terms "elementary propositions" and "tautologies," the definitions of which failed to satisfy Menger. For him, elementary propositions were of a more pragmatic nature and had to be considered in relation to the observer. In late 1927, however, the *Tractatus* was not explicitly discussed anymore, even though its influence could still be felt, especially through Schlick.

Menger relates that he took the position of a conventionalist skepticism towards any kind of ultimate foundation in the Vienna Circle around 1928–29, but did not meet with a positive response. In the period from 1927 to 1932 he also opposed the dogmatic, anti-metaphysical debate on verificationism and rejected an absolute concept of tautology, for he denied the assumption that all mathematical propositions were tautological—thus undermining the dualism of "analytical" and "synthetic" (long before the relevant works of Quine). It was primarily because of these differences that Menger set up the Mathematical Colloquium (based on the model of the Schlick circle), open to students and guests from abroad and lasting from 1928 until his emigration in 1936.

Menger was also actively involved, together with Hans Hahn, Hans Thirring, and Hermann Mark, in the book series *Krise und Neuaufbau in den exakten Wissenschaften* (Crisis and Reconstruction in the Exact Sciences) (1933), *Alte Probleme—Neue Lösungen in den exakten Wissenschaften* (Old Problems—New Solutions in the Exact Sciences) (1934), and *Neuere Fortschritte in den exakten Wissenschaften* (Recent Progress in the Exact Sciences) (1936), all of which presented the latest developments in mathematics, logic, the natural sciences, and even the social sciences, by printing the lectures of outstanding scientists (cf. Sect. 5.5). They form a counterpart to the two official series *Schriften zur Wissenschaftlichen Weltauffassung* (edited by Philipp Frank and Moritz Schlick) and *Einheitswissenschaft* (edited by Otto Neurath), which has been given little consideration so far.

It was obvious that Menger—just like Schlick, Wittgenstein, and Gödel—was not going to agree with the 1929 manifesto because of his differing views and the manifesto's proclamatory style. Subsequent to the publication of the manifesto, he

no longer regarded himself as a member, but only as "being closely connected to the Vienna Circle" (Menger 1982, 91 f.)

After a visit to Warsaw and meetings with representatives of the Polish school of logic in September 1929, Menger invited Alfred Tarski to come to Vienna and present his views in the Mathematical Colloquium. Tarski held three lectures there in early 1930 and was subsequently also invited to the Vienna Circle (ibid., 93), where he spoke on the fundamental problems of mathematics, calculi, and the three- or many-valued logic of Lukasiewicz. Together with Gödel, Tarski was to have a significant influence on Carnap in particular.

With the concept of the "metalanguage" Tarski introduced a controversial subject into the Vienna Circle: it perturbed the Wittgensteinian wing, while Carnap constructively pursued this line which eventually resulted in his *Die logische Syntax der Sprache* (*The Logical Syntax of Language*) (1934). These contacts with Tarski marked the beginning of a fruitful exchange with Polish logicians and mathematicians that started in 1930 and was to continue—at the five international congresses and in the corresponding publications—until the period of emigration. Tarski's visits to Vienna, incidentally, also had a considerable influence on Karl Popper, which—according to his own accounts—manifested itself in the semantic concept of truth and in the epistemological objectivism of his *The Logic of Scientific Discovery* (cf. Chap. 7).

The intellectual influence of Karl Menger has been underrated in the Vienna Circle's historiography so far. This is all the more surprising as written documentation of all the findings of his logical-mathematical circle exists—unlike the findings of the Vienna Circle. Yet there are various reasons for this underestimation. First, as mentioned above, Menger distanced himself—together with Gödel—from the Vienna Circle after the appearance of the Manifesto in 1929, forming his own forum, analogous to the Circle, to which little attention has been given so far. Second, the findings of his circle were regarded as purely technical mathematical research, and the mutual communication with the Vienna Circle was simply ignored, as was Karl Menger's specific role in the internal and external development of Logical Empiricism in the 1920s and 1930s. Third, those reminiscences of Menger which are available in print are fragmentary and scattered; it is only now that the comprehensive English manuscript of his intellectual autobiography (which is, unfortunately, still incomplete) has made possible a detailed survey of his accounts of the Vienna Circle and of his own role in this context.[2] Fourth, Menger's early emigration from Vienna in 1936–37, and the fact that he did not return to Europe after 1945, provide further reasons for his marginalisation in the philosophical discourse of the German-speaking area. Several autobiographical publications which appeared rather late—at the end of the 1970s—have so far failed to fill this gap.

[2] According to Menger himself, he had planned a monograph entitled *The Vienna Circle and the Austria of its Time*, which failed to be completed, however, because of other projects and health reasons. (Cf. the article "In zwei Wiener Kreisen zugleich" [In two Vienna Circles at the same time], in *Die Presse*, August 8, 1978, 5).

ERGEBNISSE EINES MATHEMATISCHEN KOLLOQUIUMS

UNTER MITWIRKUNG VON

KURT GÖDEL UND GEORG NÖBELING

HERAUSGEGEBEN VON

KARL MENGER
WIEN

HEFT 3

BERICHT ÜBER DAS KOLLOQUIUM 1930/31.
GESAMMELTE MITTEILUNGEN DES JAHRES 1930/31.

IM KOMMISSIONSVERLAG VON
B. G. TEUBNER, LEIPZIG UND BERLIN
1932

Fig. 5.1 Cover page: *Reports of a Mathematical Colloquium*

5.1 The Mathematical Colloquium and Three Lecture Series

Dissatisfied with the Vienna Circle's interpretations of the *Tractatus* and the epistemological positions that he regarded as imprecise, and not least because of the style and wording of the 1929 Manifesto, Menger decided to establish and run a colloquium "where presentations of participants' works and discussions on unsolved problems were to alternate with papers on new publications and lectures delivered by visitors from abroad" (Menger 1931, 1). He further recalled,

> I directed a group of excellent students, soon joint by guests from abroad, which was called the Mathematical Colloquium. I tried to model the Colloquium a little after Schlick's philosophical circle, though in some ways this ideal was of course unattainable. (Menger 1982, 90)

Looking at the participants and topics of this illustrious international circle, we find, on the one hand, a panorama of the logical-mathematical avant-garde, and on the other hand a confirmation of the intellectual interrelations with the Vienna Circle and the liberal circle of the Austrian school of political economy (cf. Sect. 5.5).

A synopsis offers a sense of the theoretical impulse for fundamental mathematical research as well as for the development of logical empiricism that issued from here. Tarski's three lectures in the Mathematical Colloquium on February 19, 20, and 21, 1930, were the first presentations of Polish logic in the West. These lectures—on "Set Theory," "Some Fundamental Concepts of Mathematics," and "Studies in the Calculus of Propositions"—were also attended by members of the Vienna Circle: at the third lecture on Lukasiewicz's three- and many-valued logic, allegedly unknown to the Vienna Circle at the time, and on his bracketless notation—as an alternative to the notation used by Wittgenstein in the *Tractatus* (5.161)—all members were present.[3]

The discussion reflected the skeptical attitude of the Wittgensteinians, especially of Waismann, towards the new notation in logic which had also been introduced by Emil L. Post, independently of Lukasiewicz. The discussion on the second lecture concerning the possibility and necessity of an exact metalanguage was equally polarized (Menger, Carnap, Hahn, and Neurath vs. Waismann and Schlick). Tarski also spoke on the metamathematics of the propositional calculus in the Vienna Circle and initiated a discussion on that subject at another meeting.[4] We can, therefore, wholeheartedly agree with Menger:

> Sooner or later a rapprochement between the schools of Vienna and Warsaw would of course have occurred even without Tarski's visit – but not certainly as early as 1930. (Menger 1982, 94)

The visit of Tarski, who visited Vienna once more in 1935, also played a significant role in the integration of the Polish group into the international Unity of Science movement—and thus for its entrance into Anglo-American philosophy of science (compare the contributions of Polish logicians in *Erkenntnis* since 1930). Carnap, in particular, intensified his contacts by visiting Poland in the spring of 1930 (on the

[3] For detailed information on the three lectures see Menger 1994, 147 ff.

[4] Carnap's diary, loc. cit., February 21 and 27, 1930.

exchange between the two schools cf. Woleński 1989; Woleński and Köhler (Eds.) 1999).

Menger further distanced himself from the Vienna Circle in the course of the latter's protocol sentence debate between two opposing positions: Schlick's "foundation of knowledge" (in the form of "affirmations") and Carnap's and Neurath's fallibilist conception of the empirical basis of science in the form of the physicalist protocol sentences.[5] Advocating a moderate position, Menger finally expressed his criticism of unified science in a remarkable overall assessment:

> For my part I have always taken a pragmatic view on questions of method and disliked all monistic schemes which may a priori limit the objects and/or the methods of research. But there was a point on which we all agreed: that in the 1930s many social scientists used their alleged insights for the justification of value judgements and especially of their (mostly fascist) political views in a logically quite unacceptable way. Early in the century such arguments played a role in the promotion of a fascist mentality in the Universities of Germany and Austria. But when Neurath seemed to me to dream of halting that development by a unity-of-science movement the situation in Central Europe had gone far beyond the point of intellectual arguments. (Menger 1982, 97)

The discussions of Waismann's "theses" on Wittgenstein, postulating the impossibility of talk about language, further irritated Menger so that his visits to the Vienna Circle became increasingly rare.

For Menger, the twilight of democracy and free science had begun with the political changes in Germany and Austria in 1933–34. Most of all, it was the precarious situation of Schlick at the University of Vienna in the era of Austro-Fascism and National Socialism, and then his murder and ensuing defamation in public, which gave the 'sensitive liberal' (as he once characterized himself) the final reason to emigrate to the U.S. Some time before these events, Menger had also unsuccessfully tried to be accepted as a successor to Wirtinger's chair (cf. Chap. 9). His interest in the rational discussion of ethical problems in his booklet *Moral, Wille und Weltgestaltung* (*Morality, Decision and Social Organization*) (1934), following Schlick's *Problems of Ethics*, was directly influenced by the political situation—its subject, however, was of little importance in the Vienna Circle with its prevailing metaethical non-cognitivism.[6]

Amidst the political crisis Menger still managed to initiate three popular series of lectures, dealing with the crisis of science, at the University of Vienna, later published in book form as noted. The first *Crisis and Reconstruction in the Exact Sciences* in 1933 featured contributions by Hermann Mark, Hans Thirring, Hans Hahn, Georg Nöbeling, and Menger himself. His own "The New Logic" offered the first public presentation of Gödel's consistency theorem and of incompleteness as well as remarks on the foundational debate, and concluded with a parable on mathematics strikingly reminiscent of Neurath's boat metaphor (Menger 1933, 120 f.).

[5] On the discussion of the protocol sentence debate see the excellent account presented by Uebel 2007.

[6] See the English reprint with concluding remarks by Menger in Menger 1974. On ethics and moral philosophy in the Vienna Circle see Rutte 1986; Hegselmann 1984; Pauer-Studer 1993; Geier 1994; W. Leinfellner 1993a, b; Stadler 1995; Siegetsleitner 2010, 2014.

The second series, entitled *Old Problems—New Solutions in the Exact Sciences* (1934), was opened by Menger himself with a lecture on the question "Can the Circle Be Squared?" Other speakers included Hans Thirring, Hermann Mark, Werner Heisenberg, Ferdinand Scheminzky, and Hans Hahn, whose lecture on infinity was one of his last before his early and unexpected death. The third series was devoted to *Recent Progress in the Exact Sciences* (1936), with contributions from the biologist Ernst Späth as well as from Thirring, Mark, Heisenberg, and Menger ("Some Advances in the Exact Treatment of Sociological Problems"), whose paper is remarkable insofar as it digresses from the usual natural-scientific paradigm of Logical Empiricism in the application of exact methods to political economy and sociology.

These lectures successfully realized, in a somewhat different way, the objectives pursued until February 1934 by the Ernst Mach Society as an "Association for the Promotion of Natural-Scientific Knowledge," i.e., the popularization of knowledge and science and the accessible presentation of the latest findings of international research without undue simplification. It is no exaggeration, therefore, to maintain that Karl Menger's activities in adult education were similar to those of the Ernst Mach Society both in their intentions and their success—and that Menger's achievement has yet to receive the recognition it deserves.

5.2 The Principle of Logical Tolerance—The Relativization of the Dichotomy of Analytic and Synthetic Propositions

In his *Logical Syntax*, Carnap postulated the principle of tolerance on the definite linguistic form: "We do not want to lay down prohibitions, but to establish determinations" (Carnap 1937, 44 f.), and Carnap emphatically continues,

> In logic there are no morals. Everyone is at liberty to build up his own logic, i.e., his own form of language, as he wishes. All that is required of him is that, if he wishes to discuss it, he must state his methods clearly, and give syntactical rules instead of philosophical arguments. (Carnap 1937, 52)

In the following commentary Carnap explicitly refers to the roots of this conception:

> In the conflict over the logical foundations of mathematics, this attitude was represented with especial emphasis (and apparently before anyone else) by Menger ([Intuitionism], 324 f.). Menger points out that the concept of constructivity, which Intuitionism absolutizes, can be interpreted both in a much narrower and in a much wider sense. The importance for the clarification of the pseudo-problems of philosophy of applying the attitude of tolerance to the form of a language as a whole will become clear later. (ibid.)

So much for the central passages of Carnap's official introduction of the principle of tolerance (directed against Brouwer, Kaufmann, Schlick, and Wittgenstein) concerning logics *and* languages. Menger had expressed his critique of Brouwer's intuitionism in the Schlick circle some time earlier (January 30, 1930); he also

related that he postulated the tolerance principle of logics and languages as early as the late 1920s (around 1927):

> I presented the intuitionistic-formalistic dictionary of set theory that I had devised as well as what just at that time had begun to take a firmer shape in my mind – the epistemological consequences of my critique of intuitionism: the plurality of logics and languages entailing some kind of logical conventionalism. (Menger 1979, 88)

According to Menger, however, these epistemological implications did not receive much attention in the Vienna Circle, as a philosophy of the ideal language was still dominant at the time. Rejecting this attitude he advocated—together with Kurt Gödel—the principle of tolerance against Schlick, Kaufmann, and Waismann; Carnap and Hahn remained skeptical, Neurath showed little interest, and Kraft was rather reserved. In 1927 Menger formulated his position as follows:

> 1) 'for each of the various versions of constructivity one could develop a corresponding deductive mathematics,' especially systems more restricted than intuitionistic mathematics … 2) 'the insistence on a particular idea of constructivity, the designation of the corresponding developments as meaningful and the rejection of transcending results as meaningless have not the least cognitive content,' and are to be relegated 'from logic and mathematics to the biography of the proponent'; 3) what matters in mathematics and logic is exclusively the question as to the propositions into which certain other propositions can be transformed according to certain rules – I spoke of an implicationistic point of view – while the justification (Begründung) of propositions or rules of transformation by appeals to intuition 'are nothing but empty words.' (Menger 1979, 11)

This was the first version of Menger's so-called principle of tolerance, to which he added two further assertions in his essay "The New Logic" (1932):

> 4) the entire activity of the mathematician consists in transforming propositions into other propositions by means of rules of transformation … 5) this simple statement of fact is all that mathematics and logic can say about the activity, which is neither in need nor capable of receiving a foundation (eine 'Begründung'). (Menger 1979, 12)

Since Carnap unequivocally confirmed Menger's claim of authorship of the tolerance principle, Menger's criticism of Carnap (and his "Intellectual Autobiography" of 1963) appears to be unfounded. There is, however, some evidence to suggest that this topic was discussed—just like the problems of metalanguage and the dichotomy of analytic and synthetic and of logicism as a response in the foundational debate—before Menger's participation in the Circle.[7] Given the fragmentary sources, however, it seems to be impossible to establish the exact dates of the relevant discussions before 1930. In his incomplete diaries Carnap gave January 30, 1930, as the date of Menger's first explicit paper.

What we do know is that subjects which were bound to bring controversy were discussed at several Vienna Circle meetings—questions concerning the foundations of mathematics, for example, or the nature of language (Carnap, Waismann) or axiomatics (Carnap). In mid-1931, for instance, three consecutive meetings were devoted to Carnap's metalogic (cf. Sect. 4.1.1). Furthermore, Menger was correct in

[7] Cf. the corresponding passages in Carnap's diary, loc. cit., in the protocols (Sects. 4.1.1.2, 4.1.1.3 and 4.1.1.4) and the Manifesto *Scientific World Conception*.

stating that his critique of Russell's logicism and the rejection of the strict assertion that all mathematical propositions were tautological did not represent the mainstream of opinion in the Circle around 1930. However, there were already detectable traces of the more pragmatic concept of demarcation advocated by Menger in place of the absolute principle of verification as a criterion for meaningfulness.

What is striking about this situation is that Menger and Philipp Frank were hardly aware of the other's early writings, even though Frank's conventionalism largely corresponded to Menger's positions (Frank 1949a).

5.3 Wittgenstein, Brouwer, and the Vienna Circle

Menger spent two years (1925–26) in Amsterdam with L. E. J. Brouwer, the founder of intuitionism, first as his student and then as his assistant. In late 1926 the conflicts between them, which had arisen as a consequence of Menger's anti-intuitionistic dimension theory, grew so intense that Menger decided to return to Vienna to take over Kurt Reidemeister's chair of geometry in the following year.

In March 1928 the physicist Felix Ehrenhaft invited Brouwer to give two lectures in Vienna ("Mathematics, Science and Language" and "The Structure of the Continuum"); Menger encouraged Waismann to ask Wittgenstein to attend these meetings, and—as is well-known—Wittgenstein accepted the invitation. According to Feigl, who went to a café with Wittgenstein after these lectures, these meetings basically marked Wittgenstein's return to philosophy. In Menger's opinion it was primarily Brouwer's remarks on numbers defined in relation to unsolved problems that were responsible for Wittgenstein's renewed interest in philosophy. The latter's findings, however, were hardly relevant for mathematicians in Menger's view, who was altogether disappointed by Wittgenstein's ignorance concerning special mathematics and logic (also concerning the works of Gödel, for example).

Wittgenstein, in any case, liked Brouwer's observations on the methodology of mathematics and the primordial intuition in all mathematics, and his criticism of the dominance of logic in mathematics and of Hilbert's formalism—a response which was also noticed by Russell (in a letter to Moore). Wittgenstein's observations on real numbers were clearly inspired by Brouwer, as Menger described in some detail. His assessment of the effect of Brouwer's lectures on the Vienna Circle, however, was quite different:

> Of course, all members of the Circle who were in Vienna at the time attended Brouwer's lectures. But his attacks on the law of the excluded middle and the consequences for mathematics of its rejection had been discussed in the Circle on several earlier occasions, his obscure remarks on primordial phenomena and primordial mathematical intuition were not taken seriously by any member of the Circle, including myself, while his voluntaristic views on communication aroused less interest in the others than they seemed to me to deserve. (Menger 1994, 138 f.)

This description accords with Menger's overall criticism of early and middle Wittgenstein: his *Reminiscences*, for example, contains an extensive discussion of

the philosophy of the *Tractatus*, particularly of the truth tables, the concept of tautology, and the (in Menger's view) utterly unsatisfactory propositional calculus (with its undefined and unclear basic concepts)—not to mention the "mysticism of silence," another frequent target of criticism. Furthermore, Menger also arrives at a scathing judgment of Wittgenstein's *Wörterbuch für Volksschulen* (Dictionary for Elementary Schools) (1926)[8]:

> Criticism of this dictionary cannot help being pedantic; but for all their pettiness, the preceding remarks seem to make it hard to escape the inference that, while the booklet was of some limited practical usefulness in the region for which it was destined, it was not the work of a systematic mind. (Menger 1994, 88)

The accusation that the author of the *Tractatus* was not a systematic mind is not uncommon, however; Menger's criticism is both general and, in particular, directed against Wittgenstein's terminology in relation to ontology (Menger 1994, chapter VIII):

> Ludwig Wittgenstein had enough first-rate ideas to influence a variety of thinkers; he expresses some ideas vaguely enough to keep hosts of interpreters busy; he changed them often enough to provide work for some score of biographers and historians; and he shrouded them (and himself) in enough mystery to originate a cult. (ibid., 89)

What mattered to Menger, among other things, is a new approach to tautologies, one that is independent of the matrix of truth tables and follows the logician Emil L. Post, who introduced tautologies and contradictions through positive and negative functions within Frege's propositional calculus.

There is not enough space here for an in-depth analysis of Menger's critique of the *Tractatus*. It may be described, in short, as a detailed investigation carried out by the analytic mind of a formal logician. Leaving aside the "metaphysical part" of the *Tractatus*, it ranges from discussions of defined and undefined terms, of postulates and theorems from Euclid via Spinoza and Frege to Hilbert's axiomatic method, and leads to a reconstruction of the corresponding ontology (1.–2.225), ending with the laconic remark: "The world is the set of certain compounds of things; the latter, being the substance of the world, exist independently of the world…" (ibid., 126). This corresponds to Menger's previously published critique of Wittgenstein (Menger 1980, 21–25), where he advocated the use of everyday language, described the mathematical language as incomplete, and, therefore, suggested a "method of formal interpretation" for the *Tractatus*.

Despite his distance from Wittgenstein, however, it appears that Menger's suggestion to invite him to Brouwer's lecture may have initiated the communication between Wittgenstein and the Vienna Circle, which has already been discussed, as well as inspired Wittgenstein's further philosophical works in England.

[8] A reprint of Wittgenstein's *Dictionary* Wittgenstein 1977a. On Wittgenstein as a teacher in elementary school see Wünsche 1985.

5.4 Karl Menger and Kurt Gödel—The Genius as Seen by His Mentor

One of Karl Menger's first lectures in the winter term of 1927–28, which dealt with the dimension theory, was attended by a thin young student whom Menger was to see again as a quiet participant in the Vienna Circle: Kurt Gödel. Menger's lecture on foundational questions of mathematics[9]—which, in Menger's view, marked the birth of the tolerance principle, as described above—was met with a positive reaction by Gödel, while most of the other participants rejected it. Invited by Menger, Gödel became a regular participant in the Mathematical Colloquium in late 1929, taking an active role both in discussions and in writing reports. It was also through Menger that in early 1930 Gödel came into contact with Tarski, whom he told about his dissertation on the completeness of first-order logic.

In September 1930 the Second Conference on the Epistemology of the Exact Sciences, organized by Kurt Reidemeister, took place in Königsberg (now Kaliningrad); Carnap, Heyting, and John von Neumann spoke on the foundational debate in mathematics (between logicism, intuitionism, and formalism) (*Erkenntnis* 1931, 2:91–190). It was in a discussion at this meeting that Gödel first mentioned his groundbreaking study (ibid., 147–51; cited from Gödel 1986, 200), which ends with the words: "For of no formal system can one affirm with certainty that all contentual considerations are representable within it." And in an annex he briefly summarized his famous treatise "On Formally Undecidable Theorems of the *Principia Mathematica* and Related Systems":

> For all formal systems for which the existence of undecidable arithmetical propositions was asserted above, the assertion of the consistency of the system in question itself belongs to the propositions undecidable in that system. (Gödel 1986, 205)

John von Neumann seems to have been the first to have grasped the relevance of these observations, which were to destroy the formalistic program of Hilbert.[10]

It had been Brouwer's intuitionism and Carnap's axiomatics and metalogic that had initially inspired Gödel. Talks with Tarski and Gödel (June 10, 1931), however, led Carnap to his metalogic and the formulation of what was eventually to become the principle of tolerance. Menger was then in the U.S. for the first time and had Nöbeling report to him about the scientific revolution that was taking place in Vienna, for example about Gödel's lecture "Über Vollständigkeit und Widerspruchsfreiheit" (On Completeness and Consistency) in the Mathematical Colloquium (January 21, 1931; published in *Ergebnisse* 1931–32, 3; English translation "On completeness and consistency" in: Gödel 1986, 235–237). Menger in turn spoke about Gödel's revolutionary works to American mathematicians at the Rice Institute, and after his return to Vienna he was probably the first to present

[9] Cf. Sect. 4.1.1.2.

[10] For a detailed account of its effects see Köhler 1991.

Gödel's extensive investigations to a larger audience under the heading "The New Logic" and to put them into the context of mathematical history (Menger 1933):

> I welcomed the opportunity to present the old logic from a more modern point of view and at the same time to present Gödel's great discovery not only in terms of its intrinsic significance, but also in historical perspective. (Menger 1994, 204)

Even though it does not seem to be entirely correct that, as Menger claims, Gödel's works were still unknown even to specialists as late as 1932 (just think of John von Neumann or Carnap; Wittgenstein, on the other hand, never took any notice of Gödel's logical revolution), Menger deserves the credit for the first presentation of Gödel's findings to a larger public in an easily comprehensible form. Gödel himself spoke about his theorem of incompleteness in the Vienna Circle on January 15, 1931.[11]

Well-acquainted with the philosophical discourse in the Vienna Circle, intellectually socialized in the Mathematical Colloquium, and supported by Menger who made his works known both in the U.S. and in his own country, Gödel subsequently established an international reputation as the most important logician of his time, even though he suffered from severe and recurring psychological illnesses. It was again Menger who introduced him to Oswald Veblen from the Institute for Advanced Studies at Princeton, thus laying the foundations for Gödel's temporary (1933–34) and then permanent (after 1939) emigration to the U.S.[12]

In retrospect the Mathematical Colloquium and its publications do indeed appear to form a second, parallel Vienna Circle, and the three lecture series initiated by Karl Menger still present an interesting, critical overview of open scientific research, albeit intended for a more specific audience than that of the Ernst Mach Society.

Menger's book on the Vienna Circle and its time (Menger 1994) is the detailed, highly informative work of a consistently liberal Austrian intellectual who lost his cultural home in Austria in the mid-1930s. It is all the more regrettable that Menger did not find the strength and time in his last years to complete his planned comprehensive monograph *The Vienna Circle and the Austria of Its Time*. But even the fragmentary, partially new autobiographical material that exists offers pointed accounts to add to the historiography of the Vienna Circle, which probably (and fortunately) will hardly ever take the form of a single, completed universal history, but remain a complex of individual histories—corresponding to the spirit of the tolerance principle.

5.5 The *Mathematical Colloquium* and Three Lecture Series—A Survey of Scientific Communication

Before the start of regular meetings of the *Colloquium* in 1928–29

Karl Menger: A Theorem of Topology
Hans Hornich: On the Complete Independence of Menger's Dimensional Axioms

[11] Cf. Sect. 4.1.1.3.

[12] Menger 1994, loc. cit.

Karl Menger: Notes on Dimension Theory
Helene Reschovsky: On Rational Curves
Georg Nöbeling: On the Continuous Mapping of Regular Curves
William Leake Ayres (Philadelphia): On Generalizations of Jordan's Continuums
William Leake Ayres: On Closed Curves in Peano's Spaces
William Leake Ayres: On the Density of Intersection Points and End Points
Karl Menger: A General Separation Theorem
Hans Hornich: On Bigrade Connection
Karl Menger: Metrical Studies
M. M. Biedermann (Amsterdam): On a Metrical Characterization of the Simplex
Karl Menger: On the Axiomatics of Finite Sets and Elementary-Geometrical Composition Relations
Gustav Bergmann: On the Axiomatics of Elementary Geometry
Karl Menger: An Intuitionist-Formalistic Diary
N. N.: On Surfaces Without Singularities Bounded by Knots

1929–30

1st colloquium, 24-10-1929:
Karl Menger: A Remark on Dimension Theory by Otto Schreier. Discussion with Nöbeling.
2nd colloquium, 06-11-1929:
Discussion of Menger and Nöbeling on the Universal curve.
3rd colloquium, 20-11-1929:
Karl Menger: On a Weakly Irrational Curve by Mazurkiewicz
Discussion with Nöbeling
4th colloquium, 27-11-1929:
Gustav Beer: On Compactificability
Discussion with G. T. Whyburn and G. Nöbeling
Karl Menger: On the Axiomatics of Dimension
5th colloquium, 08-01-1930:
Hans Hornich: On Connection Properties
Karl Menger: Remarks on the Product Theorem and Dimensional Space Structure
6th colloquium, 15-01-1930:
Karl Menger: An Outline of a New Theory of Measure
7th colloquium, 18-01-1930:
John von Neumann (Berlin): On Measure Theory
Discussion with Nöbeling
8th colloquium, 20-01-1930:
Gustav Beer: A Report on the Theory of Fréchet's Topological Ranks
Discussion with Whyburn
9th colloquium, 05-02-1930:
G. T. Whyburn (Baltimore): On Curves
Karl Menger: On a New Definition of Arc Length

10th colloquium, 19-02-1930:
Alfred Tarski (Warsaw): On New Results and Unsolved Problems of Cardinal Arithmetic
11th colloquium, 20-02-1930:
Alfred Tarski: On Some Fundamental Concepts of Metamathematics
12th colloquium, 21-02-1930:
Alfred Tarski: Studies on the Propositional Calculus
13th colloquium, 14-03-1930:
Knaster (Warsaw): On One-Dimensional Non-Comparable Continuums
Discussion with Menger
14th colloquium, 07-05-1930:
Karl Menger: Remarks of Mazurkiewicz and Tarski on the Axiomatics of the Concept of Dimension
Karl Menger: On Set Systems
Discussion with Nöbeling
15 colloquium, 14-05-1930:
Kurt Gödel: On the Completeness of the Axioms of the Predicate Calculus
16th colloquium, 28-05-1930:
Abraham Wald: On the Axiomatics of the Metrical Notion of Between
Discussion with Olga Taussky and Menger
Priebsch: A Multidimensional Notion of Between
17th colloquium, 17-06-1930:
Grell (Jena): A Proof of Dedekind's Fundamental Theorem
18th colloquium, 18-06-1930:
Grell: A General Ramification Theory of Commutative and Non-Commutative Hypercomplex Systems
19th colloquium, 25-06-1930:
Grell: General Ideal Theory
20th colloquium, 02-07-1930:
Georg Nöbeling: A Fixed-Point Property of Tree-Like Curves
Georg Nöbeling: A Regular Curve Which Topologically Contains Each Curve of Bounded Order
Karl Menger: Problems of General Metrical Geometry

Collected Bulletins of 1929–30

Karl Menger: A Report on Set-Theoretical Covering Theorems
Kurt Gödel: A Special Case of the Decision Problem of Theoretical Logic
Georg Nöbeling: A Refinement of the *n*-Arc Theorem
Georg Nöbeling: The General Embedding Theorem
Karl Menger: On Planar Triple Graphs and the Powers of Non-Planar Graphs
G. T. Whyburn: A Theorem on Continuums of the Plane Which Are Significantly Connected Locally
G. T. Whyburn: On Potentially Regular Point Sets
G. T. Whyburn: On Completely Dissectable Connected Sets

Karl Vanek: On Dissection Properties of Locally Connected Curves
Karl Menger: An Introduction of the Complex into General Metrics and Metrical Studies in Abstract Groups
Olga Taussky: On the Metrics of Groups

1930–31 (Direction: Georg Nöbeling)

21st colloquium, 05-11-1930:
Georg Nöbeling: On Menger's Concept of Measure
22nd colloquium, 19-11-1930:
Georg Nöbeling: Dimension and Menger's Measure
Discussion with Beer
O. Haupt (Erlangen, on the basis of a letter) and *F. Alt*: On the Concept of Curvature
F. Alt: On the Theory of Curvature
23rd colloquium, 03-12-1930:
Abraham Wald: On the General Concept of Space
Georg Nöbeling: The Refutation of the Product Theorem of Dimension Theory by Pomtryagin
Georg Nöbeling: On the Axiomatics of Dimension
24th colloquium, 22-01-1931:
Kurt Gödel: On Completeness and Consistency
25th colloquium, 04-03-1931:
Olga Taussky: On the Similar Mapping of Groups
Georg Nöbeling: On the Embedding Theorem for Curves
26th colloquium, 18-02-1931:
Georg Nöbeling: A Dimension-Theoretical Theorem of Isotopy
28th colloquium, 11-03-1931:
Georg Nöbeling: A Refinement of Menger's Embedding Theorem
29th colloquium, 20-05-1931:
Contribution for discussion by Beer
30th colloquium, 10-06-1931:
Georg Nöbeling: On Curves with Points of the Order n or 2n-2
31st colloquium, 24-06-1931:
Gustav Beer: Two Curves, All Points of Which Possess the Orders 3 and 6, or 3 and 8
Gustav Beer: A Problem on Regular Curves
Kurt Gödel: A Property of the Realizations of the Propositional Calculus

Collected Bulletins of 1931–32

Karl Menger: An Elementary Remark on the Structure of Logical Formulas
Abraham Wald: On Hilbert's Axiomatic System of Geometry
Georg Nöbeling: Hausdorff's and Set-Theoretical Dimensions
Georg Nöbeling: On Vertices of Closed Sets of the Plane

1931–32

32nd colloquium, 27-10-1931:
Karl Menger: On the Local Dimension of Set Sums
Olga Taussky: On the Axiomatics of Groups
33rd colloquium, 07-11-1931:
F. Alt: On the Theory of Curvature
Discussion with Gödel
34th colloquium, 13-11-1931:
Mimura (Tokyo): On the Continuity of the Area of Convex Closed Surfaces
W. T. Parry (Cambridge, MA): An Axiomatic System for a New Way of Implication (Analytical Implication)
Discussion with Gödel, Menger, Wald
35th colloquium, 19-11-1931:
Karl Menger: An NZ Curve
36th colloquium, 26-11-1931:
G. C. Evans (Houston): On Dimensional Axiomatics (presented by Menger on the basis of a letter by Evans)
Menger: On a Limit Class
37th colloquium, 02-12-1931:
Kurt Gödel: On Proofs of Independence in the Propositional Calculus
Laura Klansfer: On *d*-Cyclical (i.e., Congruent with Points of a Convexly Metrized Circle with a Perimeter *d*) Quadruples
38th colloquium, 16-12-1931:
Contribution for discussion by Georg Nöbeling
Norbert Wiener (Cambridge, MA): Remarks on Capacity
39th colloquium, 14-01-1932:
Discussion on the ramification index of surface points with *Karl Menger*, *Zarankiewicz* (Warsaw)
40th colloquium, 21-01-1932:
Discussion of *Karl Menger* and *Georg Nöbeling* on curve theory
41st colloquium, 04-02-1932:
Discussion on complex-metrical quadruples
Karl Menger: Remarks on Convex Plane Curves
Schreiber: On the Axiomatics of Composition Relations
42nd colloquium, 18-02-1932:
Perry: On Lewis's Propositional Calculus
Kurt Gödel: On the Metrical Embeddability of the Quadruple of R_3 in Spherical Surfaces
Kurt Gödel: On Wald's Axiomatics of the Notion of Between
43rd colloquium, 25-02-1932:
Georg Nöbeling: A Deformation Theorem
Georg Nöbeling: A Proof of Menger's Theorem II^3_1
44th colloquium, 02-03-1932:
Mimura: On Arc Length
Karl Menger: On the Set-Theoretical Treatment of the Notion of the Tangent and Related Notions

45th colloquium, 20-04-1932:
Abraham Wald: On the Axiomatics of the Notion of Between
46th colloquium, 28-04-1932:
Haupt (Erlangen): On Real Curves
47th colloquium, 04-05-1932:
Georg Nöbeling: The Projections of a Compact, *n*-Dimensional Set in R_k
48th colloquium, 08-05-1932:
Abraham Wald: On the Volume Determinant
49th colloquium, 11-05-1932:
Borsuk (Warsaw): On Boundary Points and Interior Points of Compact Metrical Spaces
Abraham Wald: On the Volume of Euclidean Simplexes
50th colloquium, 15-05-1932:
Contribution to the discussion by *Karl Menger* on notions of congruence order
51st colloquium, 25-05-1932:
On the Axiomatics of Elementary-Geometrical Composition Relations
Discussion of *Schreiber* and *Gödel*
52nd colloquium, 28-06-1932:
Kurt Gödel: On Intuitionist Arithmetic and Number Theory
Discussion on the axiomatics of elementary geometry between *Karl Menger*, *Abraham Wald*, and *Oswald Veblen* (Princeton)

Collected Bulletins of 1932–33

Kurt Gödel: An Interpretation of the Intuitionist Propositional Calculus
Kurt Gödel: On the Intuitionist Propositional Calculus
Karl Menger: A Covering Theorem for F_0
Karl Menger: A New Characterization of the Line
Laura Klanfer: A Metrical Characterization of the Sphere

1932–33

53rd colloquium, 10-11-1932:
Kurt Gödel: Remarks on Projective Mappings
A. Flores (Madrid): Contribution to the discussion
Karl Menger: On the Foundation of a Theory of Arc Length in Groups
54th colloquium, 17-11-1932:
Discussion on Menger's contributions
A. Flores: The Product of a Plane and an Arbitrary One-dimensional Complex Can Be Embedded in R_4
55th colloquium, 24-11-1932:
Contribution to the discussion by *Georg Nöbeling*
56th colloquium, 08-12-1932:
Abraham Wald: Semi-Metric Spaces and Convexifiability
57th colloquium, 26-01-1933:
A Remarkable Curve of Knaster and Mazurkievicz (presented by *Menger* on the basis of oral information)

58th colloquium, 11-02-1933:
Karl Menger: An Observation on the Powers of Weakly One-dimensional Sets
59th colloquium, 22-02-1933:
Flexer: The K_2 Does Not Have the Quasi-Congruence Order 4
Abraham Wald: A Simplified Proof of the Steinitz Theorem on Vector Series in R_n
60th colloquium, 08-03-1933:
Abraham Wald: Conditionally Convergent Vector Series in R
Abraham Wald: Series in Topological Groups
Karl Menger: Purely Imaginary Spaces, Indefinite Metrics and Related Problems
61st colloquium, 15-03-1933:
Discussion of *Alt* and *Wald*
62nd colloquium, 10-05-1933:
A. Flores: On the Existence of n-Complexes Which Cannot Be Topologically Embedded into R_{2n}
63rd colloquium, 17-05-1933:
E. Cech (Brno): On a Theorem by Ayres Concerning Curve Theory (on the basis of a letter)
Kurt Gödel, *Karl Menger*, *Abraham Wald*: Discussion on coordinate-free differential geometry
64th colloquium, 26-05-1933:
Borsuk (Warsaw): On the Topological Characterization of Euclidean Spheres
65th colloquium, 01-06-1933:
Karl Menger: A New Constitution of Vector Algebra
Abraham Wald: A Coordinate-Free Definition of Surface Curvature
66th colloquium, 21-06-1933:
Abraham Wald: The $R_{n.s}$
67th colloquium, 04-07-1933:
E. Cech: A Generalization of the Jordan-Brouwer Theorem
68th colloquium, 05-07-1933:
E. Cech: A Definition of Local Betti Numbers

Collected Bulletins of 1932–33

Abraham Wald: Complex and Indefinite Spaces

1933–34

69th colloquium, 17-11-1933:
Karl Menger: An Observation on Length Sets
70th colloquium, 24-11-1933:
A. Flores: On the Continuous Mapping in Itself of S_n
71st colloquium, 08-12-1933:
A. Flores: On n-Complexes Which Are Absolutely Interlaced in Themselves in R_{2n+1}
F. Alt and *G. Beer*: The n-Lattice Theorem in Arcs
72nd colloquium, 1901–1934:
Abraham Wald: On Quasi-Congruence Order

73rd colloquium, 10-11-1934:
R. G. Putnam (New York): On End Points of Higher Genus
74th colloquium, 19-03-1934:
Karl Schlesinger (Vienna): On the Production Equations of the Economic Theory of Value
Abraham Wald: On the Unique Positive Solvability of the New Product Equations
Discussion with *Schams* and *Menger*
75th colloquium, 27-04-1934:
Olga Taussky: Abstract Fields and Metric: I. Remark: Finite Sets and Field Powers
76th colloquium, 15-05-1934:
M. Morse (Cambridge, MA): A Report on the Theory of Critical Points and Its Application to the Calculus of Variation Globally
77th colloquium, 30-05-1934:
Karl Menger: A Theorem on Finite Sets with Applications on Formal Ethics
R. G. Putnam: On Continua of Convergence of Higher Genus
78th colloquium, 19-06-1934:
Karl Menger: Bernoulli's Theory of Value and the St. Petersburg Game
79th colloquium, 27-06-1934:
Abraham Wald: On the Differential Geometry of Surfaces: I. Remark: A New Definition of Surface Curvature
(*Karl Menger*: Obituary to Hans Hahn)
N. Aronszajn (Paris): A New Proof of the Segment Connectedness of Completely Convex Spaces
Georg Nöbeling: On the Topology of Manifolds

Colloquium Affairs and Information

Kurt Gödel went to Princeton upon the invitation of the Institute of Advanced Study. *Georg Nöbeling* accepted a teaching assignment at the University of Erlangen (Germany). Foreign guests: Prof. *R. G. Putnam* (New York University), Prof. *K. Midutani* (Kobe, Japan), Prof. *H. Terasaka* (University of Osaka, Japan), Prof. *T. Hirano* (Tokyo), and *A. Flores* (Madrid).

1934–35

80th colloquium, 06-11-1934:
Abraham Wald: On the Product Equations of the Economic Theory of Value (2nd report)
L. M. Blumenthal (National Research Fellow): A Short Proof of Menger's Theorem for a Pseudo-Euclidean (n + 3) Tuple
81st colloquium, 30-11-1934:
T. Hirano: Contradictory Logic
Leonard M. Blumenthal: Remarks Concerning the Euclidean Four-Point-Property
82nd colloquium, 12-12-1934:
A. Ville: Sur une proposition des M. L. M. Blumenthal (On a Proposition by M. L. M. Blumenthal)

83rd colloquium, 18-01-1935:
Karl Menger: The Algebra of Geometry (On the Axiomatics of Projective Composition Relations)
84th colloquium, 06-02-1935:
Karl Popper: On Sequences Free From After-Effects
Abraham Wald: On the Notion of the Collective
85th colloquium, 20-02-1935:
Abraham Wald on collectives
86th colloquium, 01-03-1935:
Abraham Wald: A Games System for Pre-Effective Conditions
F. Alt: The Axiomatics of Affine Composition Relations
87th colloquium, 13-03-1935:
G. v. Alexits (Budapest, on the basis of a letter): On Locally Connected Continuums
89th colloquium, 21-05-1935:
Karl Menger: On -Metrics and -Arc-Length
J. Groiß: A Metrical Quadruple Which is Exactly Embeddable in Two Spheres
90th colloquium, 05-06-1935:
Friedrich Waismann: Remarks on Frege's and Russell's Number Definition
Discussion with *Kurt Gödel*, *Karl Menger*, and *Alfred Tarski*
91st colloquium, 12-06-1935:
A. Lindenbaum and *Alfred Tarski* (Warsaw): On the Limited Means of Expression of Deductive Theories
92nd colloquium, 19-06-1935:
Kurt Gödel: On the Length of Proofs
93rd colloquium, 25-06-1935:
Abraham Wald: The Foundation of a Coordinate-Free Differential Geometry of Surfaces
94th colloquium, 26-06-1935:
J. Novák (Brno): On the Multiple Accessibility of a Non-Decomposable Continuum
E. Cech (Brno): On Betti Groups of Compact Spaces
G. v. Alexits (Budapest): The Metrical Treatment of Torsion of Space Curves
95th colloquium, 27-06-1935:
Karl Menger: Programmatic Remarks on the Application of Metrical Geometry on the Calculus of Variation
96th colloquium, 03-07-1935:
Alfred Tarski: On the Extensions of the Incomplete Systems of the Propositional Calculus

Bulletins of 1934–35

G. T. Whyburn (University of Virginia, USA): Concerning Rationality Bases for Curves
Olga Taussky: On Topological Algebra

Colloquium Affairs

Colloquium participants with foreign scholarships: *A. Ville* (Paris), Dr. *L. M. Blumenthal* (National Research Fellow), *A. Flores* (Madrid), Prof. *T. Hirano* (Tokyo), from January 1935 Prof. *Alfred Tarski* (Warsaw), for shorter periods Dr. *Ludovico Geymonat* (Torino), Dr. *Lutmann* (Lviv).

1935–36

Karl Menger: The Metrical Method in the Calculus of Variation (Treatise)

F. Alt: Triangular Inequalities and Standard Bodies in Generalized Minkowski Spaces

F. Alt: A Segment Image for which Does Not Exist, Although Is Bounded, Continuous and Quasi-Regular

Abraham Wald: A Segment Image for which Does Not Exist, Although Exists for Each Initial Segment

J. Novák: A Remark on Linear Measure and Rectifiability

Abraham Wald: –Length in the Hilbert Space

Anton E. Mayer: On the Greatest Diameter of Covectorial Polygons in *Rk*

Abraham Wald: On the Consistency of the Notion of the Collective of the Probability Calculus

Abraham Wald: A Proof of the Solvability of the Economic Exchange Equations

John von Neumann (Princeton, NJ): On an Economic System of Equations and a Generalization of Brouwer's Fixed-Point Theorem

Chr. Pauc (Paris): Structure d'un continu plan au voisinage d'un point où il admet une courbure de Alt ou de Menger. Derivée seconde generalisée à la courbure de Alt (published in: *C. R.*, Parisk, t. 203, 1936)

Chr. Pauc (Paris): Structure d'un continu metrique au voisinage d'un point où il admet une courbure de Alt ou de Menger (published in *Rendiconti della R. Accademia nazionale dei Lincei*, vol. XXIV, serie 6^2, 2 sem., fasc. 5–6, 1936)

Chr. Pauc (Paris): Introductions de directions dans un espace distancie. Analyse du contingent et du partingent de Bouligand du point de vue topologique (published in *C. R.*, Paris, t. 203, 1936; *Bull de la classe des Sc. de l'Ac. r. de Belgique*, XXII, 1936)

Colloquium Affairs

Foreign guests in the academic year 1935–36: Dr. *J. Novák* (Brno), Mr. and Mrs. *Pauc* (Paris), Dr. *v. Schwarz* (Munich).

Source: *Ergebnisse eines Mathematischen Kolloquiums*. Published by Karl Menger in collaboration with Kurt Gödel, Georg Nöbeling, and Abraham Wald, Issues 1–8, Leipzig-Berlin: B. G. Teubner, 1931 to 1937. A reprint (Vienna-New York: Springer 1998), with a foreword edited by Karl Sigmund and Egbert Dierker.

Three Lecture Series Organized by Karl Menger and Their Publications 1933–1936

Krise und Neuaufbau in den exakten Wissenschaften. Fünf Wiener Vorträge. (On the Crisis and Restructuring of the Exact Sciences. Five Vienna Lectures.), Leipzig-Vienna, Deuticke 1933.

Hermann Mark, "Die Erschütterung der klassischen Physik durch das Experiment" (The Unsettlement of Classical Physics through Experiments), 1–14.

Hans Thirring, "Die Wandlung des Begriffssystems der Physik" (Changes in the Conceptual System of Physics), 15–40.

Hans Hahn, "Die Krise der Anschauung" (The Crisis of Intuition), 41–64.

Georg Nöbeling, "Die vierte Dimension und der krumme Raum" (The Fourth Dimension and Curved Space), 65–92.

Karl Menger, "Die neue Logik" (The New Logic), 93–122.

Alte Probleme – Neue Lösungen in den exakten Wissenschaften. Fünf Wiener Vorträge. Zweiter Zyklus. (Old Problems – New Solutions in the Exact Sciences. Five Vienna Lectures. Second Series.), Leipzig-Vienna, Deuticke 1934.

Karl Menger, "Ist die Quadratur des Kreises lösbar?" (Can the Circle be Squared?), 1–28.

Hans Thirring, "Kann man in den Weltraum fliegen?" (Is It Possible to Fly into Space?), 29–55.

Hermann Mark, "Kann man Elemente verwandeln und komplizierte Naturstoffe herstellen?" (Is It Possible to Transform Elements and Produce Complicated Natural Substances?), 56–58

Ferdinand Scheminzky, "Kann Leben künstlich erzeugt werden?" (Is It Possible to Produce Life Artificially?), 69–92.

Hans Hahn, "Gibt es Unendliches?" (Does Infinity Exist?), 93–116.

Karl Menger, "Nachwort" (Afterword), 117–122.

Neuere Fortschritte in den exakten Wissenschaften. Fünf Wiener Vorträge. Dritter Zyklus. (Recent Developments in the Exact Sciences. Five Vienna Lectures. Third Series.), Leipzig-Vienna, Deuticke 1936.

Ernst Späth, "Vitamine und ihre Bedeutung" (Vitamins and Their Significance), 1–16.

Hans Thirring, "Die physikalischen Entdeckungen der letzten Jahre" (The Discoveries of Physics in Recent Years), 17–66.

Hermann Mark, "Extreme Versuchsbedingungen als Quelle des Fortschrittes" (Extreme Test Conditions as a Source of Progress), 67–90.

Werner Heisenberg, "Prinzipielle Fragen der modernen Physik" (Principal Questions of Modern Physics), 91–102.

Karl Menger, "Einige neuere Fortschritte in der exakten Behandlung sozialwissenschaftlicher Probleme" (Some Recent Developments in the Exact Treatment of Sociological Problems), 103–32.

The fourth series was not organized under the auspices of Karl Menger anymore:

Neue Wege exakter Naturerkenntnis. Fünf Wiener Vorträge. Vierter Zyklus. (New Trends in the Understanding of Nature. Five Vienna Lectures. Fourth Series.), Vienna, Deuticke 1939.

Fritz A. Paneth, "Die chemische Erforschung der Stratosphäre" (The Chemical Exploration of the Stratosphere), 1–14.

Gregor Wentzel, "Probleme der Kraftwirkungen im Atomkern" (Problems of the Action of Forces in the Atomic Nucleus), 14–25.

Hans Thirring, "Der gegenwärtige Stand unserer Kenntnisse von der kosmischen Strahlung" (The Present State of Our Knowledge about Cosmic Radiation), 26–62.

Hermann Mark, "Kleine Ursachen – große Wirkungen im Fortschritt der Naturwissenschaften" (Little Cause and Great Effect in the Progress of the Natural Sciences), 63–74.

Josef Mayerhöfer, "Der Vorstoß zum absoluten Nullpunkt" (Advancing Towards the Absolute Zero) (Based on a lecture by Peter Debye), 75–93.

Chapter 6
Wittgenstein and the Vienna Circle: Thought Style and Thought Collective

6.1 Establishing Contact—The Outsider and the Group

Within much of the current historiography, the relationship between Wittgenstein and the Vienna Circle is discussed in terms of a virtually one-sided relationship: a direct influence by Wittgenstein upon the circle.[1] In fact, this stereotypical approach seems confirmed in some of the self-portraits that have been offered by members of the circle.[2] Correspondingly, in the Circle's manifesto (1929), its views were illustrated with the following dictum of Wittgenstein: "What can be said at all, can be said clearly."[3] This quotation was meant to underscore their shared anti-metaphysical purpose. To be sure, the subsequent assertion that the scientific world conception knows "no unsolvable riddles" steered the Circle's reception of Wittgenstein—at least that of its left wing around Hans Hahn, Rudolf Carnap, and Otto Neurath—in a direction that Wittgenstein must have abhorred, for his intention was not to mobilize a philosophical collective into an anti-metaphysical commando squad. Rather, as has now been clearly established, he wished to engage in a process of linguistic criticism and clarifying intellectual labor, morally and therapeutically oriented in the manner of Karl Kraus, Adolf Loos, and Arnold Schönberg[4]: a philosophical counterweight to both the mannerisms of literary supplements and the metaphysically idle elements of everyday language. These thinkers were concerned with a

[1] For a general overview of the most recent literature on Wittgenstein, including, in particular, his relation to the Vienna Circle, see Frongia and McGuinness 1990; Drudis-Baldrich 1992; Baker 2003.

[2] Frongia and McGuinness 1990, 17–26.

[3] *The Scientific Conception of the World: The Vienna Circle* (1929 manifesto) in Neurath 1973, 306; Wittgenstein, *Tractatus logico-philosophicus* (1922), 4.116.

[4] On Wittgenstein in his socio-cultural context see Janik and Toulmin 1973. For the most recent intellectual biographies see McGuinness 1988; Monk 1991. On analytic philosophy in the framework of Austrian intellectual history see K. R. Fischer 1991.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_6

type of objectivity that was directed against any linguistic acrobatics and aimed at establishing the limits of that realm which can only be "shown" in language. Wittgenstein formulated this basic stance succinctly in a letter to Ludwig von Ficker: what was at stake here for him was the demarcation of ethics "from the inside," against the realm of the verifiable propositions at work in the natural sciences.[5] What we have is thus a dualism of facts and values in an ideal, picture-theoretical linguistic framework. Its result was, for Wittgenstein, the emergence of the unsayable or ineffable as central categories in the realms of philosophy, religion, art, and literature. In contrast, in their focus on Wittgenstein, the Vienna Circle concentrated almost entirely on the anti-metaphysical implications of the logical analysis of language for the realm of the sayable. It did so knowing it received a dose of mysticism in the bargain (a fact that Neurath, in particular, would note critically time and again). Against this backdrop, it is hardly surprising that in letters to his admirer Friedrich Waismann—the latter had been working fruitlessly on a popular version of the *Tractatus* since 1929—Wittgenstein offered an extremely negative opinion of the circle's program.[6]

The one-sided, mundane reception of the *Tractatus* had already begun in the early 1920s. Preliminary work in that direction took place in the seminar of the mathematician Hans Hahn. If we follow Karl Menger's memoirs, Hahn's seminar focused primarily on the *Principia Mathematica* of Russell and Whitehead[7]; the significance of Wittgenstein for modern logic and philosophy was first pointed out there in 1922, in one of the presentations by Kurt Reidemeister. At the time, the *Tractatus* tended to be treated skeptically. The start of the regular Thursday evening discussion meetings of the Schlick circle also marked the onset of a correspondence between Schlick and Wittgenstein.[8] In a note of December 25, 1924, to Wittgenstein—then teaching at a primary school in southern Austria—Schlick expressed his interest in the *Tractatus* and inquired into the possibility of a personal meeting. In his friendly reply of January 7, 1925, Wittgenstein informed Schlick that, while he possessed no extra copy of the *Tractatus*, he was himself most interested in a meeting.

In April 1926, Schlick traveled to Otterthal—in vain, since Wittgenstein had meanwhile resigned his position, in order to devote himself exclusively over the next two years to the construction of the famous house on Vienna's Kundmanngasse. Although at first glance such a project would seem to have little in common with Wittgenstein's philosophical ambitions, he was in fact steering a course back to philosophy. After the publication of the *Tractatus*, in which Wittgenstein believed

[5] Wittgenstein to Ludwig von Ficker (Oct.–Nov. 1919) in Wittgenstein 1969, 35: "Namely, I wanted to write that my work consists of two portions: what is here available, and everything that I *haven't* written. And it is precisely this second portion that is the important one. Namely, through my book the ethical is, as it were, delimited from within… ."

[6] Mulder 1968, 389 ff.

[7] Menger 1979 and 1980, IX–XVIII; Menger's memoirs 1994.

[8] McGuinness (ed.), *Ludwig Wittgenstein und der Wiener Kreis*, 1967; foreword by McGuinness, ibid., 11–32 (English translation McGuinness 1979); Nedo-Ranchetti (ed.) 1983.

he had solved all extant philosophical problems, he was visited by the English mathematician Frank P. Ramsey (1923–24) and had contact with the economist John Maynard Keynes (summer 1925), renewing his interest in philosophical problems. The house Wittgenstein built together with Paul Engelmann, an architect and friend of long standing, seems as original as his aphorisms. At the same time, it is clearly as much indebted to traditional influences as was his philosophy of logical atomism.[9] With its principles of ornament-free clarity, classical simplicity, and functionality—the result of painstaking principles of construction—the house on Kundmanngasse, like Wittgenstein's philosophy, reveals the spirit of Engelmann's teacher Adolf Loos as well as of Karl Kraus. Above all in a semantics of pure matter-of-factness and classicist mentality, the building reveals the equivalency of ethics and aesthetics for which Wittgenstein argued.[10]

Wittgenstein's conflict-ridden and eccentric contact with the Vienna Circle began in February 1927 at about the same time as this self-prescribed therapeutic architectural activity, and it was to continue, with various degrees of intensity and frequent interruptions, until the murder of Moritz Schlick in June 1936.[11] At Wittgenstein's wish, the psychologists Karl and Charlotte Bühler were invited to the first meeting, along with several members of the Circle. Schlick proposed a discussion of logical problems during the meeting, which left him filled with enthusiasm—his wife speaks of the "deferential approach of the pilgrim" and her husband's "enraptured condition."[12] Wittgenstein noted: "we both considered each other crazy," simultaneously conceding Schlick to be an "eminent and empathic interlocutor."[13] From this time on, Schlick was so fascinated by Wittgenstein that he abandoned the position of critical realism maintained in his *General Theory of Knowledge* (1918, 2nd ed. 1925), from 1925 on advocating the linguistic "turning point of philosophy," as suggested by the work of Wittgenstein.[14] Schlick would even go so far as to ascribe insights to Wittgenstein that he himself had already proposed in his book of 1918. While it would be rash to speak of a philosophical self-abandonment or even a congruence of Schlick's thinking with Wittgenstein's, together with Waismann Schlick did indeed represent the Wittgenstein faction in the Vienna Circle.[15] We see this, for instance, in the differences between their concepts of philosophy in the 1930s, as well as in diverging notions of ethics and aesthetics.[16]

As an anticipation of the Circle's internal controversies over physicalism and the problem of the empirical basis of science, Otto Neurath's early assessment of Wittgenstein is worth noting briefly here.[17] On the one hand, we have Neurath's

[9] On the theme of Wittgenstein and architecture cf., e.g., *Haus Wittgenstein* 1984.

[10] Stadler 1982c; Engelmann 1967; Wijdeveld 1994; Leitner 2000.

[11] *Ludwig Wittgenstein und der Wiener Kreis*, loc. cit., editor's foreword.

[12] Ibid., 147.

[13] Ibid., 117 f.

[14] Schlick 1930b, 4–11.

[15] On Schlick and the Vienna Circle see McGuinness (ed.) 1985; see also *Schlick Studien*.

[16] Cf. Chap. 7.

[17] Neurath 1933a, 29.

brand of philosophy-free relativism, with its coherence-centered notion of truth and its empirical-syntactic orientation; on the other hand, we have a semantically oriented philosophical absolutism, marked by a correspondence-centered approach to the problem of truth. At the same time, despite these theoretical differences and others that were personal in nature, a common denominator was also manifest: the advocacy of a scientific world view and scientific philosophy. It is against this shared backdrop that the diverging development of each side becomes intelligible. In Neurath's case, from physicalism to the empirical encyclopedism of unified science; in Schlick's case, from realistic natural philosophy to the dualism of philosophy understood as the analysis of language on the one hand and research within the individual sciences on the other. With concepts such as "habit," "behaviorism of scholars," and "pseudo-rationalism," Neurath's work as of the 1930s reveals anticipations of Wittgenstein's notion of language games—a fact mentioned here simply as one source of the later heated priority disputes.[18]

Let us now return to the question of Wittgenstein's relation to the Vienna Circle. After the ice was broken, there were further meetings between Wittgenstein and Schlick toward the end of 1928; these meetings would eventually include Waismann and other circle members such as Carnap and Feigl, who have, regrettably, left us with no notes. In March 1928, Feigl and Waismann prompted Wittgenstein to attend a lecture by the Dutch mathematician L. E. J. Brouwer. The year 1929 was hence decisive not only for the Vienna Circle (cf. Sect. 4.2), but for Wittgenstein as well. Conversations between Wittgenstein, Schlick, and Waismann were to continue until 1932; these were partially documented in the latter's notes, and have since been published. From 1933, Wittgenstein wished to see Schlick alone without Waismann—even though or perhaps precisely because Waismann had been working for years on a systematic, generally accessible account of Wittgenstein's early philosophy. (As a basis for discussion, Waismann's manuscript had circulated among the Vienna Circle since 1930.[19]) A last meeting between Waisman and Wittgenstein, focusing on interpretive problems in the *Tractatus*, took place in the Easter vacation of 1934. There were two basic causes for the failure of this communicative venture, which in any event was rather tragically neurotic in nature, hovering as it did between promise and denial.[20] On the one hand, during his lifetime Wittgenstein struggled against any fixed definition of his ideas; on the other, he was already modifying his logical atomism in the direction of a philosophy of ordinary language with the central concept of language games. This transformation ran parallel to the gradual development in the work of Neurath and Carnap from the constitutive system of the *Structure* to the physicalism of unified science.[21]

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[18] New works on Neurath in this context include K. H. Müller 1991; Uebel 2007.

[19] "Thesen von Friedrich Waismann (um 1930)," in *Wittgenstein und der Wiener Kreis*, loc. cit., 232–61.

[20] On the relationship between Wittgenstein and Waismann see Baker 1979; Haller 1986; Baker 2003.

[21] On the transition from the *Aufbau* to the *Logical Syntax* see Sauer 1989.

Without a doubt, the introverted Waismann was the member of the Vienna Circle most influenced by Wittgenstein; however, his own independent theoretical contribution, in works such as *Einführung in das mathematische Denken* (*Introduction to Mathematical Thinking*) (1936a) has been strongly underrated.[22] The relationship between Waismann and Wittgenstein ended symptomatically enough, as had been the case a year earlier with Carnap, on account of reproaches regarding priority and plagiarism in Waismann's essay "Über den Begriff der Identität" (On the Concept of Identity) (1936b). The break could not be prevented by Waismann's acknowledgment in the book of the strong debt he owed to conversations with Wittgenstein. The fact that even in English exile, Wittgenstein would unswervingly refuse any reconciliation with this student and admirer of his illustrates the characteristic eccentricity and almost- inhuman consistency of a heroic outsider—one who resisted not only all systematization or unifying reconstruction of his philosophy but also any partnership in intellectual labor.

This egomaniacal propensity also led to the break with Rudolf Carnap in 1932—simply a culmination, in fact, of a personal and philosophical conflict between two opposing thinkers. Already In his first meeting with Schlick, Waismann, Carnap, Feigl, and Feigl's later wife Maria Kasper, Wittgenstein had already refused to discuss the philosophical theme that had been proposed. Instead, he chose to read Rabindranath Tagore's poems out loud—for the most part with his back turned to his interlocutors.[23] Carnap met five times with Wittgenstein between June and August 1927; in his diary he notes as follows:

> 20-06-27: Met for the first time, at Schlick's; Waismann also. Very interesting, original, sympathetic man. Strongly against Esperanto because not grown (it was probably Schlick who mentioned I was an advocate). Artistic nature. On identity, his objections to Ramsey.
>
> 04-07-27: With W. at Schlick's. Again about Esperanto. Then about intuitionism, finally he reads Wilhelm Busch to us.
>
> 06-08-27: Schlick has already left. In the afternoon Waismann at my place; in the evening also W. W. sharply against the popularization of science; Waismann for it on account of his experience at the adult education center. Afterwards both against occultism, W. very heatedly.[24]

These comprise Carnap's notes concerning the direct contacts; basic differences are here readily apparent. It was thus no coincidence that Wittgenstein, in his role of conservative, anti-Enlightenment aphorist, criticized Carnap as a follower of Esperanto. Wittgenstein would record his aversion to the international artificial

[22] Cf. the—in comparison to Wittgenstein—relatively neglected writings of Friedrich Waismann in Reitzig (ed.) 1973; Waismann 1976, 1977.

[23] Cf. Janik and Toulmin 1973, 257.

[24] Carnap Collection RC 102-78-07, University of Pittsburgh Libraries, Special Collections Department (RCC). I would like to thank the Archives for Scientific Philosophy, Curator W. Gerald Heverly, for permission to copy passages from Carnap's diary as well as from the correspondence between Wittgenstein and Schlick. I would also like to extend my thanks to the Vienna Circle Foundation and Wiener Kreis Archiv (WKA) in Amsterdam-Haarlem, under the chairmanship of Henk L. Mulder, for permission to use and copy material from the Schlick archives.

language as late as 1946—an aversion directed, as Carnap suggests above, against any language that has not 'grown organically':

> Esperanto. The feeling of disgust we get if we utter an *invented* word with invented derivative syllables. The word is cold, lacking in associations, and yet it plays at being "language." A system of purely written signs would not disgust us so much.[25]

It is interesting to note that one year earlier, Neurath, the tireless encyclopedist and Enlightenment proselytizer, had called for a "universal jargon" meant to represent ".an advantage from the point of view of popularizing human knowledge, internationally and democratically."[26]

In Carnap's intellectual biography of 1963, such conflicts are retrospectively relativized and illuminated.[27] There Carnap described the Vienna Circle's systematic reading of the *Tractatus* beginning in 1926, following his move to Vienna, and mentioned the fact that it was Wittgenstein—along with Russell and Frege—who exerted the strongest influence on his own thinking. Before their first meeting, Schlick and Waismann had advised Carnap to exercise particular consideration with regard to Wittgenstein. In retrospect, Carnap found the advice appropriate, since the philosopher he so admired seemed to him "very sensitive and easily disturbed,"[28] although not arrogant. And in his reminiscences concerning this meeting, Feigl noted how the personal and theoretical differences led to a basic schism in modern analytic philosophy: between rational reconstruction and a philosophy of ordinary language.[29]

6.2 The Physicalism Dispute: Between Reception and Plagiarism

In light of such differences, and of the distance Wittgenstein placed between himself and the Vienna Circle's program, it perhaps seems all the more surprising that 1929 saw the beginning of what was to become a heated and influential debate between Wittgenstein and Carnap (with Schlick as mediator) over priorities in physicalism. The debate can be reconstructed through the correspondence of these three parties. Its philosophical backdrop was the transition effected by Carnap, under Neurath's influence, from a phenomenalistic theory of concept constitution to physicalist unified science. (This development has finally received suitable attention and thus requires no detailed analysis in these pages.[30]) In the same period between

[25] Wittgenstein 1980, 52e.

[26] Neurath 1945–46, cited in Neurath and Cohen (eds.) 1983, 236.

[27] Carnap 1963, 25 ff.

[28] Ibid., 25.

[29] Feigl 1969, 638 f.

[30] Cf. the contributions of Brian McGuinnes, Eckehart Köhler, Thomas E. Uebel, Heiner Rutte, and Dirk Koppelberg in Kruntorad (ed.) 1991. Cf. the essays on the same topic in Dahms (ed.) 1985; Koppelberg 1987. Also Stern 2007 and Hintikka 1993.

1929 and 1931, in the context of his discussions with Schlick and Waismann (e.g., over verification), Wittgenstein also slowly left his early philosophy behind. As we can see from Wittgenstein's *Philosophische Bemerkungen* (*Philosophical Remarks*) and *Philosophische Grammatik* (*Philosophical Grammar*) and Waismann's notes of his conversations in *Wittgenstein und der Wiener Kreis* (*Wittgenstein and the Vienna Circle*), elements of the later philosophy (i.e., the orientation toward action) had already begun to emerge in Wittgenstein's thinking while the picture theory was still retained. It would appear, however, that the continuity and unity of this thinking was not disrupted by this development; talk of a philosophical dichotomy between a "Wittgenstein 1" and "Wittgenstein 2" is not justified.

The Vienna Circle's "physicalist turn" culminated in several publications by Carnap, Neurath, and others—in particular, Carnap's essay "Die physikalische Sprache als Universalsprache der Wissenschaft" (translated as "The Unity of Science") (1932a) in the second volume of *Erkenntnis*.[31] Known also as the protocol-sentence debate, the intense controversy sparked by this programmatic piece lasted several years. In his essay, Carnap formally defined a language as universal when every sentence can be translated into it and a physicalist language as representing such an intersubjective and universal system language. The crucial protocol languages can be interpreted (via isomorphism) as partial languages within that physicalist language. According to Carnap, qualitative specifications are in principle translatable into specifications that are quantitative in nature—a process allowing a unified science in a physicalist language. Despite their differences regarding the sense of purpose and the elaboration of "physicalism," this coherence-theoretical and conventionalist program was later to be used by Carnap and Neurath as the basic epistemological tool for the *Encyclopedia of Unified Science* and was adhered to well into the 1940s.[32]

During April- and May of 1932, Wittgenstein had received Carnap's essay on physicalist language and was extremely annoyed by the absence of any mention of his name in relation to the concept 'physicalism.' He expressed his annoyance in a sharply worded letter to Carnap (20-8-1932).[33] Wittgenstein believed that both Carnap's essay and verbal communication he maintained with Schlick and Waismann beginning in 1929 contained ideas from the *Tractatus*. It thus seemed clear to him "that there was a conscious intent at work here not to mention my name, and hence to hide the provenance of the ideas." Wittgenstein had already written to Schlick in this regard; Schlick in turn wrote a friendly letter to Carnap (10-7-1932) in which he played the advocate of the wounded Wittgenstein, presenting his arguments with much understanding. It is unjust, we read, for Neurath, but not Wittgenstein, to be mentioned in the context of "specific Wittgensteinian points" treated in the *Tractatus* (such as extensive definition, natural law and hypothesis,

[31] On the more recent debate over physicalism and protocol-sentences see Hofmann-Grüneberg 1988; Uebel 2007.

[32] Neurath, Carnap, and Morris (eds.) 1970–71.

