

Vienna Circle Institute Yearbook

Christian Damböck *Editor*

Influences on the *Aufbau*



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Editor

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Contents

External World Problems: The Logical Construction of the World and the ‘Mathematical Core of the External World Hypothesis’	1
Alan Richardson	
What Carnap Might Have Learned from Weyl	15
Thomas Ryckman	
Wiener and Carnap: A Missed Opportunity?	31
Sébastien Gandon	
Neurath’s Influence on Carnap’s <i>Aufbau</i>	51
Thomas Uebel	
Theories of Order in Carnap’s <i>Aufbau</i>	77
Paul Ziche	
Carnap’s <i>Aufbau</i> and the Early Schlick	99
Matthias Neuber	
Carnap’s <i>Aufbau</i> in the Weimar Context	115
Thomas Mormann	
Carnap and Phenomenology: What Happened in 1924?	137
A.W. Carus	
Carnap’s Early Conception of a “System of the Sciences”: The Importance of Wilhelm Ostwald	163
Hans-Joachim Dahms	
The Context of the Development of Carnap’s Views on Logic up to the <i>Aufbau</i>	187
Clinton Tolley	
Assessing Rickert’s Influences on Carnap	213
Mikko Leinonen	

General Part

Report/Documentation

22nd Vienna Circle Lecture

Susan Stebbing and the Early Reception of Logical Empiricism in Britain	233
Michael Beaney	

Review Essays

Purity in Concepts: Defending the Social Sciences	257
Alexandra Couto	

<i>The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain from 1900 to the Present.</i> By Eric B. Kandel.	267
Allan Janik	

Erratum	E1
--------------------------	----

Reviews	281
--------------------------	-----

Ilkka Niiniluoto, Sami Pihlström (eds.), <i>Reappraisals of Eino Kaila's Philosophy</i>	281
Thomas Mormann	

Moritz Schlick, <i>Kritische Gesamtausgabe, Section I: Veröfentlichte Schriften, vol. 5, Rostock, Kiel, Wien. Aufsätze, Beiträge, Rezensionen 1919–1925</i>	285
Massimo Ferrari	

Mary Jo Nye, <i>Michael Polanyi and His Generation. Origins of the Social Construction of Science</i>	289
Károly Kókai	

Steffen Kluck, <i>Gestaltpsychologie und Wiener Kreis. Stationen einer bedeutsamen Beziehung</i>	292
Christoph Limbeck-Lilienau	

Obituary	295
In Memory of Pat Suppes	

Index	299
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Introduction

Rudolf Carnap's seminal book *Der logische Aufbau der Welt* (*The Logical Structure of the World*, henceforth *Aufbau*) was once viewed as a rather technical piece of reductionist and radically empiricist philosophy of science representing archetypically Quine's "second dogma of empiricism." However, since the 1980s, Michael Friedman, Alan Richardson, Thomas Mormann, A.W. Carus, Thomas Uebel, and a number of other scholars pointed out that the *Aufbau* is neither reductionist in the sense of Quine's second dogma nor empiricist in the classical sense. Rather, the *Aufbau* is a highly complex approach to epistemology, influenced by a number of contemporary philosophical currents. This volume presents a good deal of the results of a conference that took place at the *Munich Center for Mathematical Philosophy* in July 2013 and has been devoted to these influences on Carnap's early masterpiece.

Some of the contributors to this volume explicitly try to figure out in which way a certain philosopher influenced Carnap and in which way this influence can be found in the *Aufbau*. This is true for Alan Richardson (who considers the influence of Karl Gerhards on Carnap's approach toward reduction of the physical world to the autopsychological world) and Thomas Uebel (who considers the influences that Otto Neurath had on the revisions to the 1925 *Aufbau* manuscript). It is equally true for Matthias Neuber (who is concerned with the influence of early Moritz Schlick), A.W. Carus (who analyzes Carnap's move beyond phenomenology in 1924), and Mikko Leinonen (who considers the influences of Heinrich Rickert on some manuscripts of the early 1920s that represent the *Aufbau* project).

There are four papers that discuss early Carnap at the broader levels of his biography and history of ideas. Hans-Joachim Dahms's paper describes the influences that both Wilhelm Ostwald and representatives of the Dilthey school such as Herman Nohl, Wilhelm Flitner, Franz Roh, and Hans Freyer had on early Carnap. Thomas Mormann gives an outline of the influence that the spirit of the Weimar Republic had on early Carnap, focusing on the influences of his WW I experiences and on the philosophical influence of the neo-Kantian Heinrich Rickert and the positivist Theodor Ziehen. Clinton Tolley gives a fairly comprehensive outline of the development of early Carnap's views on logic, caught between Kant, the Neo-Kantians,

Husserl, Frege, and Russell. Paul Ziche focuses on the importance that early twentieth-century theories of order had on the *Aufbau*, in particular, the contributions to that topic by Hans Driesch, Theodor Ziehen, and Walter Dubislav.

Finally, two papers of this volume consider influences in a rather counterfactual way. Rather than considering actual *influences* on the *Aufbau*, they show exciting parallels between Carnap's conception and contemporaries who were not considered by Carnap but might have been relevant and interesting for his approach. Thomas Ryckman considers the relevance that Hermann Weyl might have had on Carnap. Sebastian Gandon points to important parallels between Norbert Wiener and Carnap and identifies the failure of mutual influence as a missed opportunity.