[33] The following citations and paraphrases are taken from the correspondence between Carnap and both Schlick and Wittgenstein.

and the "formal mode of speech"). Neurath, in fact, had himself already contacted Carnap, since he considered himself to be the *spiritus rector* of physicalism and Carnap responded to the complaint with a footnote.[34] In his *Logical Syntax* (*Die Logische Syntax der Sprache*) (1934), Carnap was to name Neurath as the source of the terms "physicalism" and "Unity of science."[35] (This in turn was to be called into question by Heinrich Neider, who named himself the inventor of physicalism in the context of conversations concerning Carnap's book *Pseudo-Problems in Philosophy* (*Das Fremdpsychische und der Realismusstreit* (1928a)). According to Neider, he was the source of Neurath's enthusiastic appropriation of this effort to overcome the notion of an individual psychic grounding to establish a link with the materialist viewpoint.[36]

In an extended reply to Schlick (July 17, 1932), Carnap concretely addressed the points of contention. On the one hand, he reminded Schlick that the final status of the protocol-sentences was still in doubt. On the other hand, he asserted that references in the essay to other authors were not so urgently important, and pointed out (accurately) that in his publications to date, he had carefully evaluated Wittgenstein's writing as a general philosophical foundation; the essay in question had less need to mention Wittgenstein since he had not concerned himself explicitly with physicalism. Concerning the individual points at issue, Carnap observed that precisely here there was no borrowing from Wittgenstein—although he did concede a certain degree of uncertainty regarding priority: (1) ostension is definition in the true sense and remained within the realm of language. This, Carnap explained, was directed against Reichenbach; Waismann maintained the opposite (cf. Waismann's thesis 16). (2) Concerning hypotheses: this idea was not new, but was probably already present before either Reichenbach or Wittgenstein in Poincaré. (3) Carnap indicated that the distinction between a formal and material mode of speech, for the purpose of excluding metaphysical pseudo-questions, was present in his writings as well as Wittgenstein's, but also in scientific philosophy generally. At the same time, he pointed out that the *Tractatus* was open to criticism due to its use of the material mode! In any event, he confirmed that the basic concept certainly came from Wittgenstein, indicating that references would be included in the *Logical Syntax*. So much for Carnap's commentary.

Wittgenstein had based his strong objections on the fact that, should he ever publish his work of recent years, he himself would appear as a plagiarist; at the same time, he informed Carnap of his "rejection of the easy distilling of results and the self-satisfied, pedantic tone of your last writings (concerning a subject that concerns me closely)." Carnap's answer to Wittgenstein in his letter to Schlick was deemed satisfactory by its recipient, who forwarded it to Wittgenstein. Wittgenstein drafted a new letter to Carnap, discarded it, and wrote again to Schlick with the request to forward the letter to Carnap. Since Schlick recoiled at the thought of doing so (cf. Schlick to Carnap, 24-8-1932), Wittgenstein attached this letter to the

[34] Carnap 1932b, 452.

[35] Carnap 1934a, 2nd ed. 1968, 248 f.; English: Carnap 1937, 321.

[36] Neider 1977, 29.

one previously quoted. In this indirect letter to Carnap (Wittgenstein to Schlick, 8-8-1932), Wittgenstein had already insisted rather emphatically on the following points: (1) Carnap was not revealing his chief source; (2) He, Wittgenstein, had always been closely concerned with physicalism, "only not under this—revolting—name"; (3) Carnap did not wish to recall conversations with Waismann in which Wittgenstein had revealed his idea of ostensive definitions; and (4) Carnap took the concept of hypotheses from Wittgenstein—and not from Reichenbach and Poincaré.

This issue is illuminated by the record of the conversations kept by Waismann concerning hypotheses I-III (March 22, 1930; January 4, 1931; July 1, 1932).[37] Of these, the meeting in Vienna's Argentinierstrasse on July 1, 1932 (without Schlick) may have been prompted by these disputes over priority. There, Wittgenstein spoke of the comparison of a proposition with reality, while—in contrast to the *Tractatus* (cf. 3.263; 3.2-3.201; 2.1511)—the ostensive explanation remains within language. At the same time, hypotheses would be distinguished from propositions through their grammar—as opposed to for Poincaré, "who claims to see definitions in hypotheses." This is an interpretation that in any event is only true for the principles of mechanics.[38]

Wittgenstein also insisted: (5) When Carnap argued for the formal against the material mode of speech, he did not go a single step beyond him, Wittgenstein. Wittgenstein finds Carnap's "unhistorical attitude" to be, in the end, "most revolting": "one would need to be far more original than he is in order to justify writing that" was his harsh verdict. Concluding, he stressed that "for me, it is not primarily an academic priority dispute that is here at play, but a personal affair. For at the bottom of my heart I do not care what present-day professional philosophers think of me, as I'm not writing for them." Carnap's reply to Wittgenstein was brief and concise (September 28, 1932):

> I have received your letter with the transcription of the letter to Schlick. You will not expect an answer to it. I have now written Schlick with my thoughts on the matter. I have nothing against his sharing the contents with you at his discretion. Respectfully, R. C.

This was the last direct contact between the two. In an unpublished portion of his autobiography, Carnap commented on this episode as follows:

> Years later some of Wittgenstein's students at Cambridge asked him for permission to send transcripts of his lectures to friends and interested philosophers. He asked to see the list of names, and then approved all but my own. In my entire life, I have never experienced something remotely similar to this hatred directed against me. I have no adequate explanation; probably only a psychoanalyst could offer one....But that in no way alters the fact that he was a spirit with genuine creative genius, to whom philosophy is greatly indebted.

In the above-cited letter to Schlick of September 28, 1932, Carnap had above all expressed his dismay at the tone of Wittgenstein's letter. Concerning the facts, he again repeated that not individual points but rather the general orientation of his philosophy were indebted to Wittgenstein. He specifies this as follows: (1) "I find no

[37] McGuinness (ed.) 1985, 99–101, 159–62, 209–12.

[38] According to McGuinness, ibid., 211.

clear remark concerning physicalism in the *Tractatus*" and (2) "I have an indistinct memory that in conversations with Waisman the topic of definitions came up… In his theses Waismann says the contrary." According to Carnap, definitions and demonstration remain within language. (3) Carnap indicates that both Poincaré and Duhem have written about hypotheses in the same manner. (4) He rejects Wittgenstein's approach to formal and substantive diction. In conclusion, he offers this formulation of the central question: "What is the source of Wittgenstein's oversensitivity and vehemence?"

6.3 Mentalities: Philosophy and Science as Language-Games

How are we to interpret this emotionally-laden controversy? Carnap himself felt a strong personal dislike on the part of Wittgenstein (in contrast to Schlick) built up since the 1927–28 meetings and was a result of strong intellectual antagonisms.[39] We have on the one hand—according to Carnap's portrait—Wittgenstein as creative personality, an enthusiast for Schopenhauer; on the other, we have Carnap as rationalist, an enthusiast for Esperanto and an admirer of Russell's *What I Believe*. As for Wittgenstein's injurious tone, Carnap observed that "a person speaks in that way only when things are going badly."[40] Schlick himself was to come to see Wittgenstein's accusations as unjustified and Carnap as blameless (Schlick to Carnap, 3-12-1932).

Carnap was correct in stressing the differences between the two personalities: on the one side, Wittgenstein the highly scrupulous aphorist, with his profound ethical focus; on the other, Carnap the cool, logical prototype of philosophical modernism, systematic in orientation, with Enlightenment-centered goals and values. (We can discover a similar contrast of personality, mentality, and world view between Schlick and Neurath.) We thus find, on one pole, the sensitive outsider, for whom the critique of language, clarity, and precision are moral categories, and on the other, the intellectual accustomed to working in a collective with practical-political intentions—using scientific philosophy and the scientific world conception as a means for consciously shaping human life and improving the world.

Yet *psychological* factors do not sufficiently account for the contrast between Carnap and Wittgenstein.

From the perspective of the sociology of science, we can speak—in light of the work of Ludwig Fleck and Thomas S. Kuhn[41]—of a clash between two styles of thought or between a thought collective and an individualist. This contrast is also, as well, the outcome of an intentionally partial reception of Wittgenstein by some of the members of the Vienna Circle. For instance, the rejection of the "mysticism of showing" and the metaphysics of reality (dualism of language and the world) did not prevent Neurath and others from assimilating logical analysis and the critique of

[39] Carnap 1963.

[40] Carnap to Schlick, 12-9-1932.

[41] Fleck 1980, 1983; Kuhn 1978a (2nd. ed. in German translation), 1978b.

language as elements into the scientific world conception. On the other hand, no direct reception on Wittgenstein's part of the Vienna Circle's central ideas can be demonstrated, although his many conversations with figures including Schlick, Waismann, and Feigl are likely to have left their mark indirectly. While he himself opposed historicist perspectives and academic traditions, Wittgenstein was nonetheless part of the development of an intellectual problematic that far exceeded the circle of references he himself cited: Boltzmann, Hertz, Schopenhauer, Frege, Russell, Kraus, Loos, Weininger, Spengler, and Sraffa. With all due acknowledgment of his originality and individuality, Wittgenstein was deeply embedded within the Anglo-Austrian field of communication.[42]

In order to gain a full sense of the conflict between Wittgenstein and Carnap, we must also consider its *substantive* aspect.[43] In light of both the common conceptual background of problems and the philosophical dialogue between Wittgenstein and the Vienna Circle, it is plausible to conclude that several people and groups working simultaneously on these issues with a similar vocabulary (for example the thesis that all sentences contain spatio-temporal terms) can arrive at similar results. We can formulate this more pointedly: in the case of such close (direct and indirect) communication, it is scarcely possible to sharply separate originality, priority, and plagiarism, either temporally or in the abstract, as long as a common language game with a cooperative form of work was accepted. Wittgenstein's position was very ambivalent in this regard—which becomes obvious if we look at his relationship with Waismann.

In arriving at a rational reconstruction of the dispute, we thus end up agreeing with Carnap that the 'general foundations' indeed stem from Wittgenstein—something acknowledged sufficiently in Carnap's writings—but also that it is impossible to maintain that the concept of "physicalism," in the sense of Neurath and Carnap, stems from the *Tractatus* or transcribed conversations. At the same time, it is certainly the case that in the early and middle Wittgenstein, we find elements and approaches also manifest in physicalism and in the later concept of science in the Encyclopedia project. Hence Wittgenstein's anger may well be partly due to the fact that in the work of Neurath and Carnap at the start of the 1930s, anticipations or

[42] Cf. Haller 1986.

[43] On the entire controversy, which can only be described cursorily in these pages, see Hintikka 1989; M.B. Hintikka and J. Hintikka 1990 (especially chapters 6–8); cf. Haller 1990, McGuinness 1991. Hintikka and Hintikka (1990, 184) argue "that the decisive turning point in Wittgenstein's philosophical development in 1929 was declaring a physicalist colloquial language instead of [a]… phenomenological language to be the standard, indeed sustainable basal language of philosophy." They further explain "that this transformation is the only clear initial change in Wittgenstein's views…." The background of the philosophical conflict between Wittgenstein and Carnap might, indeed, be illuminated by the postulate of two languages and two periods in Wittgenstein's thinking (phenomenalism and physicalism); at the same time Wittgenstein's own reference to the *Tractatus* in view of its physicalist content (also pointed to by McGuinness) and the (in)expressibility of semantics remains unexplained. As a result of his conceptually differentiated examination of the shift from phenomenalism to physicalism in Wittgenstein, Carnap, Neurath, and the Vienna Circle, Haller rightly calls into question the notion that Wittgenstein was a physicalist in the sense of Neurath and Carnap; this despite a common motivational background in the preference of a public-intersubjective over a private-subjective language.

variations of his notion of language-games are apparent (e.g., the above-mentioned concepts of "habit," "behavioristics of scholars," and "pseudo-rationalism") alongside the private-language argument. To be sure, such substantive connections should not obscure the large differences in global orientation regarding logic, language, and philosophy. One of the few reports on the "development of the theses of the Vienna Circle"[44] in which we can discern Wittgenstein's influence reveals shifts in position on Carnap's part (following Neurath) to a large extent away from Wittgenstein. In the *Tractatus* period, the rubric of the thesis of physicalism ("all sentences contain spatio-temporal terms") is marked by Carnap with a "no," in the post-*Tractatus* -period with a "yes." This, however, does not reveal a direct influence of a "physicalism" implicitly or rudimentarily present in the *Tractatus*.

We need, in any case, to also note the possibility that this episode is linked to the complex problem of Jewish identity. At the time the episode unfolded, Wittgenstein made the following, paradoxical observation[45]:

> I think there s some truth in my idea that I really only think reproductively. I don't believe I have ever *invented* a line of thinking, I have always taken one over from someone else. I have simply straightaway seized on it with enthusiasm for my work of clarification … It might be said (rightly or wrongly) that the Jewish mind does not have the power to produce even the tiniest flower or blade of grass; its way is rather to make a drawing of the flower or blade of grass that has grown in the soil of another's mind and to put it into a comprehensive picture. We aren't pointing to a fault when we say this and everything is all right as long as what is being done is quite clear. It is only when the nature of a Jewish work is confused with that of a non-Jewish work that there is any danger, especially when the author of the Jewish work falls into the confusion himself, as he so easily may … It is typical for a Jewish mind to understand someone else's work better than he understands it himself.

If we apply this confessional note, written in the diction of Otto Weininger, to the conflict at issue, then it becomes difficult not to go beyond the empirical-rational reconstruction of lines of influence and consider the effect of Wittgenstein's psychology on these troubled, but also productive, communicative exchanges.

6.4 Conversations Between Wittgenstein, Schlick, and Waismann: An Overview

6.4.1 Preliminary Remark

It is unclear if Wittgenstein was ever personally present at a meeting of the Vienna Circle on Boltzmanngasse, either as a lecturer or as a guest. The personal contacts between Wittgenstein, Schlick, Waismann, Carnap, and Feigl began in the spring of 1927, after Schlick had established correspondence with Wittgenstein (25-12-1924). Carnap indicated that starting in autumn of 1926, the *Tractatus* was "read aloud and

[44] Cf. Sect. 4.1.1.5.

[45] Wittgenstein 1980, 4318e f.

discussed sentence by sentence" within the circle (Carnap 1963, 24). There are no transcriptions of the conversations that took place in 1927–29; we do, however, have reports from members of the circle (Carnap, Feigl, Menger), so that a fragmentary reconstruction of the conversations is possible. Carnap speaks of several encounters with Wittgenstein in the summer of 1927 together with Schlick and Waismann; two of these meetings are dated:

1927

04-07-1927	On Esperanto and intuitionism
11-07-1927	*Wittgenstein contra Schlick* (religion, ethics) (parapsychology)?

From the beginning of 1929 on, Wittgenstein only met with Schlick and/or Waismann:

1929

18-12-1929	On mathematical proofs What does seeking mean in mathematics? (Example: tripartition of an angle, analogy: unraveling of a knot) Geometry as syntax I Non-contradiction I
22-12-1929	"The whole" I (objects, what does "the whole" signify?) Solipsism (The meaning of a proposition is its verification) Idling wheels ("I cannot feel your pain") Speech and world
25-12-1929	"The whole" II Time (External-internal) Optical space
30-12-1929	(Supplement to 25-12) Geometry as syntax II Physics and phenomenology Color-systems (Does every proposition lie within a system? I) (The world is red I) Anti-Husserl
30-12-1929	On *Heidegger* Dedekindian definition Real numbers I Supplement to 30-12

1930

02-01-1930	(Elementary propositions) ("The present state of mathematical knowledge on *Hermann Weyl*'s article")
05-01-1930	Positive and negative propositions The color blue in memory "The world is red" II Does every proposition lie within a system? II Conclusion Talk on ethics Probability I
22-03-1930	(Verification and the directly given) (Verification and time) Probability II Hypotheses I (The double meaning of geometry, misc. concerning hypotheses)
19-06-1930	(What might be said in Königsberg) (Formalism, analogy, and tautology I)
25-09-1930	(Misc.) Variable Proof Real numbers II Idealization Interpretation
17-12-1930	On *Schlick*'s ethics Value Religion Obligation Noncontradiction III (The discovery of *Sheffer*) (Rules of play and configurations of play) (What does it mean to use a calculation?) (Independence I)
30-12-1930	(Noncontradiction IV. Frege and Wittgenstein I) *Hilbert*'s proof

1931

01-01-1931	America. The institution of college Independence II (Noncontradiction V) (Independence II) (Summary) (*Hilbert*'s axioms) (Calculation and prose) (*Frege* and *Wittgenstein* II)
04-01-1931	(Analogy and replacement-rules I) (Analogy and tautology II) Verification in physics (Hypotheses II) (Geometry as syntax III) Supplements: chess, on Königsberg, definition of a number
21-09-1931	Intention, opinion, signification (Calculation and application) (Examining a calendar) The construction of a boiler Proof of existence (Noncontradiction vs. hidden contradiction) Contradiction (analogy and replacement rules II, indirect proof I)
09-12-1931	On dogmatism On infinity On *Ramsey*'s definition of identity Noncontradiction VII Noncontradiction VIII (Analogy: the extension of π) (The concept of calculation) (Proof in geometry and arithmetic) Partition of an angle Generalization in geometry Indirect proof II

1932

01-07-1932	(Proposition and reality) Hypotheses III

Sources: B. F. McGuinness, ed., *Ludwig Wittgenstein und der Wiener Kreis* (Frankfurt a. M. 1967) (= Ludwig Wittgenstein, *Schriften*, vol 3); Carnap diary, loc. cit.; Schlick correspondence (WKA Haarlem).

Chapter 7
Heinrich Gomperz, Karl Popper, and the Vienna Circle—Between Demarcation and Family Resemblance

7.1 Heinrich Gomperz and the Vienna Circle

Robert A. Kann, who edited a comprehensive book (1974) on Heinrich Gomperz's father, the classical philologist Theodor Gomperz, offered a description of the latter that could also, with slight modifications, be applied to the son: "The life of a scholar in the bourgeoisie of the era of Emperor Franz Josef" (and of the First Republic, one would have to say, referring to Heinrich Gomperz, or "Harry" as he was known). Gomperz (1873–1942) was a typical representative of the assimilated, social-liberal Jewry which saw itself as 'German,' not in the sense of *völkisch-nationalist* movements but in the sense of a uniform community of language and culture. To what extent the life and academic career of Heinrich Gomperz was informed by this attitude can be traced in his biography, which ends with his emigration to the United States (H. Gomperz 1953).

Thanks to his father, who also edited John Stuart Mill's *Collected Works* in German, the young Heinrich grew up in an intellectual atmosphere informed by the empiristic and language-critical teachings of Richard Wahle and Ernst Mach. He and his father played a crucial part in Ernst Mach's move from Prague to Vienna in 1895 and he would later describe Mach as the "Buddha of Science". The correspondence between the young Gomperz and Mach, the central figure of modernist Vienna at the turn of the century, illustrates this intellectual bond and veneration, which became manifest in the empirio-critical thrust of his large-scale work *Weltanschauungslehre* (The Theory of World Views, 1905–06). Looking back, Gomperz wrote in reference to his mentor: "he appeared to me as the incarnation of the scientific spirit" (ibid., 18). In his obituary on Mach, he underlined his importance for the renewal of Humean philosophy, with Richard Avenarius as the co-founder of the phenomenalist theory of elements and as the founder of functionalism and of the economy of thought (Occam's "razor") (Gomperz 1916). Gomperz even described Mach's critical approach as Kantian, even if anti-aprioristic in orientation. An impression can be gained from the correspondence between the two in the years

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_7

1896–1912 after Mach's *Analysis of Sensations* had appeared (reprinted in Haller and Stadler 1988, 244–57). Here we can already detect some of the first signs of Gomperz's "pathempirical method" of the *Weltanschauungslehre*: a methodological and ontological monism aimed at creating "a consistent nexus of all those ideas that are used by the individual disciplines as well as in practical life to reproduce the facts" (Gomperz 1905, 17). In this connection one might recall Mach's dictum that the lack of research is the adaptation of thoughts to facts and the adaptation of thoughts to each other. Even if Mach remained aloof or skeptical about this variation of his epistemology, in his undogmatic way he admitted to the young philosopher the basic productivity of his approach:

> It strikes me as a very fitting idea to study the role of feelings in conceptual thinking. I have absolutely no doubt that some metaphysical systems might become more understandable in this way. As long as the motifs of thought are not made completely clear, one is not finished and prone to falling back. It is my conviction that no philosopher has thought only nonsense…. (Mach to H. Gomperz, Jan. 20, 1902, in Haller and Stadler 1988, 250)

After Gomperz dedicated his small book *Das Problem der Willensfreiheit* (The Problem of the Freedom of the Will) (1907) to Mach, there was still some, albeit scanty, exchange of ideas and books. However, they did not discuss the second (uncompleted) volume of the *Weltanschauungslehre* which for Gomperz apparently no longer belonged to their common horizon of problems. It was the historico-genetic method and the epistemological monism—criticized by the early Schlick as representing "immanence positivism"—that was primarily shared by both empiricists.

Gomperz's intellectual training by his private tutors Richard Wahle and Thomas G. Masaryk as well as his university professors Franz Brentano and Ernst Mach laid the foundations for his later empirist and pragmatic development on the periphery of the Vienna Circle. The relative autonomy of his intellectual career remains uncontested, of course. Apart from his research, with regard to which he himself drew a distinction between the history of philosophy and his own philosophy, he also gave numerous lectures at Vienna adult education centers. In 1891, long before the Vienna Circle and the founding of his own circle after World War I, he created the so-called "Socratic Circle." Here a group of early friends from the pre-university years met on a regular basis to discuss topical issues of politics, economy, and science in an interdisciplinary manner (Oberkofler 1972; Schmidt-Dengler 1996). This circle reflected the spirit of antiquity and included the internal specialist Alfred Decastello (Anaxagoras), the doctor Leo Haas (Kyon), the painter Richard Harflinger (Parrhasios), the musicologist Robert Lach (Theages), the historian Harold Steinacker (Phaidros), the chemist Edmund Stiassny (Kleon), the art historian Arpad Weixlgärtner (Agathon), and Gomperz himself (as the Pythagorean Simmias). The themes addressed included not only—under Freud's influence—self-analyses, but also socio-philosophical issues and, after the war, political analyses. The discussions show Gomperz as possessing a practical mind with social reformatory ambitions. This tendency was also reflected in his *Philosophie des Krieges in Umrissen* (A Philosophy of War in Outlines) (1915)—to be sure, not a

pacifist, but also not a chauvinist work—and it is also manifest in the book he wrote in response to the turn of political events in Austria's First Republic, *Die Wissenschaft und die Tat* (Science and Action) (1934), in which he reflected on the tragic dimension of scientific thinking in the face of external demands and influences.

In terms of the history of ideas, Gomperz's studies in social philosophy stand in the enlightenment tradition of aiming at a future society or the best state in Bolzano's sense. In 1919, for example, he suggested creating a "non-party cultural working group" together with Max Ermer, and reflected on socialism as a model for improving the *conditio humana*. The affinity with the Free Union of Cultural Associations (cf. Chap. 2) is more than striking.

Having discontinued work on his *Weltanschauungslehre* and thus systematic philosophy, Gomperz worked simultaneously in several areas (logic, epistemology, aesthetics, and theory of values, political philosophy) with a critical, but charitable distance from Logical Empiricism and occasional contacts with the Vienna Circle. Just as around 1900 he had tested the limitations of psychoanalysis (in particular, Freud's *Theory of Dreams*) in self-analyses, so he associated with Schlick's circle, but saw himself as representing a skeptical voice amidst the "linguistic turn" and physicalist unifed science. He stated that his views

> have turned my personal familiarity with most members of what once was the Vienna Circle into a somewhat less external relationship and these contacts – particularly those with Professor Rudolf Carnap whose originality, logical penetration and intellectual courage I have always admired – have resulted in two of my recent publications: in one of them … I have endeavored to apply the belief that 'It cannot be impossible to work out common sense into a consistent terminology' 'to the problem of Meaning' while in the other … I have undertaken a logical analysis of the methods by which historians actually determine the character of a person and the meaning of a text. What I do not agree with in 'Logical Positivism' is its tendency to ban all speculation on issues which at present do not seem to admit of a decision based on experience, and still more its opposition to the notion that reality is something wonderful and mysterious. Since science … comprises, by definition, all we can know about the universe, it is indeed self-evident that knowledge of reality cannot be achieved in any other and – allegedly – better way. But this does not mean that guesses concerning aspects of reality that have not yet been successfully investigated by science should be decried as 'metaphysical' and thereby discouraged once for all. Indeed, since physics has done away with matter and psychology is doing away with spirit, as ultimate realities, much might be said in favor of a monistic view, conceiving the universe as a system of interacting forces not altogether dissimilar in kind. And still less is there any ground for contending that to be inspired, in view of all we know and still more of all that we do not know, by feelings of wonder and awe, is in any way undesirable or even harmful. (Gomperz 1953, 22 f.)

Notwithstanding his critical distance from any philosophical program, the skeptic Gomperz wrote the following words in his recollections: "I have more and more come to the conclusion that most of the traditional problems of theoretical philosophy are terminological rather than anything else" (ibid., 22). Reflecting his sense of equidistance from traditional metaphysical philosophy and the scientific world conception of the Vienna Circle, Gomperz organized regular discussion rounds on Saturdays at his villa on Grünbergstrasse 25 and paralleling the meetings of the Schlick Circle.

Unfortunately no complete reports and documents have been preserved from these interesting meetings, neither by Gomperz himself nor by any of the many members who included a large part of the Vienna Circle (cf. Sect. 7.2). Scattered autobiographical fragments name the following as participants: Rudolf Carnap, Hans Hahn, Viktor Kraft, Otto Neurath, Olga Hahn-Neurath, Arne Naess, Heinrich Neider, Robert Reininger, Edgar Zilsel, and above all Karl Popper. They all were interested in general philosophical themes ranging from metaphysics to the humanities and the limits of the logical analysis of language (as can be seen in the following survey of themes).

After emigrating, Gomperz focused his attention more on the work of Carnap prompting him to offer Otto Neurath a contribution to historiography for the *Encyclopedia of Unified Science*. It was published in 1939 under difficult conditions as a monograph with the title *Interpretation: Logical Analysis of a Method of Historical Research* (Library of Unified Science. Monograph Series 8/9) by van Stockum in Holland. In this book Gomperz presented a logical analysis of the methods used by history to interpret persons, acts, language, and texts. He understood his study as contributing to pragmatics within the framework of Charles Morris's semiotics. His essay "The Meanings of 'Meaning'" (1941), written, as he said, under Carnap's influence, was aimed at developing a consistent common-sense terminology for the problem of meaning.

One can thus draw a line from his *Weltanschauungslehre* to his later works in American exile at the University of Southern California in Los Angeles, where Gomperz first went as a visiting professor in 1935 through the mediation of F. C. S. Schiller. Exile was a logical consequence of his refusal to join the "Patriotic Front" after the takeover of Austro-Fascism: "As the only non-Nazi-Professor I refused to join and in September 1934 I was prematurely retired on a pension on which my wife and I could hardly have lived" (ibid., 24).

After the "Anschluss" Gomperz decided not to return to Vienna and lived in Los Angeles until his death in 1942. He led the toilsome life of a scholar, which he bore with a certain ironic and stoic aloofness. His Viennese library on the history of German literature and philosophy (18,000 volumes) was rescued from the Nazis under adventurous circumstances and bought by the University of Southern California after the war (Nethery 1976; Rizzo 1983). The importance of his philosophy as a document of a past era of Viennese culture can nowadays only be inferred from the few traces of influence (among others, in Karl Popper and in the theory of semiotics).

If one views Heinrich Gomperz and Karl Popper and their relationship to the Vienna Circle, in the context of Austrian philosophy, the following significant commonalities can be detected:

1. Both share a methodological nominalism, with Popper making explicit references to Karl Polanyi and Heinrich Gomperz. His anti-essentialist view that there are real, "non-linguistic" philosophical problems consolidated the dualism of philosophy and science and was supported by his distance from Wittgenstein's positions, as can already be seen in his *Logic of Scientific Discovery*. In the case of Gomperz, this nominalism had led, since his *Weltanschauungslehre*, to the

pragmatically oriented theory of signs and terminology of *Interpretation*. Both thinkers, however, did not turn their anti-metaphysical position into dogma. Instead they adhered to gradual transitions or tentative demarcations between non-empirical and empirical statements. In Popper, empiricism became diluted (through conventionalism and rationalism), whereas in Gomperz it remained a fundamental element of his philosophy and *weltanschauung*.

2. The basic critique of Sigmund Freud and Alfred Adler which in Popper became hardened as an anti-psychological principle, is also present already *in nuce* in Gomperz, who, however, did not conclude a priori that psychoanalysis was unscientific. His syncretism (often criticized) led him to propose an integration of the mono-causal images of man, as he saw them, of Freud, Adler, Nietzsche, and Marx and to link them with his critique of an allegedly Jewish trend to *one* God and *one* explanation. Popper, by contrast, accepted no compromise in the question of the priority of the 'logic of discovery' over the 'psychology of discovery,' (Mach) which led him to objectivism and realism.

3. Popper's falsificationist criterion of demarcation as the only possible (non-symmetrical) alternative to a verificationist criterion of meaning may also be viewed as a reinforced methodological expression of his 'anti-linguistic' position. This position, however, along with his anti-inductivism, was not seen as a decisive critique of the logical empiricist program by the Vienna Circle itself (Sects. 7.3 and 7.4). Thus Popper's proposed solutions in *Die beiden Grundprobleme der Erkenntnistheorie* (The Two Fundamental Problems of Epistemology), i.e., the delimitation of metaphysics and science, and the rejection of trying to achieve 'secure' knowledge through induction, were criticized by some of its members (Neurath, Reichenbach), defended by others (Kraft, Feigl), and regarded as an exaggerated show of self-differentiation by others (Carnap, Schlick). Whereas in Popper's work the emphasis of (non-aprioristic) rationalism is most manifest, in the Vienna Circle the accent was more on empiricism (in particular in the original form of physicalism). In both the focus was on the uncertainty of knowledge (fallibilism) and in the case of Neurath, on the ambiguity of language as a whole. For Gomperz, too, there could be no exceptionless rationalism, since practical action in everyday life did not allow something like unconditional rationality in theory and practice (Gomperz 1934): a "critical rationalism" that embraced both life and science was thus not possible. For all these thinkers, the dualism of values and facts, ought and being was, however, reconcilable with the principle of rationalism.

4. The assumption of the fallibilism of progress towards "objective knowledge" with a correspondence theory of truth obviously does not transcend the framework of the so-called "Austrian philosophy" —a philosophy that had developed since the nineteenth century between the poles of objectivism and realism in an epistemological *and* logical sense. As hypothetical-deductive realism with constructivist leanings, this variant can be found in Viktor Kraft and Herbert Feigl, whereas the metaphysical-realist principle of Popper's "Three-World Theory" can be traced to Frege and Bolzano. Gomperz's *Weltanschauungslehre*, in particular the "Semasiology" in the second volume, can be seen as a prototype of a theory of signs (Seiler 1991, 1994). In their standard work *The Meaning of Meaning* (1923), Ogden

and Richards had already referred to Gomperz, in addition to Peirce, Husserl, Frege, and Russell. Roman Jakobson (1971) speculated that de Saussure's structuralist notion of the sign stemmed from Gomperz. The reception of these first beginnings of a theory of signs is more evident in Karl Bühler's *Sprachtheorie* (*Theory of Language*) (1934), and in Popper both Gomperz and Bühler are built upon in the development of critical realism and the theory of the three worlds. In the latter the so-called content of the proposition (as a logical-ideal fact) is postulated as an autonomous dimension alongside consciousness and body and finds elaboration as a "calculus of contents" with reference to Tarski. Popper's rejection of an empiricism based on probabilistic inductive reasoning is founded in this conception of a (Platonist) logical realism. It led Popper to the well-known definition of the empirical content of theories (by means of the criterion of falsification) and to the conventionalist solution of the basic problem of empirical science. This took place in parallel with Carnap's option of gradual confirmation and corroboration (with its information-theoretical thrust) (theoretical language vs. observational language). Thus it became evident that empiricism and rationalism were drifting apart. In Popper, the positive reception of Kant certainly prevailed. Even though his references to Kant (cf. Preface to *Open Society*) aim very broadly at enlightenment philosophy as such and the ethics of the Königsberg philosopher, and even though the synthetic apriori was modified as a hypothetical apriori, the so-far-neglected reception of the New-Friesian School (from Leonard Nelson to Julius Kraft) undoubtedly served as an alternative for the logical empiricist program with the *Tractatus*.

5. If one takes into account the evolutionist principle that was typical for the naturalistic conceptions in fin -de -siècle philosophy, one can detect in Gomperz and Popper a common (non-biologistic) developmental thinking with regard to language and theory. In the *Weltanschauungslehre*, the categories of substance, identity, religion, and form are described as primordial concepts on four developmental levels, namely, animistic, metaphysical, ideological, and criticist; on a fifth level, the concepts are ultimately reduced to feeling by means of the "pathempirical" method, "such that in consciousness the entire content of experience can be represented through ideas, but all its forms through feelings" (Gomperz 1905, vol. 1, 274). Popper applied the theory of evolution as a metaphysical research program on the metalinguistic level and viewed Darwinism (environmental selection) as being analogous to the principle of falsification (and Lamarckism to the principle of verification). He also compared theories of life with the emergence of problems. In addition, non-reproducibility (emergence) is also offered as a non-deterministic concept. Both models of development thus differed from the materialistic and biologistic theories of "upward development" that are found in the popular scientific monism at the beginning of the century. This led to related proposals regarding the problem of mind and body. Even if the existence of a long-term and general historical law of development was rejected by Popper as "historicist," one sees here the application of theories of the *Logic of Scientific Discovery* to historical and social science. However, Gomperz—in contrast to Popper—does not call into question history as a theoretical science in spite of all its shortcomings as compared to natural science.

6. If one compares the history of the reception of Gomperz and Popper, one does note significant differences. As a result of historical events, Gomperz was largely

ignored in Austria after 1945—the only exception being his reception in Ernst Topitsch's social philosophy and critique of ideology. Yet even in American exile, the over sixty-year-old Gomperz did not succeed in becoming acculturated in spite of his intellectual affinity to pragmatism. He was not able to continue the university career that had been abruptly interrupted in Vienna, and faced with constant existential difficulties, he was unable to build up a second academic existence. Already in Vienna this had been very much limited institutionally by his personal professorship, which was without a permanent chair and assistant. Thus there was not enough time for a successful transfer of knowledge. He was also too old and his historical orientation was not sufficiently in demand, as becomes clear if one compares his career with Reichenbach's and Carnap's in Los Angeles, both of whom were relatively successful.

Karl Popper left hardly any trace in Austria before World War II, with the exception of the Vienna Circle. This state of affairs remained unchanged for several decades later, until the Second Republic—and the re-importation of "critical rationalism" alongside the reception of analytical theory of science, especially in the Austrian provinces. Before then, Popper's social philosophy, as developed in the *The Open Society and Its Enemies*, had been widely discussed in England and America, and later also in the German-speaking countries. This trend was mainly reinforced by the so-called *Positivist Dispute in German Sociology* (Adorno et al. 1976), but at the same time led to a radical problem shift and the ideologization of the debate between representatives of Critical Theory and Critical Rationalism (representing the unrepresented Logical Empiricism). Even though Karl Popper is today one of the most widely cited and best-known German-language philosophers, this standing seems primarily based on his social philosophy, even more so in the wake of the political upheaval in Europe since 1989–90. A critical reception of Popper's theory of science—from the *Logic of Scientific Discovery* to its *Postscripts*, the *Conjectures and Refutations*, *Objective Knowledge*, and even the reprint of *Die beiden Grundprobleme der Erkenntnistheorie*—has not really taken place. One of the reasons for this seems to be that amidst the popularization of Critical Rationalism as a school the much-vaunted battle of the arguments took second place. Thus Critical Rationalism gained a wide philosophical public through the vast quantity of secondary literature, but at the same time the clarity, stringence, and quality of Popper's philosophical arguments have been negatively affected.

7. To summarize, both Heinrich Gomperz and the intellectually related Karl Popper can be characterized as belonging within the ideal-typical framework of Austrian philosophy. By this we do not assume some sort of "Austrian national philosophy," since this would allude to the unsolved problem of Austrian identity. Rather, such a résumé is in keeping with Gomperz himself who, in 1936 in a short American article on the Austrian philosophy of the last sixty years, adopted a surprisingly cautious tone considering that he was known to be critical of Austria:

> It is not easy to say whether any common and specifically 'Austrian' features may be detected in all these approaches. What is clear, however, is that a perpetual exchange of ideas as well as of persons has been going on between Austria and the rest of Germany (sic!) and that, if Austria has been richly fertilised by the great currents of German intellectual life, it has amply repaid its debt by itself contributing to these currents in a measure that ought never be overlooked. (Gomperz 1936a, 311)

7.2 The Gomperz Circle—Discussions 1929–1931 (Fragments)

In connection with Edgar Zilsel, Heinrich Neider gave the following account of the Gomperz Circle:

> Zilsel was not really a very radical thinker in the sense of Carnap and Hahn. He was a student of Gomperz, he had completed his doctorate under Gomperz, and I was actually more familiar with him from the Gomperz Circle. However, he had also always been present in the Schlick Circle, and in political terms he was rather left-wing… The connection between the two circles was rather loose. That is, in personal terms: Carnap, Hahn, Neurath, Mrs. Neurath, Kraft and I belonged to both circles. Gomperz held Carnap in particularly high esteem. A 'tournament' was once held for Carnap, to put it bluntly. Reininger was invited to perform and then there was a long debate between Reininger and Carnap (Neider 1977, 28).

Asked to specify the topic, Neider answered as follows:

> That was the problem of metaphysics. For Reininger philosophy, which he did not refer to as metaphysics, did have a distinct subject-matter. For him metaphysics belonged to conceptual poetry. Yet there were for him specific problems of philosophy: the psychical, physical, etc. Carnap, by contrast, argued that these were simply logical questions and that there was nothing for philosophy to do beyond logical clarification. This was not Reininger's view. (ibid.)

Karl Popper had reported in an interview (cf. Sect. 7.5) details about his contacts with Heinrich Gomperz and his circle, with whom he became acquainted through Karl Polanyi. Yet he added that he was more likely to discuss philosophy with Gomperz in private than in a group.

It is also worth noting that Gomperz gave no account of his circle's activites and that we thus have to rely once again on speculations on his influence of which little note was taken. The following reconstruction can thus only be seen as a fragmented survey. Yet even as such, it should convey how intense the contacts were in and between the two circles.

1929

12-01-1929 Discussion between *Heinrich Gomperz* and *Rudolf Carnap* on "Meaning," with *Franz Kröner*, among others
0902–1929 *Herbert Feigl* on *Brentano*'s concept of probability

1930

24-05-1930 *Franz Kröner* on *Heidegger's* "Being and Time," with *Karl Bühler*, *Hans Hahn*, among others
1406–1930 *Franz Kröner* on *Heidegger* III, with *Viktor Kraft*, among others
28-06-1930 *Hans Hahn* on mathematics, identity and reality

1931

28-02-1931 *Otto Neurath* on his book "Empirical Sociology"
21-03-1931 *Else Frenkel* on eidetics

16-05-1931 Discussion with *Robert Reininger* on his "Metaphysics"
06-06-1931 *Heinrich Gomperz* on *Joachim Wach*'s book *Understanding* (vol. 1 and 2, 1926/1929)
20-06-1931 *Else Frenkel* on the conference of the Kant-Society in Halle

1932

13-12-1932 *Moritz Schlick* vs. *Karl Popper*

1934

30-03-1934 (Gomperz Circle at *Edgar Zilsel*'s)
? 1934 *Arne Næss* on dichotomies of propositions, in particular the dichotomy of "true" and "false"

Source: Carnap's diary, Archives of Scientific Collections Department. University of Pittsburgh (USA) and Vienna Circle Archives, Rijksarchief Noord, Haarlem (NL).

7.3 *The Logic of Scientific Discovery* in Context

Karl Popper's autobiographical writings[1] name the following important stages in his life: he was born in Vienna in 1902; under the influence of Arthur Arndt, a Machian, Marxist, and monist, and of the Austrian Social Democratic movement he became a pacifist around 1915–16. However, under the sway of the revolutionary post-war events and the ensuing militarization in the First Republic, Popper underwent a radical change of world view. As a member of the socialist student movement—for a short time, around 1919, he thought of himself as a communist. But an incident in that year, which he had personally experienced, shattered his faith in Marxism (Hacohen 2000).[2] In 1919, during a demonstration of unarmed socialists and communists in Vienna, some young workers were shot by the police. This triggered a conversion in Popper:

> The fact that in this clash on Hörlgasse a number of young people were killed led me to a critical reassessment of communism. Of course, I was aware that the communism of these young people was rather immature, just as my own communism was. But what I did see there clearly for the first time was the following: Marxism in its version at that time claimed that capitalism was claiming more human lives every day than the entire social revolution would ever demand. That was a claim that was very weakly grounded. I realized that the sacrifice of human lives, therefore, was something to be dealt with very, very carefully and sparingly, especially when it was demanded by others or when others were put in a situation in which their life was threatened. (Popper 1982, 9)

[1] Popper 1974, 3–181; Popper 1979a, 1982.

[2] Hacohen 2000 shows that this political transition took more time than Popper claimed later on.

After this experience the young Popper began to question the scientific nature of Marxist theory, in particular its claim that history followed a determined line of development, even though, by his account, he still saw himself as a socialist until the early thirties (Kolb 1976).

Popper developed a similar skepticism towards psychoanalysis and individual psychology (in spite of or precisely because of his activities under Alfred Adler), while at the same time he recognizing the stringent scientific nature of Einstein's theory of relativity. As opposed to the other theories, the latter allowed an empirical refutation of a deduced prognosis. For, as he said,

> psychoanalysis does not exclude any possible human behavior. It does not say that under certain circumstances it is impossible that a person does one or another thing. Thus, whatever a person does becomes a confirmation of psychoanalytic theory. (Popper 1982, 11 ff.)

In an analogous vein, he stated the following about Marxist theory:

> Marxism claims that the causal course of any social change begins with the change in means of production. As a result of this change, the relationships between people also change and this finally leads to changes in society's system of power. The last thing that changes are the ideas in society: the thoughts of man, the ideologies. The Russian Revolution showed that exactly the opposite can happen. Namely, a certain idea, for instance the idea that socialism consists of the dictatorship of the proletariat plus electrification – Lenin's main idea – that such an idea can change society from above and can thus also change the means of production. This is obviously a refutation of Marxist theory, but, of course, it was not perceived as such by the Marxists. On the contrary, they claimed that the Russian Revolution was a Marxist revolution and had been predicted by Marxism. (ibid., 12)

By contrast, Popper saw Einstein's theory of relativity as a showcase example of scientific probity, as

> Einstein tried to work out those cases which might refute his theory from a critical standpoint. And he also said: if these things could be observed, he would immediately give up that theory. The only way to obtain experimental confirmations of a theory is to consider how one could show that a theory is false and then try to make this situation materialize. And if it cannot be made to materialize, despite all one's efforts, then and only then could the failed attempt to refute the theory be regarded as a confirmation – but never as a definitive confirmation. (ibid., 13)

Such an *experimentum crucis* was actually carried out in 1919 in the Eddington Expedition. Here the predicted defraction of light was measured by means of the sun's mass and confirmed.

These early experiences and insights informed Popper's later theory of science, social philosophy, and political position—from his first book *The Logic of Scientific Discovery* to his critiques of totalitarianism written in exile during the forties, *The Open Society and its Enemies* (1944–45) and *The Poverty of Historicism* (1944), and even his later publications such as *Objective Knowledge* (1973).[3]

Here it is not possible to analyze if and to what extent Popper really understood the criticized positions of Marxism, psychoanalysis, individual psychology, and finally "positivism"—this issue has already been dealt with in the relevant

[3] See Geier 1994 and Hacohen 2000 for a concise overview on Popper's life and work.

secondary literature.[4] The tension between Popper and the Vienna Circle in the thirties will be illustrated in relation to the so-called "Popper legend."

Popper's autobiographical account also mentions the period at the beginning of the First Republic[5] when Popper left high school prematurely, enrolling as an outside student at the Vienna University and not obtaining his secondary school diploma until 1922. During this time, he worked in road construction, was trained as a cabinet-maker, and did social work for handicapped children under Alfred Adler, whose theories—unlike Manès Sperber (1970)—he did not criticize as being non-scientific. Manual work was thus supposed to help overcome the "poverty of theory"—a striking parallel to Ludwig Wittgenstein's biography in the twenties. Popper also decided to train as a teacher and planned intermittently to build a provincial boarding school. At the university he studied mathematics with Hans Hahn—from whom he claimed to have learned the most in this period—as well as physics and psychology. His intense preoccupation with the theory of polyphonic music was to become a motive for his later preference for the "logic of scientific research" instead of the "psychology of scientific research." (Blaukopf 1994).

From 1925 to 1927 Popper attended the renowned Pedagogical Institute of the City of Vienna—the leading educational center of Vienna's school reform, worked in a children's day-care center, and completed his Ph.D. in 1928 under the cognitive psychologist Karl Bühler with the philosophical dissertation *Zur Methodenfrage der Denkpsychologie* (Methodological Issues of Cognitive Psychology). Moritz Schlick had served as his (not so enthusiastic) second advisor. Karl Bühler who held the (philosophical) chair for psychology from 1922 to 1938 had initiated a third path of psychology between psychoanalysis and behaviorism.[6] It is from him that Popper borrowed the basic elements for his three-world theory and his theory of the "objective mind." From 1929 until his emigration in 1937, Popper taught mathematics and physics as a secondary school teacher. He did both theoretical and practical work in the spirit of the Viennese school reform movement on the foundation of Karl Bühler's cognitive Gestalt and developmental psychology. This psychology served as a point of departure for both his anti-inductivistic and non-sensualist notion of experience within the framework of a hypothetico-deductive theory of science. Popper's contributions in the journals *Quelle* and *Schulreform*, the organ of the Viennese reform education movement spearheaded by Otto Glöckel, must be seen in this light.[7] He also shared this involvement, even if with a different accent, with

[4] Cornforth 1970; Adorno et al. 1972; Habermehl 1980; Spinner 1982; Müller, Stadler, and Wallner (eds.) 1986. See K. Müller 1993 on Popper studies; Jarvie, Milford, Miller 2006.

[5] On Popper's "political" biography see Stark (ed.) 1971; Grossner 1971.

[6] Crucial for reception: K. Bühler 1927, 1933, 1934. Bühler advocated a non-inductivistic theory of "image-free" thinking which regarded language and thinking as guided by theory and independent of sensory impressions and contents of thought. This also meant a critique of atomism and positivism. Mainly from Bühler's *Sprachtheorie* (1934) Popper also adopted the classification of the functions of language into expression, appeal, and description, as well as the conception of language as a system of signs. On Bühler see Lebzelten 1969; Eschbach (ed.) 1984. See Benetka 1995 and Stadler 2015 on the Bühler school and on the Institute of Psychology.

[7] Glöckel 1928. Cf. Adam et al. 1983 on the school reform movement.

Otto Neurath, Edgar Zilsel, and Hans Hahn, and in a broader sense maybe even with Ludwig Wittgenstein (cf. Chap. 9). Apart from Bühler, Popper met the philosopher Heinrich Gomperz through the Austro-Marxist political economist Karl Polanyi.[8] Through the mediation of Gomperz he came into contact with the ideas of the Vienna Circle.[9] By his own account he had to develop his realistic position in epistemology to counter the latter's position. Gomperz encouraged Popper in 1932 to publish his manuscript *Die beiden Grundprobleme der Erkenntnistheorie*, which formed the basis of his *The Logic of Scientific Discovery* (*Logik der Forschung* (1934–35).[10]

Prior to this, then Popper had already had some preliminary personal contacts with the Vienna Circle.[11] He had known Edgar Zilsel, who along with Otto Neurath was present in the Gomperz Circle, since he had been a student. Popper had heard about the Vienna Circle for the first time through a newspaper article and through a speech Otto Neurath gave to a socialist youth group around 1926–27 (Popper 1973a, 51–56). He then read the manifesto *Scientific World View: The Vienna Circle*, as well as an article by his mathematics teacher Hans Hahn and the books by Rudolf Carnap that had been published by then (*Logical Structure* and *Pseudo-Problems in Philosophy*). He already knew Wittgenstein's *Tractatus Logico-Philosophicus* from his student days. After Popper's critique of Carnap and Wittgenstein, Heinrich Gomperz referred him to Viktor Kraft. The latter had also taken a hypothetic-deductive and realist position in his book *Die Grundformen der wissenschaftlichen Methoden* (The Fundamental Forms of Scientific Method) (1925).[12] After several meetings with Popper in Vienna's Volksgarten park, Kraft seriously studied his critique of the Vienna Circle (Kraft 1973, 10). In the winter semester of 1928–29, Popper attended one of Carnap's seminars and met Herbert Feigl around 1929. Feigl had recognized Popper's importance for the philosophical development of logical positivism, urging him to publish his manuscript (Feyerabend 1966, 7). After this contact was established, he had further private conversations with Moritz Schlick, whose originality and independence he greatly admired, and with Rudolf Carnap, Friedrich Waismann, Karl Menger, Kurt Gödel, and Hans Reichenbach who—like Neurath—severely criticized him (Feigl 1969, 642).

Nonetheless, Popper lectured in several discussion groups associated with the Vienna Circle at the invitation of Viktor Kraft, Edgar Zilsel and Karl Menger (cf. Sect. 5.5). These lectures resulted in conversations with Hans Hahn, Philipp Frank, and Richard von Mises. In this context, his voluminous manuscript of *Grundprobleme* was read and commented on by Feigl, Carnap, Schlick, Frank, Hahn, Neurath, and Gomperz. This exchange of ideas was continued in the summer of the same year in

[8] Cf. K. Polanyi 1978, 1979.

[9] On the relation of Gomperz and Popper in connection with Austrian philosophy see Seiler and Stadler (eds.) 1994.

[10] Cf. the publication of a large part of this manuscript: Popper 1979b, with an introduction, ed. by Hansen.

[11] Popper 1974, 58–67; Kraft 1974, 185 ff.

[12] For a philosophical account see Schramm 1992; Radler 2006.

Ötztal in Tyrol, where he spent time together with Feigl and Carnap. The latter two, however, had different memories of this period.[13] As a result of a lecture that he gave in one of the groups mentioned, Popper was finally invited in 1935 to join Karl Menger's renowned Mathematical Colloquium (Popper 1974, 80), one year after his book *Logic of Scientific Discovery* had appeared in the series Schriften zur wissenschaftlichen Weltauffassung, edited by Schlick and Frank, with the explicit recommendation of Schlick.[14] Among the mathematicians he came into contact with were Kurt Gödel, Abraham Wald, and Alfred Tarski. He had met the latter in 1934 at the Prague Preparatory Conference for the International Congresses for the Unity of Science in August and September of 1934. At the meeting organized by the Vienna Circle Tarski spoke on "Methodological Studies on the Definability of Concepts" and on "The Theory of Probability and Many-Valued Logic," while Karl Popper offered a critical supplement to Neurath and Reichenbach, lecturing on "Inductive Logic and the Probability of Hypotheses."[15] Here Popper believed to have recognized Tarski's refutation of "positivism" with his semantic theory of truth. On the impact of Tarski on his philosophical development we can read the following:

> In early 1935 I met him [Tarski] again at Karl Menger's colloquium which Tarski and Gödel belonged to and where I also met such great men as Skolem and Abraham Wald. In these days, I asked Tarski to explain to me his theory of truth which he proceeded to do with an approximately twenty-minute lecture on a bench (an unforgotten bench) in Vienna's Volksgarten park. He also offered me a glimpse of the proofs of the German translation of his great work on the concept of truth which he had just received from the editor of *Studia philosophica*. No words can describe how much I learned from this, and no words can express my gratitude. Even though Tarski was only slightly older than I, and even though we had become very close in these days, I saw him as being my real teacher in philosophy. I never learned as much from anyone else. (Popper 1979a, 350)

Tarski's modern rehabilitation of the classical correspondence theory of truth seemed to Popper to offer a suitable basis for his critical realism of everyday understanding. He saw it as an adequate means to counter non-semantic conceptions of physicalist unified science as endorsed by Neurath and in part by Carnap, but although the latter had constructively integrated Tarski's findings after 1930 (Carnap 1934a).

At the Mathematical Colloquium Popper succeeded in triggering a discussion on the statistical concept of probability, following the lead of Richard von Mises (Popper 1979a, 137–45). In contrast to von Mises and Abraham Wald, he demanded a definition of the contingency of finite series of events and an understanding of the static notion of probability as "propensity," which Hans Reichenbach strongly opposed but which Carnap and Hempel also endorsed (Carnap 1936; Hempel 1935, 1936).

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[13] According to Popper, after this meeting Carnap incorporated Popper's suggestions in his essay "On Protocol Sentences," whereas Carnap's comment's on Popper's criticism in his diary were quite friendly and calm.

[14] Cf. The correspondence between Philipp Frank and Schlick (WKA Haarlem). The latter promoted the publication of the *Logic of Scientific Discovery* with the former's agreement.

[15] Erkenntnis 5 (1995): 80–99 ff., 170–74 ff.

Until his emigration to New Zealand in 1937, Popper took part in the International Congresses for the Unity of Science organized by the Vienna Circle (cf. Sect. 4.2.5). He was also present during the so-called protocol sentence debates that had been conducted since the early thirties on the empirical foundation or coherence of a physicalist unified science. In the third volume of *Erkenntnis*, in his response to Neurath's contribution "Protocol Statements," Carnap countered Neurath's claim of the relativity of protocol sentences in the context of a coherence-theoretical epistemology by making concessions to Popper: for the variant "protocol sentences within the system language" he accepted as a protocol sentence every concrete sentence of the physicalist system language. In opposition to this relativism, Schlick postulated a "foundation of knowledge" based on non-verbal "affirmations"—as a correspondence-theoretical agreement of sentences with facts as opposed to an agreement of statements among each other (Schlick 1934). Neurath, in turn, argued polemically in his response, "Radical Physicalism and the 'Real World'" (1934), that the idea of an "agreement with reality" belonged to the metaphysical conceptual schemata of traditional school philosophy.

Popper's critique of the induction and probability concept endorsed by Reichenbach and others followed one year later. Reichenbach (1935b) drew a line between the "logic of induction" and hypothetico-deductive realism in his essay "Induction and Probability: Remarks on Karl Popper's *The Logic of Scientific Discovery*" (in: Reichenbach, M. and Cohen 1978, vol. 2, 372–3879 ("Über Induktion und Wahrscheinlichkeit. Bemerkungen zu Karl Poppers 'Logik der Forschung'" (*Erkenntnis* 5 1935b)). Neurath followed suit with an attack against the "Pseudorationalism of Falsification." Reichenbach's radical rejection of Popper's *Logic of Scientific Discovery* was, as already stated above, ameliorated by Carnap's charitable review in the same volume (Carnap 1935). At the Paris congress (1935a, b) Popper lectured on the "Empirical Method" in an excellent scientific system, and at the congress in Copenhagen (1936), which focused on the general theme of "Causality," he spoke on Carnap's *Logical Syntax of Language*; the latter contribution, however, was not included in the congress proceedings (Popper 1979a, 115–36). After the war, Popper himself reported that he was mainly interested in Carnap, whom he regarded as an outstanding philosopher (as did Kraft, Schlick, and Feigl), even though he claimed that he had been mainly influenced by Karl Bühler and Richard von Mises.[16]

Speaking in general terms, Popper's relation to the Vienna Circle was highly ambivalent—if one reads his own account. He was certainly overstating the case when he wrote that he had opposed all forms of positivism in Vienna from 1930 to 1937 and in England in 1935–36 (Grossner 1971, 138). The opposing side—with the exception of renowned figures such as Neurath and Reichenbach—did not consider the discussion to be a struggle between rivals. Popper wrote: "fighting logical positivism being by no means a major interest of mine" (1976, 88), and then: "When writing my *Logik der Forschung* I hoped only to challenge my positivist friends and opponents" (ibid., 89). Here we can detect ambivalent motives, just as they are also

[16] Popper 1974, 976. See also R. v. Mises 1968 (1st edition 1951).

to be found in his fastidious description of the key experience of which there were a number of versions:

> I was never a member of the Vienna Circle, but it is also a mistake to assume that I was not a member of the Vienna Circle because I was against the Vienna Circle. That is not true, either. I would have very much liked to have been a member of the Vienna Circle. The fact is simply that Schlick did not invite me to take part in the seminar. That was namely the way that one became a member of the Vienna Circle. (1982, 39)

And in a different passage one reads,

> Feigl writes, …, that both Edgar Zilsel and I tried to preserve our independence "by remaining outside the Circle". But the fact is that I should have felt greatly honoured had I been invited, and it would never have occured to me that membership in Schlick's seminar could endanger my independence in the slightest degree. (1976, 212)

I think that Popper himself here addressed the real reasons for the 'schism.' There can only be speculation on why Schlick did not want Popper in his circle (probably for personal reasons).[17] Subsequently, Popper, however, stylized himself as the sole "killer" of the Vienna Circle, albeit one with great respect for his victim:

> It was not murder, it was manslaughter, at the worst. I very much admired the Vienna Circle, very much admired the various members of the Vienna Circle. Otherwise I would not have mainly criticized the Vienna Circle in my first book. That was – how should I put it – a token of respect, of admiration. (1982, 39)

Yet, one still senses a sort of "narcissistic injury" that was decisive for his exaggerated demarcation from the Vienna Circle:

> I never attended Schlick's private seminar, I was never invited. Feigl wrote somewhere that I was not a member of the Vienna Circle because I had wanted to keep myself apart from it. That was not the case. I would have gone immediately if Schlick had invited me. However, I believe that Schlick would not invite me because he saw me as an opponent. I had only one discussion with Schlick on these things, at his apartment. (ibid., 40)

If one takes into account Popper's explicit self-distancing from Wittgenstein,[18] one is inclined to agree with Carnap's assessment (1963, 31) that Popper overemphasized the real differences. Maybe one can add something that has been said somewhere else on Wittgenstein's relation to Karl Kraus (and would also apply to Wittgenstein's relation to the Vienna Circle): nowhere will differences erupt as violently as among relatives (Methlagl 1969, 69).

This interplay between proximity and distance will be addressed in greater detail in the following section.[19]

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[17] From the correspondence one can tentatively conclude that it involved a difference between the personalities and mentalities of Schlick and Popper. On Schlick's side their divergent opinions were not primarily motivated by the content. Their different attitude to Wittgenstein seems to have been a further reason for communication problems.

[18] Popper 1974, 97, 150. A detailed Wittgenstein-critique can already be found in Popper's *Open Society*.

[19] Cf. The related contributions in Müller, Stadler, and Wallner (eds.) 1986.

7.4 Some Remarks on the 'Popper-Legend'

Karl Popper's relation to the Vienna Circle was both contradictory and ambivalent, as can be inferred from the above discussion. This can also be confirmed by information from biographical and autobiographical sources, from personal recollections and philosophical historiography.[20]

In his intellectual autobiography, Karl Popper presented himself not just as the founder of Critical Rationalism (a movement that was autonomous and very different from logical positivism) but also stylized himself—least through *The Logic of Scientific Discovery*—as the philosophical "killer" of the Vienna Circle. The following lines can be found in the chapter "Logical Positivism is Dead: Who is the Perpetrator?":

> most of the logical positivists did not even notice that their position was radically called into question by my critique… But apparently it does not occur to anyone to ask: 'Who is the perpetrator?' I fear that I must admit that I am the perpetrator. (1974, 121)

Popper went on to argue that in spite of all the differences between Logical Positivism and Critical Rationalism he was wrongly seen as (neo)positivist and/or a member of the Vienna Circle, so that a veritable 'Popper legend' has established itself in the relevant literature. This legend is comprised of the following four points:

1. Popper was (and is) a positivist and (perhaps) a member of the Vienna Circle.
2. Popper advocates a criterion of meaning to exclude metaphysics as something both senseless and meaningless from science.
3. There is no difference between the criterion of meaning (of verification) and the demarcation criterion (of falsification).
4. Popper replaces the criterion of meaning of verification by a new one of falsification. (1974, 964 ff.)

The four, in part redundant, points also represent an answer to Viktor Kraft's "Popper and the Vienna Circle" (1974, 1185–204) in which the commonalities and the differences are dealt with—in a much too harmonizing way, in Popper's view. From a historical perspective Kraft stressed that Popper, even if not a member of the Schlick Circle, was still not an outsider, and that the development of his philosophical work cannot be understood without reference to the Vienna Circle. Since 1928 Popper had been in personal contact with Carnap, Feigl, Waismann, Menger, Gödel, and Kraft and had assimilated some of Waismann's and Zilsel's ideas. He was influenced to a great extent by the considerable contacts he had had with the Vienna Circle with regard to his assessment of logic and mathematics, non-sensualist empiricism, and a principally anti-metaphysical attitude. Consequently there was a mutually critical but not irreconcilable relationship with a shared philosophical basis—not unlike the relationship between Wittgenstein and the Vienna Circle.

[20] Popper 1973a, b, 1974, 1979a, b, 1982. For an account of the Vienna Circle see Kraft 1950a; Carnap 1963; Feigl 1981.

In the following, this relationship will be analyzed on the basis of historical and biographical material and philosophical remarks, and Kraft's suggestion that it was characterized by an asymptotic approach between the two parties will be supported. Karl Popper claimed his autonomy with the following objections against the 'Popper-legend':

Ad1. He had always been a metaphysical realist (but not a materialist).
Ad2. Metaphysics is not a meaningless (vacuous) pseudo-science (but rather a heuristics for potential scientific hypotheses).
Ad3. The difference between the criterion of meaning and demarcation is crucial, since the central issue concerned can only be the *demarcation* between empirical and non-empirical statements.
Ad4. The falsificationist criterion of demarcation thus implies that the foundation and corroboration of theory is completely different from the criterion of meaning. (1974, 970 ff.)

The resulting rejection of inductivism in favor of a fallibilist deductivism (according to the "modus tollens" inference scheme) reflecting a Darwinian conflict of ideas, the rejection of a sensualist or phenomenalist positivism in the Machian sense, the critique of an exaggerated anti-metaphysical attitude as well as of the one-sided Wittgenstein reception within the Vienna Circle ("All philosophy is critique of language") subsequently became features of Critical Rationalism. Let us now try to examine more closely the four points of the "Popper legend."

1. It has become evident that the image of the Vienna Circle as a philosophically homogenous, closed circle is untenable in both objective and biographical terms. Even though the participants of the "inner circle" between 1924 and 1936 had been personally invited to the Boltzmanngasse by Moritz Schlick and Popper, in his own words, had never been asked to participate, Schlick did meet with Popper in his own apartment.[21] In any case, Schlick published Popper's *The Logic of Scientific Discovery* in the renowned *Schriften zur wissenschaftlichen Weltauffassung,* which he edited together with Frank. He described Popper's book as a "clever work," albeit with a "misleading account" and anti-positivist features that created basic oppositions in an artificial way.[22] One reason that *The Logic of Scientific Discovery* had been accepted for the ambitious series was that, according to Schlick, it dealt with "the problem of induction with a sharp mind."[23] In addition, Herbert Feigl, who had initiated the publication, found "Popper's critique valuable, but by no means original, and moreover the other differences were not very significant."[24] Rudolf

[21] On Dec. 13, 1931 Carnap noted in his diary (loc. cit.): "Schlick … on Popper. He thinks there isn't anything new there. Where I point to Popper's critique of Wittgenstein's views on the laws of nature, he says that Wittgenstein hadn't meant it that way. Still, he is going to phrase his expert opinion for Springer in a more positive way than he had originally intended to. He doesn't want to have Popper in the Circle permanently [*sic!*]. He says that Kraft also said that he [Popper] was trying to take center stage too much." (Schlick's expert opinion concerned *The Logic of Scientific Discovery*.)

[22] Schlick to Carnap, 9-1-1934 (WKA Haarlem).

[23] Schlick to Frank, 6-9-1933, ibid.

[24] Feigl to Schlick, 9-14-1933, ibid.

Carnap—the most important point of reference for Popper in the Vienna Circle—gave a more positive evaluation of *Logic of Scientific Discovery* in his review published in *Erkenntnis* (1935, 290–94).[25] With Neurath's approval, he invited the author to the Prague Preliminary Conference for the International Congresses for the Unity of Science, because Popper "stands at least as close to us as Zilsel, Menger…."[26] As already mentioned, Popper then gave a critical commentary titled "Inductive Logic and the Probability of Hypotheses" on Neurath's "Unity of Science as Task" and Reichenbach's "Logic of Probability." As in his book, Popper argued for the principled impossibility of induction. Like Richard von Mises, he backed the principle of falsification and a definition of probability as relative frequency against Reichenbach's "Induction and Probability of Hypotheses" (*Erkenntnis* 5 1935b), 170 ff.). Carnap, however, also found that Popper was offering "an unnecessary amount of critique,"[27] while Neurath, who had already emigrated to The Hague, wrote a massive and influential reply to Popper in a text with the militant title "The Pseudorationalism of Falsification":

> Popper's *Logik der Forschung* contains many remarkable passages whose significance for the logic of science has already been acknowledged by Carnap. But by a certain kind of pseudorationalism, Popper blocks his own way to a full appreciation of the practice of research and the history of research to which his book is basically devoted. Namely he does not use the ambiguity of all factual sciences as the basis of his comments, but … aims at one unique distinguished system of statements as the pattern or paradigm of all the factual sciences. (Neurath 1935b, cited from Neurath and Cohen (eds.) 1983, 121)

Neurath presented his likewise fallibilist and conventional encyclopedist conception as an alternative to Popper's falsificationism. In the spirit of Duhem and Poincaré, his conception amounted to a theory of scientific holism. For him the issue was not just individual sentences (propositions), but an entire class of sentences, theories, and model encyclopedias in a coherence-theoretical context of justification and truth.

Carnap, Quine, and Hempel introduced this concept into the modern discussion a little later ("Quine-Duhem Principle"). Neurath thus anticipated at a very early date some of the basic ideas of Thomas Kuhn's *Structure of Scientific Revolutions* and thus also the critique of Critical Rationalism in the course of the externalism-internalism debate. In general terms, Neurath opposed a philosophical absolutism

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[25] "Popper is very close to the Vienna Circle's views. In his representations the differences appear to be much bigger than they actually are. To a certain extent this is due also to the fact that Popper puts considerably less emphasis on the points that correspond with the Vienna Circle's newer publications than on the critique (which is certainly justified in certain areas) of our earlier opinions. Popper's views, too, have certainly been influenced by those of the Vienna Circle in some points. This is not to deny the independence of his overall conception and many of his individual observations, of course. Recently, Popper has also exerted a certain influence on our circle" (Carnap, *Erkenntnis* 1935, 5:293). Hempel also offered a positive review in ibid., 149 ff., and in *Deutsche Literaturzeitung* 58 (1937): 309–14.

[26] Carnap to Neurath, July 8, 1934, WKA Haarlem.

[27] Carnap to Neurath, Jan. 23, 1935, ibid.

for which, in a different context (the controversy over the empirical basis of science), he had also criticized Schlick (Haller 1982b).

The position of a "metaphysical realism" that Popper claimed exclusively for himself had also been represented by Viktor Kraft, Karl Menger, Kurt Gödel, Herbert Feigl, and Moritz Schlick before *The Logic of Scientific Discovery* appeared: there was already a pluralism of epistemological theories in the Vienna Circle of the twenties. In 1912 Kraft had backed this movement in his book *Weltbegriff und Erkenntnisbegriff* (*The Concept of the World and the Concept of Cognition*). Kraft thus remarked to Carnap[28] that in his lecture and in his book he had "already endorsed deductivism, he was largely in agreement with Popper and Hahn" who, like Popper, had postulated concepts that cannot be constituted and denote what cannot be directly observed.

Popper's distance from the Vienna Circle had yet another facet. When the majority of the Vienna Circle went public with the Ernst Mach Society from 1929 to 1934 and became active in the adult education movement, Popper apparently did not make an effort to lecture in this forum, in which many prominent scholars from outside the Schlick Circle participated (cf. Sects. 4.1, 4.2, 4.2.1, 4.2.2, 4.2.3, and 4.2.4). In addition to Schlick, Carnap, Neurath, Hahn, Waismann, Zilsel, and Philipp Frank, a large segment of the Austrian intellectual avant-garde also lectured there (cf. Sect. 4.2.1). The question of why the politically progressive liberal Karl Popper did not become involved in the Ernst Mach Society seems to have turned on what separated the popularizing ambitions of the Vienna Circle and the philosophical loner: it was the revolutionary ambitions in connection with the Viennese cultural movement that found expression in the 1929 manifesto—of which Popper did not think very much.

2. Karl Popper's critique of the verificationist criterion of meaning must be viewed against the backdrop of the Vienna Circle's philosophical pluralism. In the early thirties, the original criterion of meaning ("The meaning of a sentence is the method of its verification") was no longer understood so strictly by Hans Hahn, Karl Menger, Kurt Gödel, and Rudolf Carnap—possibly as a result of Karl Popper's influence. It yielded to logically precise expressions, and was debated in connection with the "logical tolerance" formulated by Menger and Carnap (cf. Sects. 4.1, 4.2, 4.3, and 4.4). Menger himself reported that in the period from 1927 to 1932, Hahn, Feigl, and Carnap gradually moved away from the criterion of meaning—as well as from a dogmatically held anti-metaphysical attitude. This pluralism was also reflected in the discussion on the basic problem between correspondence and coherence theoreticians; in the fact that the opposition between analytic and synthetic sentences had become less absolute; in the estimations of whether ethics could be a science; in the alternatives between conceptual realism and nominalism and between syntax and semantics; in the discussions on "positivism and realism"; and, finally, also in matters of world views and politics.

[28] Carnap's diary, Dec. 14, 1932.

In the inter-war period, the anti-metaphysical attitude of the Vienna Circle served mainly as an intellectual weapon against the rampant irrationalism and the idealistic speculation and ideology of the authoritarian universalism of Othmar Spann and his influential adherents in Austro-fascist intellectual life.[29] On a different level, non-empirical systems, such as the scholastic theory of natural law, vitalism in biology, Heidegger's texts *What is Metaphysics?* and *Being and Time*, as well as Klages' *Der Geist als Widersacher der Seele* (Spirit as the Antagonist of the Soul), were criticized by means of the criterion of meaning. Against this political background the pragmatic use of "Occam's razor" (Hahn 1930) becomes more understandable as a scientific tool against speculation and reaction: it did not just represent a response to a purely philosophical problem.

In his critique of *The Logic of Scientific Discovery*, Neurath—as already mentioned—underscored the one-sided focus on theories and theorems of natural science as well as the overestimation of the criteria of meaning and demarcation. Popper did not react directly to this fundamental critique—nor to the later one by Paul K. Feyerabend (1981, 245–79)—even though a large portion of these ideas would in due course be addressed in the general debate about the relationship between the history and philosophy of science (Stegmüller 1980). Apart from this, the concept of falsificationism faces logical shortcomings similar to those of verificationism, because of the impossibility of falsifying existential statements, the problem of finite ranges, and the inevitability of (inductive) procedures of the corrobation of basic sentences. Thomas Kuhn's contribution to the non-cumulative progress of knowledge, the critique of the internalist model of science, shook the foundations of the "trial-and-error mechanics" of scientific development in the (Platonic) heaven of "World 3" as much as it shook rigid verificationism.[30]

Alfred J. Ayer reformulated the critique of Popper's solution to the two basic problems (of induction and of the demarcation of experience from metaphysics) in the last years of his life (1982, 131 ff.). On the one hand he directed attention to the open problem of the empirical founding of (falsifying) basic sentences and to the decisionism of the whole procedure of falsification; on the other, he drew attention to the destruction of commonsense thinking when inductive corroboration was rejected, resulting in skepticism.

3. Opinions in the Vienna Circle were not limited to the inductive justification criticized by Popper. In the works of Schlick, Feigl, Kraft, Menger, and Neurath, we can also find the hypothetico-deductive methodology postulated by Popper as an alternative. Furthermore, Neurath and the others did not make an absolute distinction between "context of discovery" and "context of justification." While Carnap neglected the pragmatic aspect of knowledge—which was subsequently compensated for by Charles W. Morris (1977, 1981)—he already pointed at an early date to the question of the conventionalist basis of a group of scholars. Popper answered the pragmatic question (of the conventionalist basis problem) decisionistically to the effect that only the initial decision for Critical Rationalism provided access to

[29] In this context see Mohn 1977; Hegselmann 1979a; Nemeth 1981; Dvořak 1981. Cf. also Chap. 8.

[30] Oetjens 1975; Kuhn 1973, 1978a.

knowledge. Through such a decision one accepts from the outset the fact-value dualism or (in Feyerabend's terminology) the dualism of theoretical and historical traditions.

Summing up we can say:

1. There was no homogenous, closed Vienna Circle embodying a philosophical school. The pluralism of the individual positions was evident both in the inner "wings" and in the organizational forms between "center" and "periphery." The minimal shared basis of this open forum was a critical, scientific attitude towards the different forms of metaphysical system philosophy and politically authoritarian structures—a position also held by Popper in his time. One difference between them—in particular, from the so-called "left" wing—resulted from Popper's rejection of the comprehensive concept of a scientific world conception with a physicalist orientation and its claim to reform society. Later in the thirties, Popper rejected the empiricist encyclopedia, aligning himself politically with liberalism, albeit not in the same way as his promoter and friend Friedrich A. von Hayek.[31]

By contrast, the Ernst Mach Society also addressed the practical and political side of "The Elimination of Metaphysics through Logical Analysis of Language" (Carnap 1931; English in: Ayer (ed.) 1959) in the spirit of a theory and practice inspired by reformatory ideals. The scientific world conception was to serve the integration of everyday life, politics, and science, thereby contributing to a reform of society. The differences between Popper and the Vienna Circle were perceived as greater by the former than by the latter, with the exception of Neurath's head-on attack on "pseudorationalism," which criticized above all philosophical absolutism (in Neurath's words, the "non-pluralist view"). This is evident both in the publications from the time and the unpublished Vienna Circle correspondence. Neurath, for instance, found the author of *Logic of Scientific Discovery* talented, but in his view "many expressions were not sufficiently well-founded."[32]

Neurath formulated the actual differences between them very clearly (in particular with regard to the anti-metaphysical position) and endorsed an intense study of Popper, whom he called the "official opposition" of the Vienna Circle.[33] In the conflict with Carnap towards the end of World War II, Neurath distinguished three phases of influence on the Vienna Circle that led to a gradual breaking away from the empiricism of an encyclopedia of unified science: first, the "Wittgenstein boom," second, the "Popper period," and third, the "Tarski period."[34] In the personal corre-

[31] For a comparison of Popper and Hayek see Redhaed and Starbatty (ed.) 1988.

[32] Neurath to Carnap, Jan. 18, 1935, WKA Haarlem.

[33] Neurath to Carnap, Jan. 28, 1935, and Sept. 9, 1935, ibid.

[34] Neurath to Carnap, Nov. 18, 1944, ibid. Neurath had already written about Carnap's review of *Logic of Scientific Discovery*: "It is certainly nice of you to act as Popper's advocate. But in fact it is us more than him who need an advocate … I think Popper's way of ignoring what is there is a bit rich. A Viennese man, born and raised in an atmosphere which is so familiar to me and also to Frank, and which you have got to know quite well, too, wants to be the original genius, as it were. That is just not possible. Once you are unfortunate enough to grow up in such a highly-developed environment, you are always bound to be a continuer in many respects. And I consider it important from an educational standpoint, too, that Popper learns to accept this, also and mostly because his polemic is so out of place…."

spondence between Popper and Neurath, the latter said that the former put too much stress on the differences between *The Logic of Scientific Discovery* and physicalism.[35]

2. Today's ahistorical perspective of the relationship between Popper and the Vienna Circle is also a result of the *Positivist Dispute in German Sociology* (Adorno et al. 1976).[36] Apart from the fact that the epistemological epithet of "positivism" is inappropriate for the Vienna Circle and that an in-depth study of the history of the problematic of philosophy must be taken into account (Stadler 1983), the equation of Logical Positivism and Critical Rationalism in the perspective of the Frankfurt School was justified by the self-understanding of some Vienna Circle members, but not by that of Karl Popper. This still needs stressing, even though Popper and his German follower Hans Albert cited Lenin's polemic *Materialism and Empirio-criticism* (1908) in order to make their own, non-positivist (realist) position clear. Indeed, Lenin's book, which Popper commended as an excellent study and whose basic ideas he incorporated into one of his own essays,[37] is an important focus of twentieth century philosophy. It occupies this position by virtue of the fact that it does not only, as intended, distinguish "idealistic" from "materialistic" minds, but that from its publication until the political turn in 1989–90 it also served to codify the dichotomies bourgeois-reactionary vs. proletarian-progressive, philosophy vs. science, positivism vs. materialism, reformism vs. revolution, etc.

In this context, Popper's reference to Lenin's polemic treatise against the prominent empirio-criticists in the Russian social democratic movement is interesting for two reasons. On the one hand, according to Lenin's criteria, Critical Rationalism, too, would have to be classified as idealistic (ultimately also in view of the mind-body problem), while, on the other, Lenin's position indirectly confirms the difference between traditional philosophy and the "philosophy-free" scientific world conception, as was already described by Philipp Frank (1932).

Viewed from a greater distance, Karl Popper was closer to the Vienna Circle that he himself cared to admit, whereas the Vienna Circle members did not show such a pronounced contrast. They all, no doubt, shared the scientific ethos (logical-rational thinking), a commitment to the (methodological) unity of sciences, but also the shortcomings of verificationism and falsificationism. After World War II their work also reflected a certain distance between normative analytic theory of science and concrete scientific practice. Popper, however, remained more allied to traditional philosophy with its dualism of science and philosophy that was supposed to be overcome in the encyclopedia project of the Vienna Circle. (Neurath, Carnap, and Morris. 1970–71). There remains the opposition between philosophical "relativism" and "absolutism" as a philosophical contrast. Popper remained an adherent of Kant not only in ethics, which the Vienna Circle perceived to be an anachronism.

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[35] Correspondence between Neurath and Popper 1934, ibid. On this see M. Neurath and Cohen (eds.) 1983, especially the contribution of Popper (51–55).

[36] See Dahms 1994 for the most recent systematic reconstruction of the positivism dispute.

[37] First publication, Popper 1953.

Karl Popper's own achievements and contribution to contemporary philosophy are uncontested. Hardly any other philosopher from Austria has found such great public resonance—also in the German-speaking world—be it at conferences and congresses, in *Festschriften* and anthologies, radio and TV programs, or in the wide field of secondary literature. And hardly any other philosopher is so much the subject of political discussions as Karl Popper and his social philosophy of the "open society." This alone would be an interesting topic for further research.[38]

For precisely these reasons, an objective, historical reconstruction free of myth- and hero-creation is necessary. The Vienna Circle ceased to exist as an organizational entity by 1934–36, and by 1938 it was dead altogether. Who was responsible for this? Was there (only) one perpetrator? Isn't an attempt at explanation that is based on such a criminal metaphor rather problematic?

As a detective one would have to say: if there was a fatality at all—present research clearly speaks against this being the case—then there were a number of perpetrators. These came mainly from the Circle's own ranks, including students, and from those of its critics. Moreover, important ideas and theses have been assimilated into analytic philosophy of science and language, thereby undergoing a productive process of transformation. Thus the anti-positivistic critique of the "received view" of traditional philosophy of science at the beginning of the sixties was essentially inherent in the pluralist concept of Logical Empiricism (Suppe 1977). Strictly speaking, the critical forces were to be found in the dynamic of internal controversies (like those between Neurath and the "Wittgenstein group") as well as in the political developments with the crucial breaks of 1934 and 1938 (cf. Sect. 4.2.5). By 1938 at the latest, scientific reason had been extinguished in Austria, and the intellectual emigration, of which Karl Popper was also a part in 1937, reached its peak. This exodus has not been compensated for even today (Hacohen 1996).[39]

What remained of the Vienna Circle, as can be seen in the publications and events of recent years,[40] are problems addressed by it; the exact method of formal logic, mathematics, and linguistic analysis; the basic empirico-rational position; and the enlightenment goal of the concrete utopia of a more humane society.

In this movement, Popper assumes an important place: not as a heroic demolisher and solitary genius but as an independent thinker on the periphery of the Vienna Circle who contributed his own, original ideas in line with and in opposition to the Circle. Popper must count as an innovator and critic in the tradition of Wittgenstein, Russell, Einstein, Tarski, and Quine, and also as an important point of reference for the Vienna Circle in the discourse of scientific philosophy. Any historical analysis

[38] Popper 1945, vols. 1–2; *Critical Rationalism* 1975, vols. 1–2, Magee 1973.

[39] Cf. Sect. 4.2.5.

[40] Cf. the publications of the Vienna Circle Collection series (Kluwer), "Boston Studies in the Philosophy of Science" (Kluwer), "Wiener Kreis – Schriften zum Logischen Empirismus" (Suhrkamp), "Veröffentlichungen des Instituts Wiener Kreis" (Hölder,- Pichler, -Tempsky, and Springer), "Vienna Circle Institute Yearbooks" (Kluwer and Springer), "Studien zur österreichischen Philosophie" (Rodopi).

of the problems of Logical Empiricism that does not give this exchange of ideas adequate consideration will thus be subject—as in the case of the Vienna Circle and Wittgenstein (Chap. 6)—to justified criticism. Criticism, of course, is what Karl Popper raised to the exclusive principle of continuous progress in knowledge.

7.5 Documentation: Popper and the Vienna Circle—Excerpt from an Interview with Sir Karl Popper (1991)[41]

Youth

Dahms: It was then later … that you left the house completely, for this caserne, number something or other.

Stadler: 'Barracks,' for the barracks in Döbling.[42]

Popper: In Grinzing! … For a while, I no longer have any idea how long, I was the manager. 'Manager' they called it, that means it was my responsibility to see that the toilets were clean and such like.

D: You said that they were nicknamed the 'communist barracks.'

P: Yes, they were.

D: It seems to have been something like a reservoir for failed attempts at Soviet Republics, on the one hand from Hungary, on the other hand from Munich. Did you talk to those people about their attempts and their failures …

P: Of course I did, naturally, yes of course I was in contact with the people.

St: Was *Karl Polanyi* also there?

P: No, no, he wasn't. But friends of the Polanyis were there, I don't recall their names any longer, names have become very difficult for me since my stroke. Among other things I was imprisoned together with a Hungarian communist, and I helped him. He translated Lenin's *Empirio-Criticism* into German, I didn't know Russian, but I could speak better German than he could and I helped him with the German version.[43]

St: That was not published until … years later in fact.

P: I don't know.

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[41] The interview with Sir Karl Popper by Hans-Joachim Dahms (D) and the author (St) took place on August 31, 1991, in Popper's house in Kenley, Surrey (UK). The following text is an excerpt from the interview transcript containing passages of particular relevance to the subjects addressed in this book. The conversational style was largely retained, with only a few corrections or condensations where there were redundancies (marked by "…"). I would like to thank my colleague and friend Hans-Joachim Dahms (Göttingen, Germany) for producing the final version, and Mrs. Melitta Mew, the curator of Karl Popper's estate, for granting permission to print the text.

[42] For a description of the so-called "barracks" cf. Popper's autobiography: Popper 1979a, 49.

[43] V. I. Lenin's book *Materialism and Empirio-Criticism* first appeared in Russian in 1909. The first German translation appeared in 1927.

D: 1927 or so.

P: At any rate I became acquainted with it at that time and was astonished how good the book was, a good book.

St: And that also influenced you in your judgment of *Mach*, or did that only provide confirmation?

P: I thought it was a good book and I had the same or similar opinions about Mach.

St: It was like this: *Fritz Adler* translated it and told Mach about it. After all, his wife was Russian … and then Mach said to him that he didn't understand it, the whole book was a misunderstanding, because he had never—and he wrote this in the autobiographical sections—he had never doubted that there is an objective external world and didn't understand all the polemics against him.

P: One has to read the *Analysis of Sensations*.

St: The *Analysis of Sensations*. He was of the opinion that he did not represent any kind of sensualism, but rather—to use today's terminology—a phenomenalism in the widest sense, whereas Lenin always brought him into connection with sensualists in the tradition of *Berkeley*—"*esse est percipi*"—and he subjectively rejected that.

P: But he also accepted it.

D: Lenin's book did, incidentally, also have an influence on the Vienna Circle. At least, I get the impression that Neurath's transition from this phenomenalism, as it is to be found in Carnap's *Logical Structure of the World*, to physicalism was—at least partly—motivated by Lenin's criticism, which Neurath probably became acquainted with in Moscow.

P: Which I find quite good but, talking about Carnap's phenomenalism and the *Logical Structure*, have you read my critique of that?[44]

D: Where is it to be found now?

P: Somewhere in my Carnap criticism I mention the fact that it was my first critique. Actually my first encounter with the Vienna Circle was through *Feigl*: Feigl's wife was a friend of cousins of mine, and Walter (*Schiff*) was very fond of her and he invited Feigl to his place and asked me if I would like to come.
My uncle (*Walter Schiff*) knew that I had criticized Carnap and I asked him if I could perhaps mention it at some point, anyway, I told Feigl the following: that Carnap's book *The Logical Structure of the World* does not allow any synthetic propositions. Only contradictory or analytical propositions. Why? Because he first of all defines all concepts extensionally, so that 'red' is the class of my experiences of red. If I say that something is red, the proposition is true if it belongs to the class of my past experience of red. If I say that something will be red tomorrow it is contradictory … He was absolutely dumbfounded.

[44] Karl Popper, "The Demarcation between Science and Metaphysics," in: Schilpp (ed.) 1963; 183–226. Carnap's reply: ibid., 877–881.

St: How did he react?
P: I critiqued Carnap in two minutes!
St: And how did Feigl react? Did he say anything or …?
P: He spent the whole night together with me. First of all we walked around Vienna and then I went up to his place. We spent the whole night in discussion.
St: And did he then accept the criticism?
P: He then accepted it, yes. I also told Carnap. But he didn't have anything to say about it. Yet that didn't stop him reviving the whole thing and having it translated into English without saying a word about this criticism.
D: Isn't that all because of his choice of the basic concept, the remembrance of similarity?
P: The remembrance of similarity is the basis of an extensional definition. The class 'red' is in the end extensionally defined as my remembrances of red. I mentioned all that very concisely in my critique of Carnap, that is in the Schilpp volume. But history moves on and so does admiration etc.
St: Good, but I just wanted to say that of course Carnap did relinquish this position.
P: Carnap was a very nice person.

The Path to Philosophy—The Gomperz Circle

St: We spoke before about a work by Theodor Gomperz. Can we pursue the question of the Gomperz family a bit further? They are important characters, both *Theodor* and *Heinrich Gomperz*. Could you tell us how you came into contact with the family and what their meetings were like?
P: My family was somehow loosely acquainted with their family. I don't know how, but I then got to know Heinrich Gomperz through Karl Polanyi, I don't know how. Anyway, Karl Polanyi told me that I should go to see Gomperz and then I began visiting Heinrich Gomperz fairly regularly. And that continued until Heinrich Gomperz left Austria.
St: He left in 1935.
P: Yes, and that is also something very interesting. Just as it wasn't publicly announced when I was being thrown out, so too no-one really knew that he had been thrown out. It did not get into the newspapers.
St: He refused to sign … for Dollfuss.
P: He didn't join the what's-it-called …?
St: *Vaterländische Front* (Patriotic Front).

P: He didn't join the *Vaterländische Front* and that was the reason, the official reason. *Schuschnigg* threw him out. I mention that because many people in Austria believe that Schuschnigg was a liberal.[45]

St: I would be interested in one thing: Gomperz was an early critic of psychoanalysis … he even tried psychoanalysis himself.

P: Incidentally, I spoke with (Edgar) Zilsel quite a lot about psychoanalysis and also about Adler. I will never forget how Zilsel said some very intelligent things about it, some very intelligent things.

St: Critique of psychoanalysis?

P: He was interested in psychoanalysis, critically interested, like me, and he said, very intelligently—I can remember this exactly: These are all partial attempts, how shall I put it, the mind, and also the subconscious, is much richer than any of these people understand. He said that very … That was perhaps my most satisfying meeting with Zilsel.

St: And who else was at the Gomperz house?

P: Zilsel of course knew Gomperz very well, he was his academic teacher and …

St: Right. I believe he also wrote his dissertation under him. And Viktor Kraft was also in the Gomperz Circle?

P: He too was, yes, one may say that.

St: Did you meet in the Circle to discuss certain subjects, or was there simply a loose discussion?

P: I have … I was not in any circle. I always visited Gomperz privately, for about two hours or so and basically told him about my ideas, and then we would talk about them and he would tell me various things, for example about Mach and how, as a younger man, he was influential in bringing Mach to Vienna. He told me various things … he told me about what's his name? That famous philosopher, Viennese philosopher?

St: Jodl? Stöhr?

P: No, no; one moment—the Aristotelian?

D: Brentano.

P: About (*Franz*) *Brentano* he told me quite a lot. He was very ironic about Brentano.

St: Did he tell you about his own principal work, after all he had written a book, the *Weltanschauungslehre*?[46]

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[45] Kurt Schuschnigg (1879–1977), 1927–34 member of the lower chamber of the Austrian parliament for the Christian-Social Party, Minister of Justice in 1932–33, and Federal Chancellor (in succession of Chancellor Engelbert Dollfuß, who had been murdered during a failed Nazi putsch in 1934) in the authoritarian *Ständestaat* (corporative state) until Austria's Anschluss to national-socialist Germany in 1938. From 1933 to 1936 Schuschnigg was also Minister of Education.

[46] Heinrich Gomperz, *Weltanschauungslehre. Ein Versuch, die Hauptprobleme der allgemeinen theoretischen Philosophie geschichtlich zu entwickeln und sachlich zu bearbeiten* (A Theory of World-Views. An Attempt at a Historical Development and an Objective Treatment of the Main Problems of General Theoretical Philosophy). Vol. I: *Methodologie*, Jena-Leipzig, 1905; Vol. II-I: *Noologie*, Jena-Leipzig, 1908.

P: Yes, I have that, that's over there (*points to a bookshelf*).

St: And he was, so to speak, also on the edge of the Vienna Circle, he was also in contact with the people …

P: I talked about the *Weltanschauungslehre* with him. The *Weltanschauungslehre* is an incredibly interesting book, even if the basic assumptions are not possible, as I believe. Yet there are incredibly interesting observations on the history of philosophy in it, and among other things I, of course, also asked him why he had given it up. He had given it up because he had given up the basic assumptions.

Popper, Wittgenstein, and the Vienna Circle

St: Let us move on to the Vienna Circle and its early history. Actually I only wanted to ask whom you already knew before these later, quite close contacts. For example, you write that you got to know *Otto Neurath* very early on at a lecture or at a meeting.

P: I got to know him even earlier. There was a restaurant. Akazienhof it was called, now I remember the name, Akazienhof in Währingerstraße …

St: Near the university?

P: More or less opposite the Institute of Anatomy there was a little street which ran downhill, the first turning after Berggasse, and there—that is, on the right when you walk down—there was the Akazienhof, and I often sat there with colleagues. Neurath was there and (*Hans*) *Thirring* and some of those people. I got to know Neurath there and then I went to a lecture which I liked a lot. Of course I met him on a great many occasions, among other things I went with my students to …

St: The Social and Economic Museum?

P: The Social and Economic Museum.

St: Picture statistics! The … Vienna method of picture statistics was *the* educational program. And the later, closer contact with Neurath came about only after your work, your dissertation. You also met other … members of the Vienna Circle as a student. You write that during your studies you were impressed by *Kurt Reidemeister* and *Hans Hahn*.[47] You attended the lectures and later you were then invited to the Mathematical Colloquium. You gave a lecture about *Karl Menger* at the Mathematical Colloquium. Could you tell us about the impression they made upon you: Hahn, Reidemeister and Menger, what role did they play, what was decisive for you, or what did you criticize …, even at that time?

[47] Cf. Karl Popper's foreword to the *Gesammelte Abhandlungen* (Collected Treatises) of Hans Hahn in Schmetterer and Sigmund (eds.) 1995.

P: No, I didn't criticize anything. I was one of Reidemeister's pupils and it was a very nice class and, how shall I put it, we helped him in teaching, he was a very nice person.

St: And yet Hans Hahn was a bit different, a well-established professor?

P: Hahn was quite different. Hahn was a rather intimidating personality. With Hahn I first saw the *Principia Mathematica* and first heard about Russell.

St: … and Hahn also introduced the *Tractatus* as reading material.

P: Yes, yes.

D: To put it in a nutshell: you already knew a great many of the later Vienna Circle members, but from other contexts than the Vienna Circle itself: such as Neurath in 1920, Zilsel from your failed attempt at the school-leaving exams, the mathematicians of the Vienna Circle from lectures. Exactly when and how did you then become aware of the existence of this group …

P: Through an article by Neurath. I don't know any longer where the article was, but I believe it was in a daily newspaper.

St: In the *AZ* there was an article entitled "Wissenschaftliche Weltauffassung. Der Wiener Kreis" (Scientific World Conception. The Vienna Circle). In the *Arbeiterzeitung*.

P: Yes, but that was later. A bit earlier he wrote an article in which he talked about the attempts … and I had expected that it was about concerns similar to mine. Anti-Marxism was very important to me, and I had expected that they would be sure to discover that Marxism is nonsense and was rather disappointed that, how shall I put it, that Neurath's criticism of Marx was essentially limited to the fact that he wanted to replace materialism with physicalism. I was very disappointed by that.

St: That was the new form of materialism for him, replacement.

The Schlick Circle and its Ramifications

D: So you had discussions with individual members of the Vienna Circle, but you say that you were never a member of the Vienna Circle itself.

P: The Vienna Circle consisted of a seminar to which Schlick invited people personally.

D: Yes, and you were not invited. I ask myself how that happened? Was it perhaps due to the fact that this Schlick Circle consisted simply of a few of Schlick's friends and colleagues who were professors and a few doctoral candidates?

P: I don't know how it happened. All I know is what I have already said. Schlick invited people personally to this seminar. And I knew, how shall I put it, important and unimportant members. A lot of them. I mean, I knew Karl Menger very well, I knew Feigl, I knew … Viktor Kraft. I had more to do with Viktor Kraft than with any other members. We often went for a walk in the Volksgarten park and I met him at the university library. He used to like going for a walk with me, so that we very often went there and that is probably the reason why he listed me as a member of the Vienna Circle in his book. I probably talked more about the problems of the Vienna Circle with him than any other member.

St: One might say that his views were also nearest to your views. He proposed an epistemological realism and the hypothetical-deductive model …

P: He was by far the nearest to my views and, how shall I put it, he was the easiest one to talk to. He didn't have …

St: Any reservations, you mean?

P: Unlike Neurath, he wasn't so penetrating, you know, or something like that. Rather, he was interested in the subject in and for itself, without any side thoughts.

St: You have written a lot about that and what you say now fits in well. Nevertheless, many outsiders are surprised that your work, the *Logic of Scientific Discovery*, appeared in *Schlick* and *Frank*'s series Writings on the Scientific World Conception.

P: That was Frank. Frank, who was a very nice person, was a Machian, as you know, but extremely open-minded. And he definitely wanted it to be published there.[48]

St: And he also suggested it to Schlick?

P: Evidently he did, I don't know the details … he was in Prague and often, when he came to Vienna, he would phone me and let me know. I didn't like going to coffee-houses, but two people got me to the coffee-house. One was Frank, the other (*Richard von*) *Mises*.

St: That's another thing I wanted to ask you. Did you often meet Mises in Vienna?

P: Mises held court, so to speak, in … what's the name of the coffee-house in Herrengasse?

St: 'Central' isn't it?

P: 'Central,' I believe so.

St: It's been renovated now, yes.

P: Mises held court there, he called me up to tell me when I should come to Central.

St: Who else was there with Mises then?

[48] Cf. Schlick's divergent opinion in Sect. 7.4.

P: O yes, there was an especially nice man, Helly.
St: *Eduard Helly*. A mathematician.
P: Yes, a particularly nice person, I was also often in contact with him. He didn't live very far away from me when I was living in the Anton-Langer-Gasse, in the house which belonged to my wife. My wife owned a little house there. Helly was not far away from there.
St: Mises came down regularly from Berlin at this period, didn't he?
P: Mises came down regularly from Berlin, then there was an *Dozent* in chemistry, who went with Mises to Istanbul or Ankara, I don't know any longer.
St: You also write that you found Mises very convincing … as far as probability, the concept of probability, was concerned—the objective concept of probability.
P: Yes, yes, the concept of probability, I really did … That is secondary, I mean secondary in the sense that one buys something second-hand, antiquarian. I mean, it comes from Mises. I had read a great deal about probability but what satisfied me most at that time was Mises. But there were some unsolved problems and I spoke about some of these unsolved problems with Mises.
St: These were, as it were, actually external satellites of the Vienna Circle.
P: Well, of everything which is in the *Logic of Scientific Discovery*, probability is most strongly influenced by someone else, namely by Mises. But I have departed from that since then, I believe. You will know that.
St: The interpretation of propensity.
P: Propensity, yes.
St: Were you in contact with Mises after he left for Istanbul?
P: Yes, yes, I met him above all in America, in …
D: Harvard.
P: In Harvard, yes … You see, I had a friendly relationship with almost all the members … I believe I was least friendly with Schlick, I must say.
D: That surprises me. You write about Schlick's early work with quite a lot of respect, especially about his *General Theory of Knowledge*.
P: I was very fond of the *General Theory of Knowledge*, a beautiful book.
D: Yes, and one has the impression, although I have never found it explicitly in your work, that you believe that a development for the worse has set in with the influence of Wittgenstein on Schlick. If one compares the *General Theory of Knowledge* with the essay 'The Turning Point in Philosophy' …
P: Yes, terrible.
D: That is really your opinion, that it's …
P: Terrible, yes, terrible.
St: Under the influence of Wittgenstein?
P: I believe that, quite apart from the fact that he was most appallingly wrong in his predictions, and that philosophy only degenerated and did not …

St: … would not have solved any further problems …?

P: Apart from that, it was an essay of dogmatic narrow-mindedness. But in the *General Theory of Knowledge* there is a very, very, very great deal to be found.

D: Can we now go back to the Schlick seminar. So he didn't invite you to his seminar, to his circle, but that …

P: That was a special seminar.

D: If one begins to speculate, there could be several reasons. For example, the reason could have been, quite simply, that you were not one of his doctoral candidates. Did you actually attend his lectures?

P: Pardon?

D: Did you attend his lectures or seminars?

P: Not the seminars. I went to some of his lectures, but he didn't know that, and it was really only a very few. In general I went to lectures relatively seldom. I did more reading.

D: So, apart from that episode with your oral doctoral examination, Schlick hardly knew you at all at that time?

P: He knew me slightly. But I believe he was not shocked because I had criticized him. I believe he was very sensitive about Wittgenstein, and that was the reason.

St: That is confirmed in the correspondence …

P: What?

St: I can confirm that from the correspondence. Schlick described your criticism of Wittgenstein's concept of the laws of nature as inappropriate, and he was of the opinion that Wittgenstein did not intend it that way. I believe it was a matter of regarding the law of nature as conventions.

D: The pseudo-proposition position.

St: Natural laws as pseudo-propositions or as 'instructions.' He regarded this criticism which you made of Wittgenstein as misplaced.

P: I think it would be better not to enter into that—still, if you want to: I didn't know exactly what Wittgenstein had said. Other people didn't know either, but it was published.

St: Wittgenstein's discussions with Schlick and Waismann.

P: The Waismann papers. I saw them about a year ago for the first time and then saw that Wittgenstein expressly says that verification and falsification are exactly symmetrical. He demands complete verification, quite expressly. So at that point he said precisely the same thing which I had interpreted.

D: Yet I believe the complication is that Wittgenstein understood the whole of verificationism as a theory of the meaning of mathematical propositions.

P: Pardon?

D: Wittgenstein understood this verificationism—"the meaning of a proposition is the method of its verification"—as a theory of the meaning of mathematical propositions and at first demanded this complete verification of mathematical propositions, then afterwards seemed to somehow transfer this to empirical propositions.

P: Yes, I no longer know how he did that, but he did do it.

St: So, you said that most of the members of the Vienna Circle enjoyed friendly relations with you and you with them. Theoretically … there must have been reservations on the part of the Wittgenstein party, but someone who …

P: I wouldn't go so far as to say that. Waismann …

St: Yes, right, Waismann.

P: Waismann certainly belonged to the Wittgenstein party, yet he was very open-minded.

St: Yes, you had a close and positive relationship with Waismann.

P: Yes.

D: You write that you also met him after the war.

P: Yes, above all I brought him to Cambridge.

St: Right, and you yourself went to New Zealand.

P: I went to New Zealand and then Wittgenstein treated him in that frightful way.

St: Yes, had nothing to do with him.

P: In Cambridge. And the only man—he couldn't speak much English—the only man he knew in the whole country was in the same city and at the same university and never allowed him to visit him. Wittgenstein never saw Waismann face to face. He said to his pupils: if you go to Waismann, then you cannot come to me any longer.

St: … And yet since 1929 Waismann had been attempting to create a popular version …

P: And the man writes about ethics and morality etc. Not much, but still.

St: Yes, Waismann had been attempting to create a popular version of the *Tractatus*.

P: Yes.

St: And Wittgenstein never accepted what he had written, he always rejected it.

P: Wittgenstein said: "Publish it, but I will kill myself." And yet Waismann's book is very good.

St: *The Principles of Linguistic Philosophy*.[49]

P: Really, yes.

D: It is at least easier to understand than the *Tractatus*.

[49] Waismann 1965. The first German version only appeared in 1976 (*Logik, Sprache, Philosophie*).

St: But someone who then really criticized you from the Vienna Circle and … even described you as the "official opposition," who recognized the fact that you had a critical attitude to logical empiricism and to the Vienna Circle, was Otto Neurath. Neurath wrote the essay "Pseudorationalismus der Falsifikation" (Pseudo-Rationalism of Falsification). What I would like to know is: Did you speak about it to Neurath and did you respond to his criticism?

P: I spoke to him about it a little, but we didn't, how shall I put it, we did not always have very much time. We didn't sit down to talk about it. I was not unhappy with the criticism. I was not dissatisfied. It did make some sense. But I also believed that he would develop another opinion, but we didn't discuss it. I was actually very astonished. We had talked previously and I was astonished, and I must say almost flattered even, that he published it. We had spoken about it beforehand and he had roughly indicated his opinion, but I didn't think that he was taking it so seriously as to actually publish it.

St: But he had taken your book seriously and he had seen that it was another …

P: Yes, yes. I just didn't expect that he would take it so seriously. (A glider appears in the sky above Popper's house)

St: It's not coming down here, is it? I saw the TV film … You got into the plane here, didn't you?

P: Yes, yes, that's 'my' plane. … Yes, but one thing which I hold against the Vienna Circle and in particular against Neurath is that he attempted, as it were, to storm the world politically. Not politically in the sense of Marxism or something, but in the sense of taking over the chairs.

St: You mean at the university?

P: To gain power in the universities, that's what I mean by 'politically.'

D: Where does one see that, do you think? Carnap was awarded a chair in Prague, or what?

P: I mean, I only saw this from the outside, but it entered the Vienna Circle with Neurath. Neurath was a politician somehow, in both, how shall I put it, in malice and mission. He had also been a minister in Munich. And he really did hold these various meetings, these various conferences etc., first of all to make the Vienna Circle known, which in my opinion is not a political activity but a philosophical one, and secondly, perhaps really to give himself power.

St: But he himself never held a chair!

P: Not to give himself political power directly, but to give himself power at the university. And that was something which I didn't like.

D: Yes, that is also what the people from the Frankfurt School claimed, that theoretically it is simply a kind of sect, and practically a better kind of employment agency.

P: That is nonsense.

D: Well, perhaps it is a bit exaggerated, but …

P: The Frankfurt School was really much worse.

D: Yes, that's clear. I simply wanted to ask how you arrived at this impression. They have in truth not improved at all.

P: Actually such things do not interest me at all, when people accuse each other in that way, but I didn't think it was right.

St: In actual fact, the Vienna Circle was on the defensive at University of Vienna. There was only Schlick who had a chair beforehand and Neurath never received a position other than that of university lecturer.

P: Quite correct, absolutely correct. But nevertheless his operations were those of a general who also organizes on a generous scale, in the hope of achieving something like that in this way. Whether he was successful in it or not, is another question. I didn't like it at all.

St: … you say that you didn't like this enlightenment impulse, or this public orientation in the Vienna Circle. Yet the fact is that Neurath was only part of this movement and that many members of the Vienna Circle were already criticizing Neurath at that time as you do today, on account of his popularization, of …

P: …it was not so much the popularization …

St: Or this organization, for example Schlick and certainly also Feigl and Waismann viewed these activities with a very critical eye.

Visits to International Congresses of Philosophy

D: You maintained your contact to the Vienna Circle and its activities on the various journeys which you undertook all over Europe, first in Prague and then in Paris and finally in Copenhagen, in preparation for your emigration.

P: You see, I liked all those people, that's why. I liked Neurath very much indeed. He was an interesting and very unusual person. One has to admit that he had very, very wide-ranging interests. In my opinion he was a kind of Marxist, he supported a kind of politics which I regarded as very wrong. Furthermore, he was especially naive, in the best sense of the word. His attitude to communism was naive, decidedly naive. So much so, that he believed he would be able to convert them to his own ideas.

D: Yes, but he turned away from these hopes of reform at some point. There is one statement to the effect that he was appalled at the emergent persecution there, and especially the Moscow show trials.

P: Yes, probably, yes, but I really don't know. Part of the time I was in New Zealand.

St: These conferences in Prague, Paris, and in Copenhagen, they were certainly also a way of getting a foothold for you, weren't they?

P: It was Neurath's decency which enabled me to get invited to these conferences, it was …

D: From the range of participants involved and from the way in which they were organized, were they not actually more like an extended family gathering of the logical positivists?

P: Yes, yes, more or less.

D: And in then accepting these invitations, you belonged with them as well, so to speak, is that so?

P: How shall I put it?

St: As part of the family. Part of the extended family, adopted.

P: How shall I put it? I would definitely have gone to Schlick's seminar if he had invited me, why not? One doesn't like to miss out on anything. I mean, how shall I say? I was not there as a spy, was I? It's all ridiculous isn't it? But the fact is simply that I was not there. I would have liked to have gone. How shall I put it, I regarded the party business, which was promoted above all by Neurath, as being wrong, but I still liked Neurath, and I was glad when he invited me.

St: There were various opinions about this in the Circle … about Neurath, about "Einheitswissenschaft" (unified science), about physicalism. There is the biting remark made by Hans Hahn, who said that today it is once again about "Einheizwissenschaft" (the science of heating), i.e., with a 'z' …

P: Yes, I know that. Incidentally, Hahn also invited me to his place. I felt that to be a great honor, because for me he was my very remote mathematics teacher.

St: Could we get back to these congresses? In Prague, this Prague congress. What was the atmosphere like there, was it a large-scale public event, was it well-attended or was it only the *inner circle*?

P: It was a large-scale public event. Then immediately afterwards there was the …

St: World Philosophy Congress.

P: The World Philosophy Congress, and it was intended that those people at the congress who were interested were somehow invited to go to another congress first, and certainly some people did go. There were, I would say, perhaps 100 or 150 people at the congress.

St: And the Paris congress was then very big indeed?

P: That was much bigger, that was held in grand style.

St: One can see that from the list of speakers, and it must certainly have been a great event. Was there much discussion there about politics, about fascism actually? Or were there only philosophical discussions?

P: How can I remember? Remembering is difficult, isn't it? Of course there were questions about fascism etc. in my mind and they were very vivid. After all, I was just about to run away from it all, wasn't I?

D: Perhaps something more concrete. Were you also at the world congress in Prague?

P: Yes, but not the whole time. I believe I was there for two days. It was terribly boring.

D: I once held the program for the congress in my hand, and there was also a topic which obviously had been added shortly before the congress, and its title was "The Crisis of Democracy." So there must have been some discussion about the threat to democracy from the spread of fascism, while the various fascists from Italy and the German delegation supported the threat. Afterwards there was also a resolution passed in favor of democracy and freedom of thought, a really weak-kneed one. What I noticed was the fact that not a single one of all the people from the Vienna Circle, the positivists, took part in any of these more political discussions at the congress, even though they continued for many days and extended over many sections. Was the subject not interesting for them, or was that simply not an interesting subject at such a congress?

P: I was not there, I was not there. Look, among other things I also didn't have any money. After all, to stay on in Prague one needs money. Furthermore, my wife was waiting for me, to go hiking in the mountains etc. And it was terribly boring, so I sat there for one or two days and then I left.

D: Perhaps one can make this point a bit more general. It seems to me to be like this: the Vienna Circle had enlightened, politically left-wing views and also far-reaching practical ambitions. Yet when one looks at this whole period of Nazism etc., they never seem to have taken it as one of their subjects. That is somehow rather peculiar. Did you also feel this? I mean, in contrast to them you have made extensive studies of political philosophy. Which they never actually did.

St: Or was that only a private matter?

P: For goodness sake! I tried … what did I do? One of the nicest editors of the Vienna *Arbeiterzeitung*, which at that time was very different, on a different level than it is today …

St: It no longer exists.

P: What? No longer exists?

St: It was renamed the *AZ* and … then it folded up.

P: Aha. Well, at that time it was the best newspaper in Vienna, and I was friends with the *Braunthal* brothers.

St: One of them was *Julius Braunthal*.

P: Julius Braunthal was at that time the boss, the editor-in-chief of the *Arbeiterzeitung*. God knows I tried to exert a bit of influence through him. But he was an absolute admirer of Otto Bauer and it was impossible to criticize anything.

D: Could we perhaps come to talk about the Copenhagen story? … One of these congresses, which were organized by Neurath, these Unity-of-Science affairs, was this Copenhagen congress, which you too attended. What surprised me was that there is not a single word about it in your autobiography, and that it was taking place at exactly the same time as the news of Schlick's murder arrived. Could you say how that arrived and how you received it?

P: We were horrified when the news arrived there. Of course, everybody was horrified. One man, a—how shall I put it—professional Christian and a very good logician, said: "That's what comes of it."

St: But that was also in the Viennese newspapers.

D: Do you mean Bochenski, perhaps?

P: No, no, no. A German.

St: (Heinrich) Scholz?

P: *Scholz*, yes. He was the one who said it.

St: God's punishment, so to speak.

P: For godlessness, yes.

St: Well, yes, but that was also the tenor in the Viennese newspapers, it was there quite openly: this is the consequence of that godless philosophy. Above all of this Jewish philosophy.

P: Yes, yes. Somebody also said that there in Copenhagen. But he was the only one.

D: Was there actually any idea during this conference of breaking it off, as a result of the impression made by these events, and perhaps of addressing a flaming appeal to the world at large? That is, to react in some way or another, instead of simply getting on with the agenda.

P: We really didn't know anything. I do not know to this day, whether the man was also politically motivated, I have no idea whatsoever.

Miscellaneous Recollections about the Vienna Circle, the *Logic of Scientific Discovery*, and Individual Personalities

St: So, if you could describe to us how you became acquainted with members of the Vienna Circle in the phase from 1928 to 1930. That was when your contact with Feigl and Kraft and the discussions with Karl Menger began to intensify. You were working on *Knowledge and the Body-Mind Problem* from this time onwards, which means that you were in constant contact and discussion with the individual members or several of them, discussing your results, but also criticizing their work, for example on induction. It comes to mind that in 1934 and then later in Prague you criticized Reichenbach and his concept of probability …[50]

P: *Reichenbach* is really … he behaved badly towards me. Decidedly badly.

St: Couldn't he accept it, or what was the reason …?

P: No. Well, when I met him for the first time, Carnap introduced me to him, and he refused to shake hands with me.

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[50] Cf. Karl Popper, "'Induktionslogik' and 'Hypothesenwahrscheinlichkeit'" ('Inductive Logic' and the 'Probability of Hypotheses'), in *Erkenntnis* 5 (1935b): 170 f.; Hans Reichenbach, "Über Induktion und Wahrscheinlichkeit. Bemerkungen zu Karl Poppers *Logik der Forschung*" (On Induction and Probability. Remarks on Karl Popper's *The Logic of Scientific Discovery*), ibid., 267–304.

St: As a result of your criticism?
P: As a result of my criticism.
D: When was that?
P: In Prague.
D: At this preliminary congress.
P: Yes.
St: In this connection it would interest me about your uncle Walter Schiff, who was politically vulnerable, … a communist. At the same time professor of statistics
P: When *I* was a communist, he said to me: as a scientist I can guarantee you that that is false. When *he* became a communist, I said to him: As a scientist I can't guarantee you that that is false. Nevertheless it is false.
St: I presume that you often had long discussions about it.
P: Of course—quite heated ones, in fact. I even made him remove what was, in my opinion, a bad chapter from his political book, I forget what it was called … before the war he wrote a book as a communist. I made him take out a chapter.
St: But according to your descriptions he in turn, so to speak, abridged *Knowledge and the Body-Mind Problem*, is that true?
P: He abridged the last version of *The Logic of Scientific Discovery*.
St: Aha, and you accepted the abridged version, is that right?
P: I couldn't do otherwise, I couldn't shorten it any further.
D: You couldn't bring yourself to do it?
P: I couldn't, and he then shortened it still further, cutting it down to the length which the publisher required.
St: And now, in the new edition of *Two Fundamental Problems*, it says that the second part was practically lost.
P: Yes.
St: Could you reconstruct what was lost? Was it decisive or did you …?
P: You see the fact is that I really can't remember what was in that part. I mean I think I know roughly, but I don't know exactly what was lost.
…
D: Perhaps we could talk a bit more about the abridgment. *Language and the Body-Mind Problem* was not published until 1978. I think they are easier to understand than *The Logic of Scientific Discovery*.
P: Perhaps, because they have not been abridged so much.
D: I must say that I think it is actually a much better book, and I wanted to ask you how much you agreed with those abridgments.
P: You see, the fact was that everything was done under terrible pressure and I had a job and all kinds of things. When I got the proofs to correct …
St: The galleys.
P: I couldn't bear to look at them any more.

St: It then received very positive reviews: Carnap, Hempel.[51]

P: Yes, yes, it was even reviewed in America. In France: Gaston Bachelard, a very well-known man in France, who adopted some things from it. He gave it a very good review.[52] It enjoyed more success than the English edition. Zilsel gave it a fairly good review in *Naturwissenschaften*.[53]

St: Incidentally, Zilsel wrote for a long time in *Naturwissenschaften*, up until 1937. Which is rather surprising considering the situation, the political situation. What would interest me now is another person, one who was also mentioned in *The Open Society*, namely *Hans Kelsen*. He was also somebody who had been involved in this Vienna science scene and participated in both the Gomperz Circle and the Freud Circle …, and he later also took part in the Unity of Science movement …

P: I got to know him through Kraft, through *Julius Kraft*. Julius Kraft was with him for a while as a kind of …

St: Assistant? Research assistant?

P: Something like that. He also hoped to write his professorial thesis in Vienna or something. When I first went to England—I traveled from the Paris congress to England—Julius Kraft introduced me to Kelsen and Kelsen gave me a letter to Hayek. And then in England I got to know Hayek.

St: So you didn't know Hayek beforehand at all?

P: Not beforehand, no. But I knew (*Oskar*) *Morgenstern* in Vienna. Morgenstern I knew beforehand.

St: Kelsen also worked on the so-called crisis of democracy.

P: He revised all his theories under the influence of Hitler. I met him again later in America.

St: Did you ever study his theory, his theory of law?

P: I studied it enough—but not extensively—to see that I could not accept it in that form. I mean, you know that: his theory of law could be applied to anything.

St: Legal positivism.

D: At any rate, in *The Open Society*, you quote such an essay by Kelsen from *Imago*.[54]

P: Don't know any longer, don't know any more.

St: There and elsewhere Kelsen also dealt with Plato … with the origins of totalitarian thought.

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[51] Rudolf Carnap, review: "Karl Popper, *Logik der Forschung*," in *Erkenntnis* 5 (1935b): 290–94. Carl Gustav Hempel, review: "Karl Popper, *Logik der Forschung*," in *Deutsche Literaturzeitung* 58 (1937): 309–14.

[52] Gaston Bachelard, Compte rendu: "Karl Popper, *Logik der Forschung*," in *Recherches philosophiques* 5 (1935–36): 447.

[53] Edgar Zilsel, review: "Karl Popper, *Logik der Forschung*," in *Die Naturwissenschaften* 1935a, 531 f.

[54] Cf. Popper 1957, vol. I, 429.

D: There may have already been Plato critics in Austria at that time.

St: And in a much later work, *Vergeltung und Kausalität* (Retribution and Causality)—that was published … in Holland—he also strove to develop the concept of law from Greek philosophy, always in comparison with the juridical concept of law, from *mythos* to *logos* as it were. It's a very thick book, and is being republished now. Incidentally, it comes after the Mises book in Neurath's series.[55] But Kelsen himself also had great difficulties in Austria. He left in 1930 for Cologne; … there was a campaign against him for political and anti-Semitic reasons.

P: Perhaps the most interesting of all these people, in a certain respect, was *Karl Menger*. I liked him especially. As a young man he was incredible. He lost a lot later. As a young man he used to sparkle.

St: And have you read his book *Morality, Decision and Social Organization*? You have certainly criticized it.

P: No, I found that book excellent in a great many respects. It is one of the few books which attempt to get away from a lot of the stupid talk in ethics.

St: Origins of a theory of games and decision, i.e., a rational logic of morals: a completely different approach.

P: One can like something which doesn't exactly correspond to one's own ideas.

St: And actually, through his circle, Karl Menger made modern mathematics and logic … possible in Vienna. Gödel would not have been possible without Menger.

P: Yes, quite right. Menger helped Gödel a very great deal. Hahn and Menger.

St: Those first Gödelian works … what was your experience of them?[56] Did they strike like lightning, or were they simply received as original contributions at that time?

P: They were seen as very decisive, revolutionary and important contributions—without a doubt.

St: So it was the way John von Neumann described it: in the field of physics it was Einstein and in the field of logic it was Gödel who sparked off the revolution. A completely new perspective.

P: Yes, yes.

St: But for you, if one follows your writings, *Alfred Tarski* was certainly more important.

P: Tarski was important for me personally. Gödel is very late … Gödel gave me his works as a present, but unfortunately I lent them to someone and never got them back. But it was not easy to talk to him.

St: He was very introverted.

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[55] Kelsen 1982.

[56] Cf. Gödel 1931a, b and 1931–32 and the list of Gödel's writings mentioned below, Part II.

P: I mean we did speak, and then in America too etc., but he was what one calls 'timid' in English.
D: Timorous.
St: Reserved, timorous, shy, rather defensive etc.
P: It is difficult to find an expression in German which corresponds to that.
St: *Ängstlich*? But then everybody reports that Gödel was difficult in social intercourse and in his personal relationships.
P: More than that: he had difficulties.
St: Yes, in his Vienna period he received … psychiatric treatment for depression. He suffered from this mental disease … Right at the end he actually died a miserable death.

Chapter 8
The Philosophical and Political Pluralism of the Vienna Circle—The Example of Otto Neurath and Moritz Schlick

By comparing the intellectual and personal profiles of Moritz Schlick and Otto Neurath, the Vienna Circle's two main opposing intellectual figures, we can also gain a clearer sense of the basic features of this group. We can, in other words, trace out the pluralistic theoretical dynamic at work in this heterogeneous scientific circle, explore the material constituting its "psychogram" and "sociogram," and arrive at a typology of its underlying personal, conceptual, political, philosophical, and scientific elements.

In the process, a myth will be destroyed: that the Vienna Circle represents a self-contained anti-metaphysical philosophical school McGuinness—one based on the programmatic *Wissenschaftliche Weltauffassung* (1929). At the same time, a critique will be offered of the ahistorical approach to Logical Empiricism: its description as a traditional philosophical movement similar to Neo-Kantianism, with a mode of scientific communication based on loose, mainly arbitrary forms of organization, and a tendency, from the start, to self-dissolution.

The following excursus can, to be sure, only allude to the specific qualities that made the Vienna Circle into the research- group it was, while simultaneously pointing beyond its formal boundaries. In this regard, we will see that notwithstanding all personal and substantive differences within the group, the outwardly manifest awareness of a common movement corresponded to the less public reality. This involved a self-understanding which placed what brought the movement's members together over what held them apart: a self-understanding grounded, until the end, in the principle of maintaining an open forum for both discussion and experimental ideas.

Until the mid-1920s—as can still be seen, for instance, in his *Allgemeine Erkenntnislehre* (1925)—Moritz Schlick was clearly indebted to a form of non-positivist critical realism; beginning with his "philosophical turn" (1930–1931), he embodied, together with Friedrich Waismann, that wing of the circle inspired by Wittgenstein. Nevertheless, we ought not speak hastily of a congruence of Schlick's position with that of Wittgenstein: something made clear in both their distinct notions of philosophy and their diverse concepts of ethics and aesthetics, as

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_8

presented in the course of the 1930s. In the wake of his critique of metaphysical philosophy, and at the apogee of the twentieth century's second revolution in the natural sciences, Schlick brought together these scientific findings in an original philosophical theory of cognition and reality. This represented philosophy as a system for expressing the most general principles inherent in the sciences. Following this phase in his thinking, Schlick would advocate a methodological phenomenalism analogous to Carnap's *The Logical Structure of the World* (*Der Logische Aufbau der Welt*) (1928). Philosophy was now treated as a therapeutic activity, involving the logical analysis through language of statements within the individual sciences, for the sake of both overcoming metaphysics and clarifying meaning. Here Schlick followed the well-known and often misunderstood dictum that the meaning of a proposition lies in the method of its verification. We can thus schematically trace out a movement in Schlick's work from his initial, realistic position, to the "linguistic turn" à la Wittgenstein, to the more loose and liberal position he took toward the end of his life: a position represented in the little-noticed text he wrote named "L'école de Vienne et la philosophie traditionelle" (1937). This late piece represents a concrete distancing from the radical physicalism at work in Neurath's concept of a strict, anti-metaphysical, "non-philosophical" unified science McGuinness—what would later emerge as encyclopedism.

Although there is more continuity of substance and perspective, we can also discover a shift in Neurath's work from the programmatic text he helped draft in 1929 (Mulder 1968; Stadler and Uebel 2012) to the historical self-description of Logical Empiricism in "Le développement du Cercle de Vienne et l'avenir de l'Empirisme logique" (1936). This text marks the culmination of "unified science" as an expanded encyclopedic program; it also identifies the Vienna Circle with the Unity of Science movement—perhaps the source of Schlick's global perspective on the Vienna Circle. As a follow-up to the relativization of the criterion of meaning through the tolerance principle introduced by Karl Menger and Rudolf Carnap, Schlick would, until his death, assign philosophy a thoroughly positive and constructive role—one that extended into the realm of ethics. On the other hand, throughout his career, Neurath was convinced of the need to dissolve philosophy as an autonomous discipline, subsuming it under the comprehensive, empirical heading of encyclopedism. Against his will, he did, however, remain thoroughly "philosophical" in stance McGuinness—or in any event philosophically relevant, as we see in the broad influence he exerted.[1] Relatively early, he clearly pointed to substantive differences within Logical Empiricism regarding the "basis problem"; these differences notwithstanding, on both a technical and organizational level he stressed the movement's common tendencies: a harmonizing propensity that, with certain qualifications, can be also applied to Schlick.

In this respect, let us note that Schlick's internal critique becomes relativized once we take account of his public role. We see this, for instance, in his activity for

[1] Stadler (ed.) 1982; Haller (ed.) 1982; Haller and Rutte (ed.) 1981; Haller and Kinross (ed.) 1991; Hofmann-Grüneberg 1988; Uebel (ed.) 1991; K. H. Müller 1991; Uebel 1992, 2007; P. Neurath and Nemeth (ed.) 1994; Cartwright et al. 1996; Cat 2014; Sandner 2014.

the Ernst Mach Society McGuinness—especially his fight against its dissolution in February 1934. A year earlier, Neurath had, all too optimistically and euphorically, proclaimed that

> while Schlick's approach stemmed from "realism," Frank and Hahn and Neurath were already "philosophy-free" early on…Through his Tractatus, Wittgenstein strongly stimulated the "Circle" meeting around Schlick over recent years, enriching it by forcing it to take specific positions regarding many problems. Still, it is possible on the one hand to accept Wittgenstein's theory of tautologies and of the function of truth, along with his uncommonly fruitful approach to language-analysis; this does not conflict, on the other hand, with a sharp rejection, free of any qualifications, of his attempt McGuinness – taking the detour of preparatory explication McGuinness – to at least conditionally legitimate idealistic, indeed mystically oriented metaphysics, in one or another form… . (Neurath 1933a, 29)

Finally, as Neurath summarized, he has,

> in the framework of the Vienna Circle, taken the radical position that not even preliminary remarks can be offered in anything but a physicalist language. We need from the start to reject any commentary concerning whether language or the world is more complex – in short, any confrontation between "world" and "language" of the sort suggested by Wittgenstein. Expressed most pointedly: propositions are only compared with propositions…It would appear that this severe stance regarding the basic metaphysical tendencies of Wittgenstein's *Tractatus* is increasingly dominant McGuinness – and that in face of this and similar idealistic equivocations, some sort of consensus will form around the thesis of "protocol-sentences" as the basis for a logic-centered empiricism. (ibid.)

The antagonism manifest here would sharpen in the 1934 debate pitting Neurath's "coherence-theory" against Schlick's "correspondence-theory"[2]; Neurath's hope for a uniformly "physicalist" solution to the task of empirically founding scientific truth and cognition was not fulfilled. The above-mentioned harmonious vision was thus shattered McGuinness—until Schlick's death in 1936, the basis problem of empiricism, along with the concept of unified science, remained *one* source of the Vienna Circle's comprehensive theoretical pluralism.

It is important to bear in mind here that Neurath's consistent and unflinching position gains coherence within a broader historical-genetic context, one pointing to an astounding continuity at work in his thought and action: his intellectual socialization reflected the strong influence of his father Wilhelm Neurath, with his liberalistic ideas, centered around social and economic reform McGuinness—specifically, the question of a just social order (Uebel 1993). This order was meant to be achieved in a "social-technological" manner, through a planned economy, socialization, social reform, a pictorial-language McGuinness—and the scientific world view. Working in this spirit, Neurath was obliged to struggle, theoretically and practically, toward a comprehensive concept of enlightenment; this was manifest in his organizational, scientific, and pedagogic activities, and is the key to the direct development in his thinking from the scientific world view to eventual encyclopedism.

With the help of a pragmatic anti-metaphysics and a corresponding social analysis, Neurath thus criticizes the counter-worlds facing an enlightened, scientific

[2] On the so-called basis problem see Hempel 1981; Philippi 1986; Uebel 1992; Oberdan 1993.

epoch; this stance informs the contents and methodology of the empirical "unified science" of the early 1930s. We here find a systematic juncture between rational-empirical historicism as an epistemological principle and the coherence-theoretical relativism stamping the philosophy of science. In his last self-portraits, Neurath himself reveals the intensity of his vision of collective work and planning in science and society, for the sake of a broad humanization and democratization. These texts serve as a sort of legacy.

With his high bourgeois background, Moritz Schlick's intellectual biography is of a very different nature. Schlick nonetheless adhered to an anti-metaphysical view of the world, oriented toward immanence and enlightenment. On account of his strong educational background in the natural sciences, Schlick—Max Planck's favorite student and a friend of Einstein's—was predestined to formulate a profound critique of speculative-idealistic academic philosophy. In contrast to Neurath, he did, however, adhere to a philosophical-scientific discourse understood as autonomous: the inevitable source of theoretical differences, as well as differences of politics and *weltanschauung*.

Without being able to explore the Vienna Circle's "basis problem," let us briefly compare Neurath's "relativism," oriented toward both Ernst Mach's work and syntax in general, with Schlick's semantically oriented foundational effort. This opposition (described as such by Neurath himself) extended to the definition and function of the "anti-metaphysical" perspective of both figures—this despite the shared intention of overcoming all forms of idealist speculation. The opposition is also expressed very openly, and sometimes polemically, in the correspondence between Schlick and Neurath. Neurath described Schlick's "fundament of cognition" (1934) as "philosophical absolutism," "rather problematic," and "gloomily-mystic," and in the context of a critique of Schlick's ethics, he poked fun at the "Wittgensteinism" within the "Schlick sect."[3] Schlick, on the other hand, in indirect allusion to Neurath, complained of the dogmatism of some of the circle's older members and the "anti-intellectual character" of many publications. He also criticized Neurath's talk of a "right wing" and "left wing" within the circle, and spoke of the "unscientific and non-serious" nature of Neurath's book *Empirische Soziologie*:

> When almost every page contains the proclamation that we can get along without God and angels, it seems most tedious to one's allies, dogmatic to one's opponents, and ridiculous to both.[4]

Leaving aside the reality of the difference between Schlick's aristocratic and Neurath's extroverted personality, one can nonetheless clearly note a clash between these two figures in regard to pursuing "consequent" or "logic-centered" empiricism. In the case of Neurath, physicalist (behaviorist, materialist) unified science and a corresponding encyclopedism were meant to be based on a leveling of the

[3] Cf. Neurath's letters to Carnap of 5-7-1934, 5-14-1934, 6-17-1934, 12-13-1934, 1-18-1935, 9-22-1935. All WKA Haarlem.

[4] Schlick to D. Rynin, 11-4-1933. On this cf. also Schlick to Wolfgang Köhler, 3-13-1934; Schlick to Rudolf Carnap, 1-20-1935; Schlick to Ph. Frank, approx. 1930.

distinction between philosophy and science; in Schlick's case, the scientific philosophy and world view could co-exist. For Neurath, scientific-theoretical holism, fallibilism, and a pragmatically understood conventionalism are here determining factors McGuinness—the latter factor underscoring the social specifications of scientific communication, as well as the necessity of synthesizing internal and external perspectives. In this regard, the research community itself is understood as a scientific problem, one that must escape the confines of an absolutist "pseudorationalism" (Neurath 1935a).

We thus arrive, in the end, at differences of politics and *weltanschauung*. Both practically and theoretically, Neurath called for a unity of thought and action, linking McGuinness—as did Philipp Frank and Edgar Zilsel—the history of science with sociological investigation. In contrast, Schlick consistently revealed an autonomistic approach to philosophy and science: an approach that, albeit enriched with questions of "life" and "meaning," emerges as a scientific ethic and traditional cultural and social philosophy. This corresponded to a liberal-bourgeois political awareness, removed from daily and party politics. Such a juncture of social analysis and political abstinence resulted, for Schlick, in an aestheticist-moralistic vantage regarding sociopolitical circumstances McGuinness—something apparent in the posthumously published booklet *Natur und Kultur* (1952), written against German Nazism.[5] Both in its diction and practical suggestions, this text reveals elements of humanism, pacifism, and cosmopolitanism, anchored in an individualistic and hedonistic social vision (this a contrast to Neurath's social eudaimonism). In a rigorous distancing from the theories of Oswald Spengler, the Enlightenment postulate of a cultural movement toward higher development and of a gradual refinement in both consciousness and morals culminated in a decisionistic Epicureanism and libertinism. At the same time, features of an anti-statist liberalism are visible in Schlick's writings: a liberalism operating with ideal-typological constructs of "state" and "economy," without empirical-causal evidence.

Within this schema, the state was assigned the sole task of "protecting life"—even if it was seen as lacking the "morals" necessary for a happy life. This was the self-understanding of a liberal intellectual writing in the context of Europe's rising totalitarianism; it was meant to interact with an individualistic anti-fascism in harmony with Schlick's voluntaristic notion of the state. With such ideational premises, Schlick inevitably arrived at a plea for a political principle of laissez-faire, under the slogan "as little state as possible": "Liberalism is the only form of political thought suitable to the modern form of life, determined as it is by communication and technology!" (ibid., 47).

In contrast to such views, Neurath pursued his notions of planning in both theory and practice: from the war economy, to full socialization, and the movement for settlement and comradeship, on through to the idea of planning for freedom in a humane world-society. In such a society, democratically organized scientific activity was meant to work together with a non-capitalist, collective form of production.

[5] The small book *Natur und Kultur* was edited in 1952 (taken from the estate of Josef Rauscher, a supporter of the Ethic Movement in Austria) in Humboldt Verlag (Vienna-Stuttgart).

Against this background, Schlick's fruitless struggle to prevent the dissolution of the Ernst Mach Society, his critique of the politics of the authoritarian corporate state within the university of Vienna, and the differences manifest in his correspondence with Neurath, are all as plausible as the fact that, having become a disappointed emigrant, Neurath would lament Schlick's role "for Dollfuss against unified science."[6] (In point of fact, Schlick had quite naively regarded Dollfuß's political course as a bulwark against Nazism.)

It is also not surprising that Neurath would end up intensifying the dualism of empiricism and metaphysics McGuinness—and that despite his disappointment, he would look back on the period of the Vienna Circle as one marked by exemplary cooperation.[7] As both an encyclopedist and social reformer, Neurath could not separate science and politics. For this reason, he considered the "public work" that Schlick viewed so skeptically as a necessary corollary to the "playground of academics." It is the case that, as he expressed it in the "Verirrten des Cartesius" (1913), Neurath viewed political activity as restricting necessary decisions to a realm of uncertainty. It is also the case that, on account of the facts-value dualism, he viewed such activity as not being derivable from the scientific world view. Nevertheless, he conceived of scientific work and social practice as enabling possible concerted action, culminating in a unified rational-empirical program. Within this program, monism was seen as the means of empirical communication and pluralism as the stance taken in forming hypotheses.

In light of these observations, it is possible to view the personal and substantive differences between Schlick and Neurath as paradigmatic of the Vienna Circle's pluralism; it is nevertheless also clear that a dimension of commonly-held values is also at work here: values stamping the image of Logical Empiricism up to the present.

To be sure, the prosperous, bourgeois ambiance within which Schlick lived and worked, his ideal of value-free science, his Socratic ethos of clarity, order, and love of truth within both the academic and private spheres, all collided with Neurath's impulsive, spontaneous spirit, and with his organizational zeal within Vienna's cultural movement. As a promoter, innovator, and fiery orator before common people, occupying a space between proletariat and bourgeoisie, the polyhistorian Neurath demonstrated a practical cosmopolitanism: comprehensive, interdisciplinarily-oriented interests in the domains of literature, art, politics, and architecture; concrete utopian schemas like that of the *Isotype* and of *Basic*-English,[8] of universal slang and "unity of science" McGuinness—and between such schemas, the Encyclopedia and social reform.

The following commonalities between Neurath and Schlick could be listed: the critique of Plato, Spengler, and Kant; a scientific approach and elaborate critique of

[6] Neurath to Carnap, 7-18-1934, WKA Haarlem.

[7] Neurath to Carnap, 7-1-1936, ibid.

[8] Both are acronyms derived from the first letters of *I*nternational *S*ystem of *T*ypographic *P*icture *E*ducation or *B*ritish-*A*merican *S*cientific *I*nternational *C*ommercial English – the latter being a literary utopia taken from H. G. Wells (*The Shape of Things to Come*).

language; theoretical pluralism; a cognitive and methodological monism grounded in a naturalist understanding of the world; shared public work in the Ernst Mach Society; shared approaches to the facts-value problem, nominalism, and the hypothetical-deductive construction of theories; and finally, the political and conceptual embedding of rationalism and empiricism in the "late Enlightenment" (Stadler 1981a).

In their own way, each of these thinkers were dominant figures in the Vienna Circle and Ernst Mach Society. Each represented a maximum of difference accompanying a—nonetheless unifying—minimum in common awareness and self-understanding, including public self-descriptions in both books and journals and institutions. Within the latter framework, and in the context of an implicit program of enlightenment, common goals and values such as scientificity, empiricism, logic, and language-analysis were brought to bear. Schlick offered the Vienna Circle a forum for discussion in the face of difficult conditions within the university. Neurath, on the other hand, supplemented his scientific work with that as an organizer and popularizer both in Austria and abroad McGuinness—particularly for the International Congress for the Unity of Science.

Schlick's personal accomplishment was the natural-scientific and speech-analytical foundation of scientific philosophy, in face of the "chaos" of philosophical systems. On account of his early, tragic death, he could not unify the various aspects of his work. Nonetheless, through his scientific ethos, personal authenticity, and competence within his field, he played the role of doyen within the Vienna Circle, responsible for its international reputation abroad. Finally, despite the nature of the "philosophical turn" that he himself had announced, Schlick always remained a genuine philosopher. Looking back on the logical-empirical movement for the last time,[9] he presented a picture contrasting with Neurath's "unified science": that of an anti-metaphysical philosophical movement whose anti-metaphysics was simply a methodological principle in the elimination of philosophical errors. To be sure, it is here of utmost significance that despite all internal critique, Schlick never abandoned the concept of a philosophical-scientific movement.

With the distinction between "questions of fact" and "questions of meaning," Schlick was thus able to determine the different subjects lying within the realms of science and philosophy: philosophy attempts to clarify the sense of our statements, the individual sciences attempt to determine their truth. For Schlick, Socrates is, in the end, the actual father of philosophy. He thus postulated ethics as a philosophical task—that is, as a way of clarifying moral concepts, and such an undertaking seemed more important to him than solving theoretical problems. Albeit indirectly, such a common-sense based philosophy, confronting a scientifically narrow "logic," finds itself possessing much in common with Neurath's encyclopedism: an enterprise

[9] Schlick 1938. Appeared first in French in 1937 in Travaux du 9e Congrès International de Philosophie (Congrès Descartes). Fasc. 4 (=Actualités scientifiques et industrielles, No. 533), Paris 1938. Reprinted in Schlick 1938. English in Mulder and van de Velde-Schlick (ed.) 1979. Also in *Moritz Schlick Gesamtausgabe*, section II, vol. 1.2, 489 ff.

that, while lacking genuine scientific discipline, was to be constructed alongside of or above the individual sciences.

For Neurath, there was no abstract framework for a pluralistic encyclopedia representing an open program of research; rather, there was the very concrete perspective of a radical science on the English model. In contrast, on the grounds of his individualistic self-understanding, the uncompromisingly anti-Nazi Schlick advocated a moral position McGuinness—a timeless, philosophico-literary task. Such a dichotomization of experience and cognition had a high price in comparison to Neurath's pragmatic historicism and relativism: namely, the price of overestimating the influence of academic discourse, with the subsequent need of subordinating it to political power.

Still, when we consider the new evaluation of the Vienna Circle underway in recent decades, despite all the circle's conflicts, the prognosis Neurath offered Herbert Feigl in 1938, on the eve of war and Holocaust, seems correct: "that we have in common will remain; as products of their time, the differences will fade."[10]

[10] Neurath to Herbert Feigl 1938 (exact date missing), WKA Haarlem.

Chapter 9
The Role of the Universities and Institutes of Adult Education—The Demise of Reason

9.1 The Vienna Circle and the University of Vienna

9.1.1 The General Intellectual and Political Situation at the Universities in Vienna

In order to fully understand the fate of the Vienna Circle against its historical backdrop, we will have to take a brief look at the political atmosphere which dominated academic life at the time.

Generally speaking, political life at the institutes of higher learning at the beginning of the First Republic was marked by the predominance of right-wing forces, and anti-liberal and anti-Semitic tendencies were stronger than during the time of the Habsburg monarchy.[1] The opponents of this dominating phalanx (within which internal struggles for power were not uncommon) were the representatives and adherents of "Jewish" neo-positivism, of the liberal theory of marginal utility, of psychoanalysis, and of Austro-Marxism. One of the main reasons for this conservative or reactionary climate was the high unemployment among academics and the miserable social situation of intellectuals, caused by the latent crisis of the world economy and the uncompromising policy of drastic cutbacks pursued by the ruling block of bourgeois parties in reaction to the crisis—a situation which in turn led to ruthless competition and protectionism among university pressure groups. The dominant elements in this ideological cultural struggle at the universities were German nationalism (i.e., the belief that Austria belonged to the "German nation" regardless of the country's constitutional independence), which could be found in all the major parties, and, in the conservative camp, strong revisionist tendencies as

[1] On the intellectual and political situation at Vienna's institutes of higher learning see H. Fischer 1965; E. Broda 1967, 1978; Topitsch 1967; Weinzierl 1969; Ramharter 1973; Siegert 1974; Dachs 1974; Zehetner 1972; Fischer-Kowalski 1977; Meissl 1981, 1988; Hochgerner 1983; G. Fellner 1985; Stadler (ed.) 1988; Lichtenberger-Fenz 1988; Heiß et al. (eds.) 1989; Zoitl 1992; Fischer and Wimmer (eds.) 1993; Heiß and Grandner 2006; Stadler et al. (ed.) 2015.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_9

a reaction to the Peace of Versailles (the peace treaty after World War I, the conditions of which were regarded as humiliating by many Austrians) as well as a "political Catholicism" essentially founded on a position based on natural law.[2] The establishment of the Austro-fascist *Ständestaat* (corporate state) in 1934 brought further problems for all democratic forces and changed the situation insofar as the new Austria-oriented ideology tried (in vain) to assert itself against the coalition of "Catholic-national" (*katholisch-national*) and "markedly national" (*betont national*) academic teachers. (These forms of German nationalism differed mainly in their degree of extremism: supporters of the former were the bridge builders between Catholicism and National Socialism, while adherents of the latter were still more strictly *völkisch*, i.e., racist in their orientation.) It was a tragicomic reflection of the hopeless political maneuvering of the Dollfuß and Schuschnigg regimes between Hitler and Mussolini on the one hand and the illegal national-socialist opposition on the other, with the organizations of the labor movement, which had also been declared illegal, being considered least suited as partners for a coalition while anti-Semitism still continued to be tolerated and practiced.[3]

The study and analysis of the practice of *habilitation* and academic appointments offers an apt focus for examining these processes of interaction between society and the universities, for it is here that the connection between political views and the criteria of what is or should be science and philosophy become most evident. At the same time the social function of a certain concept of science and philosophy also becomes an issue.

9.1.2 The Position of Scientific Philosophy

While some accounts of the history of philosophy seem to suggest that the University of Vienna was dominated by a "typical Austrian philosophy" oriented towards empiricism and linguistic analysis in the inter-war years, a closer examination of the situation reveals that this was hardly so.[4] At that time the faculty comprised representatives of currents as different as German idealism (in particular neo-Kantianism and Herbartianism), natural-law scholasticism, Christian philosophy, and neo-romantic universalism. Nearly all these currents regarded philosophy as the synthesizing "queen of the sciences." They may have had certain empiricist and language-oriented elements, but their common denominator was—apart from a few exceptions—the sharp distinction of philosophy from the empirical disciplines on the one hand and the new logic and mathematics on the other; there were also some efforts to amalgamate science with a politicizing world view. What all these currents

[2] Hanisch 1977, 1994; Siegfried 1979.

[3] Maderegger 1973; Kadrnoska (ed.) 1981; Tálos and Neugebauer (eds.) 1984; Rathkolb 2013.

[4] For fundamental accounts see Haller 1979a, b, 1986; Rutte 1977.

had in common from a sociological and scientific point of view was their academic institutionalization as "school philosophy."[5]

Once we adopt, in place of an internalist, philosophical approach towards the history of the Vienna Circle and its reception, a concrete historical perspective on the philosophical life at the University of Vienna as a whole, we can roughly discern two tendencies which already existed at the time of the Habsburg monarchy and which became more prominent in the First Republic—a development ultimately weakening the position of scientific philosophy. Political attitudes and world views serve to support this (albeit simplifying) "two-camps" theory: while scientific philosophy was dominated by democratic tendencies (enlightenment, liberalism, socialism), the other camp was home to various anti-democratic attitudes from neo-romantic conservatism to totalitarian ideologies. It seems appropriate to project the front lines of the philosophical debate onto the topography of the cultural struggle of the time. It would be worthwhile, for example, to ask which objective function was fulfilled by anti-metaphysics in providing the ideological and theoretical foundations of the labor movement (in the light of its self-understanding at the time), as a certain affinity is undeniable ever since the emergence of "empiriocriticism." This would provide a useful addition to existing studies on the relation between political Catholicism, the theory of natural law, and authoritarian structures of government, particularly between universalism and fascism. What would have to be shown in particular is how, in this dichotomous cultural landscape, the Vienna Circle's anti-metaphysical enlightenment philosophy (along with many other movements) was related to the labor movement as its intellectual instrument and stimulus and how, in turn, its self-understanding also involved a certain missionary charisma resulting from its objective function of debunking totalitarian ideas. This social function did not emerge directly from a common philosophical platform of the Vienna Circle as a whole, however, but rather from the political commitment of individual members and the role attributed to them by contemporary protagonists. A certain incompatibility of contents was thus neutralized by there being a common enemy, and shared social positions canceled out the cognitive contradictions of the preferred systems of ideas. On the other side, rational-empiricist science was partially adopted and used, in a spontaneous and largely unquestioned way, by Austrian social-democratic forces as an ideological weapon against fascist irrationalism. This particular connection and its development and dissolution—a mutual alienation cannot be denied in the Second Republic—deserve to be investigated more closely.[6]

If we look at the discipline of philosophy at the University of Vienna,[7] we find that among the 22 teachers in the School of Philosophy (including psychology) between 1918 and 1938, logical empiricism ("neopositivism") was represented by three protagonists: Moritz Schlick as *Ordinarius* (full professor) from 1922 to 1936, Rudolf Carnap as *Privatdozent* (unsalaried lecturer) and *Titularprofessor* (honorary

[5] For an explanation of this term see, specifically, Zilsel 1930 and Philipp Frank 1932 (English 1998).

[6] For a characterization of this intellectual affinity see Glaser 1981; Stadler 1981a.

[7] For fundamental remarks related to the following observations see Wieser 1950, 158, 231, 235 ff.

professor) from 1926 to 1931, and Viktor Kraft as *Privatdozent* and *Titularprofessor* from 1914 to 1938, while on the periphery Friedrich Waismann worked as Schlick's scientific assistant and librarian from 1931 to 1936. This state of affairs was also reflected in the frequency and the type of courses offered: apart from tutorials, the history of philosophy was taught most frequently—a subject that also showed the highest attendance figures—together with ethics.

If we require merely an empiricist approach to qualify a philosophy as "scientific," and if we add the teachers of psychology (Karl and Charlotte Bühler, Sigmund Kornfeld, Egon Brunswik) who were assigned to the School of Philosophy, we get a division of teachers into two roughly equal groups. Leaving out the psychologists, the adherents of neo-positivism and related thinkers (Heinrich Gomperz, Karl von Roretz, Emil Reich) accounted for less than a quarter of the teachers (a comparison based on the number of lectures per semester is more favorable). While it is true that three of the four professorial chairs were held by Schlick (until 1936), Bühler (until 1938), and Gomperz (until 1934), the actual distribution and influence of philosophical currents at the University of Vienna as a whole is distorted by this perspective: it is not only teachers of philosophy who are of relevance here, but also a number of other "philosophizing" teachers (in the broadest sense) from different disciplines and schools. Examples include Othmar Spann, the professor of economics (1918–1938), teaching in the spirit of his pre-fascist universalism, and the lecturer I of political science, law, and sociology, Johann Sauter, who—as an illegal National Socialist in the *Ständestaat*—held introductory lectures on philosophy for students of law and political science.[8]

Just as power and influence make themselves felt in old, long-established institutions even beyond and independently of official hierarchies, "philosophy" manifests itself not only within the institutional framework reserved for it, but also—indirectly, unconsciously, and independently—in various other intellectual areas and disciplines, on the basis of certain social processes, forms of behavior, and normative systems.

One genuinely philosophical institution was the Philosophical Society at the University of Vienna, which also acted as the local group of the Kant Society. The Society's comprehensive program, which offered lectures from the most diverse disciplines, shows that the adherents of scientific philosophy constituted a clear minority and only accounted for about one seventh of the lecturers, despite the active publication record of Feigl, Hahn, Kraft, Juhos, and Schlick.[9] An equally broad program was offered by the "Wiener Internationale Hochschulkurse" (Vienna International University Courses), where Moritz Schlick figured as the only lecturer from the Vienna Circle.[10]

The only member of the logical-empiricist group to qualify for the Academy of Sciences in Vienna was the mathematician Hans Hahn, who was admitted as a

[8] Wasserman 2014.

[9] Reininger (ed.) 1938, 21–43; Fisette 2014.

[10] *Hochschulkurse*, Vienna (n.d.), 8, 14.

corresponding member.[11] Schlick failed (as Bühler before in 1927) twice, in 1926 and 1927, with an application for the admission as a corresponding member. The complete absence from the Academy of any philosophy oriented towards the natural sciences—philosophy was represented by Robert Reininger and, indirectly, by Othmar Spann—can thus be considered indicative of its philosophical orientation. (Feichtinger et al. 2013)

9.1.3 The Political Situation at the Universities in the First Republic

The Austrian university system was characterized by hierarchical structures and by personal continuity in the constitution of academic decision-making bodies, which, naturally, had a certain effect on personnel decisions. With the post of Minister of Education being held exclusively by clerical-conservative, German-nationalist, or even pro-Nazi politicians from 1920 to 1938, the Ministry of Education pursued a distinctly conservative or right-wing line in the inter-war period.[12] The much-discussed academic autonomy, therefore, turned out to be a double-edged sword: it was not so much the neo-humanistic ideals of education that the slogan of academic self-determination pretended to defend, but rather the privileges and interests of professors and militant students united by their common world view. A one-sided application of the regulations governing habilitation and appointment procedures as well as a marked anti-Semitism often placed social-democratic and liberal candidates at a disadvantage.[13] Two groups played a significant role in this context: the highly influential *Deutsche Studentenschaft* (German Student Federation), an umbrella organization of all students with a clerical-conservative and markedly nationalist orientation, which was active until the year 1933; and, above all, the *Deutsche Gemeinschaft* (German Community) (Rosar 1971), an ideological and activistic alliance of Catholic and German nationalist officers and academics for the advancement of "Germanhood," particularly in the fight against so-called "anarchic tendencies" usually attributed to Jewish liberals and Marxists. Organized as a registered society from 1919–1930, this group—counting among its members men like Engelbert Dollfuß (Austria's Federal Chancellor from 1932–1934, murdered during an attempted Nazi coup in July 1934), Emmerich Czermak, Othmar Spann, Oswald Menghin, Alphons Dopsch, and Rudolf Much—was disbanded when the "nationals" split off in reaction to the ascent of the *Cartell-Verband*, but the circle around

[11] *Dokumentation* 1972 (Austrian Academy of Science).

[12] In chronological order: From 1920 to 1933 Walter Breisky, Emil Schneider, Anton Rintelen, Richard Schmitz, Emmerich Czermak, Hans Schober, Heinrich von Srbik. From 1933 to 1938 Anton Rintelen, Kurt Schuschnigg, Hans Pernter.

[13] Corresponding newspaper reports include *Der Tag*, July 16, 1924; *Arbeiterzeitung (AZ)*, October 22, 1924, June 18, 1924, December 8, 1925.

Spann still continued to exert a considerable influence.[14] Spann's neo-romantic, universalist theory of politics and economics formed the ideological superstructure of the fascist *Heimwehr* (a right-wing paramilitary organization) and the *Ständestaat*, and Spann himself hoped—albeit in vain—that it would serve as the foundation on which to build the national-socialist state. His supporters also engaged in political activities in the *Fachgruppe Hochschule* (Professional Section of Academic Teachers) of the *Deutsche Gemeinschaft*.[15] It was this group that compiled the so-called "yellow" proscription list of "tendentious" professors in December 1925, for example, which—next to Carl Grünberg, Hans Kelsen, and Sigmund Freud—also mentioned Moritz Schlick and Otto Neurath in a discriminating context.[16] In other meetings of the *Deutsche Gemeinschaft* Spann, Much, Gleispach, Hugelmann, Czermak, and others prevented Max Adler's appointment as full professor in 1926.[17]

How did the people who came under such attacks react in the face of this massive dominance of the right-wing, bourgeois camp (other than by choosing the perfectly understandable option of retirement or passive resistance)? As has already been mentioned, leftist groups and freethinking, liberal forces remained a minority, and their political activities had almost no effect. This is true as much of the students as of the few professors and other teachers in higher learning who shared their views. This situation, however, was also the result of a misconceived system which, in line with the general political climate of the First Republic, was based more on agitation and verbal radicalism than on compromise.

9.1.4 Hans Hahn and the Vereinigung sozialistischer Hochschullehrer *(Union of Socialist University Teachers)*

Still, there were some exceptions: Hans Hahn acted both as the chairman of the *Vereinigung sozialistischer Hochschullehrer* (Union of Socialist Teachers in Higher Learning) and as a member of the Vienna Schools Council for several years and engaged in a number of remarkable publishing activities, even though these failed to achieve the desired results. He specifically spoke out for the equality of all students and teachers and for the application of democratic principles in the conflict with the academic administration which obviously favored the vandals of the *Deutsche Studentenschaft* and tolerated their riots. As early as 1922, for example, Hahn—together with his colleagues Ludo M. Hartmann, Julius Tandler, and Carl Grünberg—lodged a protest with the rector of the University against one-sided

[14] Diamant 1965; Siegfried 1974, 69 ff.; Ebneth 1976, 76 ff.

[15] Siegert 1974.

[16] On Grünberg, Kelsen, and Freud in this context see Allgemeines Verwaltungsarchiv Wien (General Administrative Archives of Vienna, AVA), Ministry of Education (UMin.), Fasz. 755, Sign. 4C/I. Ph. Prof. 1922–23; Migdal 1981; Métall 1969; Walter 1988; Eissler 1966.

[17] Siegert 1971.

refusals of access to lecture halls and against the riots against Jewish and socialist students and professors.[18] This unyielding stance of the democratic teachers in higher learning was answered from the right only with renewed defamation campaigns. In 1924, for example, the *Deutsch-Österreichische Tageszeitung* once again circulated a list of 200 Jewish teachers in higher learning, among them also Hahn and Felix Kaufmann (April 23, 1924). Hahn unerringly stuck to his principles and continued to demand unrestricted academic freedom of teaching and studying, free instruction, and state-sponsored education as well as habilitation procedures based exclusively on scientific criteria and comprising an obligatory statement of reasons for the rejection of a candidate (as stipulated by the habilitation rules proposed by Glöckel), since a number of social-democratic teachers in higher learning had become victims of one-sided appointment policies (Hahn 1924a, b). These efforts did not at all diminish German nationalist racism, however, for Hahn's name reappeared with those of 45 other colleagues in yet another denunciation campaign (handbill of the *Deutsche Studentenschaft*, 1925). The activities of the *Verein für sozialistische Hochschulpolitik* (Federation for Socialist Policies in Higher Learning), which was founded at the same time, remained relatively unsuccessful.[19] One notable exception was an article entitled "Die Pflanzstätten der Wissenschaft als Brutstätten der Reaktion" (The Seed-Beds of Science as a Breeding Ground of Reaction) by the economist Rudolf Goldscheid (1926); it provoked an outraged reaction among the professors concerned that finally led to the end of the renowned Vienna International University Courses, which had been held since 1922. It is interesting to note that one of those who spoke out against the closure of the courses was Schlick, who—for philosophical and ethical reasons—took the stance that "something that is good in itself should not be endangered…through personal motives."[20] When Hahn, Kelsen, Tandler, and Max Adler expressed their objection to the anti-Semitic riots of 1927,[21] during which the university had to be closed once again, their criticism was defamed as "agitation of Judeo-Marxist teachers"[22] by the *Deutsche Studentenschaft*, which was given permission by the rector to set up a shooting range on the university's premises. Following the events of July 1927—which left 90 people dead, 84 of them civilians—the same rector felt called upon to appeal for donations "for the victims of July 15 in the police corps"; Hahn immediately responded by setting a sign with a donation by his Union to the Aid Committee of the Social Democratic Party and Trade Union for the Victims of July 15 in order to express his disapproval of the police actions.[23] Two years later, handbills warning against attendance of the lectures by Bühler, Kelsen, Tandler, and Freud were again

[18] *AZ*, June 10, 1922.

[19] *AZ*, June 28, 1925.

[20] *Hochschulkurse*, n.d., 11 ff.

[21] *AZ*, June 15, 1927.

[22] AVA, Großdeutsche Volkspartei, 6700/307. *Deutsch-Österreichische Tageszeitung (DÖTZ)*, June 16, 1927.

[23] *AZ*, October 1, 1927.

being circulated.[24] In the same year the *Deutsche Studententschaft* returned to its favorite topic "Race and Science" and polemized—in solidarity with the German professors—against the "increasing Jewish domination (*Verjudung*) of the universities in the spirit of cursed liberalism."[25] Among the 200 professors named were Felix Kaufmann, Karl Menger, and (the non-Jewish) Moritz Schlick.

9.1.5 University Politics During the Transition to the Ständestaat

In 1930 the pro-Nazi rector Wenzel Gleispach decreed new regulations designed to distinguish students according to "nations" in order to dissimilate Jews and to promote the *Deutsche Studentenschaft*—an unprecedented negative climax of racist university politics.[26] In June 1931 the constitutional court annulled these regulations on technical grounds. The ensuing protests of radical right-wing students sparked off severe riots which resulted in the closure of all institutes of higher learning in Vienna.[27] One year later Czermak, the Minister of Education, launched another attempt to pass these regulations through parliament, but failed because of the ensuing political complications both in Austria and abroad. The violent national-socialist brawls escalated further and further and eventually led to the dissolution of the *Deutsche Studentenschaft* and the introduction of entirely new regulations in the course of the establishment of the Austro-fascist system in 1933 and 1934.[28]

The authoritarian *Ständestaat* immediately laid the legal foundations for the elimination of "elements hostile to the state."[29] This included, for example, new habilitation rules that allowed personnel decisions to be taken without any statement of reasons; in addition, the Ministry of Education was given the power to force unwanted professors and assistants into early retirement, without due process, in the course of reorganization measures or financial cutbacks. In June 1935 the Federal Council of Culture adopted new laws concerning the institutes of higher learning which were designed to ensure total uniformity in education in the spirit of the "new Austria," prescribing compulsory attendance at lectures on world view and civic education as well as paramilitary exercises and camps. The crisis experienced by the sciences at the "universities in the new state" was blamed on the influence of liberalism, which was perceived to emphasize the contrast between science and world views, in particular.[30] In order to legitimize anti-democratic policies it was necessary

[24] *AZ*, October 10, 1929.

[25] *DÖTZ*, October 13, 1929.

[26] Fenz 1978.

[27] *DÖTZ*, June 14, 1931.

[28] Weinzierl 1969, 18 ff.; Lichtenberger-Fenz 1990.

[29] *Die Presse*, August 8, 1934; *Wiener Neueste Nachrichten*, May 28, 1934.

[30] A. J. Walter 1936, 10 ff., 18, 26.

to elevate an already marginalized movement to appear as the common enemy. At the university this enemy was the "positivist" view of the world with its "lack of any presuppositions," the positive approach of natural science as the counterpart to a "uniform idea" and to the belief in a *Führer* spirit. The conformity of the universities was to be ensured by a comprehensive world view, a uniform idealistic conception of science based on medieval ideas and the common "basic science" of philosophy.

9.1.6 The Appointment of Moritz Schlick in 1922

The events surrounding the appointment of Moritz Schlick to the Chair of the Philosophy of Inductive Sciences formerly held by Ernst Mach and Ludwig Boltzmann already show some characteristic elements of the intellectual atmosphere of the time. The student riots of the same year, secretly condoned by the administration, led to the closure of the universities, and the question of whether knowledge or racial descent should be a decisive factor for a *Habilitation* was discussed seriously in the press.[31] It was during this time that Hans Hahn, professor of mathematics since 1921, started a signature campaign for Schlick among the mainly conservative professorate, against much resistance from the representatives of traditional philosophy. After lengthy negotiations the following order of candidates for the three vacant chairs of philosophy emerged from many domestic and foreign applications: Schlick, Brunswig, Pichler for the chair of philosophy of nature; Karl Bühler for the chair of psychology; and Robert Reininger for the chair of history of philosophy.[32] The professorial committee subsequently turned to Emil Reich, who had been teaching practical philosophy and aesthetics as a lecturer since 1890 and later as *außerordentlicher Professor* (associate professor) and who was also a prominent advocate of adult education, and to the botanist Richard von Wettstein—both of whom had supported Schlick—to find out whether Schlick was of Jewish descent.[33] As this was not the case and the application of this criterion—which clearly says a lot about the appointment procedure as such—therefore failed to show the result that had obviously been desired, the professor of Old German, Rudolf Much, and the historian Alfons Dopsch filed a memorandum against the proposed list of candidates. They claimed that the appointment of representatives of two philosophical specialties (i.e., philosophy of nature and psychology) ran counter to the needs of the university, for "our youth has to be led in the spirit of an idealistic world view"[34] and that, furthermore, "representatives of comprehensive areas … much wider in range than Mach's thought" were needed. Both vehemently

[31] *Der Morgen*, December 11, 1922.

[32] Wieser 1950, 48 ff.

[33] Zehetner 1972, 50.

[34] AVA, BMfUK, Unterrichtsamt (Dept. of Education) 1922, 4C, Nr. 391, Abt. 2. Universitätsarchiv Wien (UA, University Archives Vienna), Personalakt (PA, personal file) Schlick Z. 531.

demanded that an Austrian applicant be chosen and proposed the already nominated, "pre-eminent" Reininger. Their proposal was also supported by Alois Höfler, who considered Schlick to be better suited for the post of professor of physics. This initiative obviously aimed at reducing the diversity of opinion guaranteed by three chairs by combining them into one and by appointing Reininger to this single chair. In the end, however, Reininger, Bühler, and Schlick—the latter described in the committee's report as an "original and independent thinker"—were appointed despite all this opposition, and the hope was expressed that with Schlick things would develop differently than with Mach, who had always insisted on remaining a physicist, or Boltzmann, who had once described academic school philosophy as a kind of bad sport.[35] These incidents serve to confirm that massive reservations were harbored against an anti-speculative philosophy interfering in the methods of modern natural science, logic, and mathematics and that anti-Semitism was institutionalized and exerted a function of social control. (Cf. Dahms and Stadler 2015 on the procedure of the appointment in 1922)

9.1.7 Edgar Zilsel's Attempted Habilitation in 1923–24

An analysis of Edgar Zilsel's unsuccessful attempt to obtain habilitation is also quite revealing in this context, as it raises the question of the genuine subject -matter of philosophy.[36] Applying for a license to teach in the entire field of philosophy, Zilsel submitted his book *Die Geniereligion* (The Religion of Genius) (1918) as well as papers on physics, natural philosophy and the teaching of philosophy and, as his thesis for habilitation, the two-part *Beiträge zur Geschichte des Geniebegriffs* (Contributions to the History of the Concept of Genius).[37] The habilitation commission (Reininger, Bühler, Schlick, Meister, Gomperz, Schlosser, Wegscheider, Ehrenhaft) informed Zilsel, via Schlick and Gomperz, that he should withdraw his application because it probably would not be supported by the majority of the School, particularly because of the lack of any paper on the philosophy of nature and epistemology.[38] Zilsel turned down this suggestion on the grounds that he did not want his research interests to be determined by extraneous considerations and that in his opinion the result of eight years of work could withstand scientific

[35] Wieser 1950, 51; Broda 1955, 87–93; also Stadler and Dahms 2015.

[36] UA, loc. cit., PA Edgar Zilsel.

[37] Zilsel to the professors at the School of Philosophy (Phil. Fak.), June 10, 1923. His other works were "Bemerkungen zur Abfassungszeit und zur Methode der Amphibolie der Reflexionsbegriffe" (Remarks on the Time of Composition and the Method of the Amphibology of Reflexive Terms) (1913); *Das Anwendungsproblem* (The Problem of Application) (1916); "Versuch einer Grundlegung der statistischen Mechanik" (Attempt at a Foundation of Statistical Mechanics), "Der einführende Philosophieunterricht an den neuen Oberschulen" (Introductory Instruction in Philosophy at the New Upper Secondary Schools) (1921). Cf. Zilsel's bibliography in Section II.

[38] Zilsel to the dean, February 22, 1924. UA, PA Zilsel.

criticism.[39] As Reininger declared the thesis to be philosophically inadequate and Richard Meister, the professor of pedagogy, claimed to have discovered fundamental mistakes (among them that "everything focused on economics"),[40] while Schlick and Gomperz voted in favor of Zilsel, it was decided to seek an independent professorial opinion as to whether Zilsel was qualified to teach philosophy.[41] Before two members from the commission had denied the habilitation thesis any merit as a philosophical paper, even though the same commission did not object to the candidate on personal grounds.[42] Although the requested evaluations by Adolf Dyroff and Heinrich Scholz had not yet arrived, the application was discussed in another meeting, as confirmed by the School of Philosophy.[43] Then, in a letter to the dean of June 3, 1924, Zilsel announced the withdrawal of his application (despite the fact that the majority of members had accepted the "scientific value" of his work), because he considered himself unable to submit further "philosophical writings in the strict sense." Thus the divergence between philosophy and science, which lay at the bottom of the criteria of evaluation, was documented in writing. When the evaluation by Ernst Cassirer, who had "the best of impressions," arrived not long afterwards, it was no longer relevant.[44] In the end, Zilsel wrote once more to the dean in order to explain his motivation and scientific intentions: he did not approach philosophy "by coincidence from the history of literature, but … tried to develop ideas in natural philosophy and the history of philosophy in close connection with the facts of physics and of the humanities, believing that this serves philosophy better than narrowly delimiting it from the fertile ground of the individual sciences."[45] Furthermore, he thought it improbable that he would "radically change the methods of investigation" (ibid.).

One may disagree about the philosophical relevance of the thesis Zilsel submitted for habilitation, for it certainly cannot be placed clearly within the scheme of classical works of philosophy. Yet these events show a distinct trend against a conception of philosophy oriented towards natural science and sociology, with the common conception of philosophy being prescribed as the exclusive criterion of evaluation. The commission's disregard of the fact that at the time of his application Zilsel was already holding lectures on ethics, natural philosophy, epistemology, and philosophical history (on Kant, among others) at adult education centers and at the Pedagogical Institute (cf. Sect. 2, Chap. 12) only serves to confirm the suspicion that there were certain underlying motives which were founded on different political attitudes and world views and on a different understanding of science.

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[39] Zilsel to Schlick, February 23, 1924.

[40] PA Zilsel, Protocol, March 6, 1924.

[41] Reininger as well as Meister associated with the so-called "Bärenhöhle" (bear's den), an informal group of university lecturers centered around O. Abel. The aim of this group was to prevent Jewish scientists from habilitation and appointment. See Taschwer 2013.

[42] Deanery, Phil. Fak., March 10, 1924, and commission report, March 19, 1924.

[43] Protocol, March 19, 1924.

[44] Ernst Cassirer to the dean, July 7, 1924, loc. cit.

[45] Zilsel to the dean, November 11, 1924.

9.1.8 The Appointment of Hans Eibl and Viktor Kraft in 1924

The Ministry of Education also intervened in personnel decisions, and a majority of professors supported its actions. Lists about the "racial descent" of university teachers were once again being circulated. After the death of Wilhelm Jerusalem, associate professor of pedagogy and the history of philosophy, the two lecturers Hans Eibl and Viktor Kraft were discussed as his potential successors.[46] Eibl, whose philosophical interests lay in patristics and scholasticism, was to become one of the "bridge builders" between Catholicism and National Socialism in the ranks of the so-called "Catholic Nationalists" (together with Josef Eberle, Edmund von Glaise-Horstenau, Oswald Menghin, Karl Gottfried Hugelmann, and Othmar Spann). He criticized, for example, the "historical responsibility of the Jews for bolshevism," demanded a revision of the Treaty of Versailles, and expressed his sympathy for National Socialism through his advocacy of a "common Christian-humanistic" program and the concordat between Hitler and the Vatican.[47] Having studied classical philology and philosophy in Vienna, he worked as a high school teacher before World War I. At the beginning of the war he acquired his habilitation with a thesis entitled *Metaphysik und Geschichte* (Metaphysics and History), but only started to hold lectures on classical and medieval philosophy and on world views in 1921. He also taught philosophical propaedeutics for graduates of certain secondary schools until 1938.[48] In agreement with the Ministry of Education, the professorial committee favored the appointment of Eibl as associate professor (with the simultaneous conferment of the same title upon Kraft) because Eibl represented a philosophy "which is needed at the University." Protesting against the partial infraction of academic autonomy by the ministry, some professors—including Schlick and Reich—raised a minority vote based on a number of points: Eibl was not a specialist in the history of philosophy, but mainly interested in problems of religion and metaphysics; two of the five professors at the School already lectured mostly on the history of philosophy; and besides, patristic philosophy was also taught at the School of Theology, "in some cases with a more liberal attitude than Eibl's." This vote and the accusation of ministerial intervention were rejected by the School. A commission (Arnim, Bühler, Ehrenhaft, Hauler, Meister, Reich, Reininger, Schlick) then decided, with a majority vote, to propose the following motion to the School: another discussion of the Eibl/Kraft case, preceded by the appointment of Heinrich Gomperz, and the adjournment of the whole matter. The motion for adjournment was rejected; Gomperz was elected professor of the history of philosophy with a majority vote. The appointment of Eibl (the interest to keep him in Vienna was quite strong, as he had also been proposed as associate professor of the history of philosophy in Prague) brought the number of professors who lectured on philosophical history at the School of Philosophy up to four (Reininger, Gomperz, Roretz, and

[46] AVA, BfU 1924. Reg. 4, Fasz. 629, Philos. Lehrkanzeln.

[47] Weinzierl-Fischer 1963.

[48] A. J. Walter 1936; *Die Presse*, August 8, 1934; *Wiener Neueste Nachrichten*, May 8, 1934.

now Eibl), despite the School's financial and economic difficulties. The Eibl/Kraft case (with Kraft being granted merely the title of associate professor in 1924) provides *in nuce* evidence of the preference of the Ministry of Education and most professors for a scholastic philosophy of world views.

9.1.9 The Appointment to Heinrich Gomperz's Chair in 1934

With Austro-Fascism having finally won the day after the events of February 1934, universities were subjected to a comprehensive reorganization in the spirit of the Austria-oriented ideology which opposed all "liberalistic and individualistic tendencies" and was accompanied by corresponding legislation and by a selective policy of financial cutbacks. Against the powerful "national opposition" (including university teachers such as Hugelmann, Eibl, Spann, Nadler, and Srbik) and illegal National Socialists, however, education policy was bound to be rather defensive.[49]

One of the first victims was Heinrich Gomperz.[50] In our context it is, above all, the subsequent process of appointment which is exemplary of the *Ständestaat*.[51] Gomperz was pensioned prematurely because of his alleged disloyalty to the Dollfuß regime, and his chair was transformed into an associate professorship to suggest the objective of financial cutbacks. In his stead the government intended to appoint Dietrich von Hildebrand, an anti-Nazi philosopher representing a Christian world view who had emigrated from Germany in 1933. Hildebrand had studied philosophy in Germany before the war, obtaining his habilitation in Munich in 1918 and teaching there as a lecturer until 1933. Before his call to Vienna he had been adjunct professor at the School of Theology in Salzburg.[52] Advocating a personalistic ethics and philosophy, he was opposed to any form of collectivism, left or right: National Socialism was as much an enemy to him as Bolshevism. He would accept an authoritarian system in "extreme situations" and supported the formation of a new "Austrian identity." Just like his journal *Der christliche Ständestaat* (The Christian Corporate State), he fought against the anti-Semitic prophets of "Catholic National Socialism" in the Christian camp such as Spann, Eibl, and Bishop Alois Hudal, against Josef Eberle's weekly *Schönere Zukunft* (A Better Future),[53] and even against the nationalist *Reichspost*, which earned him harsh criticism and an ever increasing isolation.[54] After the Anschluss he managed to emigrate to the U.S. after a hazardous escape.

The appointments committee—dominated by Catholic and German nationalists and led by Heinrich von Srbik—considered von Hildebrand's nomination

[49] Wandruszka 1954, 414.

[50] Gomperz 1953; Topitsch 1967; Seiler and Stadler (eds.) 1994.

[51] Ebneth 1976, 39 f.; AVA 13 f. 4U, February 20, 1934.

[52] Wieser 1950, 225 f.

[53] Eppel 1980.

[54] Ebneth 1976, 76 f., 100–106.

unacceptable "on scientific grounds" and recommended, in the following order, Alois Dempf, Viktor Kraft, and Karl von Roretz. Dempf had received his habilitation in Bonn (Germany) and taught there as a lecturer and—from 1933 until his call to Vienna as full professor in 1937—as honorary professor. His special interests were medieval Christian philosophy, ethics, and cultural philosophy.[55] Though conservative in his political views and general world views, he was also a practicing Catholic which put him at a clear distance from National Socialism and also provided the reason for his suspension in 1938.[56] Karl von Roretz had studied law, medicine, and philosophy, and worked as a lecturer in the history of philosophy and as a librarian at the National Library since 1922. He represented an anti-metaphysical positivism similar to Mach's and was also concerned with critical epistemology and problems of the psychology and philosophy of culture (Austeda 1976).

The appointments commission finally reached an agreement to accept von Hildebrand's admission to the faculty. The proposal also contained the revealing remark that Hans Eibl was a "universally recognized representative of a Christian world-view" which would justify his promotion to full professor. Despite this opposition von Hildebrand was appointed *außerordentlicher Professor* by Austria's chancellor Schuschnigg at the end of 1934—at the start of his lectures, however, he had to request police protection against attempted acts of disturbance by German nationalist students. Dempf was rejected as a foreigner; Kraft and von Roretz failed to win sufficient support as well. Both were recognized as competent scholars, but were considered to be less suited for the specialist field of "philosophy with special regard to *Weltanschauungslehre* (theory of world views)" compared to von Hildebrand, who possessed "a very good reputation in scientific respect." If the concept of *Weltanschauungslehre* is indeed applied as a criterion, then this explanation for the rejection of Kraft and Roretz is plausible and reflects a realistic assessment of the candidates. At the same time, however, it is also evidence of the fact that it was impossible to engage in any exact philosophy beyond the sphere of theology, and of the existence of a concept of science shaped by political and general attitudes and opinions.

9.1.10 The Appointment to Moritz Schlick's Chair in 1937 and the Resignation of Karl Menger

The murder of Moritz Schlick June 22, 1936 sparked off a massive anti-Semitic and anti-positivist defamation campaign in many Austrian papers.[57] The appointments commission (Bühler, Knoll, Koppers, Meister, Mewaldt, Praschniker, Reininger, Srbik, Thirring, Versluys, and Winkler) for the vacant chair quickly reached the

[55] Wieser 1950, 228 ff.

[56] AVA, K.Min. fasc. 761, 4LL, August 17, 1938.

[57] Cf. *Der christliche Ständestaat*, June 8, 1936 and July 19, 1936.

conclusion that there was no suitable candidate to succeed Schlick.[58] In addition it proclaimed programmatically that "the history of philosophy should constitute the real substance and essential task of the study of philosophy," which amounted to the liquidation of the chair of the philosophy of nature that had existed since Mach. Hardly coming as a big surprise, this statement on the form and task of philosophy as an academic subject was designed for the benefit of Hans Eibl, although Heinrich Gomperz was also discussed. The candidates proposed in the final ranking were Eibl, Dempf, and Friedrich Kainz. Kainz had been a lecturer since 1925, teaching mostly linguistic philosophy, and psychology.[59] Eibl, a supporter of the German ambassador von Papen, was backed by, among others, Bishop Alois Hudal, an adherent of the vision of a National Socialist state in the spirit of Catholicism, who tried to put chancellor Schuschnigg under pressure through interventions in Rome.[60] These efforts, however, did not achieve the desired result, for it was Dempf who was eventually appointed as Schlick's successor. As a convinced Catholic he was more in line with the then official Austrian ideology than Eibl, who had distinct political interests and collaborated with National Socialism. This was more or less confirmed a year later by Eibl himself in a petition (seconded by Menghin, the Minister of Education) to Seyß-Inquart, the "Reichsstatthalter" (national-socialist governor) of Austria, in which he sought "compensation" through the conferment of the professorship for which he had been recommended twice.[61] His explanation speaks for itself and for the spirit of the Catholic nationalists: Eibl complained that he was passed over by the Schuschnigg regime because of his nationalist conviction and that, therefore, his appointment as full professor would only be just from the standpoint of the Third Reich, especially since he had complied with all demands for cooperation from the National Socialists with stout conviction. Finally, he boasted that he had

> revitalized courage and belief in the future … when the atmosphere in our circles had been depressed after the ill-fated July of 1934 … through lectures for NS students, in particular through a lecture to the extended leadership of *SS-Standarte 89* about the Third Reich and the statesmanship of the Führer.[62]

After the "Anschluss", which was welcomed happily or with satisfaction by a majority of academic teachers who had contributed to preparing the ideological ground for fascism over the years, the last traces of logical empiricism were obliterated. However bitter the forced emigration, retirement, or retreat must have been for the members of the Vienna Circle, it did not come as a surprise. But for those who had strived for years towards a fraternization of Catholicism and National Socialism, perhaps out of naive and illusory considerations, the disappointment was dramatic as they saw their ideas and dreams shattered by their hoped-for "liberators" all too soon.

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[58] AVA, B, 1937, 4CL.

[59] Wieser 1950, 218 f.

[60] Weinzierl-Fischer 1963, 498.

[61] AVA, UMin, fasc. 761, 1937–38, 4C1, 25-4-37, Zl. 12309-1/1.

[62] Loc. cit., May 3, 1938.

In addition it has to be mentioned that, except for Hans Hahn, neither Karl Menger nor Kurt Gödel, nor Kurt Reidemeister some time before them, managed to be appointed as a full professor in Vienna. Furthermore, a strict policy of cutbacks was pursued concerning the chairs of mathematics: the third chair was left vacant in 1935 after Hahn's death, and a motion for a new appointment was rejected in 1937. Instead, as in von Hildebrand's case, an *associate professorship* was created.[63] It is also characteristic of the attitude prevailing at the time that Menger's and Gödel's acquaintance with Hahn provoked anti-Semitic statements when both were tested for their "patriotic integrity."[64] Despite strong support from Schlick, Menger failed to succeed to Wirtinger's chair in 1936; disappointed, he left Austria and emigrated to the U.S.[65] Karl Mayerhofer, an illegal National Socialist at the time, was appointed to the chair in question and was even permitted—after only a short period of absence in the course of de-nazification—to resume his scientific activities in the Second Republic.[66]

9.1.11 Moritz Schlick and the Dismissal of Friedrich Waismann

Only a few months before his murder, Schlick expressed his opposition to the anti-Semitism of the time, vehemently protesting against the dismissal of his long-time collaborator and librarian Friedrich Waismann.[67] A declared opponent of National Socialism, he regarded the authoritarian *Ständestaat* (with a certain political naiveté) as a bulwark against Hitler's Germany. This was also why he supported Dietrich von Hildebrand, with whom he entertained excellent personal relations despite their scientific differences, against the German-nationalist professors.[68] Schlick's basic attitude was quite liberal, and the nature of his protests against the consistently anti-Semitic and anti-positivist actions of the Ministry of Education already demonstrated the fatal and illusory nature of his commitment to the corporate state. In one of his letters to the ministry he summarized his situation at the university,[69] pointing to the fact that in 1929, when he rejected a lucrative offer to got to Bonn "because of my affection for Austria," he was not promised an increased salary, but a librarianship for Waismann, who had already been working at his institute without any salary. In fact, Schlick was disappointed by the indifference of the Ministry of Education and the Austrian government which—unlike in the case of Eibl—had

[63] UA, Dek. Phil. Fak., Zl. 410, 1936–37.

[64] UA, PA Menger and Gödel.

[65] Menger 1994.

[66] Einhorn 1985, 31–35. UA, PA Mayrhofer.

[67] Erlaß (decree) 13, BfU., 29-1-1936, Zl. 2818/I-1.

[68] Ebneth 1976, 107.

[69] Schlick to BfU, February 29, 1936.

made no attempt to keep him in Vienna. Only after long deliberation did he decide, urged by his friends and followers, to stay in Austria.[70] Schlick's reference to his own willingness to cooperate failed to prevent the dismissal of his closest collaborator. For the *Ständestaat* Waismann was just as unacceptable as any other non-Arian, for example Robert Reininger's and Karl Bühler's assistants Amalie Rosenblüth and Else Frenkel. Incidentally, their appointments had been criticized publicly as early as 1931. When a last proposal from Schlick to employ Waismann at least as a research assistant was simply disregarded by the ministry, he complained that "the teaching of philosophy … is currently very difficult."[71]

Herbert Feigl, one of Schlick's students, arrived at a realistic assessment of the situation as early as 1931, realizing that, as a Jew, Czech and a representative of the Vienna Circle, his chances of an academic career in Austria were rather limited, even though Schlick was convinced he could get him appointed lecturer. Feigl applied to several American universities and became the first member of the Vienna Circle to emigrate in September 1931 (Feigl 1969, 650). Schlick's murder in July 1936 effectively spelled the end of the public phase of the Vienna Circle in Austria, although a small circle of students under the leadership of Waismann and Zilsel continued to meet until 1938, when National Socialism put an ultimate end to the movement.[72] (Cf. the documentation in part 2, Chap. 3)

9.2 University, School Reform, and Adult Education

Seen in the context of the intellectual situation of the time, and taking into account the increasing political influence of right-wing forces, the academic front against democratic reforms—also against school reforms and adult education—is easier to understand.[73]

While the school reform movement initiated by Glöckel was mostly rejected by the university, there was also a certain amount of cooperation in some cases.[74] Among the university teachers it was mainly Karl and Charlotte Bühler who were active in this field: the couple engaged in teacher training at the Pedagogical Institute of the City of Vienna and also wrote a number of important books and articles on cognitive and developmental psychology. From 1922 to 1934 both of them

[70] Mulder 1968, 388.

[71] See footnote 67.

[72] For a compilatory account of the so-called "Conservative Revolution" see Mohler 1972; Wasserman 2014.

[73] Another factor was the political attitude of individual university teachers in connection with academic ceremonies. In 1929, for example, the celebration of a "Vaterländischer Heimatabend" (Patriotic Evening) with references to a planned "Reichsgründungsfeier" together with German nationalist university teachers was supported by the *Ordinarius* of pedagogy, Richard Meister, against the opposition of the university's senate and the rector. Cf. Zoitl 1981, 183, 188.

[74] Achs and Krassnigg 1974, 116 ff.

contributed considerably to the improvement of training in linguistic and experimental psychology and to a fruitful cooperation between schools and the university (Benetka 1995). They also established the Wirtschaftspsychologische Forschungsstelle (Research Center for Economic Psychology) at the Institute of Pedagogy, where Paul Lazarsfeld and his collaborators Marie Jahoda and Hans Zeisel found the appropriate environment for carrying out their pioneering work in the field of empirical social research.[75]

In the schools themselves pedagogical research was carried out in an experimental setting on an empirical basis, and orthopedagogy was promoted as well; the collaboration of a number of prominent university teachers at the Pedagogical Institute also deserves to be mentioned in this context. Karl Popper, then a teacher at a lower secondary school *Hauptschule*, a collaborator of Alfred Adler, and a contributor to the periodicals *Quelle* and *Schulreform*, was quite committed to school reforms, his efforts being inspired by the Bühlers' cognitive psychology and by Glöckel's concept of vocational schools.[76] A similar enthusiasm characterized the activities of Edgar Zilsel, who taught at secondary school and at adult education centers and also wrote articles on (school) pedagogy advocating a comprehensive reform of adult education on the basis of the scientific world conception.[77] Even though the thesis arrived at with reference to the activities of Karl Popper and Ludwig Wittgenstein, that modern analytical philosophy and critical rationalism originated from the Austrian school reform (Bartley 1970), seems to be untenable, certain concrete connections undoubtedly exist. In this context, of course, we may also emphasize the active participation of members of the Vienna Circle in the school reform—a fact that was also addressed in the Manifesto of 1929:

> Thanks to this spirit of enlightenment, Vienna has been leading in a scientifically oriented people's education. With the collaboration of Victor Adler and Friedrich Jodl, the society for popular education was founded and carried forth; 'popular university courses' and the 'people's college' were set up by the well-known historian Ludo Hartmann whose anti-metaphysical attitude and materialist conception of history expressed itself in all his actions. The same spirit also inspired the movement of the 'Free School' which was the forerunner of today's school reform. (*The Scientific Conception of the World: The Vienna Circle*, in Neurath 1973, 301 f.)

And, further below,

> For instance, endeavours toward a new organization of economic and social relations, toward the unification of mankind, toward a reform of school and education, all show an inner link with the scientific world-conception; it appears that these endeavours are welcomed and regarded with sympathy by the members of the Circle, some of whom indeed actively further them. (ibid., 304 f.)

Given statements like these it is not hard to understand why Edgar Zilsel, Otto Neurath, Hans Hahn, Herbert Feigl and Friedrich Waismann participated, more or less actively, in efforts to promote adult education and school reform.

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[75] Langer (ed.) 1988; Fleck 1990.

[76] Cf. Bartley 1969.

[77] Dvorak 1981, chapter 3.

Of those mentioned, Hans Hahn was the only university teacher to publicly comment on the school reform and on the negative attitude adopted by Vienna's institutes of higher learning towards this reform. After the publication of Glöckel's *Leitlinien* (Guidelines), E. Schwind, K. Kobes, and A. Ostermeyer, the rectors of the University of Vienna, the Technical University, and the Academy for Agriculture and Forestry Studies respectively, drew up a programmatic *Denkschrift* (Memorandum) against the school reform in 1920. Referring to the planned reforms of schools and teacher training at the elementary and secondary school levels, they pointed to the alleged deterioration of the "sub-structure," expressing their concern that its quality might suffer even more through the reforms and emphasizing in particular the specific character of education at the upper secondary schools (*Gymnasium*) and the middle secondary schools (*Realschule*). What was important in the context of political education was the clear distinction between the educational objectives of schools and institutes of higher learning:

> Elementary, middle and upper secondary schools, vocational schools, commercial schools and all kinds of technical schools have different tasks; they are designed to pass on our knowledge to their pupils, in accordance with the individual school's objectives, and to present it in a purely positive way, as it were. They have not got anything to do with research, with the foundations of what is being taught, at least not with any ultimate foundations and, thus, with science as such. (ibid., 7)

Therefore it was also

> in the interest of all institutes of higher learning that the curricula and, even more importantly, the efficiency of upper secondary schools be improved again, as there is grave concern that their quality might deteriorate even more in the course of the planned school reform which, as is well-known, aims at very different objectives. These tendencies towards total uniformity and the lack of an adequate understanding and appreciation of the specific characteristics of upper secondary schools, which are designed to prepare pupils for scientific work, will make these schools entirely unsuited or less suited for fulfilling their specific and most holy task. (ibid., 8)

The assumption of a comprehensive decline of standards at Austria's upper secondary schools—no empirical justification of this opinion was given—continues to this day to be hotly disputed among rectors, university teachers, and politicians, and constantly seems to run the risk of being overshadowed by ideological considerations. While "positive knowledge" without the "inclusion of open questions [was] not desirable and the stressing of dubitable aspects would constitute a fundamental mistake" (ibid., 11) for elementary and middle secondary schools, it also appears to be "pedagogically … objectionable that those who are to be educated towards critical thinking should be spoilt by being confronted with too much criticism right from the start or that they, in turn, should be brought in touch with it only later" (ibid., 12) as far as upper secondary schools are concerned. Therefore, the following demands were made concerning teacher training: "… the teacher, too, has to acquire his knowledge essentially in a positive form, not in a critical, scientific one … It would be madness if teachers at elementary or also at middle secondary schools wanted to present their respective subjects in a skeptical-critical way …; it would be equally dangerous if the training of these teachers took place in such a scientific way. And therefore teacher training belongs neither at the middle or upper secondary schools

nor at the university" (ibid., 13 f.). For "pedagogy, to a certain extent, is like art; it is a matter of talent, but apart from that it is basically a matter of the heart and not of reason " (ibid., 15).

This line of reasoning primarily aimed at disputing any scientific aspect of pedagogy and putting intuition and talent—without any verifiable criteria—in its place, thus segregating a well-founded sociological and didactic training from the universities—a training later offered for compulsory education by the City of Vienna's Pedagogical Institute, which was founded some time afterwards. As far as the general structure of the educational system was concerned, the rectors advocated the continuation of the existing dual, differentiated system with partial permeability:

> There is no intention, of course, to make the transfer of especially gifted pupils from one group to the other altogether impossible, but in general it should not be encouraged or made too easy, particularly if the transfer is to take place at a comparatively late stage. For once a pupil has become accustomed to one particular direction according to the orientation of the individual type of school, he is not prepared and even spoiled, as it were, for any other direction … It also follows from this reason, however, that the sharp separation has to take place very early on – in our opinion at the elementary school level. (ibid., 17)

This argument against a type of comprehensive school until the age of fourteen that would ensure more social equality was closely linked to the role and function then ascribed by the universities to the humanistic upper secondary school that offered a traditional classical education. This was to be separated, in its long form (from the age of 11 to 18), from all other types of school and to be maintained as an elitist institution. In their conclusion the rectors warned against any kind of reform, pointing to the possible demise of Western values:

> Our current economic situation forces us to ensure a maximum of concentration, work and economy of time, and in the field of education this leads us to the exact opposite of a comprehensive school. What we need is schools which provide our young people, quickly and efficiently, with the education they need in life, and that is, basically, what our schools do … We do not need a reconstruction of the entire system, which would also entail an overturn of existing structures, destroying values the greatness and importance of which may be more immense than some circles outside of science may be able to imagine. (ibid., 20)

Following this memorandum a corresponding alternative proposal by Alois Höfler and Richard Meister to the *Leitlinien* was adopted as a senate's resolution by the University of Vienna. It stipulated a differentiation of the school types following elementary school into several distinct types of secondary schools.[78] This rejection of any structural change in the educational system also separated teacher training from academic pedagogy and made it the responsibility of the City's Schools Council.

Six years later, amidst the debate on the reform of Vienna's secondary schools, the University of Vienna organized another demonstration, widely covered in the press, against the educational policy of the City of Vienna. In his capacity as

[78] For a survey see Mulley 1979, 34.

chairman of the Union of Socialist Teachers in Higher Learning and member of the Schools Council of the City of Vienna, Hans Hahn criticized this demonstration in an article entitled "University and School Reform" (1926). As early as 1924 he had expressed his concern about the lack of academic freedom in teaching and studying at the institutes of higher learning and demanded adherence to the rules of the *habilitation* norm proposed by Glöckel, as well as specialized training of secondary school teachers at the university level, accompanied by practical work at schools. In the first article Hahn dealt not only with current political questions, but also with the general question of the relationship between university and school, arriving at a comprehensive evaluation from a reformist perspective. In spite of harsh criticism from his colleagues he sought to illustrate the necessity of cooperation between universities and schools on the basis of the curriculum reform. He stressed the advantages of the new types of schools and criticized the differentiating matriculation standards of the different types of secondary schools. Even then the debate concerning the teaching of Latin, which has remained a controversial issue until today, culminated in the question of whether a general instruction in Latin should constitute a prerequisite for all courses of study at the university—the necessity of which Hahn disputed. Apart from factual and professional reasons for the universities' opposition to school reform, Hahn also mentioned psychological reasons such as a certain idealization of the past and of one's own school days and a general rejection of the labor movement. Finally he arrived at a (self-)critical global appraisal of the competence of university teachers regarding school matters:

> The question is: Do university teachers have any special competence to assess school matters? I do not think so. Most university teachers have neither the time nor any particular interest to deal with school matters, so that they are usually not too well-informed about the subject. If they are now forced to give official opinions on school matters, they must do so without having sufficient knowledge of the relevant problems, and yet they are given the same authority in that field to which they are entitled in matters of the sciences they represent. (Hahn 1926, 435 f.)

In connection with the above-mentioned university demonstration, Hahn then went on to criticize that it had been initiated neither by the rector nor by the academic senate, but by a commission led by the professor of pedagogy, Richard Meister, without even consulting the representatives of psychology (Karl and Charlotte Bühler). He also addressed the central problem of academic pedagogy, referring to the chairs of pedagogy (Vogt, Höfler) and to the appointment policy of 1922, when Höfler's vacant chair was not given to Hermann Nohl, a reform-oriented professor of pedagogy from Göttingen in Germany, but to Richard Meister, a classical philologist opposing all reforms. The chair of pedagogy had thus been turned into an institution opposed to school reform.[79]

Even though Hahn was right in this assessment of the situation, he misjudged the actual developments at the universities; dying prematurely in 1934, however, he did

[79] Fischl 1926.

not live to see their actual outcome. In 1926 his forecast had still been full of enthusiasm and optimism:

> To my great regret, however, I have lately had to see this university choose a path on which I cannot follow it. It clings to what is old and obsolete, rejecting what is new and better. This fills me with deep sorrow, for I know that you cannot stop progress, and whoever tries to resist the things that have to come, will be squashed, and his memory will not be revered. (ibid., 438)

Given the university's conservative role it was mainly non-academic thinkers and representatives of pedagogical practice who cooperated with the school reform movement, while academic pedagogy—which had only been established around 1900—served to ensure academic immunization rather than bring about any social change and eventually turned into a conservative institution after 1918. It was particularly those tendencies between liberalism and socialism which had been marginalized at the university (logical empiricism, psychoanalysis, Austromarxism), which now produced fundamental theoretical and practical contributions to the movement of school reform: representatives of psychoanalysis (Sigmund and Anna Freud, Siegfried Bernfeld, Josef Karl Friedjung, August Aichhorn, and others), individual psychology (Alfred Adler, Carl Furtmüller, Gustav Ichheiser, and others), the Vienna Circle (Edgar Zilsel, Otto Neurath), as well as representatives of "late enlightenment tendencies" such as the Ethical Community (Wilhelm Börner), the Society for Social Pedagogy, the Freethinkers and Monists, the (bourgeois) women's and peace movement (Rosa Mayreder), and the Sociological Society (cf. Chap. 2).

For a proper evaluation of the school reform movement we have to take into account that it was by no means a revolutionary movement, but rather a bourgeois-progressive one. It represented a mixture of pedagogical and psychological theories on the one hand, and efforts to change people's social and living conditions on the other (it also had a certain affinity to the youth movement). The failure of the planned school reform was due to political causes, however. While in Vienna it was possible to realize at least part of the reforms over a period of several years, there were hardly any changes at all in the rest of the country, which was dominated by a block of bourgeois parties. The political position of the extremely conservative teachers' and parents' associations also played a decisive role in this context. Furthermore, the "triangle of fear" (teachers-pupils-parents), as Anna Freud described it, was also influenced by ministerial and (party-)political forces.

The commitment of some Vienna Circle members to adult education[80] derived from two main reasons. First, this remarkable participation in informative and popularizing educational work—consider the active collaboration of Heinrich Gomperz, Hans Hahn, Philipp Frank, and Viktor Kraft in the popular university lectures and at the people's college—corresponded to the self-understanding of the individual

[80] General accounts of adult education in Vienna include Bründl n.d.; Kutalek and Fellinger 1969; Göhring 1982; Knittler-Lux (ed.) 1987; Filla (1991); Stifter 2005; Filla 2014; *Mitteilungen. Verein zur Geschichte der Volkshochschulen* 1990 ff. On the political context see *Arbeiterkultur* 1981; Maimann (ed.) 1988; *Das Rote Wien* 1993.

protagonists after Ernst Mach (Altenhuber 1995). This dedication, which also manifested itself in the foundation of the Ernst Mach Society and the Museum of Economy and Society in Vienna, was to become a constitutive element of scientific world conception in the First Republic. And second, for many of the younger scientists in and around the Vienna Circle who were faced with bleak career prospects—owing to wide-spread anti-Semitism and biased political attitudes—the adult education centers offered the only, albeit unreliable, opportunity to earn some (additional) money, as the biographies of Friedrich Waismann and Herbert Feigl clearly illustrate. Still, we may assume that adult education and school reform offered both the core group and the periphery of the Vienna Circle an important cognitive area of identification, which in turn adopted a cooperative and friendly position towards these intellectuals.[81] For a short period of time this coalition, which ceased to exist after 1945, managed to realize the vision of a "republic of scholars." From the perspective of scientific sociology, therefore, the reference of the Vienna Circle's manifesto to Vienna's system of adult education was more than just an empty postulate.

A closer look at the relevant activities of members of the Vienna Circle and the Verein Ernst Mach in the inter-war period (cf. the biography in section II) reveals some remarkable facts. Not surprisingly, Edgar Zilsel (250 entries in the programs from 1916 to 1934–36) was the most active collaborator, as far as both the time and extent of his contributions are concerned, since his main occupation had been in adult education from the beginning of the First Republic until February 1934.[82]

Listed according to the frequency of contributions, Zilsel is followed by Friedrich Waismann (32 entries between 1921 and 1934–35), Viktor Kraft (28 between 1910 and 1934–35), Otto Neurath (26 between 1907 and 1933), Philipp Frank (23 between 1907 and 1931–32), and Herbert Feigl (16 between 1927 and 1930); such a survey should, of course, attach more weight to the presentation of courses or the supervision of so-called *Fachgruppen* (study groups) than to occasional individual lectures (Filla 1988). Of those who may be counted among the Vienna Circle's periphery, it is the activities of Egon Brunswik (9 entries between 1927 and 1934) and, primarily, Heinrich Gomperz (21 between 1906 and 1935–36) that deserve special mention; both were active in courses as well as in study groups.

A first analysis of contents suggests that the contributors involved covered the entire range of modern natural and social science, as well as the philosophical tradition. It is only in connection with the specific activities of popularization pursued by the Verein Ernst Mach (cf. Sect. 4.2.1) that the public activities of logical empiricism can be understood as an essential element of its philosophical profile and cognitive identity in its social environment—activities that were effectively obliterated by emigration and exile.

[81] On the relationship between science and adult education see Filla 1986; Dvorák 1981, 1988.

[82] On Zilsel's role in adult education in Vienna see Dvorák 1981, 1990.

9.2.1 Survey: Courses, Seminars and Lectures of Vienna Circle Members

The Inner Circle

Rudolf Carnap

Courses taught at the University of Vienna

Philosophy		Hours per week
SS 1927	Problems of epistemology	2
SS 1928	Philosophy of space (foundations of geometry)	2
	Readings and discussions in philosophy	2
WS 1928/29	Philosophical Foundations of arithmetics	2
	Discussions and readings in Philosophy	2
SS 1929	The Development of theoretical philosophy since Descartes	2
WS 1929/30	Introduction to philosophy	2
	Readings and discussions in philosophy	2
SS 1930	The phenomenon of space (foundations of geometry)	2
	Readings and discussions in philosophy	2

Courses Taught at Vienna Adult Education Institutes

SS 1934	How do we know what is good and evil? (Urania/lecture)

Herbert Feigl

Courses Taught at Vienna Adult Education Institutes

WS 1927/28	Introduction to natural philosophy (Volksheim Leopoldstadt/course)
	Joint discussions on the Introduction to natural philosophy (Volksheim Leopoldstadt/course)
	Body and mind (Volksheim Simmering/lecture)
	Basic issues of knowledge (Introduction to philosophy) (Volksheim Simmering/course)
SS 1928	Reading and interpretation of selected writings on natural laws and the cosmic system (Volksheim Leopoldstadt/philosophy group)
	Natural laws and the cosmic system (Volksheim Leopoldstadt/course)
	The nature of matter (Volksheim Simmering/course)
WS 1928/29	Body and mind (Volksheim Ottakring/course)
	The problem of the freedom of Will (Volksheim Leopoldstadt/ philosophy group)
	Introduction to astronomy (Volksheim Leopoldstadt/course)
	The origins of knowledge (Volksheim Landstrasse/lecture)

SS 1929	Readings and discussions of modern writings on the problem of reality (Volksheim Ottakring/philosophy group) Approaches, goals and limits of knowledge (Introduction to epistemology) (Volksheim Ottakring/course) Central problems of the philosophy of nature (reading and discussion) (Volksheim Leopoldstadt/Philosophy group)
WS 1929/30	Nature and development of the stars (Volksheim Leopoldstadt/course) Contingency and law of nature in science and philosophy (Volksheim Ottakring/course)

Philipp Frank

Courses taught at Vienna Adult Education Institutes

WS 1907/08	(together with Dr. Hofbauer) Readings and discussions in physics (Volksheim/course)
SS 1908	(together with Dr. Hofbauer) Readings and discussions in physics (Volksheim/course)
WS 1908/09	Readings and discussions in physics (Volksheim/course)
SS 1909	Readings and discussions in physics (Volksheim/course)
WS 1909/10	Introduction to physics (Volksheim/course)
1910	Natural philosophy (Vienna Society for Adult Education/course; first half of the year)
Feb./March	The development of modern physics (lectures of the University of Vienna for the general public/short course)
SS 1910	Optics (Volksheim/course) Introduction to physics (Volksheim/course)
1910	Galilei (Vienna Society for Adult Education/lecture in the series "History of the Sciences" series at the Volksheim Ottakring; Nov. 13)
1910/11	Lecture (no title) (Urania) Physics in the Volksheim. lecture in the series "Reading and Learning in the Volksheim"; Volksheim/lecture)
WS 1910/11	Introduction to astronomy (Volksheim/course)
1911712	Lecture (no title) (Urania) The law of inertia (Volksheim/lecture) Physics (Volksheim/Saturday lecture)
WS 1911/12	Electricity and its applications I. Electric current (Volksheim/course)
WS 1912/13	(together with E. Börner), Reading and discussion session in physics for beginners (Volksheim/course) Advanced-level Reading and discussion session in physics (Volksheim/course)
1915/16	What can we know about atoms and molecules? (Volksheim(Saturday lecture)
1919/20	Chance in nature and history (Volksheim (Saturday lecture)
WS 1931/32	The fourth dimension and modern physics (Urania/lecture)

Kurt Gödel

Courses taught at the University of Vienna

Mathematics		Hours per week
SS 1935	Selected chapters of mathematical logic	2
WS 1935/36	Axiomatics of set theory	2
WS 1936/37	Axiomatics of set theory	2

Hans Hahn

Courses taught at the University of Vienna

Mathematics		Hours per week
SS 1921	Differential and integral calculus	5
	Reading and discussion session on the lecture	1
	Seminar	1
WS 1921/22	The concept of the integral and its applications	1
	Seminar: for differential and integral calculus	2
	Introductory seminar and reading and discussion session on basic mathematics: Determinants	2
SS 1922	Fourier series and integrals	5
	Seminar: natural geometry	2
	Introductory seminar and course on basic mathematics (determinants) with reading and discussion session (continued)	2
WS 1922723	Theory of functions	5
	Seminar: Recent works on Fourier series and integrals	2
	Introductory seminar: Algebra and logic	2
SS 1923	Elliptic functions	5
	Seminar: Developments in the theory of the orthogonal function	2
	Introductory seminar and course on basic mathematics: Critical discussion of primary school textbooks	2
WS 1923/24	Differential and integral calculus	5
	Reading and discussion session on the lecture	1
	Introductory seminar: Reading and discussion session on the lecture	1
	Seminar: Recent works on the theory of functions (together with Reidemeister, Lense, and Vietoris)	2
SS 1924	Differential and integral calculus II	5
	Reading and discussion session on the lecture	1
	Introductory seminar: Reading and discussion on the lecture	1
	Seminar: Recent works on the theory of functions (together with Reidemeister, Lense, and Vietoris)	2

WS 1924/25	Analytic geometry	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion on the lecture	1
	Seminar: Whitehead-Russell, Principia mathematica (together with Reidemeister, Lense, and Vietoris)	2
SS 1925	Analytic geometry (continued)	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion on the lecture	1
	Seminar: Whitehead-Russell, Principia mathematica (continued) (together with Reidemeister, Lense, and Vietoris)	2
WS 1925/26	Set theory	5
	Discussion and reading session on elementary objects	1
	Introductory seminar: problem-solving	1
	Seminar: Recent works on set theory	2
SS 1926	Set theory II	5
	Reading and discussion session on elementary objects	1
	Introductory seminar: Problem-solving	1
	Seminar: Recent works on set theory (together with Lense and Vietoris)	2
WS 1926/27	Differential and integral calculus	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion session on the lecture	1
	Seminar: Recent works on the theory of real functions (together with Lense, Vietoris, Mayer)	2
SS 1927	Differential and integral calculus II	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion	1
	Seminar: Recent works on the theory of real functions (together with Vietoris and Mayer)	2
WS 1927/28	Analytic geometry	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion session on the lecture	1
	Seminar: Continued fractions (together with Vietoris and Mayer	2

SS 1928	Analytic geometry II	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion session on the lecture	1
	Seminar: Continued fractions (together with Brauner, Mayer and Menger)	2
WS 1928/29	Set functions, integration, and differentiation	5
	Reading and discussion on basic mathematics	1
	Introductory seminar: Explanations und additional remarks on the lecture	1
	Seminar: General theory of curves (together with Menger and Brauner)	2
SS 1929	Recent theories of integration and differentiation	5
	Reading and discussion session on elementary objects	1
	Introductory seminar: Problem-solving for teaching candidates	1
	Seminar: General theory of curves (together with Menger)	2
WS 1929/30	Differential and integral calculus	5
	Reading and discussion session on this lecture	1
	Seminar: H. Lebesgue, Leçons sur l'intégration et la recherche des fonctions primitives, Deuxième édition (together with Menger)	2
SS 1930	Differential and integral calculus	5
	Reading and discussion session on this lecture	1
	Introductory seminar: Reading and discussion session on the lecture	1
	Seminar: H. Lebesgue, Leçons sur l'intégration et la recherche des fonctions primitives, Deuxième édition (together with Mayrhofer, Menger and Vietoris)	2
WS 1930/31	Selected chapters in higher analysis	5
	Reading and discussion session on objects of basic mathematics	1
	Introductory seminar: Problem-solving	1
	Seminar: E. Borel, Leçons sur les fonctions monogènes	2
SS 1931	Selected chapters in higher analysis	5
	Reading and discussion session on objects of basic mathematics	1
	Introductory seminar: Problem-solving	1
	Seminar: K. Reidemeister, The foundations of geometry (together with Mayrhofer)	2

WS 1931/32	Real functions	5
	Reading and discussion session on objects of basic mathematics	1
	Introductory seminar: Problem-solving	1
	Seminar: Mathematical logic (together with Menger and Mayrhofer)	2
SS 1932	Real functions	5
	Reading and discussion session on objects of basic mathematics	1
	Introductory seminar: Problem-solving	1
	Seminar: Mathematical logic (together with Menger and Mayrhofer)	2
WS 1932/33	Analytic geometry	5
	Reading and discussion session on basic problems of analytic geometry	1
	Introductory seminar: Exercises in analytic geometry	1
	Seminar: Lectures on recent works (together with Menger and Mayrhofer)	2
SS 1933	Analytic geometry II	2
	Reading and discussion session on basic problems of analytic geometry	1
	Introductory seminar: Exercises in analytic geometry	1
	Seminar: “St. Banach, Théorie des opérations linéaires” (together with Menger and Mayrhofer)	2
WS 1933/34	Differential geometry	3
	Analytic geometry	2
	Reading and discussion session: Discussion of curves	1
	Introductory seminar: Exercises in differential geometry	1
	Seminar: The interpolation problem (together with Menger, Mayrhofer and Hofreiter)	2
SS 1934	Differential geometry II	3
	Analytic geometry IV	2
	Reading and discussion session: Discussion of curves	1
	Introductory seminar: Exercises in differential geometry	1
	Seminar: Transcendental numbers (together with Menger, Mayrhofer and Hofreiter)	2

Courses Taught at Vienna Adult Education Institutes

1908	Introduction to higher mathematics I. The basic concepts of arithmetics (with exercises) (series of university lectures geared to the general public /course; October/November)
1909	Introduction to higher mathematics II. The elements of differential calculus (with exercises) (series of university lectures geared to the general public/course; January/February)
SS 1923	The infinite in mathematics (Urania/2 lectures)
1923/24	The history of mathematics: Problems that led to the discovery of differential calculus (Volksheim Ottakring/lecture)

At the 33rd General Meeting on June 23, 1924, Hans Hahn was elected to the executive board of the Urania for a term of three years. On June 15, 1927, he was re-elected to this function again at the General Meeting.

Felix Kaufmann

Courses taught at the University of Vienna

Legal philosophy		Hours per week
WS 1927/28	Society, State, and Law. An introduction to legal philosophy	2
WS 1928/29	Legal philosophy	2
WS 1929/30	Legal philosophy	2
WS 1930/31	Legal philosophy	2
SS 1931	Reading and discussion session in the legal philosophy	2
WS 1931/32	Legal philosophy	2
WS 1932/33	Legal philosophy	2
WS 1933/34	Methodology of the social sciences with special consideration of Legal theory	2
SS 1934	Reading and discussion session in the methodology of jurisprudence	2
WS 1934/35	Legal philosophy	2
SS 1935	Reading and discussion session in the methodology of jurisprudence	1
WS 1935/36	Introduction to legal philosophy	2
SS 1936	Reading and discussion session in the methodology of jurisprudence	1
WS 1936/37	Legal philosophy	2
SS 1937	Reading and discussion session in the methodology of jurisprudence	1

Courses Taught at Vienna Adult Education Institutes

WS 1931/32	Introduction into Edmund Husserl's Phenomenology (Urania/6 lectures) 1. The purpose of phenomenology and its place in the history of philosophy 2. Phenomenology and psychology 3. Phenomenology and logic 4. Phenomenology and value theory (the value theory of Max Scheler and Nikolai Hartmann) 5. Phenomenology and ontology (Martin Heidegger's theory) 6. Present achievements and future tasks of phenomenology
SS 1933	The crisis of philosophical thought and its Overcoming (Urania/5 lectures) 1. The struggle of the philosophical schools 2. The foundational debate within the sciences a) The foundational debate in logic and mathematics b) The foundational debate in the (natural) sciences c) The foundational debate in the humanities 3. The way out of the crisis

Viktor Kraft

Courses taught at the University of Vienna

Philosophy		Hours per week
WS 1914/15	The theory of scientific knowledge	1
SS 1915	The theory of scientific knowledge II (Foundations of the validity of science)	1
SS 1916	Mach's Epistemology	1
WS 1916/17	The concept of the world and the concept of knowledge	1
SS 1917	The object and method of philosophy	1
WS 1917/18	The epistemological foundations of the knowledge of nature	1
SS 1918	Epistemological realism and the problem of induction	1
WS 1918/19	Basic concepts of epistemology	2
SS 1919	The historical development of western philosophy	2
WS 1919/20	The main currents of contemporary theoretical philosophy	2
SS 1921	The object and method of philosophy	2
WS 1921/22	Basic concepts of epistemology	2
SS 1922	Comparative science of knowledge	2
WS 1923/24	Epistemology	2

WS 1924/25	Kant's theoretical philosophy	2
SS 1925	Critique of Kant's theoretical philosophy	4
WS 1925/26	Epistemology of the science of history	1
SS 1926	Weltanschauung and epistemology	2
WS 1927/28	The basic concepts of the scientific methods	1
SS 1928	On the methods of historical knowledge	1
SS 1929	Weltanschauung and epistemology	2
WS 1930	Induction, theory, circumstantial evidence	2
SS 1931	The role of philosophy in the European history of ideas	2
SS 1932	The main currents of contemporary German philosophy	2
SS 1933	Philosophy of history	2
SS 1934	Weltanschauung and science	2
SS 1935	Induction and deduction	2
WS 1936/37	Philosophy, weltanschauung, and science	1
SS 1937	The problems of knowledge in the humanities	1
Ws 1937/38	Philosophy of history	1
SS 1938	The law of causality and the freedom of will	2

Courses Taught at Vienna Adult Education Institutes

1910	Introduction to the basic concepts of historical world views (Wiener Volksbildungsverein/course)
1911/12	Introduction to the basic concepts of historical world views (Wiener Volksbildungsverein/course)
1912	Metric measure and the English system of measure and their role in cultural history (Wiener Volksbildungsverein, at the University/ College of Agriculture/lecture, March 3)
1913	Talk given in memory of Friedrich Jodl, the chairman of many years and honorary president of the Volksbildungsverein, when he died (Wiener Volksbildungsverein/lecture, February 2)
1914/15	Fichte's Addresses to the German Nation (Wiener Volksbildungsverein/lecture, January 31, 1915)
WS 1915/16	War and weltanschauung (Wiener Volksbildungsverein/course)
1916	War and weltanschauung (Popular University Lectures/Course; January/February)
WS 1916/17	The psychological development of the child up until school-age (Wiener Volksbildungsverein/course)
1917/18	From the writings of Ernst Mach (Urania/reading in the "Readings from Scientific Masterpiece" series)
1918	On Chinese philosophy (Wiener Volksbildungsverein/leture, Nov. 10)
1918/19	Dshuang-Tse, a Chinese philosopher (Urania/lecture) The Sophists (Urania/lecture) Scholasticism (Urania/lecture)

WS 1918/19	Introduction to philosophy (Volksheim Ottakring/course)
1919/20	Nature and mind (Urania/lecture)
	A meaning of the world (Urania/lecture)
1920/21	Destiny and freedom (Urania/lecture)
WS 1921/22	Philosophical discussions (Volksheim Ottakring/course)
SS 1922	Philosophical discussions (Volksheim Sommerheim Prigglitz/ two-week discussion course)
	Philosophical discussions (Volksheim Ottakring/course)
WS 1922/23	Mysticism and conscious thought (Urania/lecture in the "Character Portraits from the History of Mysticism" series
WS 1925/26	The meaning of life and weltanschauung (Urania/lecture in the "Struggle to find the meaning of life" series
WS 1926/27	Ernst Mach (Urania/3 lectures)
WS 1928/29	The credibility of history (Urania/lecture)
WS 1929/30	What is philosophy? (Urania/3 lectures)
WS 1932/33	Fundamental problems of modern world views (Urania/4 lectures)
WS 1934/35	What makes high mountains so attractive to us? With slides (Urania/lecture)

Viktor Kraft was a member of the executive board from 1906 to 1917/18 and was responsible, together with other members, of organizing lectures until 1911.

Karl Menger

Courses taught at the University of Vienna

Mathematics		Hours per Week
SS 1928	Elementary geometry, presented in axiomatic form	3
	General metric geometry	2
WS 1928/29	Set theoretical geometry	4
	Elementary geometry (advanced-level; together with reading and discussion session)	1
SS 1929	Introduction to differential geometry	3
	Set theoretical geometry (advanced-level)	2
WS 1929/30	Analytic geometry	4
	History of mathematics in the modern age	1
	Reading and discussion session in analytic geometry	1
SS 1930	Introduction into general metric geometry	3
	Curves and planes of second order (with reading and discussion session)	2
WS 1931/32	Introduction to the theory of dimensions	3
	Projective and Euclidean geometry	2
	Reading and discussion session in projective geometry	1

SS 1932	Selected chapters in set theoretical geometry	2
	Euclidean geometry	2
	The history of mathematics since Euler	1
	Reading and discussion session in Euclidean geometry	1
WS 1932/33	Differential and integral calculus	5
	Exercises related to the lecture	1
	Doubling the cube, tripartition of the angle, squaring the circle	1
SS 1933	Integral calculus	5
	Some recent results and problems of set theoretical geometry	1
WS 1933/34	Higher geometry	4
	Integral calculus II	2
	Reading and discussion session in integral calculus (with occasional exercises)	1
SS 1934	The geometry of Hilbert space and its applications	3
	The Lebesgue integral and its applications	3
WS 1934/35	Projective and Euclidean geometry, presented in axiomatic form ("Synthetic Geometry")	5
SS 1935	Calculus of variations	5
	Recent findings on the lengths of floors and areas (with reading and discussion session and instructions on scientific work)	1
WS 1935/36	Analytic geometry (Euclidean, affine, and projective geometry)	4
	Reading and discussion session in analytic geometry	1
	Introduction to a new structure of differential geometry	1
SS 1936	Analytic geometry (continued)	2
	Introduction to the direct methods of variation calculus (with special emphasis on geometry)	3
WS 1936/37	Differential geometry	3
	Theory of real functions (with special emphasis on the geometrical applications)	2
	Theory of colors	1

Otto Neurath

Courses Taught at Vienna Adult Education Institutes

1907/98	The philosophy of war
1909/10	War and economy (Volksheim/lecture in the Political Science Group)
1919/20	What is planned economy? (Volksheim/lecture)

WS 1921/22	Event as part of the course "Settlement school for settlers, organisers, settlement architects and others", organised by the Association for Settlement together with the Wiener Volksbildungsverein. The courses included: Introduction to the settlement problem, garden town movement, financial problems and questions of law of settlement, economical and organisational problems of settlement, settler house and garden, economical methods of construction, breeding of little animals and other issues. Lecturers: Otto Neurath, Adolf Loos, Grete Lihotzky and others. (Wiener Volksbilsungsverein)
SS 1923	Utopism, history, prophecy (Urania/lecture) The history of optics (Urania/Vortrag)
WS 1923/24	Introduction to contemporary problems of society (Urania, Josefstadt branch/course) The social and cultural significance of the settlement and allotment garden movement (in the six-part series "Settlement and allotment garden movement") (Urania/lecture)
SS 1924	Courses taught in a series of the summer school on the pecuniary and intellectual problems of the settlement movement (Urania/lecture) Changes in thought and design (Urania/lecture) Modern man in the modern city (Urania/3 lectures) Economical crises, their origin and significance (Urania/3 lectures)
WS 1926/27	Economy and society in the present era (Urania/course)
SS 1927	The structure of society and world view in the present era (Wiener Volksbildungsverein Margareten/Stiftungskurs der Kammer für Arbeiter und Angestellte)
WS 1927/28	The present depicted in numbers (Wiener Volksbildungsverein Margareten/Stiftungskurs der Kammer für Arbeiter und Angestellte)
SS 1928	Economy and society (Wiener Volksbildungsverein Margareten/Stiftungskurs der Kammer für Arbeiter und Angestellte)
WS 1928/29	Pictorial statistics (Volksheim Ottakring/lecture at the Political Science Group) Guided tour through the Social and Economic Museum (Volksheim Ottakring) On pictorial statistics (Volksheim Ottakring/lecture)
WS 1929/30	World economy and the proletariat (Volksheim Brigittenau/lecture)
SS 1931	From Babylon to the U.S.A. (Urania/lecture)
WS 1932/33	Guided tour through the Social and Economic Museum with a lecture (Volksheim Ottakring)
SS 1933	Problems of world economy (Volksheim Ottakring/lecture)

WS 1933/34	What are the political and economic sciences concerned with? ("Introduction to the subject-matter of the sciences") (Volksheim Ottakring/lecture)	
	On the population of Vienna in social and economic terms (with practical illustrations) (in the series "The City of Vienna seen as a social and economic organism") (Volksheim Ottakring/lecture)	
	The problem of modern metropolis (with slides) (in the series "The City of Vienna seen as a social and economic organism") (Volksheim Ottakring/lecture)	

Moritz Schlick

Courses taught at the University of Vienna

Philosophy		Hours per week
WS 1922/23	Introduction to natural philosophy	3
	Schopenhauer and Nietzsche	2
	Philosophical seminar: Readings and discussions on moral philosophy	2
SS 1923	Logic and epistemology	5
	Philosophical seminar: Readings and discussions on Positivism	2
	Work at the Institute of Philosophy	
WS 1923/24	Introduction to ethics	3
	Contemporary philosophical schools	2
	Philosophical seminar	2
	Work at the Institute of Philosophy	
SS 1924	The system of philosophy	5
	Introduction into the world of ideas of Einstein's relativity theory	1
	Philosophical Seminar: Readings and discussions for beginners in philosophy of history	2
	Work at the Institute of Philosophy	
WS 1924/25	Natural philosophy	4
	The systems of the great thinkers	1
	Philosophical seminar	2
	Work at the Institute of Philosophy	
SS 1925	Introduction to philosophy	4
	Philosophical seminar	2
	Work at the Institute of Philosophy	
WS 1925/26	Logic and epistemology	5
	Introduction to the philosophy of mathematics	1
	Philosophical seminar	2
	Work at the Institute of Philosophy	

SS 1926	Ethics	4
	Problems of Weltanschauung	1
	Philosophical seminar	2
	Philosophical work at the Institute of Philosophy	
WS 1926/27	The system of philosophy	4
	Philosophical seminar	2
	Work at the Institute of Philosophy	
SS 1927	Natural philosophy	4
	Contemporary ethics	1
	Philosophical seminar	2
	Philosophical work	
WS 1927/28	Introduction into the world of ideas of Einstein's relativity theory	1
	Philosophical seminar	2
	Philosophical work	
WS 1928/29	Introduction to Philosophy	4
	Problems in the philosophy of history	1
	Philosophical seminar	2
	Philosophical work	
SS 1929	Ethics	2
	Philosophical seminar	2
	Philosophical work	
WS 1929/30	Natural philosophy	4
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work	
SS 1930	Logic	4
	The basic concepts of the philosophy of history	2
	Philosophical seminar	2
	Philosophical work	
	Philosophical introductory seminar	2
WS 1930/31	The problems of philosophy in context	4
	The situation in philosophy today	1
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work at the Institute	
SS 1931	Historical introduction to philosophy	5
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Philosophical work	
SS 1932	Ethics	4
	Questions of weltanschauung	1
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Philosophical work	

WS 1932/33	Natural philosophy	5
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Philosophical work	
SS 1933	Introduction to philosophy	5
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Philosophical work	
WS 1933/34	The problems of philosophy in context	5
	Philosophical Seminar	2
	Philosophical Introductory seminar	2
	Philosophical work	
SS 1934	Philosophy of culture and history	3
	Contemporary issues of natural philosophy	2
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work at the Institute of Philosophy	
WS 1934/35	Logic and epistemology	4
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work at the Institute of Philosophy	
SS 1935	Historical introduction into philosophy	5
	Philosophical Seminar	2
	Philosophical introductory seminar	2
	Work at the Institute of Philosophy	
WS 1935/36	Ethics and philosophy of culture	4
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work at the Institute of Philosophy	
SS 1936	Natural philosophy	5
	Philosophical seminar	2
	Philosophical introductory seminar	2
	Work at the Institute of Philosophy	

Courses Taught at Vienna Adult Education Institutes

WS 1921/22	Welcome speech held for the Faculty of Philosophy to open the annual teaching program (Volksheim Ottakring)
WS 1933/34	Morality and culture (Urania/three lectures, beginning January 18)
SS 1936	Riddles of the Universe? (Volksheim Ottakring/lecture)

Friedrich Waismann

Courses taught at Vienna Adult Education Institutes

1921/22	Mysticism in mathematics (Volksheim Ottakring/lecture) The inhabitability of the stars and other planets (Volksheim Leopoldstadt/lecture)
WS 1921/22	Analytic geometry (Volksheim Leopoldstadt/course) Differential and integral calculus (Volksheim Leopoldstadt/course)
SS 1922	Differential and integral calculus (Volksheim Leopoldstadt/course) Differential geometry (Volksheim Leopoldstadt/course)
1922/23	Set theory (Volksheim Ottakring/Mathematics Group)
WS 1922/23	Differential and integral calculus (Volksheim Leopoldstadt/course) Selected chapters of higher mathematics and their applications in the natural sciences (Volksheim Leopoldstadt/course)
SS 1923	Differential and integral calculus II (Volksheim Leopoldstadt/course) Selected chapters of higher mathematics (Volksheim Leopoldstadt/course)
WS 1923/24	(together with Anton Lampa and Ernst Fanta) Introduction to Einstein's theories: Special relativity theory (Volksheim Ottakring/course)
SS 1924	Non-Euclidean geometry (Volksheim Leopoldstadt/course)
1924/25	Discussions (Volksheim Ottakring/Mathematics group)
WS 1924/25	Philosophical issues of mathematics and physics (Volksheim Leopoldstadt/course)
WS 1925/26	Introduction to Einstein's theory (Volksheim Leopoldstadt/course)
SS 1926	Introduction to Einstein's realtivity theory (Volksheim Leopoldstadt/course)
WS 1926/27	Discussion of recent mathematical topics (Volksheim Leopoldstadt/ Mathematics group) Problems of modern philosophy (modern concepts in logic, law of nature and chance, etc.) (Volksheim Leopoldstadt/course)
SS 1927	Discussion of recent mathematical topics (Volksheim Leopoldstadt/ Mathematics group)
WS 1927/28	Geometry of multi-dimensional spaces (Volksheim Leopoldstadt/ Mathematics group)
SS 1928	Non-Euclidean geometry (Volksheim Leopoldstadt/Mathematics group)
WS 1928/29	Introduction to projective geometry (Volksheim Leopoldstadt/ course) (According to "Mitteilungen der Volkshochschule Wien Volksheim", no. 1, Sept. 20, 1928. Not included in the annual report)
WS 1930/31	Introduction to geometry (planimetry) (Volksheim Ottakring/course)
SS 1931	Introduction to geometry (stereometry) (Volksheim Ottakring/course)
WS 1931/32	Trigonometry (Volksheim Ottakring/course)

SS 1932	Analytic geometry (Volksheim Ottakring/course)
WS 1932/33	Introduction to planimetry (Volksheim Ottakring/course)
SS 1933	Introduction to geometry (stereometry) (Volksheim Ottakring/course)
WS 1933/34	Trigonometry (Volksheim Ottakring/course)
SS 1934	Analytic geometry (Volksheim Ottakring/course)
WS 1934/35	Introduction to planimetry (Volksheim Ottakring/course)

Edgar Zilsel

Courses Taught at Vienna Adult Education Institutes

1916/17	On the life of Spinoza (Wiener Volksbildungsverein/lecture, Jan. 7, 1917)
SS 1917	Socrates and his disciples (A chapter from the philosophy of Greek antiquity) (Wiener Volksbildungsverein)
WS 1917/18	Introduction to the philosophy of modern age. From Galilei, Bacon and Descartes to Leibniz and Hume (Wiener Volksbildungsverein/course)
SS 1918	Introduction to the philosophy of modern age II. From Locke to Leibniz and Hume (Wiener Volksbildungsverein/course)
WS 1918/19	Rousseau's Social Contract (Wiener Volksbildungsverein/course)
SS 1919	Introduction to philosophy III. Leibniz and Kant (Wiener Volksbildungsverein/course) The Life of Spinoza (Wiener Volksbildungsverein/lecture)
1922/23	Discussion of Lange's *History of Materialism* (Volksheim Ottakring/Philosophy Group) Discussion of Hume's *An Enquiry Concerning Human Understanding* and Schopenhauer's *Parerga and Paralipomena* (Volksheim Ottakring/Philosophy Group) Readings and discussions in optics and the theory of heat (Volksheim Ottakring/Physics Group)
WS 1922/23	Introduction to philosophy (Volksheim Ottakring/course) Readings and discussions on Introduction to philosophy (Volksheim Ottakring/course) Introduction to psychology (Volksheim Ottakring/course) The theory of light (Volksheim Ottakring/course) Introduction to philosophy (Volksheim Leopoldstadt/course) Discussions on Introduction to philosophy (Volksheim Leopoldstadt/course) The theory of light (Introduction to physics) (Volksheim Leopoldstadt/course) Basic questions of epistemology (philosophy) (Volksheim Simmering/course) An introduction to astronomy (Volksheim Simmering/course)

SS 1923	Philosophy of history and ethics (Volksheim Ottakring/course)
	Discussions in philosophy of history and ethics (Volksheim Ottakring/course)
	The history of the body-mind problem (Volksheim Ottakring/course)
	Joint philosophical reading (Volksheim Ottakring/course)
	Heat and its effects on nature and technology (Volksheim Ottakring/course)
	Philosophy of history and ethics (Introduction to philosophy) II (Volksheim Leopoldstadt/course)
	Discussions on philosophy of history and ethics (Volksheim Leopoldstadt/course)
	Introduction to astronomy (Volksheim Leopoldstadt/course)
	Basic questions of epistemology: Philosophy and ethics (Volksheim Simmering/course)
	Joint philosophical discussions (Volksheim Simmering/course)
WS 1923/24	Lecture on science and world view (Volksheim Ottakring)
	Kant (Volksheim Leopoldstadt/lecture)
	Full-year reading and discussion of Nietzsche (Volksheim Ottakring/Philosophy Group)
	Reading and discussion of Moritz Schlick's "General Theory of Knowledge" and Gomperz' "The Problem of the Freedom of Will" (Volksheim Leopoldstadt/Philosophy Group)
	Discussion of Paulsen's "Introduction to Philosophy" (Volksheim Simmering/Philosophy Group)
	Introduction to the philosophy of history I: Antiquity (Volksheim Ottakring/course)
	Discussions and readings in the philosophy of antiquity (Volksheim Ottakring/course)
	Space and time in philosophy and science (Volksheim Ottakring/course)
	Introduction to the study of electricity Ottakring/course)
	Instructions for unassisted performance of physical experiments (Theory of electricity, simple machines) (with Robert Hüber) (Volksheim Ottakring/course)
	Introduction to the history of philosophy I (Volksheim Leopoldstadt/course)
	Discussions and readings in the philosophy of antiquity (Volksheim Leopoldstadt/course)
	Heat, its phenomena and laws in nature, their assessment in technology
	Discussions and readings in the philosophy of antiquity (Volksheim Leopoldstadt/course)
	The inner life of man (Volksheim Simmering/course)
	Body and soul (Volksheim Simmering/course)

SS 1924	Joint discussion of philosophical issues of everyday life (Volksheim Ottakring/course)
	Introduction to the history of philosophy II: Late antiquity and the Middle Ages (Volksheim Ottakring/course)
	Introduction to the theory of electricity II with special consideration of wireless telegraphy and telephony (Volksheim Ottakring/course)
	Chance and law of nature (Volksheim Ottakring/course)
	Introduction into the history of philosophy II: Late antiquity and the Middle Ages (Volksheim Leopoldstadt/course)
	Body and soul (Volksheim Leopoldstadt/course)
	The world view of modern physics (Volksheim Leopoldstadt/course)
	The development of the world views (A survey of the history of philosophy) (Volksheim Simmering/course)
1924/25	Lecture (no title) in the Philosophy group following the annual course “Logic” (Wiener Volksbildungsverein)

All of the following courses took place at the “Volksheim”:

	What and how do we learn at the Volksheim? Four lectures at the beginning of the working year (Ottakring)
	Readings and discussions on psychology and Chinese Philosophy (Ottakring/Philosophy group)
	Readings and discussions on the philosophy of the modern age (Leopoldstadt/Philosophy group)
	Continuation of the discussion of Paulsen’s “Introduction to Philosophy”, followed by a discussion on recent philosophy (Simmering/Philosophy group)
	Readings and discussions in mechanics and dynamics, experiments and computations (Ottakring/Physics group)
	Philosophical discussions (Summer Volksheim Prigglitz/course)
WS 1924/25	Introduction to the history of philosophy III: Modern age (Ottakring/course)
	The inner life of man. An introduction to psychology (Ottakring/course)
	Matter and its physical laws (Mechanics of solid, liquid and gaseous bodies) (Ottakring/course)
	Introduction to history III: Modern age (Leopoldstadt/course)
	Introduction to the theory of electricity and magnetism (Leopoldstadt/course)
	History of recent philosophy (Simmering/course)
	Basic issues of thought and knowledge (Landstrasse/course)
	The Universe (Landstrasse/course)

SS 1925	Introduction to the history of philosophy IV: Kant and after Kant (Ottakring/course)
	Joint readings and discussions on Kant and post-Kantian philosophers (Ottakring/course)
	Personality cult and personality ideal (Ottakring/course)
	Matter and its physical laws II: Dynamics (especially celestial mechanics, oscillations and sound) (Ottakring/course)
WS 1925/26	Joint readings and discussions on the philosophical writings of Ernst Mach (Ottakring/Philosophy group)
	Readings and discussions in optics (Ottakring/Physics group)
	Introduction to philosophy I (Ottakring/course)
	Joint discussions on Introduction to philosophy (Ottakring/course)
	Matter in philosophy and science (Ottakring/course)
	Introduction to optics (Ottakring/course)
	Joint discussions on Introduction to philosophy (Leopoldstadt/Philosophy group)
	Introduction to philosophy I (Leopoldstadt/course)
	Joint readings and discussions of more accessible modern philosophers (Simmering/Philosophy group)
	Basic issues of cognition and world view as an introduction to philosophy (Simmering/course)
	Basic issues of cognition and world view (Brigittenau/course)
SS 1926	Joint readings and discussions on O. Bauer: *Das Weltbild des Kapitalismus* (Ottakring/Philosophy group)
	Readings and discussions on the theory of heat (Ottakring/Physics group)
	Introduction to philosophy II: Philosophy of history and ethics (Ottakring/course)
	Joint discussions on philosophy of history and ethics (Ottakring/course)
	Spinoza, the thinker, his work and his world view (Ottakring/course)
	Heat, its phenomena, its laws and its technical exploitation (Ottakring/course)
	Joint discussions on philosophy of history and ethics (Leopoldstadt/Philosophy group)
	Introduction to philosophy II: Philosophy of history and ethics (Leopoldstadt/course)
	Joint readings and discussion of more accessible modern philosophers (Simmering/Philosophy group)
	Basic issues of cognition and world view. Philosophy of history and ethics (Simmering/course)
	Basic issues of cognition and world view (Brigittenau/course)
	Joint discussions of philosophical works (Brigittenau/course)
	The Cosmos (Brigittenau/course)

WS 1926/27	Enlightenment and Romanticism. Joint readings and discussions (Ottakring/Philosophy group)
	Readings and discussions in the theory of electricity I (Ottakring/Physics group)
	Introduction to ethnopsychology: The intellectual life of primitive peoples (Ottakring/course)
	The problem of the freedom of will (Ottakring/course)
	The origin of the world (Ottakring/course)
	Introduction to the theory of electricity I (Ottakring/course)
	Hegel: The philosophy of history (Leopoldstadt/Philosophy group)
	Space and time in philosophy and the natural sciences (Leopoldstadt/course)
	The origin of the world in myth, philosophy and science (Landstrasse/course)
	Philosophical issues of everyday life (Landstrasse/course)
	The inner life of man (Brigittenau/course)
	Introduction to ethics (Brigittenau/course)
SS 1927	Romantic and rationalist views of the state (Ottakring/Philosophy group)
	Readings and discussions on the theory of electricity II (Ottakring/Physics group)
	Introduction to epistemology: Approaches, goals and limits of knowledge (Ottakring/course)
	Introduction to aesthetics (Ottakring/course)
	Space and time in philosophy and the natural sciences (Ottakring/course)
	Introduction to the theory of electricity II. Electromagnetic waves (Ottakring/course)
	Philosophical discussions and joint readings (Leopoldstadt/philosophy group)
	Four walking tours guided by Zilsel and Dr. Rossi with 83 participants (Leopoldstadt/philosophy group)
	The intellectual life of primitive peoples (Introduction to ethnopsychology) (Leopoldstadt/course)
	Introduction to ethics (Landstrasse/course)
	Matter in philosophy and the natural sciences (Landstrasse/course)
	Body and soul (Brigittenau/course)
	Joint discussions of philosophical issues of everyday life (Brigittenau/course)
WS 1927/28	Joint readings and discussions on Hegel: *The Philosophy of History* (Ottakring/Philosophy group)
	Joint experimentation, discussions and computations in mechanics (Ottakring/Physics group)
	Introduction to the history of philosophy I: Antiquity (Ottakring/course)

	Selected readings and discussions in the philosophy of antiquity (Ottakring/course)
	Contemporary intellectual movements (Ottakring/course)
	Matter and its laws. An introduction to mechanics (Ottakring/course)
	Joint readings and discussions of works by Nietzsche (Leopoldstadt/Philosophy group)
	Great thinkers (Leopoldstadt/course)
	Art and aesthetic pleasure (Landstrasse/course)
	The intellectual life of primitive peoples (Landstrasse/course)
	The development of world views (Brigittenau/course)
	The intellectual life of primitive peoples (Brigittenau/course)
SS 1928	Joint readings and discussions of contemporary English thinkers (Ottakring/Philosophy group)
	Joint experimentation, discussions and computations in the mechanics of motions and oscillations (Ottakring/Physics group)
	Introduction to the history of philosophy: Late antiquity, the origin of Christianity, the Middle Ages (Ottakring/course)
	Selected readings and discussions in the philosophy of late antiquity (Ottakring/course)
	The laws of nature in philosophy and the natural sciences (Ottakring/course)
	Matter and its laws: Motions, oscillations, sound (Ottakring/course)
	Mysticism and science. Selected readings and discussions of Chinese mystics and European philosophers (Leopoldstadt/Philosophy group)
	Contemporary intellectual movements (Leopoldstadt/course)
	Contemporary intellectual movements (Landstrasse/course)
	The laws of nature in philosophy and the natural sciences (Landstrasse/course)
	Great thinkers (Brigttenau/course)
	Society and world view (Brigttenau/course)
WS 1928/29	Critics of morality. Joint readings and discussions of Max Stirner and others (Ottakring/Philosophy group)
	Joint experimentation, discussion and computations in the theory of light (Ottakring/Physics group)
	Introduction to ethics (Ottakring/course)
	Introduction to the history of philosophy: modern age (Ottakring/course)
	Selected readings and discussions on modern philosophy (Ottakring/course)
	Theory of light (Ottakring/course)
	Theory of heat (Ottakring/course)
	Joint readings and discussions of contemporary thinkers on world view and the culture of our time (Leopoldstadt/Philosophy group)
	Introduction to psychology (Leopoldstadt/course)

	Great thinkers (Landstrasse/course)
	Body and soul (Landstrasse/course)
	Great thinkers of the nineteenth century (An introduction to the history of philosophy) (Brigittenau/course)
	The beginning and end of the world in myth, philosophy and science (Brigittenau/course)
SS 1929	Joint reading and discussion of works by Max Weber (Ottakring/philosophy group)
	Joint experimentation, discussion and computations in the theory of heat (Ottakring/Physics group)
	Introduction to the history of philosophy: Kant and after Kant (Ottakring/course)
	Illustrations of and discussions on Kant and post-Kantian philosophy (Ottakring/course)
	Life and being in philosophy and science (Ottakring/course)
	Theory of heat (Ottakring/course)
	Joint readings and discussions on works by Henri Bergson (Leopoldstadt/Philosophy group)
	Guided tour of the Troppberg (Leopoldstadt/Philosophy group)
	Life and being in philosophy and science (Leopoldstadt/course)
	Philosophical issues of the history of mankind (Landstrasse/course)
	Philosophical discussions (Landstrasse/course)
	Art and aesthetic pleasure. An introduction to aesthetics (Brigittenau/course)
	Joint discussion of philosophical issues (Brigittenau/course)
WS 1929/30	Joint reading and discussion of recent works in the philosophy of the natural sciences (Ottakring/Philosophy group)
	Joint experimentation and practical exercises in the theory of waves (Ottakring/Physics group)
	Four related lectures for new members: “What and how do we learn at the adult education institute?”
	Philosophy of the nineteenth century (Ottakring/course)
	Selected readings and discussions on nineteenth-century philosophy (Ottakring/course)
	Issues related to the development of culture. An introduction to the philosophy of history (Ottakring/course)
	Physics of waves. Mechanical, Electrical, Light and Sound Oscillations (Ottakring/course)
	Philosophical issues of socialism (Simmering/Philosophy group)
	The religions of the world. An introduction to theology (Simmering/course)
	Philosophical issues of socialism (Simmering/course)
SS 1930	Body and soul (Simmering/Philosophy group)
	The inner life of man. An introduction to psychology (Simmering/course)
	Body and soul (Simmering/course)

WS 1930/31	Joint readings and discussions of Ludo Hartmann: "On Historical Development" (Ottakring/Philosophy group) Readings and discussions on the course "Power and motion. An introduction to mechanics" (Ottakring/Physics group) Introduction to philosophy (Ottakring/course) Joint discussions on the introduction to philosophy (Ottakring/course) Personality ideals and the genius cult in changing times (Ottakring/course) Power and Motion. An introduction to mechanics (Experiments) (Ottakring/course) Fundamental issues of thought and world view. An introduction to philosophy (Brigittenau/course) The religions of the world. An introduction to the history of religion (Brigittenau/course) Fundamental issues of thought and world view. An introduction to philosophy (Simmering/Philosophy group) The Cosmos. An introduction to astronomy (with slides) (Simmering/course)
SS 1931	Joint reading and discussion of Schlick's recent work: "Problems of Ethics" (Ottakring/Philosophy group) Joint experimentation, discussion and computations in mechanics and acoustics (Ottakring/Physics group) Readings and discussions on the course "Power and motion. An introduction to mechanics and the theory of sound" (Ottakring/Physics group) Introduction to philosophy (problems of the psyche, life and world view) (Ottakring/course) Joint discussions on the introduction to philosophy (Ottakring/course) Our world view in changing times (Ottakring/course) Power and motion. An introduction to mechanics and the theory of sound (Ottakring/course)
WS 1931/32	Four related introductory lectures for new members: "What and how do we learn at the adult education institutes?" (Ottakring) Joint reading and discussion of Sigmund Freud's *The Future of an Illusion* and *Civilization and Its Discontents* (Ottakring/Philosophy group) Space, time, relativity theory and philosophy (Ottakring/course) The religions of the world. An introduction to the science of religion (Ottakring/course) The history of the religious ideas of Enlightenment, from antiquity to the present time (Ottakring/course) The conceptions of the cosmos in changing times (Brigittenau/course)

	Leading thinkers of mankind (Brigittenau/course)
	Problems of morality (Simmering/Philosophy group)
	Great thinkers of mankind. Their lives and problems (Simmering/course)
	Problems of morality. An introduction to ethics (Simmering/course)
SS 1932	Joint reading and discussion of works on the philosophy of the modern natural sciences (Ottakring/Philosophy group)
	Approaches, goals and limits of knowledge. An introduction to epistemology (Ottakring/course)
	The religions of the world. An introduction to theology (Ottakring/course)
	History of the religious ideas of Enlightenment from antiquity to the present time (Ottakring/course)
WS 1932/33	Metaphysical currents in contemporary philosophy and sociology. Joint reading and Discussions of several authors (Ottakring/Philosophy group)
	Four connected introductory lectures for new members: "What and how Do We Learn at an Institute of Adult Education?" (Ottakring)
	Great thinkers and their problems (Ottakring/course)
	The scientific view of the world and its social conditions (Ottakring/course)
	The beginning and end of the world in myth, philosophy and science (Ottakring/course)
	Movements of Enlightenment and freethinking in the past (Brigittenau/course)
	Body and Soul (Brigittenau/course)
	The beginning and end of the world in myth, philosophy and science (with slides) (Simmering/course)
	The development of human culture. Facts and problems (Simmering/course)
SS 1933	Joint reading and discussion of Carnap: "On Metaphysics" (Ottakring/Philosophy group)
	Great thinkers and their problems (Ottakring/course)
	Scientific and anti-scientific currents of our time (Ottakring/course)
	Matter in philosophy and science (Ottakring/course)
	The views of the nature of the soul in changing times (Simmering/Philosophy group)
	The development of human culture. Facts and problems (Simmering/course)
WS 1933/34	What is philosophy concerned with? (Lecture as part of the introduction to the material of science.)
	Four connected introductory lectures for new members: "What and how Do we learn at an institute of adult education?"
	Joint reading and discussion of recent works on social metaphysics (Spann, Rosenberg et al.) (Ottakring/Philosophy group)

	Main issues of morality. An introduction to ethics (Brigittenau/course)
	The development of human culture. Facts and problems (Brigittenau/course),
	Matter in philosophy and science (Simmering/Philosophy group)
	Basic issues of thought and knowledge. An introduction to philosophy (Simmering/course)
	Joint reading and discussion of contemporary metaphysical works (Heidegger, Jaspers Freyer) (Leopoldstadt/Philosophy group)
SS 1936	The origins of modern natural science (Leopoldstadt/lecture in the Philosophy group)
	Philosophical problems and pseudoproblems (Leopoldstadt/lecture in the Philosophy group)

Edgar Zilsel was chairman of the physics group from WS 1922/23 until WS 1933/34 at the head office in Ottakring and chairman of the philosophy group from 1927/28 until WS 1933/34. He was chairman of the philosophy group from WS 1923/24 through SS 1926 and from WS 1929/30 through WS 1933/34 at the Simmering branch.

He was also documented as head of the "Physikalisches Kabinett" from 1925/26 to 1928/29.

The Periphery

Egon Brunswik

Courses taught at the University of Vienna

Philosophy		Hours per week
SS 1934	Theory of perception	2
	Introductory course in selected fields of experimental psychology	2
	Discussions and readings in psychology (Emotion and Will) for the advanced	2
WS 1934/35	Gestalt and holistic psychology	2
	Introductory course in experimental psychology	2
	Readings and discussions in psychology: Instinct, training, intellect	2
SS 1935	Comparative and applied psychology	4
	Introductory course to selected fields of experimental psychology	2
	Readings and discussions in psychology: Methods of psychophysics (advanced-level)	2
WS 1936/37	Psychology of the cognitive functions	2
	Introductory course in experimental psychology	2
	Readings and discussions in psychology: American issues	2

SS 1937	Comparative psychology	2
	Introductory course to experimental psychology	2
	Readings and discussions in perceptual psychology	2
WS 1937/38	Introductory course to experimental psychology	2
SS 1938	History of psychology	2
	Introductory course in experimental psychology	2
	Readings and discussions in perceptual psychology	2

Courses Taught at Vienna Adult Education Institutes

WS 1927/28	Experimental psychology (Volksheim Ottakring/course)
SS 1928	Experimental psychology (Volksheim Ottakring/course)
WS 1928/29	Problems of modern psychology (Volksheim Ottakring/course)
SS 1929	The types of human personality (Volksheim Ottakring/course)
	Reading and discussion of psychological works (Volksheim Ottakring/course)
WS 1929/30	Experimental psychology (Volksheim Ottakring/course)
WS 1930/31	Introduction to psychology (Volksheim Ottakring/course)
SS 1934	What do we use to deceive ourselves in everyday life? (Urania/Vortrag)

Egon Brunswik was head of the experimental-psychological department in the years 1927/28 and 1928/29.

Heinrich Gomperz

Courses taught at the University of Vienna

Philosophy		Hours per week
SS 1906	Discussions and lectures in philosophy	1
WS 1906/07	Basic concepts of epistemological logic	2
	The problem of the freedom of will	1
	Discussions and lectures in philosophy	1
WS 1907/08	Problems of General Aesthetics	2
	Discussions and lectures in philosophy	2
SS 1908	Discussions and lectures in philosophy	2
WS 1908/09	History of Philosophy I	2
SS 1909	History of Philosophy II	2
	Discussions and lectures in philosophy	2
WS 1909/10	Socrates, Plato, Aristotle	2
	Discussions and lectures in philosophy	2
SS 1910	Plato	2
	Discussions and lectures in philosophy	2
WS 1910/11	Graeco-Roman philosophy since Aristotle	2
	Discussions and lectures in philosophy	2
SS 1911	The philosophy of antiquity after Aristotle	2
	Discussions and lectures in philosophy	2

WS 1911/12	The main problems of aesthetics	2
	Discussions and lectures in philosophy	2
SS 1913	Kant and philosophical Romanticism	2
	Readings and discussions	1
WS 1913/14	Introduction to Philosophy	2
	Discussions and lectures in philosophy	2
	Introduction to philosophical bibliography 1460–1860	1
SS 1914	Discussions and lectures in philosophy	2
	Introduction to philosophical bibliography (continued)	1
WS 1915/16	Problems of the philosophy of history	1
SS 1916	Problems of the philosophy of history	1
SS 1917	New problems of the philosophy of history	1
WS 1917/18	History of philosophy I	2
	Discussions and lectures in philosophy	2
SS 1918	History of Philosophy II	2
	Discussions and lectures in philosophy	2
WS 1918/19	The Philosophy of the Greeks I	2
	Discussions and lectures in philosophy	2
SS 1919	The philosophy of the Greeks II	2
	Discussions and lectures in philosophy	2
WS 1919/20	The philosophy of the Greeks in the 5th Century B.C. I	2
	Discussions and lectures in philosophy	2
SS 1920	The philosophy of the Greeks in the 5th Century B.C. II	2
	Discussions and lectures in philosophy	2
WS 1920/21	Greek metaphysics and natural philosophy	2
	Metaphysics of the Eleatics	1
	Discussions and lectures in philosophy	2
SS 1921	The Greek Sophists	3
	Discussions and lectures in philosophy	2
SS 1922	The Socratic Schools	2
	Discussions and lectures in philosophy	2
	Instructions for work in the history of philosophy	1
WS 1922/23	Plato I	3
	Discussions and lectures in philosophy	2
SS 1923	Plato II	3
	Discussions and lectures in philosophy	2
WS 1923/24	A survey of the history of the western world until Kant	2
	Plato's philosophical development	2
	Discussions and lectures in philosophy	2

SS 1924	A survey of the history of modern philosophy	2
	Plato and the modern age	2
	Discussions and lectures in philosophy	2
WS 1924725	A survey of the main problems of theoretical philosophy I	2
	Discussions and lectures in philosophy	2
	Discussions and readings of the history of ancient philosophy (Diels, Fragmente der Vorsokratiker)	2
	Discussions and lectures in philosophy	2
WS 1925/26	Survey of the history of European philosophy I	4
	Readings and discussions of the history of ancient philosophy (Socrates in comedy)	2
	Discussions and lectures in philosophy	2
SS 1926	Survey of the history of European philosophy II	4
	Plato's Doctrine of Ideas	1
	Discussions and lectures in philosophy	2
WS 1926/27	Survey of the main problems of theoretical Philosophy	4
	Indian philosophy	2
	Discussions and lectures in philosophy	2
	Discussions and readings of the history of Greek philosophy	2
SS 1927	A survey of the main problems of practical philosophy	4
	Indian mysticism	1
	Discussions and lectures in philosophy	2
	Discussions and readings of the history of Greek philosophy	2
WS 1927/28	Survey of the history of philosophy in antiquity and the Middle Ages	4
	Buddha's doctrine	1
	Discussions and lectures in philosophy	2
	Discussions and readings of the history of Greek philosophy	2
SS 1928	Survey of the history of modern philosophy	4
	Freedom of will	1
	Discussions and lectures in philosophy	2
	Discussions and readings of the history of Greek philosophy	2
WS 1928/29	A survey of the main problems of theoretical philosophy	4
	On meaning and meaningful structure	1
	Philosophical literature of the Greeks and Romans I (with illustrations)	2
	Discussions and lectures in philosophy	2

SS 1929	On understanding and explanation	1
	Philosophical literature of the Greeks and Romans II (with illustrations)	2
	Discussions and lectures in philosophy	2
WS 1929/30	Survey of the history of philosophy in antiquity and the Middle Ages	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
SS 1930	Survey of the history of modern philosophy	4
	Discussions and readings of the history of ancient philosophy	2
	Reading and discussion sessions in philosophy	2
WS 1930/31	Indian philosophy	4
	Discussions and readings of the history of ancient philosophy	2
SS 1931	Buddhism	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
WS 1931/32	Presocratic philosophy I	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
SS 1932	The Philosophy of the Presocratics II	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
WS 1932/33	Plato	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
SS 1933	Plato's late writings and doctrines	4
	Discussions and lectures in philosophy from the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
WS 1933/34	Survey of the history of philosophy in antiquity and the Middle Ages	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
SS 1934	Survey of the history of modern philosophy	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2

WS 1934/35	Main problems of philosophy	4
	Discussions and readings of the history of ancient philosophy	2
	Discussions and lectures in philosophy	2
SS 1935	Freedom of will and responsibility	1
	Discussions and readings of the history of ancient philosophy	2
WS 1935/36	Review session of the history of ancient philosophy	2
	Discussions and readings of the history of ancient philosophy	2
WS 1936/37	Review session of the history of modern philosophy	2
	Discussions and readings of the history of ancient philosophy	2

Courses Taught at Vienna Adult Education Institutes

1906	Main currents of philosophical conceptions of life I (series of university lectures geared to the general public/short course; Nov./Dec.)
1907	Main currents of philosophical conceptions of life II (series of university lectures geared to the general public /short course; Jan./Feb.)
1913	Philosophy I. Introduction to philosophy (university lecture series geared to the general public /short course; Oct./Nov.)
1915	War and peace in philosophy (university lecture series geared to the general public /short course; Jan./Feb.)
WS 1919/20	Philosophical Konversatorium (Volksheim/course)
SS 1920	Philosophical Konversatorium (Volksheim/course)
WS 1920/21	Konversatorium in philosophy and history of philosophy (Volksheim/course)
SS 1921	Konversatorium in philosophy and history of philosophy (Volksheim/course)
WS 1922/23	Indian philosophy (Volksheim Ottakring/course)
SS 1923	Indian philosophy (Volksheim Ottakring/course)
WS 1923/24	Buddha's Doctrine (Volksheim Ottakring/course)
1928/29	Lecture in the philosophy group (no title) (Volksbildungsverein)
WS 1928/29	The Origin of Knowledge (Volksheim Landstrasse/one-time lecture) (not contained in the annual report. Information taken from *Mitteilungen der Volkshochschule Wien Volksheim* Nr. 12, March 7, 1929.)
	A retrospective of nineteenth-century philosophy (Urania/lecture)
	Ein Gedenktag der Philosophie. Anniversary of Hegel's day of death (Nov. 14, 1831) (Volksheim Ottakring (Saturday lecture)

WS 1933/34	Philosophy and Life (Urania/5 lectures): 1. Philosophy as Science and Philosophy as Wisdom; 2. The Philosophy of Knowledge; 3: The Philosophy of Faith; 4. The Philosophy of Suffering; 5. The Philosophy of the Deed Wise Men of Prehistory (Urania/6 lectures): 1. Lao Tse, 2. Vájnavalkya, 3. Buddha, 4. Heraclitus, 5. Plato, 6. Plotin
SS 1934	Spinoza (Urania/lecture)
WS 1934/35	Great world views (Urania/4 lectures) 1. Mechanism, 2. Vitalism, 3. Scholasticism, 4. Mysticism
WS 1935/36	Administration of the life counselling service opened at the beginning of this work year at the Ottakring Adult Education Institute. Counselling encompassed the following three areas: 1) issues of world view. Clarification of personal view of philosophical issues; 2) educational counselling; 3) Counselling in psychological difficulties.

Science and world view, as part of the series "The Education of Mankind" (Volksheim Ottakring/ lecture in the Pedagogy group)

Kurt Reidemeister

Courses taught at the University of Vienna

Mathematics		Hours per week
SS 1923	Analytic Geometry II	4
	Reading and discussion session on analytic geometry	1
	Colloquium on topology	
WS 1923/24	Theory of continuous transformation groups	5
	Analytic Geometry and tensor algebra	2
SS 1924	Affine differential geometry	4
	Colloquium on hypercomplex numbers	2
WS 1924/25	Theory of contact transformations	1
	Theory of invariants	2

9.3 "Words Divide—Pictures Unite": Otto Neurath's "Social and Economic Museum," Picture Statistics, and Isotype

9.3.1 The "Social and Economic Museum in Vienna," 1925–1934

The Social and Economic Museum ("Gesellschafts- und Wirtschaftsmuseum in Wien," GWM) was founded in 1925 on the initiative of Otto Neurath.[83] Formally set up as a *Verein* (association), it comprised the following members: the City of Vienna, the Free Trade Unions (*Freie Gewerkschaften*), the Chamber of Labor (*Arbeiterkammer*), the Consumer Cooperatives (*Konsumgenossenschaften*), the social insurance institutes, and the Labor Bank (*Arbeiterbank*). This novel institution, designed by Neurath to act as an "educational museum of the present" to promote the recognition and understanding of socio-economic matters, organized permanent exhibitions in the Public Hall of Vienna's town hall as well as at venues in the city's 1st and 12th districts. Until 1933 the GWM organized or contributed material to 36 national and international exhibitions.

The topics presented there convey a clear impression of the museum's systematic encyclopedism and its commitment to adult education in the spirit of the social reform movement: they comprised health, woman and child, social politics, housing, city planning, education for peace, schools, the labor movement, art, social insurance, architecture, etc. The GWM also organized independent touring exhibitions in Austria and abroad and produced its own publications and contributions to various journals and books.

Josef Frank, the brother of Philipp Frank, joined the project as an architect in 1927, and one year later Neurath brought in the artist Gerd Arntz, who designed the characteristic symbols and also systematized production methods. The scientific department under Aloys Fischer, the department of Transformation under Marie Reidemeister (later Marie Neurath), and various technical collaborators completed the team.

For several years Neurath and his museum, which stands as a model of museum instruction even today, worked in close and fruitful cooperation with the social-democratic movement for school reform. Picture statistics corresponded particularly well to the pedagogical principles of independent learning, the practical relevance of what is being taught, a concentrated, descriptive, and easily comprehensible form of instruction and aesthetic education.[84] Following these principles, the GWM had a remarkable organizational and educational influence on Vienna's

[83] On the development and influence of picture statistics and the GWM see Arntz 1976, 1982a, b; Kinross 1979; Stadler (ed.) 1982a, b, c. For personal accounts of Otto Neurath see M. Neurath and Cohen (eds.) 1973; Haller and Kinross 1991. For a general overview see Hegselmann 1979a; P. Neurath and Nemeth (eds.) 1994. For an assessment of picture statistics by present-day research see K. H. Müller 1991; Vossoughian 2011; Burke and Kindel 2014.

[84] Cf. Stadler 1979b and below, Sect. 9.3.4.

cultural life, and as early as 1931 the Dutch "Mundaneum" was founded to encourage international cooperation. Associated groups were established in Berlin, Amsterdam, Prague, New York, London, and the Soviet Union.[85]

The events of and after February 12, 1934, put an end to the GWM's highly productive period of work in Austria and abroad. Some of its functionaries were arrested, and a number of valuable objects were confiscated. Renamed "*Österreichisches Institut für Bildstatistik*" (Austrian Institute of Picture Statistics), it remained under the control of the Austro-fascist *Ständestaat* until it was taken over by the National Socialists to be employed for propaganda. Despite the initial confiscations, Neurath was able to transfer a large part of the museum's materials to the Netherlands and England.[86]

9.3.2 "The Vienna Method of Picture Statistics" and "Isotype"

Picture statistics aimed at representing socio-economic facts and relationships, especially within their historical context and development, with the help of simple and easily comprehensible symbols.[87] A number of real objects and complex facts is represented by a certain number of signs and figurative symbols in such a way that the same sign is always used for the same object. This method of visualization, thus, is based on the coincidence of the representations of content and quantity and on the comparison of sets in such a way that a larger set of objects is represented by a larger set of signs (without perspective). According to Neurath, this approach permitted a quantitative representation of social facts.[88]

Improved and further developed in exile in the Netherlands, the method was adequately renamed the International System of Typographic Picture Education or the acronym Isotype (meaning "always the same sign" in Greek).[89]

The GWM's founding phase demonstrated not only Neurath's organizational talents, but also the support he received from the City of Vienna. In a Memorandum of 1924 he laid down his concrete conception of an "educational museum of the present" designed to facilitate the recognition and understanding of socio-economic matters.[90] The epistemological basis of picture statistics probably lies in a visualization of logical atomism, for the arrangement of pictures was designed to give a quantitative representation of social matters. Machian "empirio-criticism" and physicalism also seem to have played a certain role, as the non-dialectical form of

[85] Kinross 1979; Arntz 1982a, b.

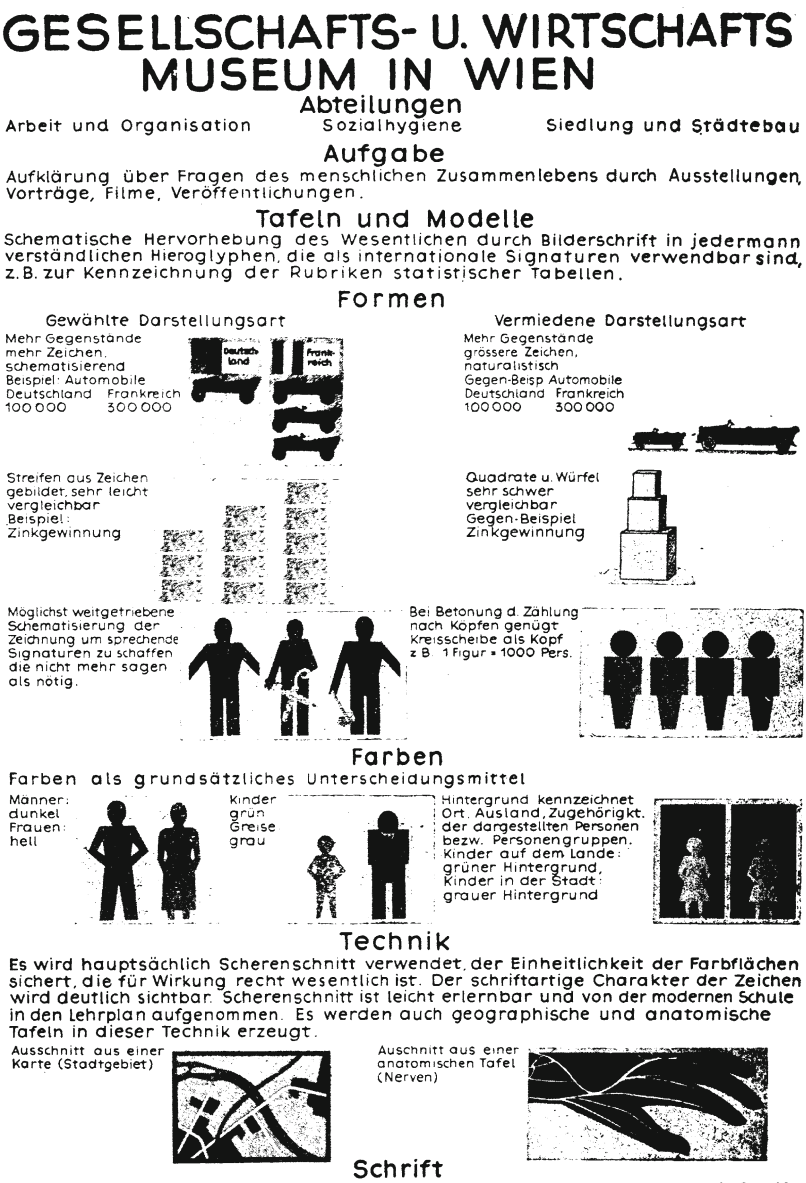
[86] M. Neurath 1982.

[87] For a specific description of the Vienna Method see the writings of Otto Neurath in his *Gesammelte bildpädagogische Schriften* (Collected Writings on Visual Education) (1991). For a present-day perspective see Nemeth and Stadler (eds.) 1996; Burke and Kindel 2014.

[88] Neurath 1933b, reproduced in Neurath 1991.

[89] Neurath 1936a and 1937, reproduced in Neurath 1991.

[90] M. Neurath and Rauscher 1965.



Eine der ersten Werbungen für das neugegründete Museum, um 1925

Fig. 9.1 Vienna Method of Pictorial Statistics. One of the first flyers for the newly founded Social and Economic Museum, around 1925

presentation—as an expression of abstract sociological categories—conformed to the neutral representation of relations demanded by logical empiricism.[91]

Picture statistics and Isotype must be considered within the wider context of Neurath's work, however[92]: his main concern was to make a comprehensive contribution to general and international education and culture. This cosmopolitan and egalitarian approach also corresponded to the idea of an encyclopedia, which Neurath tried to put into practice with the "Unity of Science" movement after his emigration—another aspect of his emancipatory concept of education in the spirit of social enlightenment (as a necessary precondition for the humanization of life) through visual education.[93] Therefore, pictorial statistics forms only one part of wide-ranging educational efforts, which were by no means limited to schools and adult education.

With World War II drawing nearer, however, the hoped-for effect on the masses was not achieved, despite a number of successful exhibitions in the Netherlands and several important publications.[94] Neurath's and Marie Reidemeister's hazardous escape to England in May 1940 meant the end of their activities on the continent, while Gerd Arntz stayed in the Netherlands and continued to work there on his own after 1945.[95] After the death of her husband, Marie Neurath (née Reidemeister) carried on their fruitful work at Oxford in the newly-established Isotype Institute before moving to London in 1948. In spite of all adversities their work was not in vain; the Vienna Method of Picture Statistics and Isotype continue to be developed in a special department at the University of Reading even today.[96]

9.3.3 Picture Statistics and the Political Graphic Art of Constructivism

In 1928 Otto Neurath invited the German artist Gerd Arntz to come to Vienna as a graphic designer—an invitation that was to be the beginning of a long and innovative cooperation.[97] Arntz's specific form of representational, constructivist graphic art concerned with social issues and his membership in the *Rheinische Gruppe Progressiver Künstler* (Rhenish Group of Progressive Artists) (1918–1933) had already earned him a name in the art scene of the Weimar Republic. After World War I he received his artistic education in the post-revolutionary atmosphere of the young republic (in Düsseldorf in particular) and came in contact with artists' circles

[91] Gillen 1975; Runggaldier 1979.

[92] For an overview see Stadler 1989.

[93] Neurath 1973, 227–48.

[94] Primarily *Modern Man in the Making* (1939) at Alfred A. Knopf, New York, with Dutch and Swedish translations.

[95] Arntz 1988.

[96] M. Twyman (ed.) 1981, 1994.

[97] Arntz 1976, 1982a, b, 1988.

in Cologne. Later he worked with Peter Alma and August Tschinkel at the GWM and also contributed to the constructivists' eccentric theoretical journal *a-z* from 1919 to 1933. Arntz's works were shown in a number of international exhibitions, and—following the GWM's activities in Moscow in the early 1930s—he also was in contact with Russian artists. After the events of February 1934, which made it unsafe for him to stay in Austria, he emigrated to The Hague together with Neurath and, besides his difficult work at the Mundaneum Institute, engaged in anti-fascist resistance, for example in an exhibition in London and in the exhibition "Olympic Games Under the Dictatorship" in Paris. Arntz's collaboration with Neurath on the book *Modern Man in the Making* (1939) was a success for the promotion of picture statistics. During the war Arntz acted as the head of the graphic department of the Nederlandsche Stichting voor Statistik. Having been conscripted into the German *Wehrmacht*, he defected to the resistance movement in Paris, where he was later taken prisoner of war. After World War II he resumed his artistic activities in a changed setting: in addition to his usual graphic work addressing social issues he also produced picture-statistical works for UNESCO. His political work has attracted increasing international attention since the late 1960s.

Fig. 9.2 Gerd Arntz, "Krise" (*Crisis*) (1931)

While Arntz's first wood engravings still reflect the influence of expressionism, his works of the 1920s already display an abstract, constructivist approach; he also integrated ideas of French cubism (Legér) until he established an individual profile for himself in the Group of Progressives. Common features of this Cologne-based group—with members such as Heinrich Hoerle, Franz W. Seiwert, Hans Schmitz, August Tschinkel—were a representational, constructivist form of expression, common political (libertarian-communist) attitudes programmatically linking art and politics, the culture of the Rhineland region, and, finally, their self-understanding.[98] Inspired by the intensive reception of Russian revolutionary art (Lunacharsky, Bogdanov, El Lissitsky, and others) they organized a number of joint exhibitions in Germany, all of them marked by the post-revolutionary spirit of the Weimar Republic. Despite their close contact with the Bauhaus movement, the constructivists were critical of *Neue Sachlichkeit* (New Objectivity). What is interesting in our context is their contribution to modern typography, which found expression in Gerd Arntz's typical figurative-constructive style and which was also employed on a non-artistic basis in picture statistics. Rejecting, for example, the "psychologism" of Otto Dix or George Grosz, Arntz's principle was depersonalize everything, use stencils, construct things. Influences ranging from realism to functionalism, from Japanese woodcuts and French purism to the Dutch group "De Stijl" (Piet Mondrian, Doesburg, Van Esteren), characterized his work.

9.3.4 The Vienna Method of Picture Statistics and School Education

As the Vienna Method was particularly well-suited for application in schools, Neurath and his co-workers cooperated closely with Vienna's social-democratic school reform movement for several years. Initiated by Otto Glöckel, the school reforms between 1918 and 1934 represented a radical attempt to reform the traditional system of education characterized by state- and church-dominated "drill schools," and to establish secular "work schools" where instruction was to be based on methods emphasizing social equality and the partnership of pupil and teacher.[99] Special importance was attached to the educational principles of self-motivation, proximity to practical tasks, and an easily comprehensible, concentrated, and aesthetic way of education based on a solid scientific background. Picture statistics was ideally suited for these aims. In the 1929 manifesto Neurath described Vienna's school reform movement and its predecessor, the "Freie Schule" (Free School), as a movement related in spirit, after stressing that education had to enable the pupil to comprehend the "statistical age." The concrete practical cooperation culminated

[98] *Politische Konstruktivisten* 1975; Bohnen 1976.

[99] Glöckel 1928; Achs 1969; Achs and Krassnig 1974; *Schul- und Bildungspolitik* 1983; Glaser 1981, 301–16; Zucha (ed.) 1979; Adam 1979 (Literaturbericht).

with the Vienna Schools Council's decision to test picture statistics in an experimental school setting.

These tests were preceded by systematic preliminary efforts at the GWM[100]: statistics was experimentally included in the syllabus, and the GWM introduced "intellectual life and school education" as a permanent topic in its department of Living Conditions and Culture. Various school classes visited this educational museum, and experiments in visual education were carried out even in nursery schools. All these activities also produced a number of publications, especially in the journal *Das Bild im Dienste der Schule* (The Picture in the Service of the School), which appeared with GWM supplements from 1927 to 1930.[101]

The most impressive accounts of the application of picture statistics are found in the publications *Die bunte Welt* (Colorful World) (1929) and *Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk des GWM in Wien* (Society and Economy. A Picture-Statistical Primer from the GWM in Vienna) (1930). Neurath also sought to spread the ideas of the school reform movement through lectures at the Ernst Mach Society and through articles in various papers.[102] Further activities were initiated with the start of the school experiments,[103] until the events of February 1934 put a final end to the promising school reform and also led to the previously mentioned dissolution of the GWM in its original form.

Neurath had laid down his approach to methodology, didacticism, and visual education in his book *Bildstatistik nach Wiener Methode in der Schule* (The Application of the Vienna Method of Picture Statistics at School) (1933b): social enlightenment through the training of the children's intellect and creative talents. His quantitative pictures (*Mengenbilder*) were tested successfully at Vienna's Montessori school and nursery school. There was also a certain affinity between Neurath's orientation towards practical application and the newly-developed pedagogy of Freinet in France, which put the idea of work schools into practice with its school printing shops.[104] The experiments, started in the school years 1930–31 and 1931–32, covered four classes and aimed at optimizing the forms and resources of concrete instruction in various subjects. Their results were discussed in numerous conferences; many interested visitors from Austria and abroad came to watch the classes. The experiment was concluded with an exhibition of the quantitative pictures that had been produced and with lectures by the teachers involved in which they related their experiences. It was noted that an introduction and a certain amount of time was needed for the application of the Vienna Method, but that in all subjects the most varied applications were possible, from the presentation of complete quantitative pictures to their production in the classroom. The method's drawbacks were, depending on the subject in question, the necessary rounding up or down of the

[100] Arntz 1976, 47.

[101] Neurath 1927.

[102] See, for example, *Arbeiterzeitung*, June 15, 1926, 10.

[103] Especially with the periodical *Fernunterricht* 1931 and with contributions by Neurath in *Die Volksschule* 27 (1931) and *Die Quelle* 77.

[104] *Die Quelle* (1933), 4/5:1–12.

numbers or quantities involved, the amount of time it required, and its unsuitability for teaching German; among its advantages were the opportunities it offered for active learning, the enhanced motivation of pupils, the sound comprehension of the subject- matter at the end of working through the respective problems, the possibility of linking different subjects, and, particularly, its usefulness for the teaching of history.

9.3.5 Visual Education and Adult Education

Otto Neurath's Vienna Method of Picture Statistics, developed in the GWM between 1925 and 1934, and the International System of Typographic Picture Education, developed in exile between 1934 and 1945, form an instrument of education that has been neglected so far.[105] The reconstruction and actualization of these educational efforts at conveying information in a written and pictorial form in the context of a scientific world conception[106] is long overdue and might be based on Neurath's writings on visual education, a comprehensive collection of which is now available in German for the first time.[107] They offer the opportunity to systematically investigate the theoretical and visual development of this interdisciplinary, cooperative educational undertaking and to explore the methods, principles, and contents of picture statistics.

Otto Neurath's *Gesammelte bildpädagogische Schriften* (Collected Writings on Visual Education) provide an excellent basis for the study of interdisciplinary, collective work in science and adult education. In numerous illustrated articles, booklets, and books Neurath described both the external organizational history of the GWM and the internal theoretical and practical development of its picture language, from picture statistics to the stage of visual education integrating letters and symbols. His writings also serve to illustrate the project's relation to and roots in Vienna's labor movement as well as its basic connection with the scientific world conception and with the art of figurative constructivists around Gerd Arntz.[108] Even the programmatic titles of some of the texts convey an impression of the intention and social orientation of the project, which was put on an international basis in 1930: the visual representation of social matters with the help of "statistical hieroglyphs"[109] was to describe the social situation as a whole in a concise, informative way, aiming at an improvement of "living conditions." The topics covered ranged from housing, the realities of working life, and city planning to an economic perspective that took into account the aspect of human happiness. From a

[105] Stadler 1989.

[106] Stadler 1991.

[107] Neurath 1991. All following quotations are taken from *Gesammelte Schriften* (Collected Writings).

[108] Arntz 1988 (includes "Autobiographische Skizze" [Autobiographical sketch]).

[109] Cf. table of contents and Neurath 1991 (*Schriften* 1925 to 1946).

contemporary point of view, special mention must be made[110] of the independent publications *Bildstatistik nach Wiener Methode in der Schule* (The Application of the Vienna Method of Picture Statistics at School) (1933), *International Picture Language* (1936), and, finally, the most mature work, *Modern Man in the Making* (1939), in which numerous pictograms help to explain the theory and application of picture language along with written language. In his article "Museums of the Future" (1933) Neurath also presented an impressive manifesto for a modern museum of economy and society, which may be read as an antithesis to post-modern "experiential" museums, collections of relics, or artificial constructions of a *gesamtkunstwerk*[111]:

> From Comenius' *Orbis Pictus* an uninterrupted movement leads to modern visual education. A picture made according to the Vienna method shows at the first glance the most important aspects of the subject; obvious differences must be at once distinguishable. At the second glance, it should be possible to see the more important details; and at the third glance, whatever details there may be. A picture that has still further information to give at the fourth and fifth glance is, from the point of view of the Vienna school, to be rejected as pedagogically unsuitable. Thus a new clarity and purposefulness is developing in communication that may be regarded as preparation for more incisive social planning. Teachers and other groups of people concerned in social education, directors of museums, and editors of periodicals are confronted with the responsibility of placing their energies at the service of this common international task. (Neurath 1973, 223)

Neurath's premature death prevented him from completing his socio-historical monograph on picture language, which has been published posthumously. It is only the fragments of the visual autobiography "From Hieroglyphics to Isotypes" (1946), as well as the manuscript "Visual Education: Humanisation vs. Popularisation," published posthumously, which allow us to understand the intentions of this concept of emancipatory visual education.[112] It is concerned with the opportunity to create a non-hierarchical international picture language, the neutral character of which will encourage mutual acceptance in education and also promote humanization against authoritarian popularization:

> We must begin our explanations in accordance with the knowledge and vocabulary already familiar to the people. Gradually simple traditional expressions in more complicated combinations and perhaps some more advanced terms may be introduced. But in principle, one should try to build up more comprehensive knowledge by simply looking at the environment, and by using the language of daily life and its derivatives. This procedure from the simplest to the most complicated, I shall call *humanisation*. Generally speaking the average books destined for children and the man in the street start in a different way. They try to simplify the highest level of scientific formulation, presented in scientific books. Sometimes writers think that a translation of well selected terms into popular terms is sufficient, whereas it is common knowledge that the insufficiency of these terms was the main reason for the introduction of scientific terms. This kind of translation for the complicated to the simple, from top to bottom, as it were, I shall call *popularisation* of knowledge. In the

[110] German translation by Neurath 1939.

[111] Neurath, "Museums of the Future," in Neurath 1973, 218–23.

[112] "From Hieroglyphics to Isotypes," in *Future Books* III. London 1946, 93–100; Neurath 2010. "Visual Education. Humanisation vs. Popularisation," in Nemeth and Stadler (ed.) 1996.

> humanisation of knowledge one tries to avoid what may be called an inferiority complex as well as all kinds of frustration which so often appear when people try to grasp a piece of knowledge in vain. Looking at a book often creates a kind of fear. There are not a few people who become uneasy when confronted with a general term like 'magnetism' but who would not be irritated by hearing about magnets and iron. Humanisation implies avoiding technical terms before they are really needed. The question is how far we can go without using more complicated expressions.

It is important not to tell children and adults that something complicated and highly scientific is going to be explained to them. On the contrary by using the pupil's apparatus for defining scientific terms we always should try to give him a feeling of relative sovereignty. All statements which speak of seeing, hearing, touching, tasting, etc., appeal to the average man, because every sensual statement is possible in the common neutral and democratic language.[113]

Thus, visualization becomes the most important tool of intercultural communication which, starting out from people's concrete existence, enables the establishment of a cosmopolitan social museum of the present ("Mundaneum"). What also becomes evident is the cooperative and international element of this form of educational work which—in contrast to the spirit of the time—incorporated the democratic concept of "planning for freedom":

> Visual education leads to internationalisation much more than word education does. One can use the same visual arguments, connected with different words for explanation in various languages; one can even vary the remarks on the same visual material. Visual education is related to the extension of intellectual democracy within single communities and within mankind, it is an element of international social planning and engineering. This is a period of planning, planning for getting something done, where without planning defects are manifest, such as destruction of coffee, unemployment, etc. But we can remove all this without regional planning, without city planning; we can imagine a nation with planned production as far as raw materials are concerned, but also building up 'planning for freedom,' which signifies intentionally *not* interfering. Much city planning is full of pomposity, with a totalitarian undercurrent, pressing forward some way of life. Perhaps people want to do so; but the dictatorship of planning is in danger in itself and is not connected with planning against want. You may be in security, but free to choose your kind of life within this security. The either-or is important. We may create certain conventions in language without unifying the laws; a world language does not imply a world dictatorship but may help world understanding. For a democratic society it is important to have a common language.[114]

While both the theory and practice of the Vienna Method of Picture Statistics for schools were relatively well-known (cf. Sect. 9.3.4), a parallel initiative concerning adult education received less attention. From 1931 to 1933 the GWM in Vienna regularly published the *Fernunterricht* (Correspondence Instruction) series of booklets, entitled *Bildstatistik* (Picture Statistics) after 1932, as corresponding publications focusing on specific topics.[115]

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[113] Neurath 1973, 231 f.

[114] Ibid., 247.

[115] Gesellschafts- und Wirtschaftsmuseum in Wien (Leipzig-Vienna), *Fernunterricht*: 1.1 (April 1931); 1.2 (May 1931); 1.3 (June 1931); 1.4 (July 1931); 1.5 (August 1931); 1.6 (September 1931); 2.7 (1932); 2.8 (1932); 2.9 (1932); continued under the title *Bildstatistik*: 2.10 (1932); 2.11 (1932–33).

As this series of publications devoted to adult education has not been included in the *Gesammelte bildpädagogische Schriften* it will briefly be characterized here. From a modern point of view these booklets, which discussed a wide range of subjects, may be regarded as modules facilitating orientation in a socio-historical field of instruction. The call for feedback in the introduction illustrates the specific orientation towards the user—a measure designed to ensure a non-hierarchical form of communication based on participants' interests:

> *Fernunterricht* is for all those who are eager to acquire new knowledge, especially for instructors in adult education and teachers who impart knowledge to a smaller circle of people. Newspapers and magazines are unsuited instruments for planned education: the former offer brief reports on current affairs, while the latter are devoted to detailed discussions of specific topics. Not everybody has enough time and energy to gain an overall view of matters from these sources and then to seek out the additional information necessary to form a comprehensive opinion. *Fernunterricht* aims at filling this gap. Lack of time forces both students and teachers to be concise in their summaries, and pictures are very useful in this context. They show what is important quickly and clearly, and also to those with little previous education. With the 'Vienna Method of Picture Statistics,' which has already proved efficient in a number of countries, material is presented in an objective way that makes it easy to remember. Taking these goals into account, *Fernunterricht* offers no elegant articles, no detailed discussions, but descriptive material and pictures which will stick in the mind. From the individual *Fernunterricht* issues the reader can thus compile material according to his personal needs. The issues may also be cut into pieces, since each section ends with a full sheet. Society, life, technology, and science are dealt with; everybody can find out which way he should take in order to acquire specific knowledge, and which short cuts there may be on this way. Working students in Vienna, whose colleagues far from the capitol are faced with a lack of educational opportunities, turned to the Museum of Economy and Society to suggest some kind of correspondence instruction, which is now available on a broader basis and for a wider audience.[116]

Neurath then goes on to describe the interrelation of science and adult education which may be established, in his opinion, by an empiricist unified science:

> Scientific predictions may also be of little accurateness, such as: 'Next year no more than 10 and no less than 2 people per every 1000 people will die.' The prediction is fulfilled if the department of statistics announces at the end of the year: 'There were 14 deaths per every 5000 people.' The goal is to make the predictions as accurate as possible. Quite often, verifiable predictions are mixed with unverifiable ones. It would be unverifiable, and therefore pointless, for example, to predict: 'Reports are coming in from everywhere about new events, but still the eternally unknowable essence of the world has always remained the same.' It is not always easy to find out whether a sequence of words has a meaning and may be ascribed to observational statements. The adherents of physicalism seek to free everything which may be stated in any form from meaningless sequences of words and to gather meaningful scientific statements in unified science. Unified science comprises everything that can be confirmed through observational statements. The proposition that, in particular circumstances, people can be lulled into sleep with words is as verifiable as the assertion that a stone, if dropped, will fall to the ground. How to formulate any information for unified science as precisely as possible is something that physics teaches us. It has instruments to determine and measure sounds, colors, hardness etc. Since unified science comprises only what can be determined and described with the means of physics, we have come to speak of the physicalism of unified science. We have all been trained since our youth to

[116] *Fernunterricht* 1.2 (1931).

> make rough descriptions, but more exact scientific descriptions require a certain scientific education. What it aims at and achieves can be explained also to someone who does not want to fully take part in it.[117]

The *Fernunterricht* booklets mainly comprised quantitative pictures from the GWM, taken from books such as the fundamental picture-statistical publication *Gesellschaft und Wirtschaft* (Society and the Economy) (1930) with additional introductory and informative texts, which could also be ordered separately by mail as photographs and special prints. A separate sheet for readers' inquiries and suggestions also provided the opportunity for a loose correspondence on the respective booklets with, and for feedback from, the subscribers. Answers to selected questions were published in the following editions. The number of responses indicates the project's success, which was also noted abroad.[118] In the wake of the political changes of 1934 and 1938 this tradition of practical enlightenment was destroyed in Austria and fell into total oblivion after 1945. It is no coincidence that Neurath's ideas were to flourish in England, where bourgeois enlightenment laid the foundation for egalitarian ideas of education. Thus Neurath had the chance to expound the value of visual education for adult education in a number of articles for the bulletins of organizations active in adult education.[119] The article "Visual Aids in Adult Education" (1944), in particular, covers a wide area from Comenius to modern visual education and its use in the struggle against inadequate education and illiteracy with the help of a network of variable "visual arguments." It finishes with a quite realistic vision which, however, has yet to be translated into reality:

> The practical promotion of a future social system seems to be within the reach of our generation. The network of arguments conveyed by isotypes is, of course, much more limited than the one conveyed by literature, but it may still be similar to it. Even if all these international daydreams about the intellectual world of the common man do not become reality, the introduction of visual education both in schools and in adult education classes does seem to foster an atmosphere of reasoned reflection and a certain peaceableness[120]

Current international research on visual communication and general semiotics impressively underlines the potential of Neurath's approach.[121] As mentioned before, Isotype is a subject of research and study at the University of Reading's (UK) Department for Typography and Graphic Communication, where Otto and Marie Neurath's legacy of visual education is kept. In Austria, awareness of the innovative tradition of the "Vienna Method" is growing only slowly in the course of the reappraisal of Neurath's life and work.[122]

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[117] Ibid., 11.

[118] Ibid., VI, 6.

[119] For example in the *Bulletin of the World Association for Adult Education* (London 1942); *Highway* (London 1944); *The New Era* (London 1944); *Health Education Journal* (London 1944); *The Lancet* (London 1945).

[120] "Visual Aids and Arguing," in Neurath 1991, 617.

[121] Cf. K. H. Müller 1991.

[122] Cf. recently Groß 2015. Recent exhibitions on Neurath's Isotypes: "Gypsy Urbanism" (MAK 2010); "Zeit (lose) Zeichen" (Künstlerhaus 2012–13).

Chapter 10
Epilogue: The Exodus of Scientific Reason

The book burnings all over Germany in May 1933 marked the first negative victory of anti-Enlightenment powers pursuing anti-democratic politics and "national" science.[1] Supported by a large portion of the senior faculty, the Nazi-dominated *Deutsche Studentenschaft* (German Student Federation) destroyed thousands of books by renowned writers such as Erich Kästner and Stefan Zweig; the same fate was suffered by a series of socialist, psychoanalytic, and pacifist texts under the programmatic call "against class warfare and materialism…, shabby views and political treason…, a soul-shredding overestimation of human drives… ."[2] In the struggle against so-called "Jewish cultural Bolshevism" Marx, Freud, and Einstein became symbols of the hated rational-empirical science of nature and society.[3] Appearing since 1935, the list of "dangerous and undesirable writings" included over 4,000 authors, and despite official claims that purely scientific works were to be excluded from it, the list still contained names like Alfred Adler, Friedrich Adler, Max Adler, Viktor Adler, Otto Bauer, Siegfried Bernfeld, Ernst Bloch, Martin Buber, Ludwig Brügel, Richard Coudenhove-Kalergi, Helene Deutsch, Gustav Eckstein, Albert Einstein, Sándor Ferenczi, Ernst Fischer, Bruno Frei, Sigmund Freud, Anna Freud, Alfred Hermann Fried, Egon Friedell, Erich Fromm, Rudolf Goldscheid, Carl Grünberg, Emil Julius Gumbel, Dietrich von Hildebrand, Rudolf Hilferding, Magnus Hirschfeld, Max Horkheimer, Erich Kahler, Paul Kammerer, Otto Felix Kanitz, Karl Korsch, Siegfried Kracauer, Otto Leichter, Georg Lukács, Karl Mannheim, Karl Marx, Johannes Messner, Otto Neurath, Friedrich Pollock, Wilhelm Reich, Theodor Reik, Karl Renner, Rudolf Steiner, Karl Vorländer, and Fritz Wittels. Censorship was, of course, also practiced in Austria: while the *Ständestaat* regime of 1934 saw to the banning of, above all, social-democratic and

[1] Comprehensive texts on this theme include Walberer (ed.) 1983; Schöffling (ed.) 1983; Sauder (ed.) 1983; "*Das war ein Vorspiel nur*…" 1983; Krockow 1983; Poliakov and Wulf 1983; Belke 1983; *Bücherverbrennung* 1979.

[2] Cited from Walberer (ed.) 1983, 115.

[3] Ringer 1983; Beyerchen 1982; Erdmann 1967; Frank 1979; Mehrtens and Richter (eds.) 1980.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_10

Nazi literature, the "Anschluss" marked the starting-point for the cleansing of scientific libraries with the help of "black lists" of Jewish and socialist professors (*Die verbrannten Bücher* 1993).

The long-term effect of intellectual emigration and 'cleansings' of the universities and other educational institutions was as disastrous for science as it was for art and literature.[4] During the economic depression following World War I, most of the intellectual workers of the university were part of the politically and economically disfranchised middle classes; as a result, the majority of Austrian professors and students, just as in Germany, tended to belong to an anti-democratic and anti-Semitic front that was sustained by the ideologies of German nationalism and political Catholicism. Again, the opponent was "liberalism," in all shapes and forms. With nationalist agitation at the universities increasing (cf. Chap. 9), eminent representatives of humanism and liberalism—such as Carl Grünberg, Max Adler, Sigmund Freud, Karl Bühler and Charlotte Bühler, Moritz Schlick, Karl Menger, Hans Kelsen, Julius Tandler, and many other scientists, mostly of Jewish origin—found themselves hopelessly on the defensive.

Authoritarian ideologues (e.g., Othmar Spann, Heinrich Ritter von Srbik, Josef Nadler) furnished the groundwork for the progressive elimination of enlightened reason. Characterized by an opportunist interaction between academic autonomy and an interventionist ministry, appointment policies and habilitation procedures guaranteed that the selection processes favored right-wing candidates. Nazi students distributed "black lists" and called for boycotts; with the support of sympathetic teachers, deans, rectors, and ministers, they demanded the implementation of restricted admission for "non-Aryan" students. This kind of agitation had become common even before the dissolution of parliament in March 1933 by the authoritarian regime which, having defeated the democratic opposition and finding itself caught between Italian fascism and German Nazism, was working toward the construction of a Christian corporative state.

The "Anschluss" of the universities was completed long before the political one of 1938 (cf. Sects. 9.1.1 and 9.1.5). Already in 1925 the politically motivated murder of the journalist Hugo Bettauer, an outspoken advocate of sexual enlightenment, by a Nazi had been justified both by the right-wing press and by various university members (Hall 1978). It is hardly surprising, therefore, that similar arguments were offered by professors and journalists who supported the corporative state after the murder of Moritz Schlick. Some proponents demanded the unity of religion and science. Johann Sauter, the very philosophy professor who had classified Schlick's doctrine as "negativist," polemized against Freudian analysis in the *Ständestaat's* intellectual organ *Die Pause*:

> For those familiar with matters of intellect [*geistigen Dinge*], psychoanalysis is merely a crude form of materialism; leaving aside its scientific untenability, it is more or less the most degrading concept of man in recorded history … Hence in the end, psychoanalysis – the evaluation of which cannot be left to novelists such as Stefan Zweig or Thomas Mann,

[4] Huber 1977; Huber (ed.) 1978; Kadrnoska (ed.) 1981; Leser (ed.) 1981; *Österreicher im Exil* 1977; Pfoser 1980; Haslinger (ed.) 1983; Stadler (ed.) 1987/88, 1988.

> of course – is in fact simply an elaborate form of pornography disguised as science. We pity its founder as a misguided genius and – like Nietzsche – as a victim of a materialist zeitgeist. For science and philosophy, however, in light of the high responsibility they have towards the nation, this monstrous error – containing point by point, as errors do, a distorted grain of truth – signifies a serious test of conscience.[5]

It is quite apparent that Sauter, an exponent of political Catholicism, applauded the burning of Freud's works. In the land of the Patriotic Front, such attacks on the representatives of scientifically-oriented psychology, sociology, and psychoanalysis were only marginally different from the Nazi's attacks on Magnus Hirschfeld, Wilhelm Reich, and Sigmund Freud. The fires burning throughout Germany in 1933 did not spare books from Austria. These included the famous study by Marie Jahoda, Paul Lazarsfeld, and Hans Zeisel, *Die Arbeitslosen von Marienthal* (1933); the political and scientific conditions under Austro-Fascism eventually also drove the three authors into exile.[6] The same circumstances meant that those intellectuals branded as outsiders in Germany on May 10, 1933, could not expect a friendly welcome in Austria (Heiss and Rathkolb 1995). Following the events of February 12, 1934, the first great wave of politicians, scientists, and artists emigrated from Austria. Sexual anxiety combined with lower middle class conservatism to form a bulwark against reason, which in turn was demonized as a corrosive influence on the *Heimat*. The "healthy body politic" was meant to immunize itself against the "ulcers of the Jewish world view." Fear of direct contact soon translated itself into physical aggression. With the call for a "solution to the Jewish question," the Final Solution had already become thinkable.

The Austrian writer Jean Améry vividly described what the destruction of democracy and the resulting "green-brown" cultural landscape—with its anachronistic ideology of empire, the Christian world view, its metaphysical speculations, and its irrationalism—meant for the enlightened mind:

> Earlier than might be expected, the country rejected the intellectual achievements to which it had itself given birth. Freud became an inner-Jewish affair, against which Christian alertness was recommended. Behind the men of the Vienna Circle young Thomistically-oriented assistants were already waiting; behind these, in turn, came students of Rosenberg, willing to offer Christianity the same co-existential loyalty like that with which Austria's church, for its part, credited the Nazis. Literature could look forward to public encouragement and recognition as long as it engaged in a Christian-Alpine yodeling that could be transformed most easily and without formal difficulties from a solemn Catholic key into that of Nazism. The native literati behaved like drunkards whose emotion, unexpectedly yet predictably, was transformed into howls of rage. (1971, 49 f.)

The consequences of this decline of scientific culture remain deplorable even today.[7] The destruction of Vienna's cultural movement, the dissolution of the Vienna Circle and the Ernst Mach Society, the suppression of empirical social research: long before the political annexation, all these developments represented the sad consequence of a cultural politics executed by those preparing the way for Nazism.

[5] Sauter 1935–36.

[6] Talos and Neugebauer (eds.) 1984.

[7] Stadler (ed.) 1988.

That the completion of the destruction was left to actual members of the 'master race' from Germany was coincidental, given that they were enthusiastically welcomed by most of the Austrian populace.

The expulsion and exile of Austrian scientists from the academic domains of philosophy, logic, and mathematics must be understood in conjunction with the motives of its political and intellectual perpetrators who, after the process had been completed, enjoyed its benefits (Stadler (ed.) 1988 and Stadler (ed.) 2010).

As we noted, this process had its roots in social developments which began in the 1920s, particularly within the Austrian universities, in which Jewish scientists and scholars had little chance for academic advancement.[8]

Reinforced by an aggressive anti-Semitism, the "cultural struggle" against the scientific spirit continued after the destruction of democracy in 1933–34; it was now channeled into "Christian-German" and "German-*völkisch*" (i.e., Nazi) alliances. Posing the fateful alternatives of destruction and emigration, the so-called "Anschluss" (annexation) represented the culminating moment in this campaign of cultural repression that deeply affected most fields of science, while other fields (e.g., history, German philology, geography, anthropology, medicine) became ideological flag bearers of Nazi rule as a result of their German-nationalist orientation even before 1938.[9]

The politically, economically, and scientifically determined break-up of the Vienna Circle, accompanied as it was by successful internationalization, has been described at length in previous chapters.[10] The chronological course of emigration in its historical-political context in the respective countries of refuge has been portrayed in some detail elsewhere, as have the catastrophic effects of the circle's emigration for both pre- and post-war analytic theory of science in Austria and Germany (Dahms 1987, 1988; Stadler and Weibel 1995). Nevertheless, qualitative research on scientific emigration in an interdisciplinary context remains a desideratum.[11] A thematic supplement to the present study with a compact description of the origins, development, and expulsion of logical empiricism, juxtaposing the intellectual features of the "scientific world conception" with those of Nazi ideology, might well reduce to absurdity—both from a historical and a theoretical perspective—the charge leveled by the Frankfurt School (Max Horkheimer in particular) that logical empiricism simply represented a "philosophy of power" (Hegselmann 1988).[12]

In this broader context, individual case studies (on Gustav Bergmann, Kurt Gödel, Karl Popper, Ludwig Wittgenstein, and Friedrich Waismann, among others[13]), focusing on individual courses of emigration and acculturation from a

[8] Lichtenberger-Fenz 1988; Stadler 1987; Klamper 1988; Meissl 1988.

[9] On the professionalization of individual disciplines under Nazism see Weinzierl 1988; Fellner 1988; Conte 1988; Seidler 1988; Hubenstorf 1988.

[10] Cf. Chaps. 4 and 9.

[11] Kröner 1988.

[12] On a corrective of this approach to positivism see Müller 1985; Dahms 1994.

[13] Cf. the case studies on Bergmann, Gödel, Popper, Wittgenstein, and Waismann by Grossmann, Köhler, Belke, and Haller in Stadler (ed.) 1988.

biographical and theoretical perspective, offer a mosaic-like illustration of the movement's common fate. A report by Gustav Bergmann to Otto Neurath in 1938 offers a unique inner document of the Vienna Circle and, together with yet-unpublished correspondence and (auto-)biographical memoirs, helps to contribute to a more differentiated picture of logical empiricism.[14] Looking at these biographical studies, however, we have to bear in mind that, despite all the painful experiences, these were careers that were relatively successful—a fact that, in view of the failures suffered by other emigrants (e.g., Waismann[15] or Zilsel), should not minimize the gravity of the events that unfolded.[16] A wide range of cultural factors connected to emigration research still needs to be investigated here. These include, alongside structural characteristics, specific determinants such as the following: countries of origin, transition, and immigration; age and professional situation at the time of the emigration; ethnic and linguistic identity; the history of disciplines in a comparative international context; degree of institutionalization; and communicative structures specific to individual schools.[17]

For members of the Vienna Circle, the Anglo-American countries offered relatively favorable conditions of exile. As Coser and Holton show in their studies of the process of scientific transfer,[18] this was particularly true of the United States, as a result of developments in scientific research there. The price paid for this extraordinary "success story"—depolitization, liberalization, academization[19]—would need to be discussed within a wider framework; the question of the specifically Jewish determinants of emigration and acculturation is likewise open to further debate (Strauss 1987; Holton and Sonnert 2008).

Witness reports illustrate the broad spectrum of these factors.[20] We see, for instance, that as a result of her specific training and her discipline's international standing, the mathematician Olga Taussky-Todd was in a relatively favorable position compared to many of her colleagues before 1938. But even she had to contend, in exile as before, with gender discrimination. Beyond this, the specific phenomenon of *Jewish* scientific emigration is of central relevance here—not least on account of the high proportion of Jews involved in the overall cultural exodus from Germany and Austria. Regardless of the fact that a strict distinction between so-called "racial," political, and cultural emigration is hardly possible, the phenomenon is clearly linked to both the mass emigrations in general and the mass destruction of European Jewry.

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[14] On the Vienna Circle's autobiographical dimension cf. primarily the correspondence in the Wiener-Kreis-Archiv Haarlem and the University of Pittsburgh, Archives of Scientific Philosophy, Special Collections.

[15] Haller 1988b; McGuinness (ed.) 2011.

[16] P. Zilsel 1988.

[17] On the state of such research cf. Röder 1988.

[18] Coser 1984, 1988; Holton 1993; Eppel (ed.) 1995.

[19] Dahms 1987, 104 ff.

[20] Taussky-Todd 1988.

Put in quantitative terms, the emigration of logical empiricism can be summarized as follows[21]: between 1931 and the outbreak of World War II, 13 of the 20 founding members of the Vienna Circle (Gustav Bergmann, Rudolf Carnap, Herbert Feigl, Philipp Frank, Olga Hahn-Neurath, Felix Kaufmann, Karl Menger, Richard von Mises, Marcel Natkin, Otto Neurath, Rose Rand, Josef Schächter, Friedrich Waismann, and Edgar Zilsel) emigrated because of political, economic, and cultural reasons, but above all because of Nazi racial policy. Moritz Schlick, the circle's founder, would undoubtedly have suffered a similar fate if he had not been murdered on the stairs of the University of Vienna in 1936. Viktor Kraft and Heinrich Neider went into inner emigration; Béla Juhos spent the Nazi period as an independent scientist; the mathematicians Hans Hahn and Theodor Radakovic died in Vienna before the "Anschluss". It is thus evident that even before the war, virtually all the members of the Circle either lost their academic positions or had the foresight to abandon them voluntarily. Apart from the three exceptions, all members had to emigrate, more than half of them on account of their Jewish origins. Among the approximately 50 scientists in various disciplines on the Circle's periphery, there were many who also had to leave their country after 1934 and 1938: Egon Brunswik, Rudolf Ekstein, Josef Frank, Heinrich Gomperz, Walter Hollitscher, Karl Popper, Hans Kelsen, Siegfried Bernfeld, and Olga Hahn-Neurath, to name but a few. Karl Popper's years of exile in New Zealand reveal, in exemplary manner, the connection between the specific locus of his emigration and a philosophical corpus that remains largely unexplored.[22]

It has to be kept in mind, however, that emigration and exile was also the fate of a variety of scientists outside of the logical empiricist movement, for example the anti-Nazi Catholic circle around Dietrich von Hildebrand and his student Balduin Schwarz,[23] as well as the Kantian, freethinker, and religious socialist Oskar Ewald (Friedländer). Having been imprisoned in a concentration camp, he was later forced into English exile and died in total isolation at Oxford in 1940. In contrast, "bridge builders" such as Hans Eibl and Johann Sauter could continue their careers during the "Third Reich"—albeit not without conflicts of their own with the new authorities, who had sent their own philosophers to Austria from the "Old Reich." Among members of the younger generation who had either already been studying philosophy or turned to the discipline after their emigration, let us briefly mention Alfred Stern here: his career represents that of many philosophical individualists working outside of schools and common traditions—and also that of many who were expelled from Austria and never returned.[24]

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[21] Fundamental for all biographical data is *Biographisches Handbuch* 1985 ff. For Austria in particular see Stadler and Weibel (eds.) 1995 (includes biographical data-base).

[22] Müller, Stadler, and Wallner (eds) 1986; Belke 1988; Müller 1993; Hacohen 1996 and 2000.

[23] Ebneth 1976.

[24] Of all those concerned, only four people came back to Austria either for a certain period of time or for good: Günther Anders, Kurt R. Fischer, Albert Fuchs, Hilde Spiel, and Walter Hollitscher. On Stern cf. Aspöck 1988.

In face of such an irretrievable loss the distressing personal and theoretical continuities have to be noted that have only come to be investigated in the past few years.[25] If we consider, for instance, the Institute of Philosophy at the University of Vienna, a cursory overview of the postwar catalogues reveals that those professors who had advocated the "corporative state" before 1938, as well as those who began or continued to teach after 1938, were also active after 1945. Among those who had remained in Austria in "inner exile," Viktor Kraft was the only one to be "reactivated"—albeit only briefly. Not a single former emigrant can be found in academic philosophy after the war. One might speak of something like a postwar philosophical restoration as a consequence of clerical-conservative university politics on the one hand, and the omission of a thorough de-nazification process on the other.[26] A similar situation is manifest in the fields of psychology and pedagogy (linked to philosophy at the time).[27] At the University of Graz, the philosopher and pedagogue Ferdinand Weinhandl, notorious for his extreme racism during the Nazi years, was even endowed with a double professorship: a particularly blatant example of the continuing influence of the old elite.[28] It is clear that such personnel policies and such a philosophical environment did not encourage any remigration or help to renew interest in the scientific culture that had been repressed and expelled. (Pfefferle and Pfefferle 2014).

The situation in logic and mathematics was scarcely better. Their representatives were displaced in favor of representatives of "Aryan" or "German" mathematics. At both the University of Technology and the University of Vienna, the losses amounted to the abandonment of an entire, highly-developed scientific tradition. Those dismissed or expelled in the wake of the Nazi seizure of power, or even beforehand, include the following figures[29]: Franz Leopold Alt, Alfred Basch, Adalbert Duschek, Ludwig Eckhart, Ernst Fanta, Herbert Federer, Eduard Helly, Friedrich Hopfner, Gustav Kürti, Eugen Lukács, Heinrich Mann, Anton E. Mayer, Walther Mayer, Hans Schneider, Alfred Tauber, Hans Thirring, Stefan Vajda, Abraham Wald, and Karl Wolf, as well as several individuals already mentioned in connection with the Vienna Circle: Gustav Bergmann, Kurt Gödel, Karl Menger, and, not least of all, Olga Taussky-Todd. Among them, a dozen mathematicians were forced to emigrate, Hans Thirring survived in inner emigration,[30] while Eckhart committed suicide and Tauber died in the concentration camp of Theresienstadt. Among those dismissed in

[25] Fischer and Wimmer (eds.) 1993.

[26] On the period of restoration see Haller 1988b. Among those who taught before the 1938–45 period and then became active again after the war: Alois Dempf, Friedrich Kainz, Erich Heintel, Richard Meister, Hubert Rohracher. The married couples Bühler and Brunswik were not invited back. Cf. Meissl, Mulley, and Rathkolb (eds.) 1986; also Stadler (ed.) 2010.

[27] On psychology and pedagogics in an institutional context cf. Benetka 1995. For Germany see Geuter 1984.

[28] On the history of the University of Graz in this period see *Grenzfeste* 1985. On Weinhandl see Oberkofler and Rabofsky 1987, 69–81.

[29] Pinl and Dick 1969; Pinl and Furtmüller 1973.

[30] Glaser 1981.

1938, only three were employed at the university again after the war (Hopfner, Wolf, and Thirring), and not a single emigrant was called back to teach. Karl Menger's attempt to return on his own initiative failed miserably.[31] This sort of "coming to terms with the past" can be contrasted paradigmatically with the career of one Nazi, Karl Meyerhofer: having occupied Wilhelm Wirtinger's chair of mathematics between 1936 and 1945, he was forced into retirement for some years because of his Nazi activities before being allowed to resume teaching at the University of Vienna between 1957 and 1969.[32]

In reviewing all of these losses, we also have to take into account emigrants from other Austrian universities (e.g., the now world-famous historian of science, Otto Neugebauer[33]), as well as non-university mathematicians such as Olga Hahn-Neurath, and finally those who had already left Austria before 1938 (Emil Artin, Hilda Geiringer-Mises, Richard von Mises).[34]

When it comes to assessing the consequences of emigration for logic, mathematics, and the theory of science in both Austria and the various countries of immigration, some historical remarks are useful.[35] In the mid-1930s, the philosophical and political pluralism that marked both the monarchy and the First Republic before 1934 was gradually suppressed, first theoretically and then physically, through the monolithic culture of political Catholicism and fascist universalism. Dominating the universities, both these ideological currents blended readily, and almost seamlessly, with the eclecticism of Nazi ideology, while the anti-Semitic "cultural struggle" was directed primarily at representatives of psychoanalysis, cognitive psychology, sociology, logical empiricism, and the Vienna school of legal theory.

After 1945, above all under the ministers Felix Hurdes and Heinrich Drimmel, the gaps left by emigration could not be filled. Holistic philosophy, Christian existentialism, and theology-oriented philosophy remained a "spiritual bulwark" against the scientific world conception and empirical research. This restorative phase of the postwar period, lasting approximately thirty years, coincided with the twists and turns of the cold war. With few exceptions, the failure of de-nazification which had largely been dismissed since 1947 also meant a failure to come to terms with the recent history of science and to link contemporary ideas to the rich intellectual life of the First Republic: either undertaking would have meant confronting the expulsion and exile of scientists from Austria. Such traces were only discovered and reconstructed in the late 1960s, but meanwhile Austrian philosophy and science had experienced some decisive developments in its exile, where it was turned into an international enterprise in the process. The delayed intellectual return of analytic theory of science, for example, could not compensate for or replace the deficits and losses that had been suffered. (Stadler (ed.) 2010).

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[31] Einhorn 1985, 264 ff.

[32] Ibid., 264 ff.

[33] Kager 1987.

[34] W. Frank 1987, 1988; Stadler 1990.

[35] Cf. the discussions in Chap. 9.

In light of such unfortunate breaks and continuities in the Austro-German history of philosophy, it is possible to agree with the following appraisal[36]:

> Thanks to the manifold ways of interpreting dominant philosophical ideas, the year 1945 does not signify a true break in German philosophy … Phenomenology and existentialist philosophy continued to be the most prominent tendencies, which, given their individualist focus, did not have much to say regarding state and society. Another widespread view was that true philosophy was only to be found among the great spirits of the past, offering us models for philosophical existence… By contrast, logical empiricism and the various shades of Marxist philosophy were extinguished.

Elsewhere, the "consequences of emigration of German and Austrian theorists of science and logicians between 1933 and 1945" were summarized somewhat more optimistically[37]:

> Against the rich background of activity in the 20s and 30s of our century, there is manifest a rapid decline of high-ranking research in the philosophy of science and (to a lesser degree) in logic in Germany and Austria. Since, with one exception, émigré logicians and philosophers of science did not return after the breakdown of the Third Reich recovery in these fields has been extremely slow. Pertinent knowledge had to be re-imported, and a satisfactory level has been reached only with the coming of a new generation.

In light of the long-term effects of socialization it is uncertain, of course, whether a new generation of scientists automatically means a shift in research paradigm. Furthermore, one criterion for a discipline's relevance and standards is its role within an international discourse of researchers—a point that would have to be further examined in the case of contemporary German-language philosophy.

In any case, the internationalization of Austrian philosophy in exile itself involved a personal and cognitive uprooting and estrangement from a social milieu embedded in a flourishing cultural movement. The capacity for adaptation was here sometimes limited.[38] It remains an indisputable fact that the emigration of the Vienna Circle and its surrounding figures was a decisive moment for its impact on the world stage. It is also indisputable that it opened an intellectual wound in Austria that has not yet healed[39]—but one that might perhaps still heal, provided a sustained effort is made to close this dark chapter of Austrian intellectual history in an international context.

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[36] Kamlah 1983, 38.

[37] Thiel 1984, 227.

[38] In *this* sense, the title of Feigl's pioneering study, "The *Wiener Kreis* in America" (1969) is inaccurate.

[39] Cf. the autobiographical assessment of Baier (1988).

Part II
The Vienna Circle—The Biographical and Bibliographical Dimension

Preliminary Remarks

In Part II of these *Studies* the reader finds an overview of the Vienna Circle diagrams and a list of the joint publications, followed by a biographical and bibliographical documentation of the Vienna Circle and its periphery. This part of the book focuses mainly on the regular visitors of the Schlick Circle at the Boltzmanngasse in the period between 1924 and 1936. However, the documentation also includes those scholars who only occasionally attended meetings of the Schlick Circle, foreign visitors and those leading intellectual figures who stood in regular contact with members of the Vienna Circle (as, for instance, Ludwig Wittgenstein or Karl Popper). An almost complete classification of this scientific communication can be found in the chapters of Part I.

The biographical units (with bibliographical information) generally consist of the following sections:

1. A short biography with the most important life data and scientific achievements.
2. A list of publications (bibliography) only including first editions but not translations and reviews. For the core of the Vienna Circle, an attempt was made to list all of the publications. The list of peripheral figures is not complete but was intended to give an idea of the relevance of the Vienna Circle. It conveys the innovative intellectual setting and the intense international network of communication of the Schlick Circle.
3. A recent list of literature and sources with the most important research literature. This is also intended as a supplement to the general list of sources and literature.
4. The contents of the three book series and the journal *Erkenntnis* round off the synoptic diagrams and structure of the Vienna Circle (and Logical Empiricism, respectively). Together with the biographies and bibliographies they provide the quantitative basis for Part I and its interpretation.

5. A documentation of the murder of Moritz Schlick, the initiator and leading figure of the Vienna Circle, on June 22, 1936. It contains to date unpublished documents on the murder and the murder trial.

The most important published and unpublished information referring to the individual biographical units is cited in the list of literature and sources – in some cases, also in the primary literature of the lists of publications.

Standard reference books are not named separately. Here I would only like to cite the following:

The Encyclopedia of Philosophy, ed. Paul Edwards, 8 vols., New York-London: Macmillan Publishers 1967.

International Biographical Dictionary of Central European Emigrés 1933–1945/Biographisches Handbuch der deutschsprachigen Emigration nach 1933, ed. Werner Röder and Herbert A. Strauss, 3 vols., Munich-New York-London-Paris: Saur 1980–1983.

Enzyklopädie Philosophie und Wissenschaftstheorie, ed. Jürgen Mittelstraß, 4.vols., Mannheim-Vienna-Zurich: B.I. Wissenschaftsverlag 1980 ff. (starting with vol. 3: Stuttgart-Weimar: J.P. Metzler).

Philosophie der Gegenwart in Einzeldarstellungen, ed. Julian Nida-Rümelin, Stuttgart: Kröner 1991.

Vertriebene Vernunft. Emigration und Exil österreichischer Wissenschaft, 2.vols., ed. Friedrich Stadler, Vienna-Munich: Jugend und Volk 1987/1988.

The Cultural Exodus from Austria, ed. Friedrich Stadler and Peter Weibel, Vienna-New York: Springer Verlag 1995 (see, in particular, Part II: Biographical Documentation).

For the short biographies this catalogue of dissertations was used.

Science and Philosophy in the Twentieth Century. Basic Works of Logical Empiricism. Ed. By Sahotra Sarkar. 6 Vlms. Garland Publishing 1996.

Wissenschaftlicher Humanismus. Texte zur Moral- und Rechtsphilosophie des frühen logischen Empirimus. Hrsg. von Eric Hilgendorf. Freiburg-Berlin-München: Haufe 1998.

Wiener Kreis. Texte zur wissenschaftlichen Weltauffassung von Rudolf Carnap, *Otto Neurath*, *Moritz Schlick*, *Philipp Frank*, *Hans Hahn*, *Karl Menger*, *Edgar Zilsel und Gustav Bergmann*. Hrsg. von Michael Stöltzner und Thomas Uebel. Hamburg: Felix Meiner 2006.

Die Berliner Gruppe. Texte zum Logischen Empirismus. Hrsg. von Nikolay Milkov. Hamburg: Meiner 2015.

Der Wiener Kreis. Ausgewählte Texte. Hrsg. von Christian Damböck. Stuttgart: Reclam 2013.

The following public catalogue of lectures were consulted for the lectures and courses held at the University of Vienna. For the shortbiographies the cited catalogue of dissertations was used.

Verzeichnis über die seit dem Jahre 1872 an der philosophischen Fakultät der Universität in Wien eingereichten und approbierten Dissertationen, ed. The Dean's Office of the University of Vienna, Vienna 1937

Verzeichnis der an der Universität Wien approbierten Dissertationen 1937–1944, compiled by L. Alker, Vienna 1954.

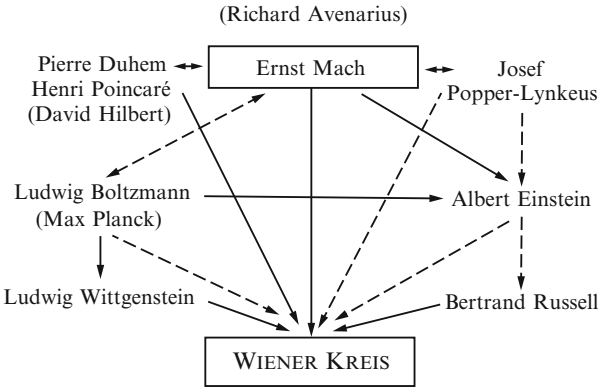
The documentation of the teaching activities of the Vienna Circle members at Vienna institutions of adult education (Sect. 9.2.1) is based on material compiled by Robert Kaller ("Wiener Kreis und Volksbildung", Vienna Circle Institute 1991). Thanks go to him and to Ulrike Weidner, Helmut Ruck and János Békési for the work on the biographies and bibliographies.

Chapter 11
An Overview of the Vienna Circle

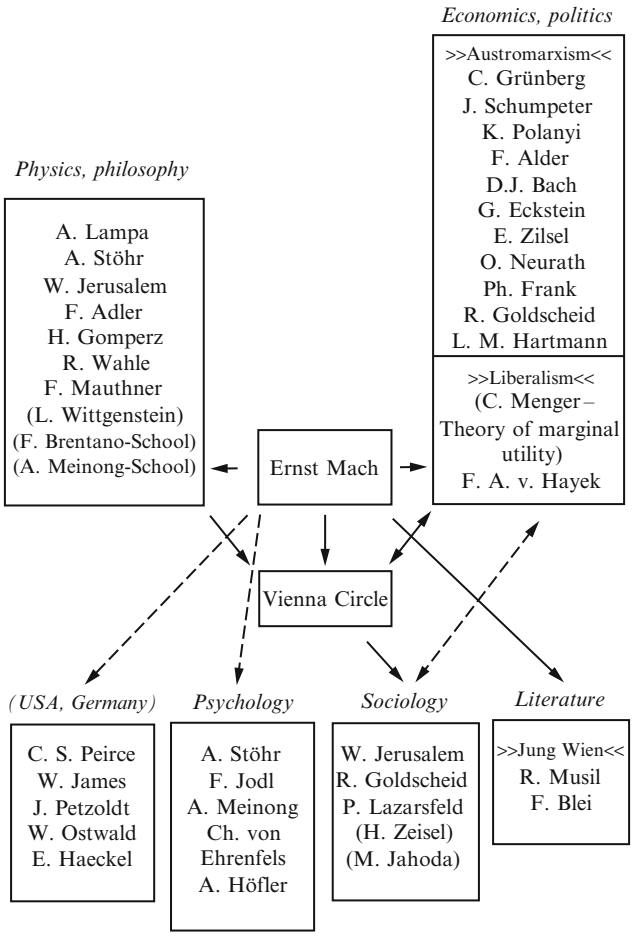
11.1 The Vienna Circle in Diagrams

Philosophy of Science from the Monarchy to the Republic

(a) The antimetaphysical-positivist and realist paradigm in Austria 1895–1934



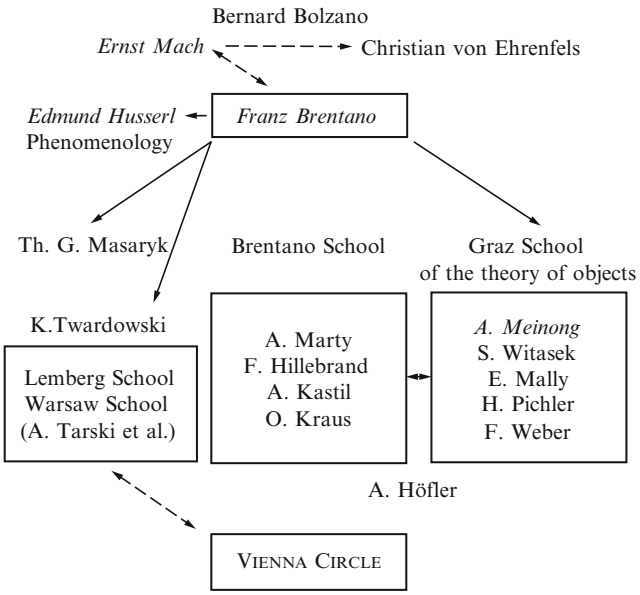
F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_11



Criterion: Reception on the basis of communication between scientists (correspondence, discussion groups, quotations in publications).

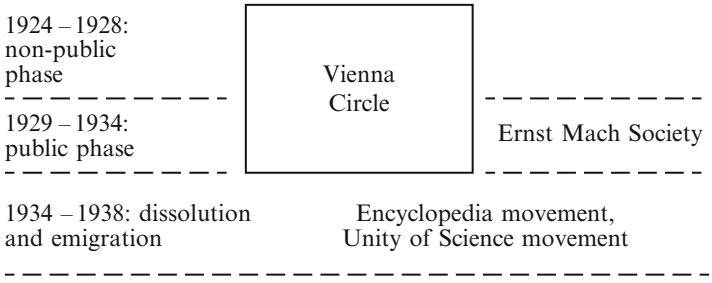
←--------→strong reciprocal communication or reception
----------→ strong one-sided communication or reception
←-- --→ weak reciprocal communication
--- --→ weak one-sided communication

(b) The objectivist-phenomenologist paradigm



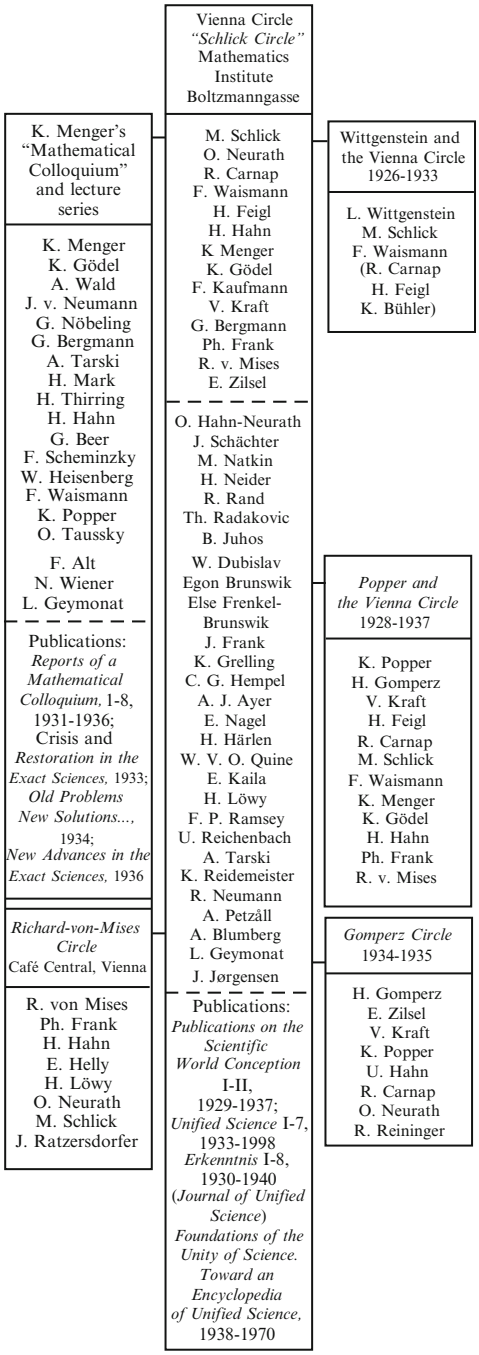
(c) External development phases: The Vienna Circle and the Ernst Mach Society

1907–1914: First discussion group: the "proto-circle"
Participants: Philipp Frank, Hans Hahn…
Issues:
Themes:
World War I: rupture
1918–1924: constitutive phase
Hans Hahn: reading of *Tractatus* in a seminar; Kurt Reidermeister: reading of the *Prinicipia Mathematica* in a seminar; 1922: Moritz Schlick receives a call to Vienna



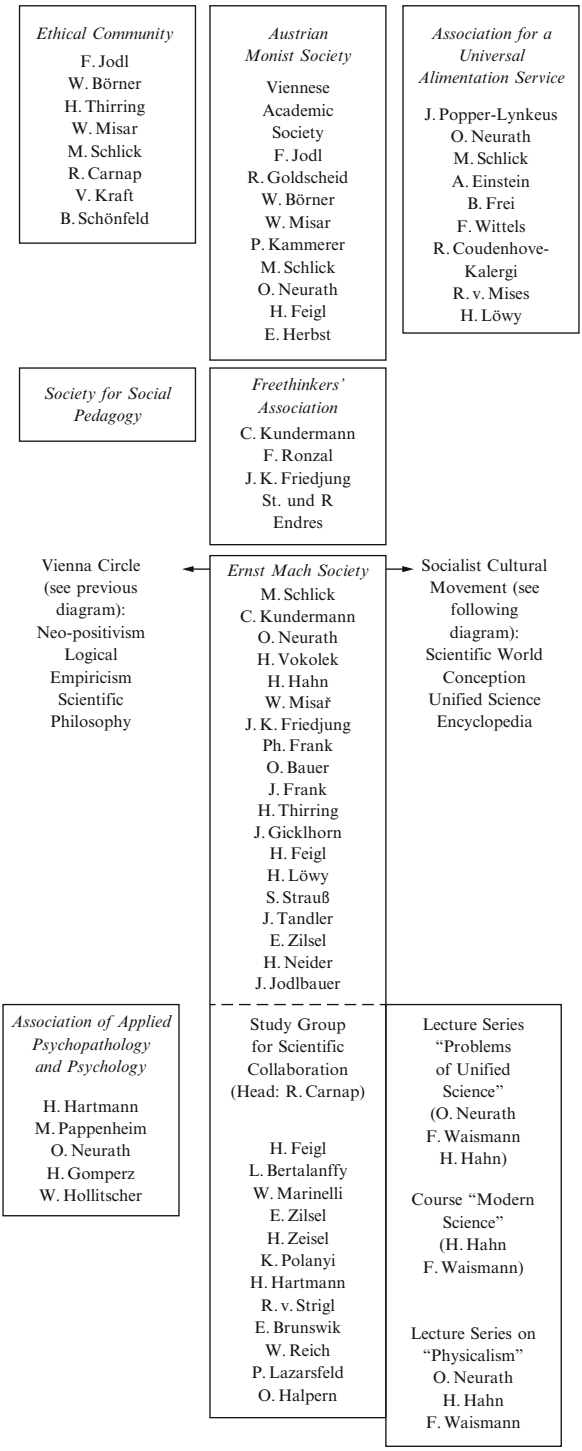
Diagrams showing typology of Vienna Circle

(d) The Vienna Circle and its periphery



(e) The Ernst Mach Society and its Setting

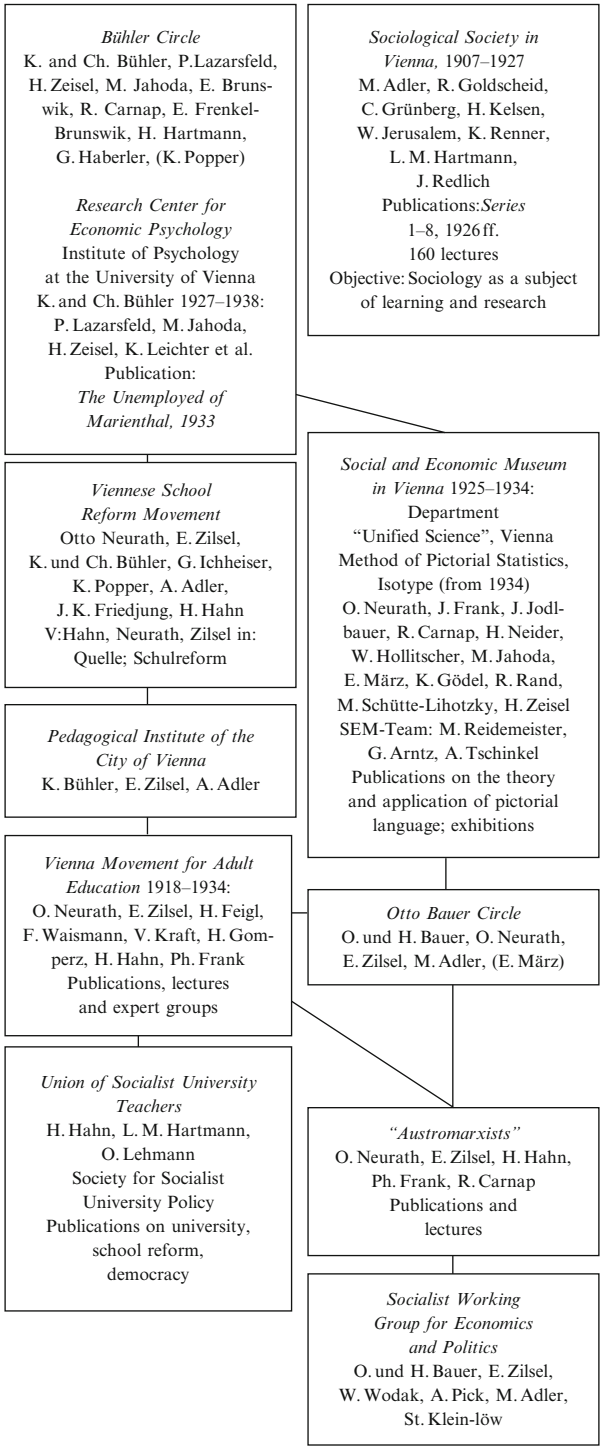
Intellectual and weltanschauung-political setting of the "Ernst Mach Society": socialism—"late-Enlightenment"—liberalism
Themes and objectives: science, anti-metaphysics, socialism, monism, evolutionism, planning and social engineering, positivist sociology, social reform, socialization, separation of church and state, school reform, scientific socialism, empirist rationalism, Epicurean marxism, "human economy", peace movement, life and social reform, pan-Europe, Esperanto.


Ethical Community
F. Jodl
W. Börner
H. Thirring
W. Misar
M. Schlick
R. Carnap
V. Kraft
B. Schönfeld
Austrian Monist Society
Viennese Academic Society
F. Jodl
R. Goldscheid
W. Börner
W. Misar
P. Kammerer
M. Schlick
O. Neurath
H. Feigl
E. Herbst
Association for a Universal Alimentation Service
J. Popper-Lynkeus
O. Neurath
M. Schlick
A. Einstein
B. Frei
F. Wittels
R. Coudenhove-Kalergi
R. v. Mises
H. Löwy
Society for Social Pedagogy
Freethinkers' Association
C. Kundermann
F. Ronzal
J. K. Friedjung
St. und R Endres
Vienna Circle (see previous diagram): Neo-positivism Logical Empiricism Scientific Philosophy
Ernst Mach Society
M. Schlick
C. Kundermann
O. Neurath
H. Vokolek
H. Hahn
W. Misař
J. K. Friedjung
Ph. Frank
O. Bauer
J. Frank
H. Thirring
J. Gicklhorn
H. Feigl
H. Löwy
S. Strauß
J. Tandler
E. Zilsel
H. Neider
J. Jodlbauer
Socialist Cultural Movement (see following diagram): Scientific World Conception Unified Science Encyclopedia
Association of Applied Psychopathology and Psychology
H. Hartmann
M. Pappenheim
O. Neurath
H. Gomperz
W. Hollitscher
Study Group for Scientific Collaboration (Head: R. Carnap)
H. Feigl
L. Bertalanffy
W. Marinelli
E. Zilsel
H. Zeisel
K. Polanyi
H. Hartmann
R. v. Strigl
E. Brunswik
W. Reich
P. Lazarsfeld
O. Halpern
Lecture Series "Problems of Unified Science" (O. Neurath F. Waismann H. Hahn)
Course "Modern Science" (H. Hahn F. Waismann)
Lecture Series on "Physicalism" O. Neurath H. Hahn F. Waismann

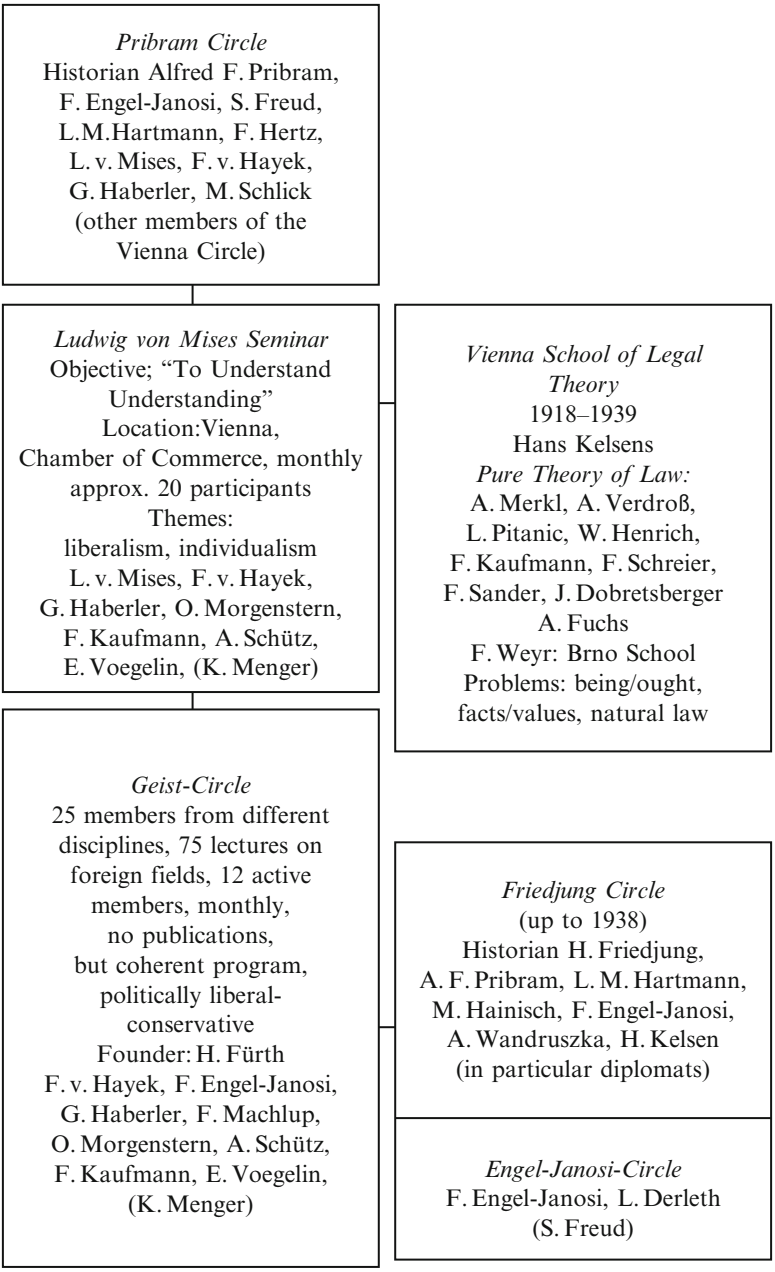
Publications of the *Ernst Mach Society*: *Scientific World Conception. The Vienna Circle*, 1929. H. Hahn, *Superfluous Essentialities. Ockham's Razor*, 1930. *Erkenntnis*, 1930 ff.
Events: First International Conference on the Epistemology of the Exact Sciences, Prague 1929
1929–1933: approx. 50 lectures. 2.12.1934: dissolution
International Congresses for the Unity of Science ("Unity of Science Movement"): Paris 1935, Copenhagen 1936, Paris 1937, Cambridge (England) 1938, Harvard 1939, Chicago 1941

(f) The *Vienna Circle* and *Ernst Mach Society*—The intellectual and *Weltanschauung* context

1. Socialist Cultural Movement

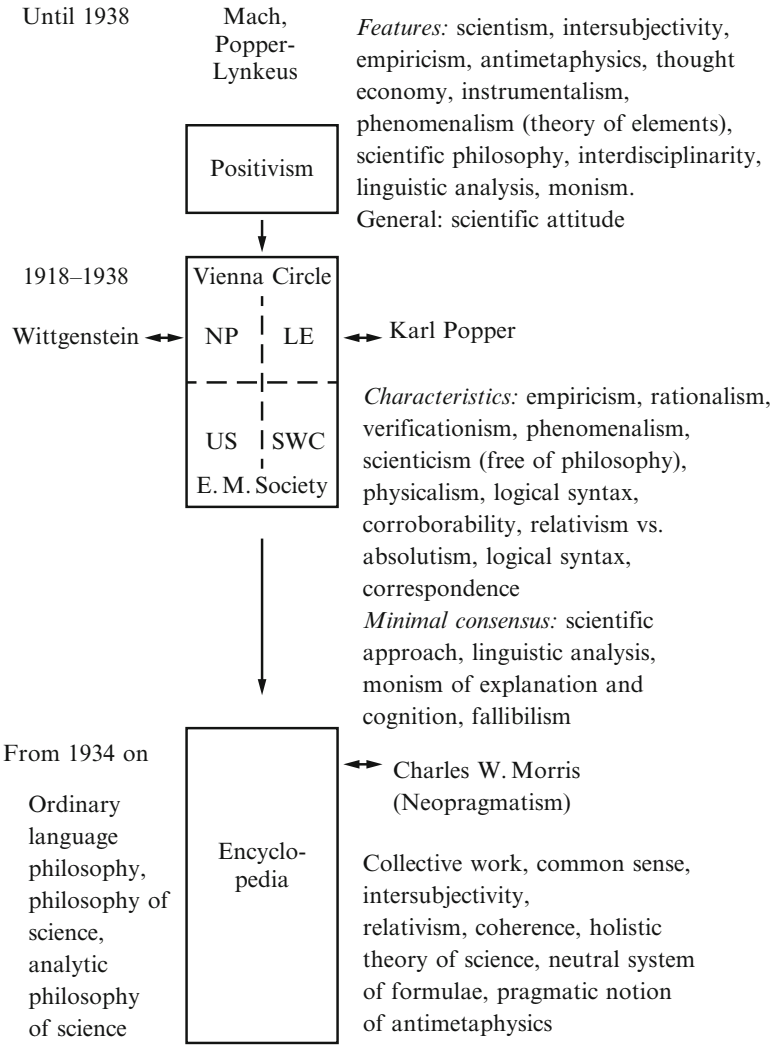


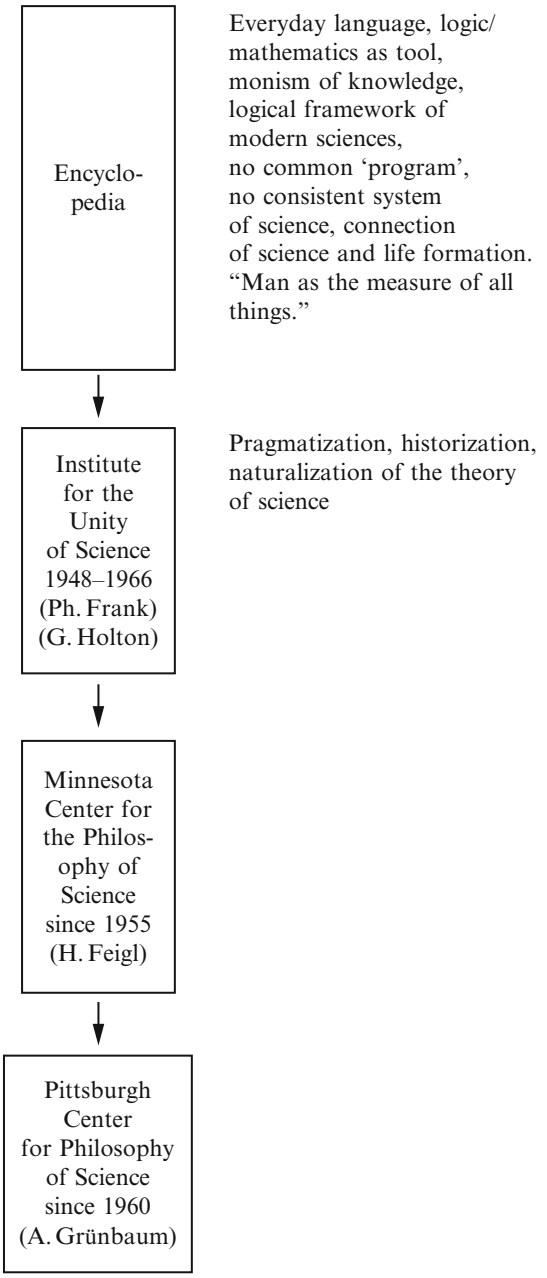
2. Liberalism



(g) The typology of positivism, neopositivism, logical empiricism, scientific world view, unified science, encyclopedia

Encyclopedia: a term coined by Otto Neurath from 1934, with recourse to Diderot and d'Alembert: "Enlightenment through scientific education."
Characteristics: empiricist language, no 'system'; collective work





Abbreviations:
NP: neopositivism, LE: Logical Empiricism, US: Unified Science, SWC: Scientific World Conception

11.2 Register of the Journal *Erkenntnis/Journal of Unified Science* I–VIII (1930–1940)

1. Essays

Ajdukiewicz, Kasimir, "Sprache und Sinn", IV (1934), 100–138
Ajdukiewicz, Kasimir, "Das Weltbild und die Begriffsapparatur", IV (1934), 259–287
Aster, Ernst v., (with Th. Vogel), "Kritische Bemerkungen zu Hugo Dinglers Buch *Das Experiment*", II (1931), 1–20
Avenarius, Richard, (und Ernst Mach) Briefe an *Wilhelm Schuppe*, VI (1936), 73–80
Ayer, Alfred Jules, "Concerning the Negation of Empirical Propositions", VI (1936), 260–263
Bachmann, Friedrich (with Rudolf Carnap) "Über Extremalaxiome", VI (1936), 166–188
Baege, Hermann, "Die moderne Tierpsychologie. Ihre Aufgaben, Prinzipien und Forschungsmethoden", VI (1936), 225–251
Behmann, Heinrich, "Sind die mathematischen Urteile analytisch oder synthetisch?", IV (1934), 1–27
Black, Max, "Relations between Logical Positivism and the Cambridge School of Analysis", VIII (1939/40), 24–35
Bon, Fred, "Der Gegenstand der Psychologie", IV (1934), 363–376
Brown, J.F., "A Methodical Consideration of the Problem of Psychometrics", IV (1934), 46–63
Brunswik, Egon "The conceptual focus of some psychological systems", VIII (1939/40), 36–49
Bünning Erwin, "Sind die Organismen mikrophysikalische Systeme?", V (1935), 337–347
Carnap, Rudolf, "Die alte und die neue Logik", I (1930/31), 12–26
Carnap, Rudolf, "Psychologie in physikalischer Sprache", III (1932/33), 107–142
Carnap, Rudolf, "Erwiderung auf die vorstehenden Aufsätze von E. Zilsel und K. Duncker", ibid., 177–188
Carnap, Rudolf, "Über Protokollsätze", ibid., 215–234
Carnap, Rudolf, (with Friedrich Bachmann), "Über Extremalaxiome", VI (1936), 166–188
Chwistek, Leon, "Die nominalistische Grundlegung der Mathematik", III (1932/33), 367–388
Copeland, Arthur H., "Predictions and Probabilities", VI (1936), 189–205
Dingler, Hugo, "Über den Aufbau der experimentellen Physik", II (1931), 21–38
Dohrn, Anton, (Briefwechsel mit Friedrich Albert Lange), "Dokumente über Naturwissenschaft und Philosophie", III (1932/33), 262–300
Dubislav, Walter, "Über den sogenannten Gegenstand der Mathematik", I 81930/31), 27–48
Dubislav, Walter, "Bemerkungen zur Definitionslehre", III (1932/33), 201–203

Jørgensen, Jørgen, "Über die Ziele und Probleme der Logistik" III (1932/33), 73–106
Jørgensen, Jørgen, "Reflexions on logic and language", VIII (1939/40), 218–228
Juhos, Béla, "Kritische Bemerkungen zur Wissenschaftstheorie des Physikalismus", IV (1934), 397–418
Juhos, Béla, "Negationsformen empirischer Sätze", VI (1936), 41–55
Juhos, Béla, "Empirische Sätze und logische Konstanten", VIII (1939/40), 354–360
Kelsen, Hans, "Die Entstehung des Kausalgesetzes aus dem Vergeltungsprinzip", VIII (1939/40), 69–130
Kokoszynska, Marja, "Über den absoluten Wahrheitsbegriff und einige andere semantische Begriffe", VI (1936), 143–165
Kosswig, Curt (with Alfred Heilbronn), "Principia genetica", VIII (1939/40), 229–255
Kraft, Julius, "Das Problem der Geisteswissenschaft", VI (1936), 211–224
Lange, Friedrich Albert (Briefwechsel mit Anton Dohrn), "Dokumente über Naturwissenschaft und Philosophie", III (1932/33), 262–300
Löwy, Heinrich, "Commentar zu Josef Poppers vorstehender Abhandlung", III (1932/33), 324–347
Mach, Ernst (und Richard Avenarius), Briefe an *Wilhelm Schuppe*, VI (1936), 73–80
Malisoff, William Marias, "Meanings in Multi-valued Logics (Toward a General Semantics)", VI (1936), 133–140
Mannoury, Gerrit, "Die signifischen Grundlagen der Mathematik", IV (1934), 288, 317
Morris, Charles, "Esthetics and the Theory of Signs", VIII (1939/40), 131–150
Neurath, Otto, "Protokollsätze", III (1932/33), 204–214
Neurath, Otto, "Radikaler Physikalismus und 'Wirkliche Welt'", IV (1934), 346–362
Neurath, Otto, "Pseudorationalismus der Falsifikation", V (1935), 353–365
Pannekoek, Anton, Das Wesen des Naturgesetzes", III (1932/33), 389–400
Penttilä, Aarni (with Uuno Saarnio), "Einige grundlegende Tatsachen der Worttheorie nebst Bemerkungen über die sogenannten unvollständigen Symbole", IV (1934), 28–139
Popper-Lynkeus, Josef, "Über die Grundbegriffe der Philosophie und die Gewißheit unserer Erkenntnisse", III (1932/33), 301–323
Rand, Rose, "Kotarbinskis Philosophie auf Grund seines seines Hauptwerkes: *Elemente der Erkenntnistheorie, der Logik und der Methodologie der Wissenschaften*", VII (1937/38), 92–120
Reichenbach, Hans, "Die philosophische Bedeutung der modernen Physik", I (1930/31), 49–92
Reichenbach, Hans, "Schlußbemerkung", II (1931), 39–41
Reichenbach, Hans, "Zum Anschaulichkeitsproblem der Geometrie.Erwiderung auf Oskar Becker", ibid., 61–90
Reichenbach, Hans, "Die Kausalbehauptung und die Möglichkeit ihrer empirischen Nachprüfung", III (1932/33), 32–64

2. Proceedings of Conferences and Symposia

Heisenberg, Werner, "Kausalgesetz und Quantenmechanik", II (1931), 172–182
Helmer, Olaf, "Languages with expressions of infinite length", VII (1937/38), 138–141
Hempel, Carl Gustav, "Zur Frage der wissenschaftlichen Weltperspektive", V (1935), 162–164
Hempel, Carl Gustav, "Eine rein topologische Form nichtaristotelischer Logik", VI (1936), 436–442
Hempel, Carl Gustav, "On the logical form of probability-statements", VII (1937/38), 154–168
Hempel, Carl Gustav, "Supplementary remarks on the form of probability-statements, suggested by the discussion", ibid., 360–362
Hermann, Grete, "Zum Vortrag Schlicks", I (1936), 342–343
Hertz, Paul, "Über den Kausalbegriff im Makroskopischen, besonders in der klassischen Physik", I (1930/31), 211–227
Hertz, Paul, "Vom Wesen des Logischen, insbesondere der Bedeutung des modus barbara", II (1931), 369–392
Hertz, Paul,"Regelmäßigkeit, Kausalität und Zeitrichtung", VI (1936), 412–420
Hertz, Paul, "Sprache und Logik", VII (1937/38), 309–324
Heyting, Arend, "Die intuitionistische Grundlegung der Mathematik", II (1931), 106–115
Hoensbroech, Franz Graf, "Beziehungen zwischen Inhalt und Umfang von Begriffen", II (1931), 291–312
Hohenemser, Kurt, "Beitrag zu den Grundlagenproblemen in der Wahrscheinlichkeitsrechnung", II (1931), 354–364
Hollitscher, Walter, "Zu Arne Ness", VII (1937/38), 363
Hosiasson, Janina, "Wahrscheinlichkeit und Schluß aus Teilprämissen", V (1935), 44–45
Hosiasson, Janina, "Wahrscheinlichkeit", ibid., 176
Hosiasson, Janina, "Bemerkungen über die Zurückführung der physischen auf psychische Begriffe", VII (1937/38), 335–340
Hosiasson, Janina, "Diskussionsbemerkungen: 1. Zum Vortrag von C.G. Hempel, ibid., 364; 2. Zum eigenen Vortrag", ibid., 365
Jørgensen, Jørgen, "Einige Hauptpunkte der Entwicklung der formalen Logik seit Boole", V (1935), 131–141
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Advisory Committe: Niels Bohr, Egon Brunswik, J. Clay, John Dewey, Federigo Enriques, Herbert Feigl, Clark L. Hull, Waldemar Kaempffert, Viktor F. Lenzen, Jan Lukasiewicz, William M. Malisoff, Richard von Mises, Gerrit Mannoury, Ernest Nagel, Arne Naess, Hans Reichenbach, Abel Rey, Bertrand Russell, L. Susan Stebbing, Alfred Tarski, Edward C. Tolman, Joseph H. Woodger.

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Chapter 12
The Vienna Circle and Its Periphery: Biographies and Biobibliographies

12.1 The Inner Circle: Biography, Bibliography, Literature

Gustav Bergmann (1906–1987)

Born May 4, 1906, in Vienna. Studied mathematics at the University of Vienna. Ph.D. with a thesis on *Contributions to Metric Differential Geometry* under Walther Meyer in 1928. Completed teaching qualification exams for mathematics and physics at secondary schools in 1929, followed by one year of teaching at a Viennese secondary school (Realschule), during which time he continued his scholarly work. Visited Vienna Circle 1927–1931. In the academic year 1930–31, a grant of the "Notgemeinschaft" of German Science enabled him to live for some time in Berlin,

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_12

where he worked together with Walther Mayer (who collaborated with Albert Einstein from this time on). After Mayer emigrated to the U.S. in 1933, Bergmann returned to Vienna to continue his scholarly and teaching activities, but was prevented from doing so by the rise of anti-Semitism. He was a private tutor from 1932 to 1936. His interest in legal and administrative issues, which had been triggered by the Vienna Circle, prompted him to begin studying law at the University of Vienna, completed in 1936 as Dr. jur. Following a year of internship as court secretary, he became a junior partner (clerk in lawyer's office) in a Viennese law firm where he worked until June 1938. Until this time Bergmann was also a leading member of the so-called "Fleischer-Circle," a discussion group of Viennese scientists, social workers, and legal experts formed around the Kelsen student Dr. Georg Fleischer.

Emigration to the U.S. in 1938. Through Herbert Feigl's mediation he worked at the State University of Iowa (Iowa City) from 1939 on, first as Research Assistant in the Child Welfare Department under Kurt Lewin, under Leola Nelson in 1943. Professor of Philosophy and Psychology at the University of Iowa from 1950. His last position was Carver Distinguished Professorship, Departments of Philosophy and Psychology. Sojourn in Sweden in 1962. President of the American Philosophical Association in 1968.

Gustav Bergmann died April 21, 1987, in Iowa, Massachusetts, U.S.

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Rudolf Carnap (1891–1970)

Born May 18, 1891, in Ronsdorf (in northwest Germany). He attended the humanist Gymnasium in Barmen (today a part of the city of Wuppertal). He studied philosophy, mathematics, and physics in Jena and Freiburg, under Gottlob Frege among others, from 1910 to 1914. Participated actively in the German youth and student movement. War service and physicist in the army in Berlin 1914–17. Dr.phil. with a thesis on *Space* under Bruno Bauch in 1921. Further philosophical studies in Buchenbach near Freiburg im Breisgau, with Hans Reichenbach among others, until 1926. First lectures in the Vienna Circle at Schlick's invitation in 1925. Since then a leading member of the logical empiricist movement. Habilitation at the University of Vienna in 1926 with a study on *The Logical Structure of the World* (published in 1928). Private lecturer on theoretical philosophy at the Institute of Philosophy of the University of Vienna from 1926 to 1930. Associate professor at the same university 1930–31. Carnap was associate professor for natural philosophy at the School of Natural Science at the German University in Prague from 1931 to 1935. He was named full professor (Ordinarius) in 1936 while on leave as visiting professor at Harvard University.

For scientific and political reasons, Carnap emigrated permanently to the U.S. at the end of 1935 through the mediation of Charles Morris and Williard Van Orman Quine. He assumed American citizenship in 1941. He was Professor for Philosophy at the University of Chicago from 1936 to 1952. Visiting professor at the Institute for Advanced Study in Princeton from 1952 to 1954. In 1936, 1940–4, 1954–1961, chair at the University of California, Los Angeles (UCLA) as successor to his deceased friend Hans Reichenbach.

Rudolf Carnap died September 14, 1970, in Santa Monica, CA.

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Born December 14, 1902, in Reichenberg (Liberec, today's Czech Republic). Czechoslovakian citizen in 1918. Studies in mathematics, physics, and philosophy in Munich from 1921. Studied under Moritz Schlick, Hans Hahn, Hans Thirring, and Karl Bühler in Vienna beginning 1922. A co-initiator of the Vienna Circle as Schlick's student since 1924. Ph.D. in philosophy with a thesis on *Chance and Law* in 1927. Attempt at a "*Natural-epistemological Clarification of the Problem of Probability and Induction*." Taught at Vienna adult education institutes from 1927 to 1930. Lectured at the Bauhaus in Dessau. Because of the lack of professional opportunities in the Austrian academic world (mainly for "racial" reasons), he emigrated to the U.S. in 1930 (backed by a Rockefeller Research Fellowship for Harvard University). Married Maria Kaspar in 1931. Permanently emigrated to the U.S. Feigl was lecturer and Assistant Professor at the University of Iowa from 1931 to 1937. Associate Professor there from 1938 to 1940. U.S. citizenship in 1937. Professor of philosophy at the University of Minnesota from 1940. In 1953 he founded the Minnesota Center for the Philosophy of Science, which was influential in analytic philosophy, and also served as its head. Visiting professorships in Berkeley in 1946 and 1953, Columbia University in 1950, University of Hawaii in 1958. Sojourns in Mexico, Australia, and Austria in 1964–65. Visited the Institute of Higher Studies in Vienna and the Forum Alpbach (together with Rudolf Carnap, Karl Popper, Paul Feyerabend). Official positions included President of the American Philosophical Association, Vice-president of the American Association for the Advancement of Science.

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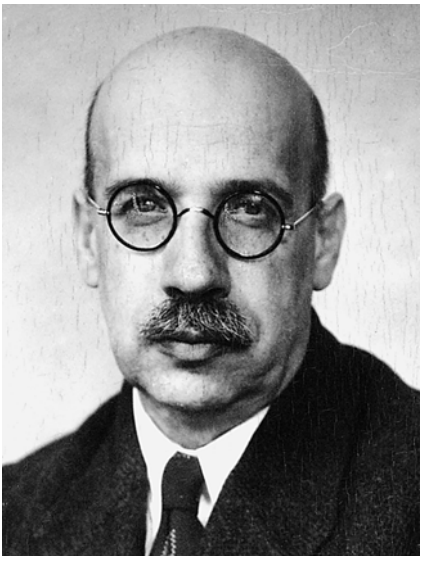

Philipp Frank (1884–1966)

Born on March 20, 1884, in Vienna. Attended the gymnasium. Studied mathematics and physics at the Universities of Vienna and Göttingen under, among others, Ludwig Boltzmann, Felix Klein, and David Hilbert. Dr. phil. in 1906 with a thesis *On the Criteria for the Stability of the Movement of a Material Point and its Relation with the Principle of the Smallest Effect*. Habilitation in physics at the University of Vienna (*The Position of the Principle of Relativity of Mechanics and Electrodynamics*) in 1909. Private lecturer for physics at the University of Vienna 1910–12. Associate professor for theoretical physics as the successor of his friend Albert Einstein at the German University in Prague from 1912 to 1916. Full professor and director of the Institute of Theoretical Physics in Prague 1917–18, until he emigrated to the U.S. Czechoslovakian citizenship in 1918. Married Hania in 1920. Philipp's brother was the well-known architect Josef Frank, and also co-worker of Otto Neurath's Social and Economic Museum in Vienna. In the Viennese years prior to World War I from 1907 on, Philipp Frank was, together with Hans Hahn, Otto Neurath, and Richard von Mises, among the activists of the regular discussion round at the café that can be seen as the proto-circle of the Vienna Circle. In Prague he was the intellectual and organizational focus of the Frank Circle with philosophers, scientists, and writers ("Prague Circle" around Max Brod). After Rudolf Carnap's appointment in 1931, Frank and the former were the central figures of the "Prague branch" of Logical Empiricism. Parallel to these activities, Frank visited his home town regularly to participate in scientific discussions.

Due to his Jewish origins and his political stance, Philipp Frank was forced to escape the threatening conditions in Prague and remained at Harvard University in Cambridge, Massachusetts, after a lecture tour on modern physics at American universities, first as lecturer in physics and mathematics. Frank declined an offer from

the University of Istanbul where his friend and co-worker Richard von Mises had been teaching since 1933 because of a contract he had concluded with an American publisher on a book on physics. Frank worked at Harvard University from 1939 to 1953, first as Hopper Fellow. He was visiting professor at a number of American universities.

The Einstein-biographer worked together with Otto Neurath and Rudolf Carnap on theoretical and practical matters in the Unity of Science movement from 1934 on. After World War II, from 1948 to 1965, he was founder and director of the Institute for the Unity of Science in Harvard—the intellectual forum for the continuation of the Vienna encyclopedia program in exile. In this role, he exerted considerable influence on his colleagues and students (including, Gerald Holton, Robert S. Cohen, and Ernest Nagel, among others). He also participated in the conferences on science, philosophy, and religion for the Harvard Shop on the Science of Science and for the Boston Colloquium for the Philosophy of Science. Frank was also a member of the American academy of Arts and Sciences.

Philipp Frank died on July 21, 1966, in Cambridge, Massachusetts.

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Vienna Circle Foundation Amsterdam/Haarlem (VCF).

Kurt Gödel (1906–1978)

Born April 28, 1906, in Brno in Moravia (Czech Republic). Gödel grew up in Brno, where he attended primary school and the German Realgymnasium. He studied mathematics and physics at the University of Vienna under, among others, Hans Hahn, Philipp Furtwängler, Karl Menger beginning in winter 1924. Accepted to the Vienna Circle at Hans Hahn's suggestion in 1926. Intensive contacts with individual members (Rudolf Carnap, Alfred Tarski) on the foundations of mathematics and symbolic logic, as well as epistemology. Beginning in 1929—in an attempt to distance himself from the "Wittgenstein-group" in the circle—he participated in the Mathematical Colloquium around Karl Menger. Austrian citizenship in 1929. Dr.phil. in mathematics with a dissertation on *The Completeness of the Logic Calculus* under Hans Hahn in 1930. This "completeness theorem" related to the so-called Hilbert program was followed in 1931 by Gödel's revolutionary work on the famous "incompleteness theorem" ("On Completeness and Consistency" and "On Formally Undecidable Sentences of *Principia Mathematica* and on related Systems I"). Gödel submitted the latter work as his Habilitation in 1933—at the age of 27. He became *Privatdozent* in mathematics at the University of Vienna. Gödel's revolutionary works became known almost at the same time in the U.S. through his teacher Karl Menger, so that he was invited in 1933–34 to the Institute for Advanced Study in Princeton by O. Veblen. A second stay followed in fall of 1935, when he also worked with John von Neumann.

Married Adele Nimbursky in 1938. After the "Anschluss" followed a further stay in Princeton and in Notre Dame (U.S.). In spite of the precarious political situation, Gödel returned to Vienna in the spring of 1939. He finally had to apply for an appointment as lecturer with civil servant status in the new order of "Ostmark" (which was granted in 1940!). In the middle of this procedure, Gödel submitted a

new application for a permit to leave the country. At the end of 1939, he emigrated to the U.S. in an adventurous way via the U.S.S.R. and Japan.

There he was full permanent member of the Institute for Advanced Study in Princeton from 1940 to 1953. He was also professor at the same institute from 1953 to 1976. Close contacts to Albert Einstein, Oskar Morgenstern, and John von Neumann. Gödel received U.S. citizenship in 1948 and, subsequently, a number of scientific honors for his life work, e.g., honorary degrees from Yale and Harvard in 1951–52, the Einstein Award in 1951. Gödel was a member of the National Academy of Sciences and the American Philosophical Society, as well as a Member of the Royal Society (UK), honorary member of the London Mathematical Society, corresponding member of the British Academy. He received the U.S. Medal of Science in 1974. In his home country he was awarded an honorary professorship for mathematics at the University of Vienna in 1966, but he did not make use of it. He declined honorary membership to the Academy of Sciences in the same year because of his U.S. citizenship.

Kurt Gödel suffered from serious mental illnesses that kept recurring since his Vienna period. He died January 14, 1978, in Princeton.

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Kurt Gödel Archives, Princeton (USA); Kurt-Gödel-Society, Wien.

Hans Hahn (1879–1934)

Born September 27, 1879, in Vienna. Attended the Gymnasium in Vienna-Döbling. Began studying at the School of Law at the University of Vienna in 1898. One year later he switched to mathematics. Studied at the universities in Strasbourg and Munich 1899–1900. Returned to the University of Vienna where he obtained his Ph.D. in 1902 with a thesis on *The Theory of the Second Variation of Simple Integrals*. Studied in Vienna and Göttingen under Ludwig Boltzmann, David Hilbert, Felix Klein, and Hermann Minkowski, among others. Habilitation and private lecturer (with the study *Observations on Calculus of Variation*) in 1905. Substituted at the University of Innsbruck in the winter semester of 1905–06.

Hans Hahn was a protagonist in the first circle of the logical empiricism movement beginning in 1907 (together with Otto Neurath, who married his sister Olga in 1912, and Philipp Frank). He was appointed associate professor at the University of Czernowitz (Bukovinia, Austro-Hungary) in fall of 1909. He married the mathematician Eleonore (Lilly) Minor in 1910. Took part in the war and was badly wounded. He became associate professor at the University of Bonn in 1916, full professor in 1917. He was given a chair for mathematics in 1921 at the University of Vienna where, as the "actual founder of the Vienna Circle" (Philipp Frank), he was active in organizational matters (e.g., in the appointment of Moritz Schlick) and as a theoretician until his early death in 1934 at the age of 55 following an operation.

From 1921 on Hahn was a corresponding member of the Vienna Academy of Science, honorary member of the Calcutta Mathematical Society, committee member of the German Society of Mathematicians, and numerous times executive member of the Mathematical Society in Vienna in 1931–32. He was active in the Vienna adult education and school reform movement (also as a member of the Vienna School Board.) He received the R. Lieben prize of the Vienna Academy of Science in 1921.

Hans Hahn died July 24, 1934, in Vienna.

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Olga Hahn-Neurath (1882–1937)

Born July 20, 1882. Sister of Hans Hahn. Studied mathematics at the University of Vienna. Studied together with Otto Neurath, with whom she published articles on mathematics. At the age of 22, she became totally blind as a result of ophthalmoneuritis. Completed her dissertation with the help of rotational lectures organized by Otto Neurath. Married Otto Neurath in 1912. Olga Hahn-Neurath regularly attended the seminars of her brother Hans Hahn and, from 1924 on, the meetings of the Schlick Circle. Parallel to this she organized a number of meetings with members of the Vienna Circle at her, and Otto Neurath's, home. After February 1934, she followed Otto Neurath in emigrating to the Hague. In his *Survey of Symbolic Logic*, C. I. Lewis described Olga Hahn-Neurath's early mathematical studies as the "most important contributions to symbolic logic."

Olga Hahn-Neurath died on July 20, 1937, in the Hague.

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Béla Juhos (1901–1971)

Born November 22, 1901 in Vienna into a Hungarian family of low nobility (Hungarian citizenship until 1945). Son of a Hungarian tradesman and entrepreneur (iron wholesale) with subsidiaries in Vienna and Budapest. Attended primary school in Budapest. In 1910 returned to Vienna where he completed Realgymnasium. Studied mathematics, physics and philosophy at the University of Vienna. In 1926: Dr. phil. with a dissertation under Robert Reininger and Moritz Schlick ("To What Extent did Schopenhauer Do Justice to Kantian Ethics?") Participated in Vienna Circle since the founding of the Schlick Circle until its dissolution in 1936. Given his financial independence Juhos could spend World War II years in Vienna as a private scholar, except for the period of his military service 1942–44.

1948 Habilitation thesis (*venia legendi*) under Viktor Kraft. Bacame *Privatdozent* for theoretical philosophy ("Cognition and its Achievements"). In 1955, Juhos was appointed associate professor but did not receive a permanent position at the Philosophy Faculty. This limited his influence in research and teaching.

Béla Juhos died on May 27, 1971 in Vienna.

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Felix Kaufmann (1895–1949)

Born July 4, 1895, in Vienna. Studied law at the University of Vienna. Dr.jiur. Continued his studies at the University of Vienna in 1920. Dr.phil. (dissertation on *Criteria of Law*) in 1926. Felix Kaufmann, who combined interests in mathematics, theory of science, philosophy of law, legal science, and social and natural science, was a private lecturer in legal philosophy at the School of Law and Political Science at the University of Vienna from 1922 to 1938. At the same time he made his living as a business manager (representing the Anglo-Iranian Oil Company). As a mediator between logical positivism, Husserlian phenomenology, and Hans Kelsen's "Pure Theory of Law" Kaufmann regularly attended the meetings of the Vienna Circle. Together with Alfred Schütz he associated with the liberal circles of the Ludwig Mises seminar, the "Geist"-circle around Friedrich A. Hayek, and the Hans Kelsen Circle of the Vienna School of Legal Theory.

Because of his Jewish origins, he was forced to emigrate in 1938 with his family to the U.S. Associate professor in 1938, full professor in 1944, for philosophy at the Graduate Faculty of the New School for Social Research in New York (the "emigrants' university"). Further contact with emigrated members of the Vienna Circle and preoccupation with American pragmatism (John Dewey). Co-editor of the journal *Phenomenology and Philosophical Research*.

Felix Kaufmann died December 23, 1949, in New York.

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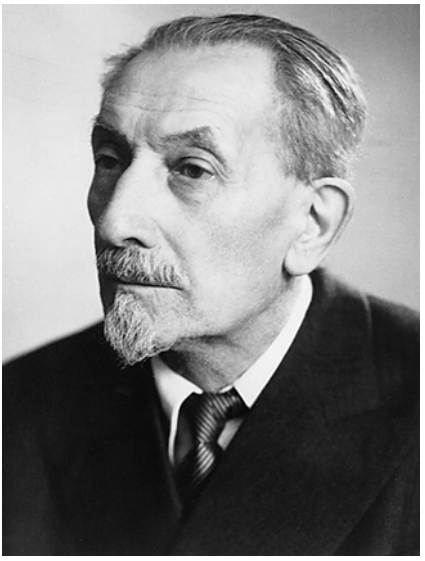

Viktor Kraft (1880–1975)

Born July 4, 1880, in Vienna. Attended the Gymnasium there and studied philosophy, geography, and history at the University of Vienna. His philosophical interests were also stimulated by the events organized by the University of Vienna's Philosophical Society. He also associated with private circles (inter alia, with Oskar Ewald, Otto Weininger, Othmar Spann). He obtained his Ph.D. in 1930 with a dissertation on *Immanence and Idealism*. Continued his studies in Berlin (under Georg Simmel, Wilhelm Dilthey, Carl Stumpf). To make a living he began working at the University of Vienna library in 1912. He became library assistant and civil servant responsible for scientific issues in 1915, one year before he completed his Habilitation (under Adolf Stöhr) for theoretical philosophy with the book *Weltbegriff und Erkenntnisbegriff* (The Concept of World and the Concept of Knowledge). Since then worked as librarian (labor union and education) on the one hand and as philosopher on the other. Since the founding of the Vienna Circle Kraft was a regular guest of the Schlick Circle until its dissolution, and at the same time also member of the Gomperz Circle with contacts to the so-called periphery of the Vienna Circle (e.g., Karl Popper). Viktor Kraft received the title of associate professor for theoretical philosophy in 1924. However, he did not succeed in obtaining further appointments.

After the Anschluss Kraft was forced to retire early from his librarian position because of his wife's Jewish background. He also lost his *venia legendi* as university teacher. He continued his intellectual work under the most difficult conditions as "inner emigrant" during the NS-regime.

He was once again employed by the university library as civil servant responsible for reorganizing it in 1945. He became *Generalstaatsbibliothekar* (national librarian) in 1947 and in the same year he was appointed associate professor for philosophy. Full professor and co-director of the School of Philosophy from 1950 until his

retirement in 1952. Further philosophical activities with publications up until his death. His book *Der Ursprung des Neoposivitismus* (Origins of Neo-Positivism), a first survey and retrospective of Logical Empiricism and its banishment, was published in Vienna in 1950.

Viktor Kraft died on January 3, 1975, in Vienna.

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Karl Menger (1902–1985)

Born on January 13, 1902, in Vienna to the well-known liberal political economist (and teacher of the prince royal Rudolf) Carl Menger. Completed his schooling at the Döbling Gymnasium in Vienna. He studied mathematics at the University of Vienna from 1920 to 1924, principally under Hans Hahn. Studied theoretical physics with Thirring and philosophy with Moritz Schlick. Ph.D. (dissertation on *On the Dimensionality of Point Sets*) in 1924. Rockefeller grant enabled him to work in Amsterdam with L. E. J. Brouwer, whose assistant he was from 1925 to 1927. Also completed his Habilitation (with a study on the *Fundamentals of a Theory of Curves*) in Amsterdam in 1926. Menger returned to Vienna in 1927. After his teaching certification for mathematics had been transferred from Amsterdam to Vienna he became associate professor in 1928, which he remained until he emigrated. In 1929 he was associate professor for geometry. Menger was Visiting Lecturer at Rice Institute and at Harvard in 1930–31, serving as an important mediator of the most recent studies of the Vienna Circle and its periphery to the U.S. After his return from Amsterdam, Menger was a critical and distanced member of the Schlick-Circle (together with his student Kurt Gödel) and also stood out as the founder of and driving force behind the so-called Mathematical Colloquium (1929–1936), whose members included Kurt Gödel, Abraham Wald, John von Neumann, Gustav Bergmann, Alfred Tarski, Hans Thirring, Hans Hahn, Karl Popper, Olga Taussky. They met regularly on Boltzmanngasse at the Mathematical Institute (most contributions were published in *Ergebnisse eines mathematischen Kolloquiums*, 1931–1936).

After Schlick was murdered and he himself was not considered as a candidate for the chair previously held by the deceased Wilhelm Wirtinger (preference was given to someone who was at the time an illegal national socialist), Menger decided to

emigrate in 1936. He was first visiting professor at the University of Notre Dame in Indiana in 1937–38. After the Anschluss he gave up his Vienna professorship (anticipating the Nazis) and was subsequently dismissed as university teacher. An attempt to return to Austria in 1945 failed.

Karl Menger remained at the University of Notre Dame until 1946. He taught at the Illinois Institute of Technology in Chicago from 1946 until his retirement as professor emeritus in 1971. Visiting professorships in 1951 at the Sorbonne in Paris, University of Arizona in 1961, Institute for Higher Studies in Vienna in 1963–64, Technical University in Ankara in 1968.

Karl Menger died on October 5, 1985, in Chicago.

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Personal file Karl Menger, Archives of University of Vienna

Richard von Mises (1883–1953)

Born as Richard Martin Edler von Mises April 19, 1883 in Lemberg (Galicia), which today is L'viv (Ukraine). He came from a Jewish civil servant and engineer family. His brother later became the well-known liberal political economist Ludwig von Mises. The latter founded the "Mises Circle" with August Friedrich von Hayek, Gottfried von Haberler, and Oskar Morgenstern in the inter-war period.

Richard von Mises attended the Academic Gymnasium in Vienna. He later studied machine engineering at the Technical University in Vienna, where he presented his first scholarly work in 1905. Many of his 145 publications (including 14 books) became standard works in mathematics, statistics, aerodynamics, probability theory, and the history of science and philosophy. After he completed his state examination he worked as assistant and constructor at the chair for mechanics at the German Technical University in Brno, Czechoslovakia, under Georg Hamel. He submitted his dissertation (*The Determination of Inertia Mass in Crank Mechanisms*) in 1906. Habilitation in Brno with his book *Theory of Water Wheels* in 1908. Appointed associate professor at the University of Strasbourg, where he remained a member of the faculty in 1909, with interruptions, until the end of World War I. During the war he successfully designed and built the first large airplane, which proved him to be both a theoretician and practician in aerodynamics. Mises was an active member of the first circle of the later Vienna Circle around Hans Hahn, Otto Neurath, and Philipp Frank beginning in 1907. Even though Mises was never again professionally active in Vienna, he returned regularly to visit his family and organized—in addition to visiting the Vienna Circle and individual members of it—his own Mises Circle (including, among others, Frank, Hahn, Neurath, Schlick, and Popper) at Café Central, which he also frequented, as an expert on Rilke, with Adolf Loos and Peter Altenberg. (At the end of his life, Mises had the largest Rilke collection in the world.)

After World War I he lost his academic position and his residence in what was now French Strasbourg. Lecturer in mathematics at the University of Frankfurt in 1918–19, he became full professor for theory of strength and hydrodynamics at the Technical University in Dresden in 1919–20. Full professor at the University of Berlin from 1920 to 1933. At the same time he was director of the institute for applied mathematics, which he had founded. Edited the *Zeitschrift für angewandte Mathematik* (Journal for Applied Mathematics) (1921–33). The Berlin years formed the intellectual acme in Mises' life and work. His house became an intellectual center of the scientific and literary avant-garde. He had contacts with Robert Musil as well as with the Berlin Society for Empirical (Scientific) Philosophy around Hans Reichenbach, Carl Gustav Hempel, Walter Dubislav, Kurt Grelling, and others. The Viennese mathematician Hilda Pollaczek-Geiringer, who had completed her habilitation on mechanics in Vienna, also went to Berlin with Mises. She obtained an associate professorship in 1933 and then emigrated with Mises to Turkey and later to the U.S., where they married.

After the Nazis seized power, Mises was dismissed on the basis of the so-called "law for restoration of professional civil servant status." However, he was able to take advantage of the favorable situation at that time and contribute significantly to developing the Turkish university system—together with some other 140 scientist emigrants from Germany and Austria (including his Berlin colleague Hans Reichenbach). In Istanbul Mises was active until the outbreak of World War II in the Faculty for Mathematics and Natural Science at the Institute for Mathematics and as an advisor for the Turkish government.

Shorting before the outbreak of World War II, he once again fled National Socialism, emigrating to the U.S. First, he worked, incommensurate with his status, at Westergaard College in Harvard. From 1940 to 1943 lecturer at Massachusetts Institute of Technology (MIT), Associate Professor in Harvard. It was only in 1944 that he obtained the Gordon McKay professorship for aerodynamics and applied mathematics, which he held until his death in 1953. During World War II he served as a civilian in the U.S. army. In 1946 he became an American citizen. Visiting professor in Rome in 1951–52. Already during the Weimar Republic Mises was a member of the Prussian Academy of Science and, shortly before his death, he became a corresponding member of the Bavarian Academy of Science and of the Academy of Science in Berlin. Dr.h.c. at the Technical University in Vienna in 1951. Honorary doctorate from the University of Istanbul in 1952. Co-editor of the journal *Advances in Applied Mechanics* from 1948 to 1953.

Richard von Mises died of cancer July 14, 1953, in Boston.

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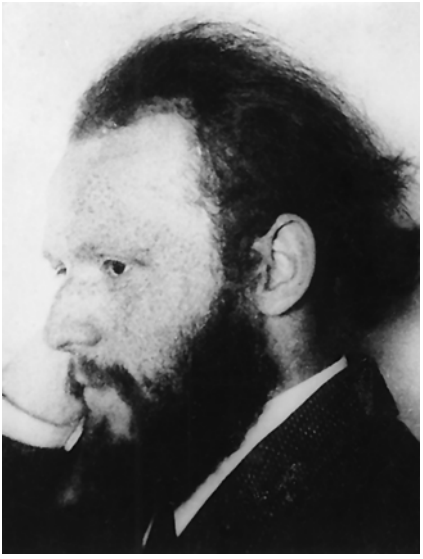

Otto Neurath (1882–1945)

Born December 10, 1882, in Vienna to the social reformer and political economist Wilhelm Neurath. Attended school in Vienna; studied mathematics, political economy, and history at the universities in Vienna and Berlin (at the recommendation of Ferdinand Tönnies). He completed his Ph.D. summa cum laude with the dissertation *Zur Anschauung der Antike über Handel, Gewerbe und Landwirtschaft* in 1906 under Eduard Meyer. This dissertation was later published. At the same time, he submitted a second study *Antike Wirtschaftsgeschichte* (Economic History of Antiquity), published in 1909, as dissertation. He became a member of the Goethe Society for his edition of Faust by Ludwig Hermann Wolfram. In 1906 he completed his military service. From 1907 to 1914 he taught political economy at the Neue Wiener Handelsakademie (New Vienna Trade School). In 1907 Neurath married the social scientist and feminist Anna Schapire (1877–1911), who died from complications related to the birth of their son Paul. In 1912 he married the blind mathematician Olga Hahn, Hans Hahn's sister. They jointly published mathematical articles before World War I. This period also encompassed the early philosophical and scientific activities in the "First Vienna Circle" with Hans Hahn und Philipp Frank, with whom he maintained private and scholarly contacts until the inter-war years. Prior to 1914 he also published sociological studies, inter alia, on the so-called "theory of war economy" and on the economical situation in the Balkans, to which he took a number of study trips with the support of a grant awarded by the Carnegie Foundation for International Peace.

Following the outbreak of World War I, Neurath served on the east front and in Vienna. Appointed director of the German war economy museum in Leipzig. At the same time he worked in the war economy section of the war ministry in Vienna. In this period Neurath developed his theory and practice of graphic representation

of socio-economic relations and his natural science models. He also completed his Habilitation and became private lecturer in political economy at the University of Heidelberg in 1917—a position which, due to his war service and later his involvement in the Munich "Räterepublik," he was never to actively exercise.

In the revolutionary phase of the post-war period Neurath became president of the Central Economic Office in Bavaria, where as "Social engineer" he had futilely tried to carry out his vision of full socialization on the basis of economy in kind in 1919. After the movement was suppressed, Neurath was sentenced to one and a half years imprisonment for "aiding and abetting high treason." After 6 weeks of detention he was able to travel to Austria on Otto Bauer's intervention, but he was no longer permitted to enter Germany (until 1926) and thus also lost his lectureship in Heidelberg.

After his return, Neurath devoted his efforts to social economy and the settlement movement in Viennese communal politics. In 1920 he became secretary general of the organization for settlement and allotment movement. In 1923 he founded the Museum for Settlement and City Planning. From this he finally developed the Social and Economic Museum in Vienna (1925–34), of which he was also director. Here he, together with an interdisciplinary team, developed his "Viennese method of pictorial statistics" as a highly effective tool for adult education. In addition to experts from various fields, he also collaborated with artists and constructivist graphic designers (most notably Gerd Anrtz). As an architect he was able to secure his old friend Josef Frank, and as collaborator Marie Reidermeister, the sister of the mathematician Kurt Rademeister, who taught in Vienna until 1924. He had contacts with the Bauhaus in Dessau. Still in Vienna, Neurath attempted, in view of the emerging fascism, to promote the internationalization of pictorial statistics by founding branches and institutions abroad. After he emigrated in the wake of the events on February 12, 1934, the "Foundation for Visual Education" in the Hague was to become the platform for the further activities of the encyclopedia movement and pictorial paedagogics. There, under the most difficult conditions, he continued his work on the project known as Isotype (International System of Typographic Picture Education). His wife Olga Hahn died in 1937 in Holland from complications after a kidney operation.

At the beginning of the twenties, still during his Vienna years, Neurath resumed his philosophical work from before World War I and was actively involved in the Vienna Circle and further circles in Neurath's private apartment and at the Social and Economic Museum. Important highlights of these activities were his initiation of and collaboration on the manifesto *Wissenschaftliche Weltauffassung: Der Wiener Kreis* (Scientific World View: The Vienna Circle) in 1929, which he wrote with Hans Hahn and Rudolf Carnap, and the founding and organization of the Verein Ernst Mach (1928–34), the organ for the popularization of the Vienna Circle in connection with the Vienna school reform and adult education movement. Neurath was also active as a teacher at Vienna's Workers' University, in the labor union movement, and at diverse adult education institutes, in particular at the Ottakring "Volksheim." Finally, as the main representative of the so-called "left wing" of the Vienna Circle, Neurath was the leading figure for public relations

and—increasingly after 1934—for the internationalization of logical empiricism (1935–1941: six international congresses for the unity of science in Paris, Copenhagen, Cambridge, Harvard, Chicago). In 1937 he founded the Institute for the Unity of Science in the Hague.

In 1940, after German troops invaded the country, Neurath undertook a second adventurous flight to England, where he was interned on the Isle of Man. He subsequently established another Isotype Institute together with Marie Rademeister, whom he married in 1941. From 1941–45 he worked as a lecturer at the University of Oxford. Consultant of the city of Bilston in city renewal project. Edited book series such as *Unity of Science* and *Encyclopedia of Unified Science* from 1938 on.

Otto Neurath died of heart failure on December 22, 1945, in Oxford.

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Rose Rand (1903–1980)

Born June 14, 1903, in Lemberg (today's L'viv, Ukraine). Attended school there, and then at the Polish Gymnasium in Vienna. From 1920 on, secondary schools in Währing-Vienna. Completed secondary school at a Realgymnasium in Vienna's 2nd district in 1924. Studied philosophy at the University of Vienna with, among others, Moritz Schlick. Completed her studies in 1937 with a dissertation on the Polish logician Tadeusz Kotarbinski (*T. Kotabirnski's Philosophy*). Intermittently attended meetings of the Vienna Circle and also kept the minutes, the only remaining documents of the discussions in the Schlick Circle from the years 1930–33. In 1933–34 she lectured at the adult education center in Ottakring (Volksheim), tutored students, and translated logical texts from Polish to German for the Springer publishing house. Parallel to this, conducted research at the Psychiatric Clinic under Otto Pötzl and Heinz Hartmann from 1930 to 1937.

In 1939 she emigrated to England as a Jew without a nationality. Worked there as a nurse, while also trying to resume her philosophical work. Attended lectures, including Ludwig Wittgenstein's, at the Moral Science Faculty in Cambridge. From 1943 on, she performed military service and worked at a factory until 1948. Beginning in 1947, she gave evening courses on psychology and German at Luton Technical College and Tottenham Technical College. Rose Rand finally emigrated to the U.S., where she made a futile attempt to resume her scholarly work begun England (she received support from Otto Neurath, Rudolf Carnap, Viktor Carnap, and other acquaintances from the Vienna years).

Rose Rand died on July 28, 1980, in Princeton, N.J.

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Correspondence Otto Neurath–Rose Rand, Vienna Circle Foundation Haarlem (NL)

Personal file Rose Rand der Society for the Protection of Science and Learning, Bodleian Library, Department of Western Manuscripts in Oxford (UK).

Josef Schächter (1901–1995)

Born September 16, 1901, in Kudrynce, Galicia. Trained as a rabbi, ordained in 1926. and Talmud teacher at the Hebraic school in Vienna from 1922 to 29, and teacher at the Bible Rambam Institute in Vienna from 1935 to 1938. Parallel to this, studied philosophy, primarily with Moritz Schlick. 1931 Dr.phil. with the dissertation *Critical Account of N. Hartmann's 'Grundzüge einer Metaphysik der Erkenntnis*.' As secondary school and university student, attended Vienna Circle from 1925 to 1936 and published book *Prolegomena zu einer kritischen Grammatik* (1935) under the influence of Schlick, Waismann, and Wittgenstein. After Schlick was murdered, Schächter intermittently substituted for Friedrich Waismann in running philosophical seminars.

1938 emigration to Palestine. Teacher at secondary schools in Tel Aviv from 1938 to 1940; in Haifa from 1940 to 1950. School inspector in the Israeli school system in 1951–52. Initiated Yodefat Kibbuz movement. From 1953 on at teachers' seminar in Haifa, instructor for bible and Aggadah. Published numerous textbooks on classical Judaism and on language, meaning, and belief in the context of science and religion. Schächter was a member of the Association of Hebrew Writers in Israel, the Israeli PEN, and winner of the City of Haifa's Ruppin prize.

Josef Schächter died in 1995 in Haifa.

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Moritz Schlick (1882–1936)

Born Friedrich Albert Moritz Schlick on April 14, 1882, the third and youngest son of Protestant parents. His father, who owned a factory, descended from a Bohemian family of noble lineage. Attended primary and secondary school in Berlin. The sickly schoolchild Schlick was already interested in philosophy, art, and poetry at the Luisenstädter Gymnasium. However, he went on to study natural science and mathematics at universities in Heidelberg, Lausanne, and Berlin. In 1904 he completed his Ph.D. under Max Planck, who regarded him as one of his favorite students, with a thesis on *The Reflection of Light in an Inhomogeneous Layer* in mathematical physics. Schlick spent the following three years working on scientific studies in Göttingen, Heidelberg, and Berlin. After his first book, *Lebensweisheit* (Life Wisdom), appeared, Schlick devoted his efforts for two years to studying psychology in Zurich. In 1907 he married Blanche Hardy. After a short sojourn in Berlin, Schlick completed his Habilitation in 1911 at the University of Rostock with a study on *The Essence of Truth according to Modern Logic*. He then worked as a private lecturer. During his ten-years of activities in Rostock, Schlick worked on the reform of traditional philosophy against the backdrop of the revolution in natural science. He became friends with Albert Einstein, whose theory of relativity he was one of the first to study philosophically. During World War I, he served 2 years at a military airport.

In 1917 Schlick received the title of professor in Rostock. In 1921 he was granted the official title of associate professor with a teaching position in ethics and natural philosophy. In the Republican period Schlick backed a university reform as member of the Union of Progressive Academics. In 1918 his major study *Allgemeine Erkenntnislehre* (General Epistemology) was published. In the summer of 1921 Schlick received a call to the University of Kiel as full professor.

In 1922 Schlick was appointed to the chair for natural philosophy (*Philosophy of the Inductive Sciences*) in Vienna as the successor of Boltzmann and Mach. Beginning in 1924, Schlick organized, at the suggestion of his students Herbert Feigl and Friedrich Waismann, a regular discussion circle which first met privately, then in the rear building of the Institute of Mathematics on Boltzmanngasse 5 in Vienna. In the history of philosophy and science, this circle has been called the "Vienna Circle." In addition to extensive research and teaching activities, Schlick was also active in adult education: as a member of the Ethic Society, and, above all (from 1928 to 1934), as chairmen of the Verein Ernst Mach. In spite of numerous interventions, he could not prevent its dissolution after February 12, 1934. From 1926 on, he remained in contact with Ludwig Wittgenstein, who influenced him significantly. In 1929 he refused an attractive call to Bonn (at his students' request), then spent several months as a visiting professor at Stanford in Berkeley, California (1931–32). Intensive international contacts with the natural scientific community in Berlin, Prague, Göttingen, Warsaw, England, and the U.S. with publications and lectures. Together with Philipp Frank, he published a series Schriften zur wissenschaftlichen Weltauffassung (1929 to 1937).

On June 22, 1936, Moritz Schlick was murdered on the steps of the Vienna University by a former student, who acted on private and weltanschauung-political motives. Schlick was at the apogee of his influential life as a scholar. The student was released early by the Nazis and lived as a free citizen in Austria after 1945. This act marked the definitive demise of the "Vienna Circle." Until 1938 there only existed a few circles.

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Personal file Schlick, University archives, University of Vienna

Friedrich Waismann (1896–1959)

Born 1896 in Vienna to an Austrian mother and a Russian father. Completed his schooling in Vienna, where he also studied mathematics (with Hans Hahn among others) and physics at the university. He began studying philosophy in 1922, primarily with Moritz Schlick. He terminated his studies officially in 1936 with a Ph.D. with already published articles ("On the Concept of Identity" and "Logical Analysis of the Concept of Probability"). After World War I, he made his living teaching philosophy and mathematics at Viennese adult education institutes. From 1924 on, Waismann was a scholarly assistant and librarian at the School of Philosophy for his mentor Schlick. Regularly attended and organized the Vienna Circle. After its dissolution in 1936 until he emigrated, Waismann was the central figure of a discussion circle uniting former students of Moritz Schlick. Together with Schlick, he had discussions with Ludwig Wittgenstein from 1926 to 1933. He also kept the minutes of these discussions and, from the beginning, tried to provide an accessible account of Wittgenstein's philosophy (which failed due to the latter's opposition). Shortly before Schlick was murdered, Waismann was dismissed as a librarian, the official reason being economic cutbacks, but probably because of his Jewish descent. Through the mediation of Karl Popper, who had emigrated to New Zealand in 1937, Waismann was able to emigrate to Cambridge (UK), where he worked as a lecturer from 1937 to 1939. However, he never met Ludwig Wittgenstein there, who avoided contact with his former follower. In 1939 Waismann, who suffered from his involuntary exile, became a member of the Oxford Faculty, where he was a reader in philosophy and later in the philosophy of science. In 1955 he became a Fellow of the British Academy but was at the same time increasingly isolated, partly as a consequence of the suicide of his wife and son.

Friedrich Waismann died on November 4, 1959, in Oxford (UK).

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Edgar Zilsel (1891–1944)

Born August 11, 1891, in Vienna to the lawyer Jacob Zilsel. After attending the Viennese Franz-Joseph-Gymnasium from 1902 to 1910, he studied philosophy, mathematics, and physics at the University of Vienna. Ph.D. with a dissertation on *A Philosophical Trial on the Law of Big Numbers and its Relatives* in 1915. His first book, *Das Anwendungsproblem* (The Application Problem) (1916), impressed the young Herbert Feigl and was widely acclaimed in mathematic circles. During his studies he was active in the Academic Association for Literature and Music. Beginning in 1915, he worked as insurance mathematician for a Viennese life insurance company. In 1916, he resumed his university studies to complete the examinations that would qualify him to teach mathematics, physics, and natural science at secondary schools. He began teaching in 1917, before he had taken the necessary examinations in November of 1918.

Married the teacher Dr. Ella Breuer in 1919. His son Paul was born on May 6, 1923. In the academic year 1922–23, the Vienna School board allowed him to take leave from his secondary school teaching to give lectures on philosophy and physics at Vienna adult education institutes. In 1923–24 his attempt to complete his Habilitation with a study on *Contributions to the History of the Notion of Genius* failed due to the reservations harbored by the representatives of traditional philosophy. From the beginning of the First Republic, Zilsel was also active in the Vienna adult education (in particular in connection with the so-called Volksheim) and in Glöckel's school reform movement. Was a regular member of the Vienna Circle from early 1924, while retaining a certain critical distance from the core of the Schlick Circle and with intensive external contacts as, for instance, a participant of

the Heinrich Gomperz Circle, which his teacher organized every Saturday. At the same time he was a member of the Verein Ernst Mach (1928–34). From 1925–26 on, Zilsel was also active at the Teacher's Training Institute of the City of Vienna in training and further education. His exemption from teaching was limited by the Austrofascist school authorities in 1933. In February of 1934, Zilsel was dismissed from the adult education institute as a social democrat and demoted to teaching at secondary schools.

After the Nazis seized power, he was dismissed from teaching and forced to retire for political and "racial" reasons. Emigrated to England with his wife and son and in 1939 to the U.S. There he continued to pursue his studies and projects on the emergence of modern science under extremely dire economic and psychosocial conditions with the help of the Rockefeller Foundation, the Committee for Aid of Displaced Scholars, the Social Research Council, and the American Philosophical Society. Collaborated in the Unity of Science movement centered around Otto Neurath. To make ends meet, Zilsel had to teach at Hunter College of New York's City University and then at Mills College in Oakland.

Isolated and in poor health, Edgar Zilsel committed suicide on March 11, 1944 in Oakland.

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12.2 The Periphery: Biography, Bibliography, Literature

Alfred Jules Ayer (1910–1989)

Born on October 29, 1910, in London. Studied at Eton and Oxford. Bachelor of Arts, Christ Church College, Oxford 1932. Lecturer in philosophy. Ayer studied in Vienna and visited the Vienna Circle in 1932–33. As Research Student of Christ Church in Oxford he wrote his influential book *Language, Truth and Logic* (1936), which popularized the Vienna Circle in England and presented it together with English empiricism. During World War II, he served in the British army. He began teaching at Oxford in 1945. Grote Professor of the Philosophy of Mind and Logic at the University of London from 1946 to 1959. He was Fellow of the New College and Honorary Fellow of Wadham College from 1957 on. Fellow of the British Academy (1952), and received numerous honorary doctorates and international honors. Wykeham Professor of Logic at the University of Oxford from 1959 to 1978. He was knighted in 1970. Ayer put his philosophical orientation into practice serving as president of the British Humanist Association (from 1965).

Sir Alfred Ayer died on July 1, 1989, in London.

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Egon Brunswik (1903–1955)

Born on March 18, 1903, in Budapest. Studied at the Technical University in Vienna. First state examination in 1923. Studied at the University of Vienna. Qualification exam for teaching mathematics and physics at secondary schools in 1926. Dr. phil. in 1927 at the University of Vienna with a dissertation on *Structural Monism and Physics* (published in an extended edition in the festschrift for Karl Bühler in 1929). Karl Bühler's assistant at the Institute of Psychology at the University of Vienna from 1927 to 1931. Taught at the Teachers' Training Institute of the City of Vienna and at Viennese adult education centers. Attended the Vienna Circle. Visiting lecturer in Ankara (Turkey), where he helped establish an institute of psychology and held lectures in 1931–32. *Privatdozent* in psychology at the University of Vienna (*Perception and Object World*) from 1934. Emigrated to the U.S. in 1936 with a Rockefeller Fellowship at the University of California, Berkeley. Married the Viennese psychologist and psychoanalyst Else Frenkel. Member of the Faculty in Berkeley, California, from 1937 to 1955: assistant professor (1937), associate professor (1939), professor (1947.) American citizenship in 1943. After his emigration, he actively participated in the Unity of Science movement as an organizer and author in connection with the *Unified Science* series and the *International Encyclopedia of Unified Science*.

Egon Brunswik committed suicide on July 7, 1955, in Berkeley, California.

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Karl Bühler (1879–1963)

Born on May 27, 1879, in Mekkesheim, Baden (Germany). He studied in Freiburg i. B., Strasbourg, Berlin, Bonn, Würzburg. Dr. med. Univ. Freiburg i. B. in 1903. Dr. phil. (philosophy) at the University of Strasbourg in 1904. Assistant at the University of Berlin in 1906. Assistant at the University of Würzburg from 1906 to 1915. Habilitation in 1907. Rehabilitation in 1909 at the University of Bonn and adjunct professor. Associate professor at the University of Munich from 1912 to 1915. War service as doctor from 1914 to 1918. Full professor of philosophy and pedagogy at the Technical University in Dresden from 1918 to 1922. Full professor of psychology at the University of Vienna from 1922 to 1938. Head of the Institute of Psychology. Briefly detained by the Nazis in 1938. Emigration to Norway in 1939. Emigrated to the U.S. in 1940. Professor at the College of St. Scholastika Duluth, Minnesota, and St. Thomas College St. Paul, Minnesota, from 1940 to 1945. Clinical professor of psychiatry at the University of Southern California, Los Angeles, from 1945 to 1955.

Karl Bühler died on October 24, 1963, in Los Angeles.

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Josef Frank (1885–1967)

Born in 1885, in Baden near Vienna (brother of Philipp Frank). Studied at the Technical University of Vienna. Dissertation in 1910. Private architect. Professor at the Vienna Arts and Crafts School from 1919 to 1925. Worked for the City of Vienna (settlement and mass urban planning) and the Austrian Werkbund, architect of the Social and Economic Museum in Vienna (Otto Neurath) from 1921. Emigration to Sweden, work for Svenskt Tenn. in 1934. New School for Social Research (New York) in 1942–43. Numerous exhibitions and honors.

Josef Frank died in Sweden in 1967.

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Else Frenkel-Brunswik (1908–1958)

Born on August 18, 1908, in Lemberg. Moved with her parents to Vöslau near Vienna, 1919, and to Vienna in 1914. Began university studies, mathematics and physics, in 1926. After two semesters she switched to psychology. Ph.D. in 1930. Charlotte Bühler's assistant in the Department for Biographical Studies at the Vienna Institute of Psychology from 1930. Visited the circle and attended seminars by Karl Bühler and Moritz Schlick. Emigrated to New York in 1938. Married Ego Brunswik in June of 1938. Research Associate at the Institute of Child Welfare at the University of California, Berkeley. Collaborated in the Berkeley Public Opinion Study Group and in the series (Studies in Prejudice) edited by Max Horkheimer and Samuel H. Flowerman from 1943 to 1950.

She worked mainly on the scientific and theoretical foundations of psychoanalysis in the first half of the fifties. She was appointed fellow of the newly founded Center for Advanced Studies in the Behavioral Sciences at Stanford in the academic year 1954–55.

Else Frenkel-Brunswik committed suicide on March 31, 1958, in Berkeley, California.

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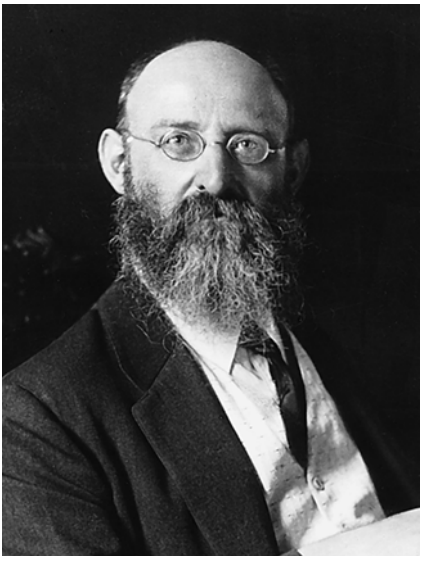

Heinrich Gomperz (1873–1942)

Born on January 18, 1873, in Vienna, the son of the classical philologist Theodor Gomperz. Studied law at the University of Vienna from 1891, after studying for some time in Berlin (church history under A. Harnack). Returned to Vienna. Studied classical philology and philosophy. Completed his doctorate under Ernst Mach (*On the Psychology of Logical Basic Facts*) in 1896. The so-called "Sokratiker-Kreis" (Circle of Socratics), a circle of Gomperz's school and university friends, met from 1891. Habilitation in Berne (*The World as a Structured Phenomenon*); Privatdozent there from 1900 to 1903; Privatdozent in Vienna from 1905 to 1920. Associate professor from 1924 to 1934, full professor of philosophy at the University of Vienna. Since the inception of the Vienna Circle, occasional participant of Schlick Circle. Parallel to this, contacts with Vienna Circle members, mostly in connection with his own discussion group which met regularly on Saturday, the so-called Gomperz Circle (which also included Viktor Kraft, Edgar Zilsel, Rudolf Carnap, Herbert Feigl, Kurt Gödel, Hans Hahn, and Karl Popper). Forced by the state to retire as professor emeritus (dismissed for political reasons because he refused to declare his loyalty for Dollfuß and Schuschnigg) in 1934. Temporary emigration to the U.S. through the help of F. C. S. Schiller in 1935. Visiting professor at the University of Southern California, Los Angeles, until his death. After he emigrated, he resumed contacts with Carnap and Neurath and associated loosely with the Unity of Science movement by participating in the relevant congresses and by publications (e.g., "Interpretation" 1939)

Heinrich Gomperz died on December 27, 1942, in Los Angeles (U.S.).

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Carl Gustav Hempel (1905–1997)

Born on January 8, 1905, in Oranienburg near Berlin. Studied in Göttingen, Heidelberg, Berlin, and Vienna. Participated in the Vienna Circle. Dr.phil. in Berlin in 1934. Emigration to Belgium in 1934; private scholar and author until 1937. Emigration to the U.S. in 1937. University of Chicago (under Rudolf Carnap) from 1937–38. City College and Queens College, New York, from 1939 to 1948. Yale University from 1948 to 1954. Professor of Philosophy at Princeton University from 1955 to 1973. Professor of Philosophy at the University of Pittsburgh from 1977. Numerous visiting professorships.

Carl Gustav Hempel died in 1997.

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Eino Kaila (1890–1958)

Born on August 9, 1890, in Alajärvi (Finnland). Studied philosophy and psychology in Helsinki from 1908 to 1910. Ph.D. (*On Motivation and Decision. An Experimental Psychological Study*) in 1916. Full professor of philosophy at the University of Turku in 1921. Full professor of theoretical philosophy and psychology at the University of Helsinki in 1930. Numerous visits in Vienna since the 1920s, attendance to the Vienna Circle with contacts to Schlick, Carnap, Neurath and others. Member of the Finnish Academy of Sciences from 1948.

Eino Kaila died on July 31, 1958, in Helsinki.

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Charles William Morris (1901–1979)

Born on May 23, 1901, in Denver, Colorado (U.S.). Studied engineering, biology, physiology, psychology, and philosophy at the University of Wisconsin in Madison, at Northwestern University, Evanston, Illinois, and in Chicago under, among others, George Herbert Mead. Bachelor of Science, Chicago, 1922. Ph.D. in 1925 under Mead (*Symbolism and Reality. A Study in the Nature of Mind*). Instructor of philosophy at Rice Institute in Houston, Texas, from 1925 to 1931. Professor at the University of Chicago from 1931 to 1947. At the same time taught at Harvard and New York (New School for Social Research). Since the beginning of the thirties contacts with representatives of Logical Empiricism in Europe and from 1935 (beginning with the first international congress for the Unity of Science in Paris) regular organizational and theoretical collaboration in the Unity of Science movement, in particular with Rudolf Carnap and Otto Neurath, on the *Encyclopedia of Unified Science* project (also as Editor-in-chief). In the context of this encyclopedia, Morris founded modern semiotics by a synthesis of American pragmatism, English empiricism, and Logical Empiricism. Morris was Research Professor at the University of Florida in Gainesville from 1958 to 1971.

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Arne Naess (1912–2009)

Born on January 27, 1912, in Oslo. Completed his philosophy studies with his master's thesis *A Discussion of the Notion of Truth* (1933). Went to study philosophy, psychology, mathematics, and astronomy in Paris and, in 1934–35, in Vienna, where he participated in the late Schlick circle and exchanged ideas with members of the Vienna Circle. As a result of these contacts he published the book *Knowledge and Scientific Behavior* (Ph.D. dissertation, Oslo 1936). Research period in Berkeley under E. C. Tolman and C. Hull. Professor of philosophy in Oslo from 1939 to 1969. Founded the journal *Inquiry*, of which he was intermittently editor, in 1958. Numerous visiting professorships and honorary doctorate from the University of Stockholm. The avid alpinist and extreme mountain climber was an active participant of the peace movement (1940–1955) and, from 1970 on, of the ecology movement. He contributed to the latter as theoretician of an "ecosophy" in theory and practice. Before that he was head of a UNESCO project on the East-west conflict in 1948–49. Sonning prize for contributions to European culture in 1977. He died in 2009 in Oslo.

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Karl Raimund Popper (1902–1994)

Born July 28, 1902, in Vienna. Attended a Realgymnasium until 1918. Left secondary school ahead of time and enrolled as guest student at the University of Vienna. Secondary school diploma as external student in 1922. Before that, training as cabinet maker and social worker for handicapped children under Alfred Adler. Participated in the Vienna Youth and School Reform movement. A member of the German young people's movement, the Jung-Wandervogel, a socialist secondary school pupil, Kinderfreunde (Friends of Children). Attended the Institute for Public School Teachers' Training of the City of Vienna from 1925 to 1927. Lower-level secondary school teacher for mathematics and physics from 1929. Studied philosophy, psychology, mathematics, and physics at the University of Vienna (under Hans Hahn, Karl Bühler, and Moritz Schlick, among others). Dr. phil. with a dissertation *On the Methodology of the Cognitive Psychology* under Karl Bühler in 1928. Since the end of the twenties regular, intense contacts with members of the Vienna Circle mediated by Heinrich Gomperz, but he did participate in the Schlick Circle. At the suggestion of Schlick Popper's main philosophical work *Logic of Scientific Discovery* was published in the series Schriften zur wissenschaftlichen Weltauffassung, edited by Moritz Schlick and Philipp Frank, in 1934. Emigrated to New Zealand in 1937; taught at the University of Canterbury in Christchurch until 1945; finished his two main socio-philosophical works, *Open Society and its Enemies* and *The Poverty of Historicism*. Taught at London School of Economics and Political Science after World War II (from 1946 on). Professor of Logic and Scientific Method at LSE from 1949 until he retired in 1970. Numerous visiting professorships, above all in the U.S. International honors and memberships, inter alia, in the London Royal Society and British Academy. Knighted by the English queen in 1965. An attempt to return to Austria failed in 1986. On the occasion of his

90th birthday in 1992, Karl Popper received the Golden Honorary Medal of the City of Vienna, among other honors.

As professor emeritus, Sir Karl Popper lived in south London, where he died on September 17, 1994.

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Willard Van Orman Quine (1908–2000)

Born on June 25, 1908, in Akron, Ohio (U.S). Studied mathematics and philosophy at Oberlin College and at Harvard University from 1930. Completed doctoral studies under Alfred North Whitehead with a dissertation on *The Logic of Sequences: A Generalization of Principia Mathematica* in 1932. Lived in Europe in 1932–33 and participated in the Vienna Circle and had close contacts with Rudolf Carnap in Prague. Visited Polish logicians in Warsaw. After his return, in 1936, he was Junior Fellow at Harvard. His teaching there was made possible by a Faculty Instructorship. Intense dialogue with the emigrated members of the Vienna Circle in the U.S., in particular with Carnap, from the end of the 1930s. Quine founded the *Journal of Symbolic Logic* in 1936. Three-year service with the U.S. Navy during World War II. Full professor at Harvard from 1948, Edgar-Peirce chair from 1956. Institute for Advanced Study at Princeton in 1956–57. Quine has traveled and researched extensively since the 1920s. Numerous international honors.

Willard Van Orman Quine was one of the best-known, most influential philosophers of the 20th century.

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Frank P. Ramsey (1903–1930)

Born on February 22, 1903, in Cambridge (UK). Studied mathematics at Trinity College (1923). Together with C. K. Ogden, translated Wittgenstein's *Tractatus* into English. Subsequently, first short sojourn in Austria (September 1923 with Wittgenstein in Puchberg). 1924 Fellow of King's College in Cambridge. Spent from March until October 1924 in Vienna. Visited with Wittgenstein and the Vienna Circle. Completed psychoanalysis with Theodor Reik. Contacts with Schlick, who visited him in England in the fall of 1927. Together with Moore and Russell, he helped negotiate a grant for Wittgenstein at Trinity College.

Frank P. Ramsey died on January 18, 1930, in Cambridge.

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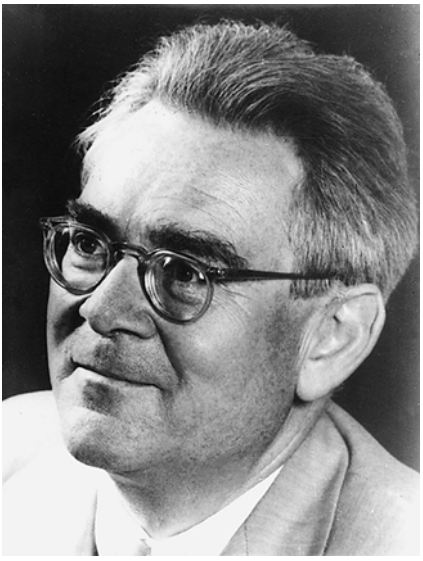

Hans Reichenbach (1891–1953)

Born on September 26, 1891, in Hamburg. Studied civil engineering at the Technical University in Stuttgart and mathematics, philosophy, and physics at the Universities of Berlin, Göttingen, and Munich. Dr.phil. Erlangen in 1925, war service in Russia in 1915–17. Involved in the socialist students' movement from 1918. *Privatdozent* at the Technical University in Stuttgart from 1920 to 1926. Adjunct professor of natural philosophy and physics at the University of Berlin from 1926 to 1933. Editor of the journal *Erkenntnis*, together with Rudolf Carnap, from 1930. Dismissal in 1933 and emigration to Turkey. Professor of philosophy at the University of Istanbul from 1933 to 1938. Emigration to the U.S. in 1938. Professor of Philosophy of Science at the University of California, Los Angeles, from 1938 to 1953. Visiting professorships in New York and Paris.

Hans Reichenbach died on April 9, 1953, in Los Angeles.

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Kurt Reidemeister (1893–1972)

Born on October 13, 1893, in Braunschweig. Studied mathematics and philosophy in Freiburg i.Br. from 1911. War service from 1914 to 1918. Continued his studies in Munich, Marburg, and Göttingen. State examination qualifying him to teach mathematics, physics, and philosophy in 1920. Ph.D. in Hamburg with a study "*On the Relative-Class Number of Certain Relative-Square Number Bodies*" in 1921. Call to Vienna (on the initiative of Hans Hahn) as adjunct professor for geometry in 1922. Read Russell and Wittgenstein together with Hahn and Schlick. Also founding member of the Vienna Circle. Full professor in Königsberg in 1925. Dismissed in 1933; following protest reinstated as full professor in Marburg in 1934 (until 1954). Princeton from 1948 to 1950. Full professor in Göttingen from 1955 to 1961. Member of the Academy of Sciences in Göttingen from 1955. He became a corresponding member of the Austrian Academy of Sciences in 1965. Co-editor of the *Mathematische Annalen* and the *Studium Generale*.

Kurt Reidemeister died in 1972.

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Alfred Tarski (1901–1983)

Born as Alfred Tajtelbaum on January 14, 1901, in Warsaw. Studied mathematics and philosophy at the University of Warsaw from 1918 to 1922. Dr. phil. (under Stanislaw Lesniewski) in 1924. Habilitation at the University of Warsaw in 1925. Lecturer in philosophy of mathematics from 1925 to 1934. Because of his Jewish background Tarski received no full professorship in Poland. After contacts with Karl Menger he visited the Mathematical Colloquium of the Vienna Circle. Lecture trip through the U.S. in 1939. Participation in the Unity of Science movement. Emigration at the outbreak of the war. Professor of mathematics at the University of California at Berkeley from 1942 to 1973. Taught at Harvard, New York, Princeton (Institute for Advanced Study). Numerous visiting professorships and presidencies of scholarly organizations.

Alfred Tarski died on October 27, 1983, in Berkeley, California.

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Olga Taussky-Todd (1906–1995)

Born August 30, 1906, in Olomouc (Olmütz) in Moravia (Czechoslovakia). Studied mathematics in Zurich and Vienna. Dr.phil. with the dissertation *Über eine Verschärfung des Hauptidealsatzes* in 1929. Attended the Vienna Circle on occasion and Karl Menger's Mathematical Colloquium regularly. Assistant of Richard Courant at the University of Göttingen's School of Mathematics in 1931–32. Collaborated in the Hilbert edition. 1933 Returned to Vienna in 1933. Worked together with Hans Hahn, Wirtinger, and Karl Menger as assistant and editor. Sojourn in the U.S. (Bryn Mawr College, Pennsylvania) in 1934–35, inter alia with Emmy Noether. Sojourns in Princeton. Fellowship at Luton College in Cambridge, England, from 1934 to 1937. Continued her work on topological algebra. 1937 Emigrated permanently to England in 1937. Obtained M.A. from Girton College, Cambridge, in 1937. Lecturer for mathematics at the University of London from 1940 to 1944. Subsequently, conducted research at the Department of Science and Industrial Research. 1947 Emigrated to the U.S. in 1947. Consulting in Mathematics at the National Bureau of Standards, Washington, D.C., from 1947 to 1957. Worked at the Institute for Advanced Study in Princeton in 1948, Department of Mathematics at the California Institute of Technology from 1957, professor of mathematics at the same university from 1971. Edited four mathematical journals, inter alia, the *Journal of Linear Algebra*. Numerous honors and awards, visiting professorships, and memberships, including the Austrian and Bavarian Academy of Science among others.

Olga Taussky-Todd died on October 7, 1995, in Pasadena (U.S.).

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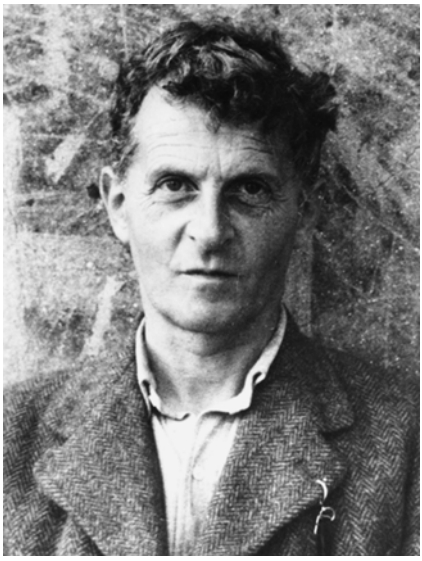

Ludwig Wittgenstein (1889–1951)

Born on April 26, 1889, in Vienna. Attended the Realschule in Linz in 1903. Studied engineering at the Technical University in Berlin-Charlottenburg in 1906. Research student at the University of Manchester in 1908. Cambridge, Trinity College in 1911. Friendship with Russell, Keynes, and G. E. Moore. Sojourn in Norway (Skolden) in 1913–14. War service volunteer in Krakow from 1914 to 1918, then in Lemberg, Galicia, Olmütz, Bukovinia, Italy. Final version of the *Logisch-Philosophische Abhandlung* (*Tractatus logico-philosophicus*) in 1918. Attended the teachers' training institute in 1919. Vacation job as gardener's assistant in 1920. Primary school teacher in Trattenbach from 1920 to 1922. Primary school teacher in Puchberg am Schneeberg and Otterthal (Lower Austria) from 1922 to 1924. From 1924 on, corresponded with the Vienna Circle. Personal contact with this circle (Waismann, Schlick and others) as of 1927. Gave up teaching profession in 1926. Gardener at a convent near Vienna. Construction (together with Paul Engelmann) of the house on Kundmanngasse 19 for his sister Margarethe Stonborough from 1926 to 1928. Returned to Cambridge in 1929. His *Tractatus* was accepted as dissertation. Fellow at Trinity College in Cambridge from 1930 to 1936. Research and teaching job. Regular visits to Vienna. Traveled to Ireland in 1934, to the Soviet Union in 1935, and to Norway in 1937. He took over Moore's chair in 1939. Laboratory assistant at Guys Hospital in London in 1941. Laboratory assistant at the hospital in Newcastle in 1943. Once again professor in Cambridge in 1944. Gave his last lecture in 1947.

Ludwig Wittgenstein died on April 29, 1951, in Cambridge (UK).

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12.3 Moritz Schlick's Doctoral Students, Disciples, and Guests in the Context of the Vienna Circle

12.3.1 Schlick's Doctoral Students

*Albert Bl*umberg (1906–1997)

Studied philosophy (Schlick) and physics (Hans Thirring) at the University of Vienna, 1929–30. Dissertation under the direction of Schlick (second reader: Heinrich Gomperz).
Title: "The Philosophy of Émile Meyerson and Positivism", 1930.

Egon Brunswik (1903–1955)

From 1923 on studied at the University of Vienna.
Dissertation under the direction of Karl Bühler (second reader: Moritz Schlick).
Title: "Structural Monism and Physics", 1927.

Rudolf Ekstein (1912–2005)

Dissertation, begun under the direction of Schlick and completed under Bühler.
Title: "On the Philosophy of Psychology. A Philosophical Study based on Theodor Ziehen's 'The Foundations of Psychology'", 1937.

Herbert Feigl (1902–1988)

Studied with Schlick from 1922 on. Dissertation under the direction of Schlick (second reader: Heinrich Gomperz).
Title: "Chance and Law. Attempt at a Natural Epistemological Clarification of the Problem of Probability and Induction", 1927.

Else Frenkel-Brunswik (1908–1958)

Studied at the University of Vienna, first mathematics and physics, then psychology, 1926–30.
Dissertation under the direction of Karl Bühler (Second reader: Schlick).
Title: "The Law of Association in Psychology", 1930.

Walter Hollitscher (1911–1986)

Studied philosophy, medicine, zoology at the University of Vienna, 1930–34.
Dissertation under the direction of Schlick (second reader: Robert Reininger).
Title: "On the Grounds and Causes of the Controversy on Causality in the Present", 1934.

Bela Juhos (1901–1971)

Studied philosophy, mathematics and physics, 1920–26.
Dissertation under the direction of Robert Reininger (second reader: Moritz Schlick).
Title: "To what Extend did Schopenhauer do Justice to Kantian Ethics?", 1926.

Hans Lindemann (1882– ?)

Studied at the University of Vienna (philosophy, psychology, art history), 1929–32.
Dissertation under the direction of Schlick (second reader: Robert Reininger).
Title: "Epistemological Clarification of Behaviorism", 1932.

Arne Naess (1912–2009)

Studied at the University of Vienna and took part in discussions of the Vienna Circle, 1934–1935. As a result of his involvement in the Vienna Circle: dissertation and publication of
Knowledge and Scientific Behavior, Oslo 1936.

Marcel Natkin (1904–1963)

Studied philosophy at the University of Vienna 1926–1928.
Dissertation under the direction of Moritz Schlick (second reader: Heinrich Gomperz).
Title: "Simplicity, Causality and Induction", 1928.

Heinrich Neider (1907–1990)

1926–1930 studied philosophy and philology at the University of Vienna.
Dissertation under the direction of Moritz Schlick (second reader: Robert Reininger).
Title: "The Relevance of Understanding for the Method of the so-called 'Geisteswissenschaften' (Humanities)", 1930.

Karl Popper (1902–1994)

Studied philosophy, psychology, mathematics and physics at the University of Vienna, 1925–1927. Dissertation under the direction of Karl Bühler (second reader: Moritz Schlick).
Title: "On the Method of the Psychology of Thinking", 1928.

Rose Rand (1903–1980)

From 1924 studied philosophy at the University of Vienna.
Dissertation begun under the direction of Schlick, continued after his death under Robert Reininger.
Title: "T. Kotarbinski's Philosophy", 1937.

Josef Rauscher (1895– ?)

Studied law, political economics, and philosophy at the University of Vienna. 1924 Dr. iur. Attended lectures and seminars given by Schlick. Published some of Schlick's writings from his papers: *Basic Features of Natural Philosophy*, together with W. Hollitscher (1948); *Nature and Culture* (1952); *Questions on World View and Philosophy*, together with J. Zehetner (1958).

Josef Schächter (1901–1995)

Since 1925 studied at the University of Vienna (philosophy, geography, ethnology, history.)

Dissertation under the direction of Schlick (second reader: Robert Reininger).
Title: "Critical Account of Nikolai Hartmann's *Metaphysics of Knowledge*", 1931.

Käthe Steinhardt (1894–19??)

Studied at the University of Vienna with a major in philosophy and biology, 1932–1935.
Dissertation under the direction of Schlick (second reader: Robert Reininger).
Title: "On the Logical Analysis of the Doctrines of American Neo-realism", 1935.

Tscha Hung (= Hong Qian) (1908–1992)

Studied five semesters (with interruptions) at the University of Vienna, also with Schlick, Kraft, Waismann, 1931–1934. Dissertation under the direction of Schlick (second reader: Robert Reininger).
Title: "The Causal Problem in Today's Physics", 1934.

Friedrich Waismann (1896–1959)

Studied with Schlick from 1922. Dissertation begun with Schlick, submitted to Robert Reininger (second reader: Richard Meister).
Title: "Logical Analysis of the Concept of Probability", 1936. The dissertation consists of two articles that were first published in the journal *Erkenntnis* ("Logical Analysis of the Concept of Probability", 1930, vol. 1; "On the Concept of Identity", 1936, vol. 6)

12.3.2 Moritz Schlick's Guests and Associates at the Vienna Circle

Alfred Jules Ayer (1910–1989)

Studied in Vienna and visited the Vienna Circle, 1932–33.

Gustav Bergmann (1906–1987)

Studied mathematics at the University of Vienna. Member of the Schlick Circle.
Dissertation under Walther Mayer. Title: "Contributions to Metric Differential Geometry", 1928.

Ludovico Geymonat (1908–1991)

Spent time in Vienna and studied with Moritz Schlick, 1934.
The results of his stay appeared in: La nuova filosofia della natura in Germani (1934) and *Nuovi indirizzi della filosofia austriaca* (1935).

Kurt Gödel (1906–1978)

Studied mathematics and physics at the University of Vienna, 1924–30. Took part in the Vienna Circle.

Carl G. Hempel (1905–1998)

Studied philosophy at the University of Vienna, 1929/30. Took part in the Vienna Circle, also contact with Rudolf Carnap.

Karl Menger (1902–1985)

Studied mathematics at the University of Vienna, as well as philosophy (with Schlick) and physics (with Hans Thirring), 1920–24.

W.V.O. Quine (1908–2000)

Spent time in Vienna and Prague, 1932–33. Visited Vienna Circle, contact with Rudolf Carnap. Attended Schlick's lectures.

Delfim Santos (1907–1966)

Studied in Vienna with a scholarship from the Portuguese Cultural Institute 1935/36. Studies philosophy as a visiting student with Schlick and Reininger. Completed the research he undertook in Berlin with the book *Situacio Valorativa do Positivismo* (Berlin 1938).

Chapter 13
Documentation: The Murder of Moritz Schlick

13.1 Editorial Remarks

The following documentation of the murder case of Moritz Schlick presents a deliberately source-oriented selection of unpublished and archival materials to illustrate the causes, course, and consequences of this tragic incident, which was to be so fateful for Austrian science.

As the primary sources "speak for themselves" we have refrained from any interpretative descriptions of this dramatic event, because we did not want to create yet another crime story around the "Nelböck case," a case that has already inspired quite a number of journalistic and literary myths in the past. Still, we wanted to confront and compare these sources with existing material on the subject. Previous articles include the following:

Cless-Bernert, Traude, »Der Mord an Moritz Schlick. Augenzeugenbericht und Versuch eines Portraits aus der Sicht einer damaligen Studentin«, in: *Zeitgeschichte*, April 1982, Heft 7, S. 229–234.

-, »Der Philosoph und sein Mörder. Bericht einer Augenzeugin«, in: *morgen* 22/1982, S. 83–85.

Gadol, Eugene T., "Philosophy, Ideology, Common Sense and Murder The Vienna of the Vienna Circle Past and Present", in: ders. (Hg.), *Rationality and Science. A Memorial Volume for Moritz Schlick*, Wien-New York 1982, S. 1–35.

Holmes, Deborah/Silverman, Lisa (Eds.), *Interwar Vienna: Culture between Tradition and Modernity*. Rochester and Woodbridge: Camden House 2009.

Grieser, Dietmar, »Eine verhängnisvolle Affäre. Johann Nelböck und Sylvia Borowicka«, in: ders., *Eine Liebe in Wien*, St.Pölten-Wien 1989, S. 170–177.

Lotz, Renate, "Mord verjährt nicht: Psychogramm eines politischen Mordes", in: Friedrich Stadler und Hans Jürgen Wendel (Hrsg.), *Stationen. Dem Philosophen und Physiker Moritz Schlick zum 125. Geburtstag*. Wien 2009, S. 81–106.

F. Stadler, *The Vienna Circle*, Vienna Circle Institute Library 4,
DOI 10.1007/978-3-319-16561-5_13

-, »Zur Biografie Leo Gabriels«, in: *Zeitgeschichte* 6/31, 2004, S. 370–391.
Mahr, Peter (Hrsg.), *Erinnerung an Moritz Schlick. Textbeiträge und Ausstellungskatalog*. Wien 1996.
Malina, Peter, »Tatort: Philosophenstiege. Zur Ermordung von Moritz Schlick am 22. Juni 1936«, in: Michael Benedikt und Rudolf Burger (Hg.), *Bewußtsein, Sprache und die Kunst. Metamorphosen der Wahrheit*, Wien 1988, S. 231–253.
Matejka, Viktor, »Die Philosophie der Untat«, in: ders., *Das Buch Nr. 3*, hg. von Peter Huemer, mit einem Vorwort von Johannes Mario Simmel, Wien 1993, S. 44–58.
Siegert, Michael, »Mit der Browning philosophiert«, »Die Gelbe Liste«, »Das Ganze und das Nichts«, in: *Forum*, Juli/August 1981, S. 18–26.
-, »Der Mord an Professor Moritz Schlick«, in: Leopold Spira (Hg.), *Attentate, die Österreich erschütterten*. Mit einem Vorwort von Friedrich Heer, Wien 1981, S. 123–131.
Silverman, Lisa, "Reconsidering the Margins. Jewishness as an analytical framework", in: *Journal of Modern Jewish Studies*, Vol.8, No. 1, March 2009, pp. 103–120.
Spiel, Hilde, »Zentrum im Wiener Kreis. Gedenkblatt für Moritz Schlick«, in: dies., *Die Dämonie der Gemütlichkeit. Glossen zur Zeit und andere Prosa*, München 1991, S. 273–276.
-, »Wissenschaft, Philosophie und Intolreanz. Ein Gespräch mit Prof. Gernot Heiss über die Moritz-Schlick-Inschrift an der Universität Wien«, in: *Gedenkdienst,* Nr. 3/11, S. 3–4.

In his profound, source-oriented historical reconstruction of the case in its cultural context, Malina arrives at the following conclusion:

> In the final analysis Johann Nelböck's individual act only highlighted a general development which had already begun to emerge some time before. For years Schlick and his colleagues had been the target of boycott propaganda and anti-Semitic hate campaigns from national-socialist and conservative-catholic forces who categorically rejected any liberal, open approach to science. Nelböck's act was not a political crime in the narrow sense of the word, but the political atmosphere of the 'corporative state' certainly encouraged its perpetration. The reactions in the press as well as in some scientific circles show that there was a certain readiness to find 'positive aspects' in this event. The murder of Moritz Schlick offered a very welcome opportunity for the corporative state's 'new' spirit of philosophy to establish itself at the universities, too. (1988, p. 248)

If we read the transcripts of this case file in conjunction with newspaper articles on the subject, then the "Nelböck case" is largely de-mystified and becomes a symptom of the depressing intellectual climate on the eve of the National Socialist seizure of power in Austria. The murderer's subsequent life up to and into the Second Republic is another individual symptom of Austria's so-called "coping with the past" after World War II.

The documentation reprinted chronologically within this section is based on sources obtained from the following institutions, which we would like to thank for granting permission to use and print their documents:

Case file Nelböck (partially reconstructed). Provincial Court of Vienna. Federal Ministry of Justice.

Personal file Schlick. University of Vienna archives.

Estate of Moritz Schlick. Vienna Circle Foundation/Wiener Kreis-Archiv Haarlem (NL).

Archives of the Republic of Austria (General Administrative Archives). Ministry of Education files.

13.2 Documents Concerning the Murder of Moritz Schlick - The Prehistory, the Murder Trial, and the Consequences

Document 1

Psychiatric and Mental Clinic
Vienna, IX., Lazarettgasse 14.
Vienna, October 21, 1931

To the

Office of the Honorable Rector of the University of Vienna

Concerning your letter of October 12, 1921, file no. 339/973, we are able to provide you with the following information:
Miss Sylvia Borowicka is a nervous girl of slightly eccentric character without any process psychosis (without any progressive mental disorder). At the time of her admission she was under the induction of a schizoid psychopath.

Psychological treatment and her stay in the clinic have greatly improved her sense of judgment so that we would warmly recommend giving her the chance to finish her studies in Vienna.

Dr. Johann *Nelböck* was referred from the psychiatric clinic to the mental institution "Am Steinhof" on June 27, 1931, with the diagnosis of "schizoid psychopathy." He received treatment for several weeks and was then discharged to be looked after at home. To the clinic's knowledge *Dr. Nelböck* is currently in an ordered and emotionally balanced condition. If more detailed information is required we would recommend an ambulatory examination of his state of mind at the clinic.

Yours sincerely,
Prof. Dr. Otto Pötzl
October 22, 1931

Document 2

File no. 873 of 1930/31
Vienna, November 7, 1931
K./Gg.

To
The Honorable Dean of the School of Philosophy,
Univ. Prof. Dr. Ernst *Späth*

Enclosed please find the rectorate's file no. 873 of 1930/31 and the file U 1731/31 of the Local Court of Hietzing concerning Miss Sylvia *Borowicka*, student at the School of Philosophy, and Dr. Johannes *Nelböck*, candidate for a teaching post.

According to a report to the police station in the 1st district of Vienna made by Prof. Dr. Moritz Schlick in June this year, the student Borowicka had informed him about a plan to shoot him. Detailed investigations of the police and court authorities led to the dismissal of the case against both defendants, who were referred to the psychiatric ward of the General Hospital, however, on suspicion of suffering from mental disorder.

In a letter to the rector's office (att. I.II) the head of the psychiatric clinic, Prof. Dr. Otto Poetzl, has now commented on the mental state of both persons concerned, adding that the clinic would warmly recommend that Sylvia Borowicka be given the chance to finish her studies in Vienna.

I would kindly ask you to state your School's view on the questions arising in connection with this matter (initiation of disciplinary proceedings, permission to continue their respective studies and probably to obtain graduation etc.).

Dr. Johannes Nelböck is registered here neither as a student nor as a candidate for a teaching post.

The Rector

Enclosures:
Rectorate's file no. 783 of 1930/31,
court file U 1731/31,

To be kindly returned

Document 3

The Case of Professor Schlick in Vienna -
A Reminder to Search Our Conscience
By Prof. Dr. Austriacus

On June 22 Moritz Schlick, professor of philosophy at the University of Vienna, was shot down by his former student Dr. Hans Nelböck on the stairs of the university. This event, unprecedented in the university's history, has caused enormous sensation, of course, in academic circles, in the Vienna press and throughout society at large. The newspapers featured pages and pages of in-depth accounts of the event and reports about the killer. Schlick, the scholar of world renown, had become the pitiable victim of a psychopath, they said. But everything that has been written about this case so far has failed to address the true facts and motives behind this terrible case. It is necessary, therefore, to place the entire discussion of the affair onto a more fundamental level, namely onto that level where the great struggle between Nelböck and Schlick actually took place. This level is a struggle of world-views and ideologies which had been going on for years in the depth of young and lonely Dr. Nelböck's soul under the influence of Prof. Schlick. And what lends this shot on the University of Vienna's Grand Stairway an almost uncanny character is the fact that 33-year-old Dr. Nelböck cannot be regarded as a born psychopath, but that he only turned into one, according to certain signs, under the influence of the radically destructive philosophy which Prof. Schlick had been teaching at the university since 1922; that is to say this bullet was not guided by the logic of some lunatic looking for a victim, but rather by the logic of a soul deprived of its meaning of life, and that, therefore, this case is not a singular, "psychopathic" one, but "only" a symptom, "one" catastrophic expression of misery and despair brought upon young students by a certain academic philosophy. I know several cases myself where young students have lost all faith in God, the world and humanity under the influence of Schlick's philosophy. Schlick often told his students: "Someone who worries about *weltanschauung* today should seek psychiatric treatment." And how horribly these words have now come true for him! This bold negator of God and soul also told his students: "If someone hears the word 'immortality' in 200 years' time, he will have to look it up in an encyclopedia to find out what it actually means." How terribly the soul, negated in so many lectures, has now taken revenge and manifested itself as a reality to the one who denied its existence!

We do not need to emphasize that we utterly condemn this heinous murder and that we also regret the tragic end of Prof. Schlick, who was a very charming person, from the bottom of our soul. But we must not be criticized, either, if we try to go beyond the fateful consequences of this crime and trace it back to its probable, pernicious causes in order to eliminate them, through an honest discussion with all those who are well-meaning, so that we will not be confronted with other regrettable consequences in the future.

The shot at the University of Vienna has torn apart a veil which was concealing certain "impossibilities" at the Vienna School of Philosophy to outside observers

and to those without any specific interest in questions of *weltanschauung*. Schlick had been holding the only Chair of Systematic Philosophy and weltanschauung since 1922. Yet Schlick was not a philosopher by training, but only a physicist. And he never intended to be anything more than a physicist even as the holder of the chair of philosophy, i.e., he always called it his profession to dissolve philosophy entirely and to present anything that could be grasped scientifically as a purely physical process. Thus, he considered psychology, ethics, and man as such to be nothing more than objects of physics. This attitude is referred to as Panphysicalism. Schlick ultimately owed his call to Vienna to his materialistic way of thinking, for the materialism of the last century promoted the idea that philosophy, and metaphysics in particular, was not a science, but that only the natural sciences were exact. Thus it became an established practice to always give "one" chair of philosophy to a physicist. This is why the physicist Ernst Mach was appointed to the Chair of Philosophy at the University of Vienna in 1895, and it was to this chair that Schlick was called – in succession of Boltzmann and Höfler – from Kiel in 1922. Soon all elements hostile to metaphysics gathered around him, particularly all the Jews and freemasons. Under his leadership the "Vienna Circle" was formed, a very active group which is regarded abroad as representing Austrian philosophy – much to the disadvantage of Austria's reputation as a Christian state. Schlick referred to his philosophy as Neopositivism or Logistics, and he wanted to distinguish his doctrine from the older Positivism as represented by Mach; these differences, however, are mostly of internal relevance. In its overall views the older and newer Positivism of Locke, Hume, Avenarius, Mach, and Schlick is always the same – it is the radical denial of anything metaphysical. A close associate of Schlick, Professor Frank from Prague, therefore commented quite frankly, two years ago, that the "anti-metaphysical movement" in Europe was represented mainly by Schlick; the Vienna Circle was the "combat patrol of anti-metaphysical studies." Indeed, Schlick was not content with presenting his radically negative doctrines only to the academic youth, but in 1929 he also founded the Mach Society with the help of the freemasons in order to propagate his theories among the wider public of Vienna. Schlick himself acted as the society's chairman; the board comprised well-known leading freemasons as well as Otto Neurath, communist minister in Munich during the soviet period and a close friend and collaborator of Schlick. This society publicized its anti-religious and anti-metaphysical theories through regular lectures as well as specific pamphlets. Its manifesto, published in 1929, declared very earnestly: "In science there are no depths; there is surface everywhere. Everything is accessible to man; and man is the measure of all things. Here is an affinity with the Sophists, not with the Platonists; with the Epicureans, not with the Pythagoreans: with all those who stand for earthly being and the here and now. The scientific world-conception knows no unsolvable riddle." After the failure of the social-democratic revolt of February 1934 the Mach Society was dissolved like the other social-democratic associations. The leader of the Mach Society, Professor Schlick, however, was still allowed, with his honor intact, to go on presenting the same doctrines which had been banned for having a destructive effect on the nation and on culture to the academic youth. Soon after the "Patriotic Front" had been established Professor Schlick joined it in order to protect

himself against his probable dismissal. The Mach Society's manifesto, which rages against all religion and metaphysics, was being distributed to the masses even recently at a heavily reduced price, 80 groschen instead of 2 schillings.

Schlick's main doctrine in his lectures and all his writings was always that all metaphysics was "meaningless". Not that it was dubious or not exact from a scientific point of view, maybe – no, his unshakable conviction was that all statements concerning metaphysics lacked any meaning. Since they did not correspond to any objects, it was utterly "meaningless" to even ask about them. For Schlick a statement was only "meaningful" if it was "verifiable on the basis of what can be perceived by the senses". This logistically embellished materialism was Schlick's basic doctrine. He used to describe all metaphysicians only as "fantasts", "mystics" or – with particular zest – as "philosophical writers" or "actors who only put on a show until they realize that their audience has stolen away and they are speaking to empty seats". Consequently, Schlick radically denied the existence of God, of the human soul, of the fellow-man and of the homogeneousness of the world. He even rejected the distinction between the external and the internal world as a "metaphysical" and, therefore, "meaningless" question. According to Schlick one cannot make a statement about a fellow-man because one cannot perceive what is going on inside him with one's own senses; therefore, the fellow-man is like some kind of projection onto a cinema screen or a railway light signal, the color of which indicates a certain meaning. Schlick's "scientific world conception" did not regard man as a rational being with a body and a soul, but as a "lump of flesh with a specific potential", a "cluster of cells" or "a something draped with clothes". Naturally, Schlick also denied all objective and God-given moral laws. In the sphere of morality, too, everything was exclusively determined by cause: ethics, after all, was only a part of physics to him. Moral laws or values? – Yes, Schlick replied, if we "can taste and sense it, like the humps of a camel", then I believe in them, but otherwise I won't! But, even if there were such moral laws and values: "What have we got to do with it?" he once frivolously exclaimed at another occasion.

Schlick had been publishing a journal called "Erkenntnis" (Knowledge) for some years. In the first issue he wrote a programmatic introduction entitled "The Change in Philosophy", explicating that the great "change in philosophy" had been initiated by him, specifically through his discovery that all metaphysicians since Pythagoras and Plato and Aristotle and right up the present time had been asking totally "meaningless" questions all their lives without ever noticing it. The young students had to get the impression from Schlick's lectures that all metaphysics was scientifically impossible, which is exactly what Schlick had in mind.

Classical philosophy has always considered it to be its main task to establish a uniform and scientific world-view. But not Schlick! He frankly told the academic youth that it was nothing more than a "triviality". Philosophy was nothing more than a "crosswords puzzle", always searching and forming new combination of words, and its only task was to set up the "rules of the game". It is hardly surprising that such a trivialization of the supreme discipline of the humanities provoked utter indignation

in the young students' souls! Similarly, Schlick also told his students that the meaning of life was nothing more than to enjoy, to be happy and to experience as much pleasure as possible. Sensuous pleasure in an Epicurean sense was, as he always used to add expressly, his central ethical concept. Notions such as "law", "duty", inborn moral knowledge he loathed. How many students were plunged into severe mental anguish by Schlick! Apparently Dr. Nelböck also used to get extremely agitated and confused whenever Schlick presented his nihilistic doctrines and then reminded his followers: "But be careful!"

Just as life-philosophy, Schlick also propagated his purely negativistic and markedly atheistic doctrines in natural philosophy. Thus, he obstinately maintained the basic idea that there was no "difference in principle" between what is dead and what is alive, between inorganic and organic matter. Living matter had "emerged" from dead matter. Schlick, who always used to pride himself on his logic, would obviously rather put up with a "contradictio in adjecto" (and this is what the previously mentioned definition is, in fact) than concede the metaphysical element of the world even the slightest right of existence. Similarly, he founded his polemic against "purpose" in nature, which all philosophers have always regarded as an important indication of the metaphysical element, on a primitive "petitio principii", for he defined purpose as "the imagined final success of our actions", presupposing an imagining consciousness; "before" man and nature, however, there was no such thing (!), so that purpose is "a priori to be banned from nature". Existing purposiveness, and with it life, movement, order etc., is still explained by Schlick through "coincidence" and with the help of materialistic Darwinism; both give "plausible" reasons how an "existing (!) purposiveness can refine itself solely through purely coincidental changes".

After this brief presentation of Schlick's doctrine, which he had been propagating in his capacity as the holder of the only chair of systematic philosophy at the University of Vienna since 1922, it is not hard to understand what must have been going on in the souls of our young students, educated in grammar schools in the spirit of a Christian *weltanschauung*, when they were confronted, from the professor's desk, with the total negation of everything which had been sacred to them so far. Higher psychology has proved that the modern degeneration of nerves is largely caused by a degeneration of weltanschauung. This is even more true at university level, and any academic who does not happen to have the leaning or the money for being an Epicurean and who places even the slightest value on his weltanschauung, will be afflicted by such a degeneration under the influence of these destructive theories.

The Schlick case is a sort of counterpart to the Berliner case at the "Phönix" insurance. Just as the latter case demonstrated the fateful influence of the Jews on economics and politics, the former one has exposed the Jews' dangerous intellectual influence. It is well-known that Schlick, whose research assistants were a Jewish man (Waismann) and two Jewish women, was the idol of Vienna's Jewish circles. And now the Jewish circles of Vienna are constantly celebrating him as the most significant thinker. This we understand very well. For the Jew is the born

anti-metaphysician and loves Logicism, Mathematicism, Formalism and Positivism in philosophy – all of them qualities which Schlick possessed in abundance. Nevertheless we would like to call to mind that we are Christians living in a Christian-German state, and that it is we who will decide which philosophy is good and appropriate. Let the Jews have their Jewish philosophers at their Cultural Institute! But the philosophical chairs at the University of Vienna in Christian-German Austria should be held by Christian philosophers! It has been declared on numerous occasions recently that a peaceful solution of the Jewish question in Austria is also in the interest of the Jews themselves, since a violent solution of that question would be unavoidable otherwise. It is to be hoped that the terrible murder at the University of Vienna will quicken efforts to find a truly satisfactory solution of the Jewish question!

Source: *Schönere Zukunft*. 1936. *Das neue Reich* XI.41 (July 12/August 9): 1 f.

According to Heinrich Neider (letter to Otto Neurath of August 28, 1936, Vienna Circle Foundation, Amsterdam/Haarlem [NL]) "Austriacus" was the pseudonym of Johann Sauter.

Sauter taught philosophy at the University of Vienna's School of Law and Political Science as *Privatdozent* and *extraordinary professor*. On June 4, 1935, he took part in the establishment of the "Deutsche philosophische Gesellschaft in Wien" (German Philosophical Society in Vienna) (*Reichspost* June 4, 1935); he also acted as the head of the anti-Semitic "Deutsche Kunstgemeinschaft" (German Art Community). His close contacts with Othmar Spann and his supporters brought the "catholic-national" Sauter into conflict with the National Socialists after Austria's *anschluss* to the German Reich. Even stressing his vehement support for Nelböck failed to save him from losing his university post. On Nelböck and Sauter in the context of events see above, Chap. 10, and below, document 11; also: Gernot Heiß: "…'Wirkliche Möglichkeiten für eine nationalsozialistische Philosophie'? Die Reorganisation der Philosophie (Psychologie und Pädagogik) in Wien 1938 bis 1940", in: Kurt R. Fischer and Franz M. Wimmer (eds.), *Der geistige Anschluß. Philosophie und Politik an der Universität Wien 1930–1950*, Vienna, WUV-Verlag, 1993, p. 130–169, esp. p. 143 f. and p. 168; also: Oliver Rathkolb, "Die Rechts- und Sozialwissenschaftliche Fakultät der Universität Wien zwischen Antisemitismus, Deutschnationalismus und Nationalsozialismus", in: Gernot Heiß et al. (eds.), *Willfährige Wissenschaft. Die Universität Wien 1938 bis 1945*, Vienna, Verlag für Gesellschaftskritik 1989, p. 197–232.

Document 4

Ing. Albert Schlick, Vienna IV, Prinz Eugenstraße 68.

To
Prof. Dr. Richard *Meister*,
Vienna
Vienna, August 22, 1936

Dear Professor!

I shall gladly follow your suggestion to comment on the attacks which have been directed at my father after his death. Of the various articles which contained such attacks, the first one – and definitely the most aggressive one of all – appeared in an edition of "Schönere Zukunft" from July 12, 1936. As is the case with most articles of this kind the author does not have the courage to answer for his words with his true name, which is quite revealing in itself. He has compiled scientific and semi-scientific catchwords, political remarks, and personal calumnies into an elaborate mixture which cannot fail to have the desired effect on an uninformed reader.

I do not think I need to say much about the article's "scientific" merits. It contains many quotations, all of which are ascribed to my father. I should like to note that I am not too familiar with my father's field. I did have the opportunity, however, to speak about the article in question with several of my father's students and other experts of his philosophy. Some of these remarks were actually made by my father, but they are presented here in such a context as to give the reader a wrong impression; of others I have repeatedly been told that my father could never have said these things; and other quotations were ascribed, without doubt, to third persons. The "Schönere Zukunft" pays a lot of attention to the Mach Society. I am not very well-informed about the Mach Society, but there is some information I can provide on this point. The foundation of the Mach Society was not my father's initiative at all. My father never was the kind of man to found a society or actively take part in such an act. Quite on the contrary, he strongly disliked all such activities. It was only natural that the Mach Society's founders turned to my father to ask him to accept the Society's chair, and as the holder of Ernst Mach's professorial chair he could hardly refuse their proposal. From what my mother has told me I know that it was with some reluctance that he accepted this offer. It was definitely a big mistake of my father that he did not to try to overcome his aversion against all forms of clubs at least so far as to fulfill a chairman's most basic duties. The only use the Society had of its chairman was my father's name. The Society's organization was the responsibility of several politicians, and Neurath, in particular, played an important role. I do not think that my father was ever aware of the dangerous direction the Mach Society was taking; in any case he was much too good-natured, I would even say naive, to take any measures against it. I would like to relate one incident which is characteristic of the whole situation. At the time in question I was working at the Vienna Boy Scouts' Corps, which had its office in the Old Town Hall in Wipplingerstraße. The office of the Union of Freethinkers was right next door on the same floor. It was

approximately eight years ago that I once went to the Boy Scouts' office to take care of some matters, and the secretary there told me that a sign at the entrance to the Freethinkers' office said that the office of the Mach Society was also located at this address. This information was also confirmed to me personally by the Freethinkers' office when I went to ask them myself. I left in an agitated state, and I remember being rather angry with my father when I came home. At first I was astounded to find out that he did not even have the slightest idea (!) that the Mach Society had moved in with the Freethinkers; then he reassured me with the explanation that one of the Mach Society's officials probably also happened to be a member of the Union of Freethinkers. – The fact is that my father was involved in this whole matter by Neurath and the other gentlemen, and the fact is also that a kind of personal union existed between the Mach Society and the Social-Democratic Party. – When the Mach Society was dissolved, for understandable reasons, in the wake of the February uprising, my father initially also thought that this had only happened because "by coincidence" the office was situated in a council house. I think he only really became aware of the true state of affairs when his appeal against the dissolution, which he had to file in his capacity as the Society's chairman, was rejected. – Quite recently my father often spoke of his intention to revive the Mach Society. This intention certainly sprang from his feeling that he had previously failed to live up to his duties as a chairman.

The "Schönere Zukunft" writes that Otto Neurath was a close friend and collaborator of my father. Neurath was not my father's friend (he never ever visited us at home, for example), but rather was in opposition to him. I remember occasional remarks of my father which clearly indicated that he did not think very highly of Neurath.

Furthermore, my father is said to have joined the *Patriotic Front* in order to protect himself against his probable dismissal. This allegation in the "Schönere Zukunft" is as ridiculous as it is perfidious. Firstly, it is absolutely certain that my father joined the *Patriotic Front* because of his political convictions. His immediate personal interests had nothing to do with this decision. – My father did not have to worry about his daily bread, he would have been welcomed with open arms everywhere in the world.

Some clarifications on my father's religion: An article in the "Kleines Volksblatt" once alleged that my father had been religiously unaffiliated. My father was a member of the Protestant Church (Augsburg Confession) all his life, just like all other members of our family. My sister and I were also baptized and confirmed as Protestants.

The "Schönere Zukunft" writes: "Consequently, Schlick radically denied the existence of God, of the human soul, of the fellow-man and of the homogeneousness of the world." Everybody who even remotely knew and understood my father knows that he was an extremely devout man. Many of the short notes he has left behind also bear vivid testimony to this attitude.

My father allegedly had one male and two female Jewish research assistants. As far as I know, Waismann was never a regular research assistant, but only a librarian. We may concede some validity to the statement concerning Waismann, for he actually was a very important figure in my father's seminar. But there is no doubt, in any case, that Waismann was employed by my father not because of his race, but because of his abilities. – As for the two female Jewish assistants, they are sheer fabrication.

I would also like to thank you, on this occasion, for all the help you have given to my mother and thus to all our family.

With kind regards,
Yours sincerely
(Signed: Albert Schlick)

Document 5

Pedagogical Seminar
of the University of
Vienna
I – Liebiggasse 5, I
T.B 46576
Univ. Prof.
Dr. Richard Meister

Vienna, October 27, 1936

To the

Rectorate of the University,

Vienna

Complying with a request by His Magnificence, the Rector, I have the honor to present a report on the matter of file no. 686 concerning attacks by various newspapers against the late Prof. Schlick and to offer a proposal for the Academic Senate's statement to the Federal Ministry of Education.

Immediately after Prof. Schlick's tragic death various newspapers and journals deemed it appropriate to publish attacks against his scientific work, which in some cases were combined with attacks on a personal level. As far as the meritorious aspect of the factual attacks is concerned, I would like to say this: Every newspaper or journal has the right, of course, to express criticism of the work of any public teacher, and they will also be free to base this criticism on ideological differences. Whether it is appropriate to raise such criticism immediately after the tragic end of the one at whom it is directed, is up to the personal tact of authors and publishers; one publisher justified these critical articles as necessary statements to counter some particularly laudatory obituaries. Since such criticism is a matter of personal scientific conviction, there cannot be a public reply from the Senate, which is a corporate body. As concerns the personal opinion of the signed author, the articles in question are not up to the standard of scientific argumentation. The statements cited from individual works are often presented arbitrarily and out of context, and the fundamental attitude of Schlick's ethics is popularized and simplified to such an extent that its central idea, through which it transcends mere hedonism, namely to regard goodness as the central concept of ethics, does not really become evident. There are also some frequent mistakes such as statements from other scholars close to Schlick, e.g. from Carnap (Prague), being ascribed to Schlick himself. And finally, if sufficient care had been given to an analysis of facts, it should not have happened that the "Vienna Circle", a name chosen by a group of scientists around Schlick for their epistemology and natural philosophy, was confused with the philosophy of new Austria – a view, by the way, which was then rightly rejected by the author. I feel obliged to make these comments for the sake of completeness and of an open presentation of my own statement here, even though or probably because from a scientific point of view I represent a different approach to the fundamental questions of both epistemology and ethics.

Even though it is quite unlikely that a counter-statement will be published, as some time has already passed since the event, I still consider it the Senate's duty of piety and of loyalty towards the cruelly murdered colleague to deliver a statement on the personal attacks – all the more so as they contain real mistakes. This could only have been done efficiently, however, in the form of an actual public rectification. At the time of the event the rectorate did not have the necessary documents, and today the matter is already forgotten. Yet I do think that the Senate should at least decide on a statement in its meeting and report this statement to the Federal Ministry. I propose the following wording for this statement:

"In its meeting of November 28, 1936, the Academic Senate of the University of Vienna discussed the matter of various articles which were published in a number of newspapers and journals after the death of Prof. Schlick and which contained not only discussions of his teaching and research activities, but also personal attacks against him. The Academic Senate will not comment on the appraisals of Prof. Schlick's scientific work on the grounds of respect for the free expression of scientific opinion, even though the authors of the articles in question failed to sign with their own names. It does regret, however, that it is Prof. Schlick, who met such a tragic death, who came to be the target of such attacks. It finally declares that these attacks, especially those concerning Prof. Schlick himself and the situation of the University's philosophical chairs, do contain untrue statements of fact. It mentions as examples: 1. It is not true that Prof. Schlick was religiously unaffiliated. He belonged to the Protestant church and regularly paid the respective church rates, as is evident from the counterfoils of the receipts of payment to the Protestant community (Augsburg Confession) from 1924 to 1936. 2. It is not true that the other two philosophical chairs have Jewish research assistants. The assistant at the Institute of Psychology, Dr. Egon Brunswik, is not Jewish, and the second chair of philosophy had a Jewish librarian, but no Jewish assistant.

It also has to be added that Prof. Schlick was not on intimate terms with Dr. Neurath neither personally nor professionally, as the authors of some of these articles have assumed, but with regard to this point they are probably to blame only for a lack of relevant knowledge. The Academic Senate asks the Federal Ministry of Education to accept the above statement."

(Signed: Meister)

Document 6

Draft

File no. 1411/926 of 1935/36

Prof. Meister/T.

Vienna, December 9, 1936.

To the
Federal Ministry of Education

in
Vienna

In its meeting of November 28, 1936, the Academic Senate of the University of Vienna discussed the matter of various articles which were published in a number of newspapers and journals after the death of Prof. SCHLICK and which contained not only discussions of his teaching and research activities, but also personal attacks against him. The Academic Senate will not comment on the appraisals of Prof. SCHLICK'S scientific work on the grounds of respect for the free expression of scientific opinion, even though the authors of the articles in question failed to sign with their own names. It does regret, however, that it is Prof. SCHLICK, who met such a tragic death, who came to be the target of such attacks. It finally declares that these attacks, especially those concerning Prof. SCHLICK himself and the situation of the University's philosophical chairs, do contain untrue statements of fact. It mentions as examples: 1. It is not true that Prof. SCHLICK was religiously unaffiliated. He belonged to the Protestant church and regularly paid the respective church rates, as is evident from the counterfoils of the receipts of payment to the Protestant community (Augsburg Confession) from 1924 to 1936. 2. It is not true that the other two philosophical chairs have Jewish research assistants. The assistant at the Institute of Psychology, Dr. Egon BRUNSWIK, is not Jewish, and the second chair of philosophy had a Jewish librarian, but no Jewish assistant.
It also has to be added that Prof. SCHLICK was not on intimate terms with Dr. NEURATH neither personally nor professionally, as the authors of some of these articles have assumed, but with regard to this point they are probably to blame only for a lack of relevant knowledge. The Academic Senate asks the Federal Ministry of Education to accept the above statement.

The Rector of the University:
Arzt sign. pers.

To
The Honorable Dean of the School of Philosophy,
Univ.-Prof. Dr. Hans *Hirsch*,
for your kind attention.

The Rector:
(Signature)

Document 7

5 St 137/37
Vr 5387/36

Bill of Indictment.

The Department of Public Prosecution of Vienna I. brings against:

Dr. Hans *Nelböck*, born May 15, 1903, in Brandel,
ass. to Lichtenegg, District of Wels, Upper Austria,
rom.cath., sgl., unemployed, currently
in *prison*,

the *Indictment* that:

Dr. Hans *Nelböck*, on June 22, 1936, in Vienna,
1./ committed a malicious act by firing shots from a pistol at Dr. Moritz *Schlick* with the intention of killing him, which brought about the latter's death;
2./ possessed an illegal weapon, namely an automatic pistol, system *Singer*, below the size of 18 cm and [carried it] without authorization and without any apparent necessity to avert an imminent danger.

He thus committed

the crime of murder under sections 134, 135, par. 1, of the Penal Code, and a violation under sections 32, 36 of the Weapons Act and is to be punished therefore under section 136 of the Penal Code in its version of article I of the Federal Act of June 19, 1934, with due consideration of section 35 of the Penal Code.

Motions:

1./ To institute a trial of indictment as a trial by jury before the Provincial Court for Criminal Matters of Vienna I,
2./ To produce the accused, who is to remain in pretrial detention under section 180/2 of the Code of Criminal Procedure,

Dr. Hans *Nelböck,*

who is to appear at the trial of indictment as prisoner at the bar,
3./ To summon the witnesses:

Rudolf *Kreczny*, BZ 203,
Josef *Heinemann*, BZ 203,
Dr. Hans *Ullrich*, BZ 202,
Marie *Finder*, BZ 205,
Adrianne *Sponer*, BZ 206,
Melitta *Possanner*, BZ 207,
Valerie *Hanus*, BZ 207a,
Dr. Richard *Czwiklitzer*, BZ 209,
Ing. Albert *Schlick*, BZ 212,
Friedrich *Waismann*, BZ 118,
Dr. Georg *Fleischer*, BZ 223,

Dr. Leopold *Gabriel*, BZ 119,
Dr. Viktor *Matejka*, BZ 122,
Otto *Rückemann*, BZ 116,

4./ To summon the psychiatrists Reg.Rat *Dimitz*, and Prim. Dr. *Stelzer*,
5./ To read out the following testimonies under article 252, par. 1.4 of the Code of Criminal Procedure:

Johanna *Rendulic*, BZ 208,
Emilie *Fuchs*, BZ 211,
Amalie *Köry*, BZ 214,
Marie *Reitter*, BZ 216,
Franz *Hermann*, BZ 224,
Dr. Sylvia *Borowicka*, BZ 227,
Dr. Johann *Sauter*, BZ 140,
Ing. Hubert *Borowicka*, BZ 114,
Dr. Siegfried *Nowotny*, BZ 117,
Dr. Alfred *Kastil*, BZ 120,
the expert opinion ref. no. 107,

6./ To read out, under section 252, penult. par., of the Code of Criminal Procedure, the charge and police investigations, Onr. 2,3, the criminal record, BZ 80, the findings of the autopsy BZ 97.
7./ To present the weapon used for the act under section 253 of the Code of Criminal Procedure.

Substantiation:

On June 22, 1936, at 09.20 a.m., the accused, Dr. Hans *Nelböck*, shot and killed Dr. Moritz *Schlick*, professor at the School of Philosophy, on the premises of the University of Vienna on the main stairway leading to the School of Philosophy, when Dr. *Schlick* was on the way to his lecture.

According to the findings of the autopsy Dr. Schlick was hit by 4 bullets which were shot from a pistol of the caliber 6.35 mm. Two bullets went through the heart, opening both ventricles; one bullet went through the width of the victim's trunk from the left side to the right, piercing the colon and the stomach and ripping apart the pylorus; the fourth bullet entered the lower leg. The first three injuries were absolutely lethal. Dr. *Schlick* died at the spot where he had fallen even before medical help arrived at the scene of the crime.

The accused, with the smoking pistol still in his hand, did not resist arrest. He has fully confessed to having committed the crime of murder and the violation of the Weapons Act of which he stands accused.

The act has the following prehistory:
In autumn 1925 the accused enrolled at the University of Vienna and attended Prof. Dr. *Schlick's* lecture on philosophy from the first to the last semester. In March of 1931 he took the degree of Doctor of Philosophy. In 1928 he had become acquainted with the student Sylvia *Borowicka* who also attended the lectures of Prof. Dr. *Schlick*. He soon came to feel a deep affection towards her, even though Sylvia *Borowicka* left him in no doubt that she was ready to be a colleague to him, but nothing more. The accused felt even more unhappy when *Borowicka* told him in 1930 that she felt a certain interest for her teacher, Prof. Dr. *Schlick*, and that Prof. *Schlick* appeared to reciprocate this interest. The accused stated that the friendship between Prof. *Schlick* and *Borowicka* lasted until May 1930. Dr. *Schlick's* behavior so outraged him that he told *Borowicka* in 1931 that he was going to shoot Prof. *Schlick* and then commit suicide. *Borowicka* told Prof. *Schlick* about these words, and Prof. *Schlick* then laid a charge of grave threat against the accused. Dr. *Nelböck* was diagnosed with "schizoid psychopathy" and committed to the mental institution "Am Steinhof", where he remained under observation for three months. Having been discharged the accused went to live with his parents in Upper Austria, but returned to Vienna in the late autumn of 1931 in order to study for the examinations for the teaching profession.

When Dr. *Nelböck* met Prof. *Schlick* at the university again, they had a fierce argument. This resulted in a new charge by Prof. *Schlick* against the accused because of the latter's rather peculiar behavior. The accused was once again committed to the psychiatric ward of the General Hospital on June 15, 1932, but was discharged on June 24, 1932. He subsequently earned his living by preparing students for the doctoral exams. He also established contacts with several university professors with whom he worked together on various fields of philosophy. Through the intervention of Prof. Dr. *Gabriel* he was given a teaching assignment, as a replacement, to lecture on philosophy at the adult education center in Brigittenau [Vienna's 20th district]. In late 1934 he presented a lecture entitled "A Critique of Positivism" at the philosophical adult education center in Ottakring [16th district]. He was also supposed to hold a course on philosophy at that center in the summer of 1935. However, this did not happen. According to the accused, this was due to the following reasons:

In early 1935 Prof. *Gabriel* informed him that Prof. *Schlick* had opposed this course. On this occasion Prof. *Gabriel* asked him, the accused, whether he had had a problem with Prof. *Schlick*, to which he gave an evasive answer. Prof. *Gabriel* then informed him that Prof. *Schlick*, in a reply to an inquiry by the secretary-general of the adult education center, Dr. *Czwiklitzer*, had said that he could not recommend the accused. Prof. *Schlick* had not given any reasons for this opinion, but he had recommended his assistant, *Waismann*. Some days later he, the accused, went to the adult education center's chairman, Dr. *Matejka*, who informed him that he was not suited to hold the courses because he was a positivist. He denied this, but Dr. *Matejka* told him there was nothing he could do about it. Prof. Dr. *Gabriel* then

informed him of a letter to the administration of the adult education center, which said that he, the accused, had been interned at the mental institution "Am Steinhof" and that this information would be made public in case of his employment. Dr. *Matejka* did not tell him, Dr. *Gabriel*, who the author of this letter was. Dr. *Gabriel*, however, expressed the opinion that *Waismann*, Prof. *Schlick's* research assistant, had written and sent the letter. It has to be stated here that Prof. *Gabriel* vehemently denies ever having spoken about such a letter with the accused. The other persons in charge of the adult education center's administration do not know of any such letter, either.

It is true, on the contrary, that Dr. *Matejka* heard about the accused's stay in the mental institution "Am Steinhof" from private sources and that he then made official inquiries as to the truthfulness of this information, which was confirmed to him. This was the reason why the accused was not employed at the adult education center in Ottakring. He was informed about the cancellation of these lectures in a letter of January 23, 1935, which said, however, that the only reason for this cancellation were the problems which had surrounded the plan of holding a philosophical course on a positivistic basis from the very beginning.

It has to be stated that Prof. Dr. *Schlick* was never asked for any information about the accused by any official of the adult education center in connection with the accused's employment, and that Dr. *Schlick* never exerted the slightest influence on the employment or non-employment of the accused.

The accused, however, was of the unshakable conviction that it was Dr. *Schlick's* fault that he had not gotten this job. This view was encouraged by the fact that his employment had been rejected on the grounds that he was a positivist, and that it was a positivist who had then been appointed to this post. This, he said, led him into such a state of depression that he planned to shoot Prof. *Schlick* and then commit suicide even in May 1935. For this purpose he bought the pistol, complete with fitting ammunition, which he used for the murder in 1936. He subsequently changed his mind and threw the ammunition into the Danube, but kept the pistol. In early January 1936 he once again fell into a state of depression and got particularly agitated about the cynical way in which Prof. *Schlick* had allegedly treated the issue of immortality in one lecture. He could not get the idea out of his mind that his former stay at the mental institution "Am Steinhof" would always be a handicap for him and that Prof. *Schlick* and his followers were always going to use it against him. Therefore, he decided to put an end to the whole matter. For this reason he bought another ten bullets for the pistol he already had in his possession.

On June 22, 1936, he left his apartment after 8 o'clock in the morning. He knew that Prof. *Schlick* was going to start his lecture at 9 o'clock. On the way from his apartment to the Schottenfelder church he took the decision to shoot Prof. *Schlick* and to commit suicide afterwards. As he did not have the weapon with him, he returned to his apartment where he loaded the pistol with 7 bullets, set the pistol's safety device, put it into the pocket of his jacket and then once again set off for the university.

When he got there, he went to stand on the first steps of the stairway to the School of Law and waited for the arrival of Prof. *Schlick*. It was about a quarter past 9 o'clock when he saw Prof. *Schlick* enter the great hall of the university from the street. Prof. *Schlick* was slowly walking up the stairs to the School of Philosophy, and the accused went after him, then passed him, turned around just in front of him, drew the pistol, released the safety device and fired two or three shots at him from a short distance. He saw Dr. *Schlick* collapse. He was not thinking of his intention to commit suicide anymore.

The witnesses reported that the accused fired the shots from a distance of about 1 or 2 meters pointing at Prof. Dr. *Schlick's* chest. Marie *Finder* said that after the act the accused shouted at his victim, who was lying on the stairs, "Now, you damned bastard, there you have it!"

The accused told the examining magistrate that the matter Sylvia *Borowicka*-Dr. *Schlick* had not played any role in the act. It was not the result of his positive or negative attitude towards a particular world-view, but only and exclusively of the personal conflict he had had with Dr. *Schlick*.

This personal conflict was doubtlessly rooted on the one hand in the *Borowicka-Schlick* affair and on the other hand in the opposing views Prof. *Schlick* and the accused held on the problems of philosophy as well as in the accused's assumption that Prof. *Schlick* was trying to interfere with his career for this reason.

The accused confessed himself that he had planned to kill Prof. *Schlick* because of his relationship with Sylvia *Borowicka* even in 1931. In 1935 this plan came to his mind once again. This was due to the fact that in his opinion it had been Dr. *Schlick* who had not recommended him for the post at the adult education center because of his opposing views on philosophical questions.

The accused, a religiously-minded man by nature, considered the scientific struggle against the Positivism represented by Dr. *Schlick* as well as an opposition against the destructive tendencies of atheistic Positivism an absolutely essential task. On the other hand, as was stated by people with whom he had regular contact, he perceived Prof. *Schlick* as the embodiment of an almost superhuman power against which he felt so utterly helpless that he even devoted a lot of attention to the positivistic way of thinking. Eventually he realized, however, that this positivistic weltanschauung, which is fundamentally negativistic, was opposed to the religious world-view with which he had grown up and which was imbued in his very soul. Thus, Prof. *Schlick* must have appeared to him as an extremely ambivalent person. This idea was haunting the accused and, naturally, it had to lead to hatred against the man who, in his opinion, had hampered his fortune and his career in other ways, too.

Thus, it becomes evident that the act committed by the accused was not a spontaneous idea, but rather the execution of a thoroughly contrived plan, but that its motives are not suited to excuse his act.

The fact that the murder was committed with a weapon of a size smaller than 18 cm, which is easy to conceal and thus enabled the accused to carry out his act suddenly and unexpectedly, substantiates the assumption that the murder was carried out [in] a malicious fashion.

With regard to the accused's committal into the psychiatric clinic in 1931 and 1932, his mental state was also examined. The expert witnesses have presented the unanimous opinion that the accused is neither insane nor was in a state of mental confusion when he committed his act.

Department of Public Prosecution
on April 12, 1937

Dr. Franz Schwartz
(Certified as true copy.
The head of the administrative office.)

Document 8

Copy

20 Vr 5867/36-67
Hv 9/37

In the Name of the Federal Republic of Austria!

The Provincial Court for Criminal Matters of Vienna I, sitting as a jury court,
after the trial of indictment on May 24, 25 and 26, 1937,
under the presidency of Vice-President Edmund Hellmer,
in the presence of L.G.R. Dr. Paul Brik,
L.G.R. Dr. Franz Werner
and of Mr. Nikolaus Benedikt, Mr. Georg Drah and Mr. Robert Leurer as judges, of K.S.A. Kocman as recording clerk, and in the presence of the Public Prosecutor Dr. Siegfried Sturm, the private party representative noe. Dr. Friedmann,
Dr. Emanuel Winternitz,
the defendant Dr. Hans *Nelböck*
and the counsel for the defense, Dr. Arnulph Hammer – OV -
concerning the charges brought against Dr. Hans Nelböck by the Department of Public Prosecution of Vienna I., has rightly found on May 26, 1937 that:

The defendant, Dr. Hans *Nelböck*, is guilty:
of having
1./ acted in such a way by firing shots from a pistol at Dr. Moritz *Schlick* with the intention of killing him that this caused the latter's death;
2./ possessed an illegal weapon, namely an automatic pistol, system *Singer*, below the size of 18 cm and carried it without authorization and without any apparent necessity to avert an imminent danger,
on June 22, 1936.
He thus committed the crime of murder under section 134 of the Penal Code, and a violation under sections 32, 36 of the Weapons Act and is sentenced therefore under section 136 of the Penal Code, second degree of punishment, section 35 of the Penal Code and section 265a/2 of the Code of Criminal Procedure, to penal servitude for

ten (10) years,

aggravated quarterly by a hard bed, and to bear the costs of the criminal proceedings and of the execution of the sentence under section 389 of the Code of Criminal Procedure.
The impounded weapon is forfeited under section 32 of the Weapons Act.
Under section 55a of the Penal Code allowance is made for the time served in custody from June 22, 1936, 9.20 a.m., to May 26, 1937, 12.30 p.m.

Grounds:

Owing to the defendant's confession, which corresponds almost entirely with the evidence taken, the jury court has come to the conclusion that the facts of the case as laid down in the bill of indictment are true and has only excluded the circumstance of perfidy. The facts of the case as determined hereby constitute the crime of murder

under sections 134, 135/4 of the Penal Code and violations of sections 32, 36 of the Weapons Act. In particular, the following has been found with respect to external events and internal motives and intentions:

On June 22, 1936, at 9.20 a.m., the defendant shot and killed Dr. Moritz *Schlick*, professor at the School of Philosophy, on the premises of the University of Vienna on the main stairway leading to the School of Philosophy when Dr. *Schlick* was on the way to his lecture.

According to the findings of the autopsy Dr. Schlick was hit by 4 bullets which were shot from a pistol of the caliber 6.35 mm. Two bullets went through the heart, opening both ventricles; one bullet went through the width of the victim's trunk from the left side to the right, piercing the colon and the stomach and ripping apart the pylorus; the fourth bullet entered the left lower leg. The first three injuries were absolutely lethal, and Dr. *Schlick* did indeed die at the spot where he had fallen even before medical help arrived at the scene of the crime.

In autumn 1925 the defendant enrolled at the University of Vienna and attended Prof. Dr. *Schlick's* lectures from the first to the last semester. In March of 1930 he took the degree of Doctor of Philosophy. Some years before (1928) he had become acquainted with the student Sylvia *Borowicka* who also attended the lectures of Prof. Dr. *Schlick*. He soon came to feel a deep affection towards her, even though she left him in no doubt that she was ready to be a colleague and friend to him, but nothing more. The defendant felt even more unhappy when she told him one day that she felt a certain interest for her teacher and that the latter was also fond of and affectionate with her.

These revelations put the *defendant* into a state of deep and permanent agitation; and his outrage at what he felt to be indecent behavior by a teacher towards one of his students led him to tell *Borowicka* in 1931 that he was going to shoot first *Schlick* and then himself. *Borowicka* told *Schlick* about these words because she was afraid that the defendant might really carry out his plan. Prof. *Schlick* laid a charge of grave threat against *Nelböck*, who was diagnosed with "schizoid psychopathy" and committed to the mental institution Steinhof, where he remained under observation for three months. Having been discharged the defendant went to live with his parents in Upper Austria, but returned to Vienna in the late autumn of 1932 in order to study for the examinations for the teaching profession.

When Dr. *Nelböck* and Prof. *Schlick* met at the university the next time, they had a fierce argument. This resulted in a new charge being laid by Prof. *Schlick* because he was worried and frightened by the defendant's passionate and rather peculiar behavior. *Nelböck* was once again interned, but was discharged again soon. Until 1934 he earned his living by preparing students for their doctoral exams; he also established contacts with several professors and scholars in order to continue workwing on various fields of philosophy with them and to maybe obtain a teaching post and thus some sort of permanent employment with their help; he hoped this would provide him with more means to support himself, since private tuition did not earn him much money and he was rather destitute at times.

His efforts were successful insofar as, through the intervention of Prof. Dr. *Gabriel*, he got the chance to lecture on philosophy at the adult education center in Brigittenau as the former's temporary replacement. He also began to teach at the adult education center in Ottakring, and after he had given a lecture on Positivism there (which did contain a critique of the subject, however), he was scheduled to hold a full course on philosophy at that center in the summer of 1935.

The defendant was disappointed in these expectations, however. His request was not granted on the grounds that he was unsuited to hold a course since he was a Positivist. The true reason was, however, that the authorities in charge had been informed that the defendant, twice reported to the police by *Schlick* for having threatened him, had twice been committed to the mental institution Steinhof and to the psychiatric ward of the General Hospital. Even though *Schlick* had been quite reticent on the whole affair and, in particular, had not passed on any information to the adult education center's management concerning the fact that *Nelböck* had been at Steinhof because of psychopathy, the defendant blamed him for the failure of his plans because of some erroneous or misunderstood remarks by third persons, among them Prof. *Gabriel*, and fell into a veritable state of depression, planning even then to shoot the person who had destroyed his existence. For this purpose he bought a pistol with fitting ammunition; this was the weapon he also used when he finally committed his crime. But he abandoned his plan at first and even threw the ammunition into the Danube. He did keep the pistol, however, and locked it away in his room.

In early January 1936 he once again fell into a state of depression, caused primarily by a lecture by Prof. *Schlick* which also treated or at least touched upon the issue of immortality in a way which the defendant perceived as cynical. Now his feeling returned that his stay at Steinhof would always be a handicap for him and that Prof. *Schlick* and his followers were always going to use this indelible fact against him. Therefore, he decided to put an end to the whole matter and bought new ammunition for his pistol.

On June 22, 1936, he left his apartment after 8 o'clock in the morning. He knew that Prof. *Schlick* was going to start his lecture at 9 o'clock. On the way he decided to shoot Prof. *Schlick* and to commit suicide afterwards, or, as he also put it, to shoot himself and take Prof. *Schlick* with him. He returned to his apartment to get the pistol and, after loading it with 7 bullets, set the pistol's safety device and put it into the pocket of his jacket. After arriving at the university he loitered in the great hall or in its close vicinity, in the corridor or on the stairs, until Prof. *Schlick* entered the building from the street. Prof. *Schlick* was slowly walking up the stairs to the School of Philosophy, the defendant followed him closely, then passed him, turned around just in front of him, drew the pistol, released the safety device and fired two or three shots at him from a short distance. The defendant saw how Dr. *Schlick* fell down on the stairs and lay dead on the floor. He did not think of his intention to commit suicide anymore. According to the defendant himself as well as to the testimony of an eyewitness *Nelböck* also shouted a word or remark at the collapsing Prof. *Schlick* which expressed his embitterment towards his victim.

Following what has been said, this embitterment and the veritable feelings of hatred and revenge which the defendant harbored against Dr. *Schlick* at the end were caused, firstly, by the so-called Borowicka affair; secondly, by the fundamentally different world-views; and, lastly, the defendant regarded Prof. *Schlick* as the destroyer of his existence who had deprived him of a job and was going to deprive him of all possible future jobs, too. In the mind of the defendant *Schlick* was nothing less than the one who "stole his love, his faith and his existence".

These were the motives upon which the defendant acted, presumably with the intent to kill, and he does not deny this at all, but only denies the accusation of deliberate, planned action. This was certainly not the case, the crime was certainly not committed deliberately or on the basis of a plan developed in advance. But the killing of *Schlick* was doubtlessly intended, which is evident not only from the confession of the defendant, but also from his attitude towards *Schlick* and from the fact that he had had this intention before, but had then abandoned it, and, lastly, from the fact that he returned home to get his pistol, loaded it and released the safety device and finally fired several shots from the deadly weapon at *Schlick* from a very close distance.

It was not found that the crime was committed in a perfidious manner, even though the weapon has a length of less than 18 cm and was therefore easy to conceal. Still, the other, already mentioned circumstances do not suggest that an actual assault had been planned and carried out.

It may be assumed, however, that the defendant, who – as the opinion of the psychiatric experts reliably states – is fully responsible for his act – for, according to the opinion, he is neither permanently nor temporarily insane and did not commit his act in any state which might be a reason for exemption from punishment – was only driven to this crime by excusable vehement agitation. This assumption is due to the already determined motives of the crime, and the act is excusable by the defendant's disposition, even though it is not actually psychopathic, as well as by a chain of circumstances and coincidences which were likely to rouse his anger against Prof. *Schlick*.

The facts of the case hereby determined constitute the crime of non-capital murder under sections 134, 135, par. 4, of the Penal Code, and the violation of sections 32, 36 of the Weapons Act.
The punishment to be imposed was to be assessed under sections 136 (second degree of punishment) 35 of the Penal Code.
The following aspects were considered as
mitigating: the defendant's confession, integrity and evidence of good character, disposition and predicament, and as *aggravating*: only the concurrence of the crime with the violation of a law.
Section 265a/2 of the Code of Criminal Procedure was applied.
The other statements of this sentence are based on the indicated passages in the law.

Vienna, on May 26, 1937.

The President: The Recording Clerk:

Hellmer (personal signature) PCocmann (personal signature)

Document 9

Gauleiter Josef Bürckel
Authorized Representative of the Führer
for the Referendum in Austria

Vienna, April 11, 1938

Staff

Rei./M.

Imprisonment

To the
Minister of Justice,
Vienna I.,
Schmerlingplatz 3.

Subject: Clemency petition for Dr. Hans *Nelböck*, curr. at Stein on the Danube

Enclosed please find a petition from Mrs. Magda Stöger, Vienna XVI., Kirchstetterngasse 55, clerk with Mrs. Anna Wampel, stationery shop, of April 1938, including enclosures, with the kind request for competent consideration. Notice of delivery has been made.

Heil Hitler!
by order
(Signature)

4 enclosures

Document 10

The Ministry of Justice

Reference number: 35.086-4/38
Subsequent numbers 38875/38

Subject
Clemency petition, conveyed to the Minister
by Gauleiter Josef *Bürckel*,
submitted by Magda *Stöger*, clerk, Vienna, XVI.,
Kirchstetterngasse 55.

In her petition Magda *Stöger* states that Dr. Hans Nelböck was a victim of the former government, according to the opinion even of catholic papers a character like Dr. Schlick could never be a suitable educator of young people and contribute to the beneficial development of Austria. She petitions to grant a pardon to Dr. Hans Nelböck, who is serving a 10-year sentence of penal servitude in the prison of Stein on the Danube, and to release him from prison.
Since Dr. Nelböck was sentenced to penal servitude for the duration of 10 years for the crime of murder and this sentence was passed hardly one year ago, a clemency petition can hardly be considered at the present moment.

Therefore the motion is made:
Concerning clemency petition:
Is conveyed to the
Provincial Court for Criminal Matters

Vienna I

for official action under section 411 of the Code of Criminal Procedure.

April 26, 1938

(Signature)

Document 11

Concerning 38875/38

Sir!

Referring to the conversation we had yesterday I humbly submit to you, by your permission, the plea for clemency of Dr. Hans Nelböck. I have known Hans Nelböck, who comes from humble, rural origins from Oberdonau, since 1929, i.e., about six years before his act, since he often attended my lectures at the university as a student. Prof. Schlick, whom he attacked in June of 1936, was an exponent of Jewry at the School of Philosophy. Nevertheless he was among the first to join the Patriotic Front in order to secure his existence. Nelböck, a man of strong national motives and explicit anti-Semitism, grew more and more outraged at Schlick, all the more so since he considered Schlick to be an adversary to his economic efforts and plans. Since it was impossible for him to improve his precarious economic situation because of Schlick's opposition and his ideological and political efforts towards a removal of Schlick were not successful, either, Nelböck completely lost his balance. These ideological and political motives could not be addressed in the trial, however, since this would have been even more detrimental to the defendant's situation during the system period. And thus, in my opinion, it was more the preliminaries and accessory circumstances to which most attention was given. This, however, made it impossible to do adequate justice to the defendant. Therefore, I humbly ask you, Sir, to kindly and benevolently consider this plea for clemency, since the crime was committed in a state of excusable necessity – of ideological and political necessity.

Heil Hitler!

Dr. Joh. Sauter Univ. Prof.
Vienna II Obere Donaustr. 45/13
(Signature)

Document 12

Ref. no. 926 of 1935/36

Vienna, October 23, 1939

Draft

Certificate.

Mr. Johann *Nelböck*, born May 12, 1903, in Wels, currently living in Vienna VIII., Langegasse 44, studied mathematics, physics and philosophy at the School of Philosophy of the University of Vienna from 1925 to 1931. In 1931 he passed the doctoral exams in physics and philosophy, and on March 21, 1931, the degree of Doctor of Philosophy was conferred upon him.

Through the sentence passed by the Provincial Court for Criminal Matters in Vienna I. he was found guilty under section 134 of the Penal Code. Under section 26 of the Penal Code this conviction entails the forfeiture of the academic degree.

The Rector of the University of Vienna:
(Signature)
Professor Dr. Fritz Knoll

Document 13

The Senior Public Prosecutor
at the Provincial Court of Wels

Wels, May 12, 1941
Telephone

The Department of Public Prosecution at the
Higher Regional Court of Linz

Reference number: Gns 287/40 Received on May 15, 1941

With regard to the decree of 19-11-1940
III g^{I9} 3563/40

To
the Reich Minister of Justice
Berlin W 8
Wilhelmstraße 65

by the hand of the
Chief Public Prosecutor at the Higher Regional Court
Linz/Danube

Enclosures: 1 copy from the penal register
1 clemency dossier
1 file of documents

Petition by Nelböck Hans, technical employee

in Vienna VIII
Langegasse II/20

for erasure of a conviction

Order for limited information from the penal register.

I. The convict's
1. Marital status;
2. Economic and other personal circumstances relevant to the decision.

on 1): Hans Nelböck was born on May 12, 1903. He is single and only has to provide for himself.
on 2): Hans Nelböck has been working as a technical employee at a main surveying office since 1939, earning a net salary of 200 Reichsmark per month.
Prior to his conviction he was dr. of philosophy and gave private tuition lessons. He is not a member of the NSDAP or one of its sections. In his environment he is regarded as a sober, quiet person and enjoys a good reputation.

II. Convictions according to the copy from the penal register

A short description of the criminal offenses on
which the convictions are based;
the situation of the execution of the sentence

1. Criminal case 20Vr 5867/36 of the Provincial Court of Vienna I
On June 22, 1936, Hans Nelböck killed Professor Dr. Moritz Schlick by firing 4 shots at him from a pistol. He thus made himself guilty of the crime of murder and of a violation of the Weapons Act.

Nelböck has served part of his 10-year sentence of penal servitude. The remaining sentence of 7 years, 1 month and 29 days was suspended on October 18, 1938. The period of probation will expire on October 11, 1943.

According to the verdict Nelböck acted out of jealousy, of fundamental differences between the victim's world-view and his own, and of revenge for the destruction of his existence.

According to the petition for clemency Nelböck claims to have acted out of purely idealistic reasons, namely to free the University of Vienna and its faculty from the victim's ideas and their corruptive effect on National Socialism and the German people. Trying not to cause any harm to National Socialism, he says, he emphasized the personal aspects of his action, i.e., jealousy and revenge, and only hinted at the ideological background. Enclosure I with the clemency petition indicates, however, that the mainly personal motives significantly contributed to the commission of the crime.

III. Substantiation of the petition (summary)
Hans Nelböck asks for a pardon to enable him to become a full member of the national community again. He points out that by his act and the resulting elimination of a Jewish teacher who propagated doctrines alien and detrimental to the nation he rendered National Socialism a service and also suffered for National Socialism as a consequence of his act. Since the world-view, the rightness of which he recognized even then and out of which he committed his act, is now the ruling national ideology, he considers it a hardship if he still has to remain in a disadvantaged position because of an act which sprang from this world-view. Nelböck is obviously trying to have his conviction erased in order to enable him to obtain a teaching post.

IV. Comments by the authorities heard
The NSDAP Head Office of the District of Vienna fully supports the petition for clemency and emphasizes that Nelböck is not a common murderer, but a man of great intellect and morals who turned somewhat naive and eccentric through his studies of philosophy, but who has to be conceded the idealistic motives which, according to him, motivated his act. The clement erasure of his conviction is advocated also with a view to the securing of his occupation.

The Office of the Führer of the NSDAP does not support the petition for clemency because the crime was committed only a short time ago and the probationary period has not expired yet.

The Provincial Court of Vienna, referring to the clemency granted only in 1938, considers a new demonstration of clemency to be premature. The court points out

that Nelböck acted only out of jealousy, hate, and revenge and that he is now trying, by referring to the liberating aspect of his act and the elimination of a national parasite, to use the subsequent events to his advantage and present himself in a more favorable light, even though he could hardly have foreseen these subsequent events at the time.

Enclosure II contains a number of statements, sought by Nelböck himself, in support of the petition for clemency, to which we refer for further information. In general it may be stated that Nelböck is regarded as an idealist and that the authors of these statements also support his petition for clemency.

V. Motion of the Senior Public Prosecutor and substantiation

It is the opinion of the clemency authority that it cannot advocate a demonstration of clemency at the moment. It does acknowledge the fact that Hans Nelböck has been hit severely by his conviction, which bars him from obtaining an occupation adequate to his studies and knowledge. It cannot be denied, either, that Nelböck committed his act also out of idealistic motives, yet the fact remains that the act was accompanied primarily by personal motives. An erasure of the conviction after such a comparatively short time and during the period of probation would, according to the argumentation of the petition for clemency, amount to a justification of the crime. With regard to the personality of the petitioner for clemency, however, who thinks he has the right to eliminate a person he regards as pernicious, such an action would seem to entail a certain danger for the legal system. It is necessary, therefore, that the applicant for clemency displays good conduct according to the terms of probation for some more time.

signed
Dr. Meyer-Kronov
Senior Public Prosecutor

Certified
(Signature)
Senior Officer of Justice

VI. Statement of the Reich Minister of Justice

The Chief Public Prosecutor
425 E – N 5/41

Linz (Danube), May 16, 1941

I consider the clemency authority's opinion to be right and reject a grant of clemency for the same reasons.

By order:
Dr. Nordmeyer
First Public Prosecutor

Certified
Judicial officers

VII. Decision of the Reich Minister of Justice

III g^{20} 406^{0}/41
Enclosures:
1 file of documents
1 clemency dossier
By the Chief Public Prosecutor
in Linz
to the Senior Public Prosecutor
in Wels

Rejection

Berlin, May 28, 1941
by order
signed Dr. Suchomel

Seen!
Department of Public Prosecution
at the Higher Regional Court of Linz
on June 11, 1941

Certified
Ratzke
(Signature)
Senior Secretary of the
Minister's Office

Postscript

Johann Nelböck (1903–1954)

Born:	1903 in Brandel near Lichtenegg (Upper Austria). Attended the gymnasium in Wels (Upper Austria).
Beginning in 1925:	Studies of philosophy in Vienna under Moritz Schlick; dissertation on *The Importance of Logic in Empiricism and Positivism* (1930). Graduation as Dr. phil. in 1931.
June 22, 1936:	Murdered Moritz Schlick at the University of Vienna.
May 26, 1937:	Sentenced to 10 years of penal servitude for the murder of Moritz Schlick.
October 11, 1938:	Released on probation; occupation in the geological department of the wartime economic oil authority.
October 11, 1943:	End of the period of probation; technical employee in the soviet oil authority.
1947:	No police record according to the certificate of character.
1951:	Nelböck sued Viktor Kraft, who called him a "paranoid psychopath" in his book *Der Wiener Kreis*. Kraft agreed to an out-of-court settlement because he felt threatened by Nelböck.
February 3, 1954:	Nelböck died in Vienna.

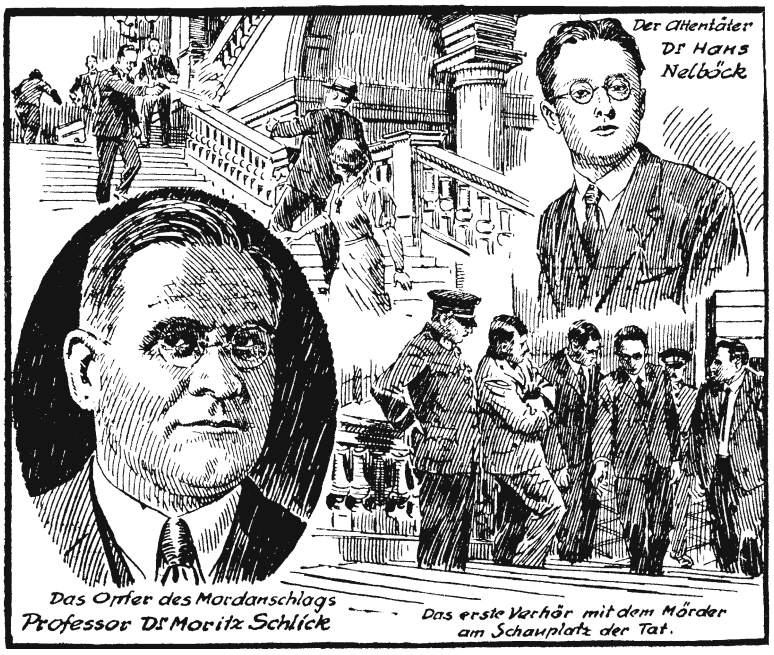

Fig. 13.1 *Illustrierte Kronenzeitung* of June 23, 1936 (*left*: "The victim of the murder attack – Professor Dr. Moritz Schlick"; *top right*: "The attacker – Dr. Hans Nelböck"; *bottom right*: "First questioning of the murderer at the scene of the crime")

Sources and Literature

The primary literature and most recent secondary literature of the Vienna Circle (Logical Empiricism) and ist periphery is listed after the individual biographies in Part 2. There the reader can also find cited literature that does not appear in the literature list below.

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3 Personal Conversations and Interviews

Gerd Arntz (Den Haag), Sir Alfred Ayer (London), Kurt Baier (Pittsburgh), Traude Cless-Bernert (Wien), Eva Frodl-Kraft (Wien), Carl G. Hempel (Cambridge, Mass.), Walter Hollitscher (Wien), Gerald Holton (Harvard), Marie Jahoda (Sussex), Eduard März (Wien), Viktor Matejka (Wien), Karl Menger (Chicago), Henk Mulder (Amsterdam), Arne Naess (Oslo), Heinrich und Michael Neider (Wien), Marie Neurath (London), Paul Neurath (New York/Wien), Sir Karl Popper (Kenley), Franz Rauscher (Wien), Margarete Schütte-Lihotzky (Wien), Wolfgang Stegmüller (München), Karl Trötzmüller (Wien), Tscha Hung (Peking), Barbara van de Velde-Schlick (Bilthoven), Hans Zehetner (Wien), Hans Zeisel (Chicago).

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