Thanks go to Hannes Leitgeb and the MCMP without whose generous financial and organizational support our workshop would not have been possible and to Friedrich Stadler and the IVC who also supported the conference.

External World Problems: The Logical Construction of the World and the ‘Mathematical Core of the External World Hypothesis’

Alan Richardson

In a book I wrote (Richardson 1998) what seems like a lifetime ago, I offered a reading of Rudolf Carnap’s *Der logische Aufbau der Welt* that claimed it was importantly informed by the scientifically-oriented neo-Kantianism of the generation of his teachers, including the work of Ernst Cassirer, Paul Natorp, and his dissertation director Bruno Bauch. I have, as a result, become one of a small set of people about whom a story circulates that they argue Rudolf Carnap was a neo-Kantian. That characterization seems importantly over-simplified—about each such person and certainly in my own case. So, I hope that I may, without too much self-indulgence, summarize what I was doing in that book and in subsequent historical work on Carnap.

What I was attempting to argue was not that Carnap is most properly located in a specific school of thought but rather that one cannot understand some of the specific philosophical moves, attitudes, or projects in Carnap’s early philosophy and how those moves, attitudes, and projects influence his later philosophy if you do not take into account Carnap’s engagement in the 1910s and 1920s with neo-Kantianism. For example, if we wish to understand the significance or provenance of Carnap’s use of logical form as presenting the conditions of meaningfulness for empirical languages, we need to understand this, given the Kantian overtones of this view, against the background of actual neo-Kantian projects with which Carnap was familiar. For the view does not simply sound somehow related to the Kantian notion

An earlier version of this paper was given at the Munich Workshop on Influences on the *Aufbau* in July 2013. I would like to thank the audience and especially Christian Damböck for both the invitation and for his patience with the revisions. The final version of this paper has been enormously improved by close critical and yet sympathetic comments by Thomas Uebel of an all-too-human penultimate draft.

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of objectifying form, rather one can trace through in rich detail this philosophical theme in Carnap's work: his early explicit use of Kantian-cum-phenomenological terminology in his dissertation, his motives for dropping "Wesensschauung" after his dissertation and locating all formal features of knowledge in logic, and how this all relates to various movements in Germanophone philosophy, including, as noted, the scientific neo-Kantianism of his time. Far from being a highly controversial project, I take this to be little more than a universal instantiation of the claim that those trained in philosophy are influenced by the philosophy into which they are trained.

Two things make this claim grate in the case of Carnap, I suppose. The first is the lingering "great philosopher" sensibilities in historiography of philosophy: Carnap was a great philosopher and great philosophers express a *sui generis* philosophical genius unrelated to their places and times. I grant for sake of argument that there have been great philosophers and that Carnap is among them. I do not however think it is at all plausible that greatness even in philosophy has the form of spontaneous genius unrelated to on-going issues and methods in philosophy. It would be impossible, if this were the case, to differentiate between geniuses and, on the one hand, cranks and, on the other hand, people who were simply doing something entirely different from philosophy. So, even if I were to grant the additional premises about greatness and lack thereof, I simply reject this inference: Carnap was great and (we may also grant for sake of argument) Bruno Bauch and Paul Natorp were not great; thus, Carnap could not have been influenced by them.¹

The second reason is more serious: Carnap self-consciously and famously sought to reject much of the historical background out of which he emerged; and he has been taken to have been either largely successful in doing so or to have been hugely mistaken in the attempt. So, a narrative of Carnap's place in, as one might wish to say, "twentieth-century thought" that insisted that the most important feature of Carnap's philosophy is his reorientation of philosophy in ways that crystallized a rejection of the German philosophy that he was trained in would run counter to an effort to understand some of the main themes in his philosophy by drawing on their continuity with some features of that very background philosophy. I have sought to square this particular circle by noting that if Carnap's means of rejecting older philosophy relied, as surely it did, on the technical tools available in the new logic and in the sensibility that using the new logic that way allowed philosophy to enter the secure path of a science, nonetheless, how he deployed those logical resources could still reveal thematic, philosophical continuities of thought with some of the very movements he aimed to reject. In particular, the objectifying role of logical form was a key theme in the epistemological projects within some forms of

¹A related but somewhat more subtle thesis would be that Carnap achieved his greatness only after divesting himself of such influences, influences now rightly forgotten. Not only do I rather doubt that is how intellectual development works but also I worry that such a methodological claim is inherently conservative in a way detrimental to learning anything substantive from history. After all, it might be that Paul Natorp is in fact a great philosopher but according to the thesis under consideration we already know, because he has been forgotten, that he is not. Philosophical forgetting is not infallible.

neo-Kantianism that Carnap was well-informed about and cites in the *Aufbau*. Lingering questions about whether this means his latter philosophy really was or really was not “neo-Kantian” are, so it seems to me, arguments about nomenclature in which I have little interest. There are no necessary and sufficient conditions for a view to be Kantian or neo-Kantian. There are, however, in the course of philosophical history interesting projects that have proceeded through lines of mutual interaction, surprising juxtaposition, and so forth.

The project of trying to unearth some of the background of the *Aufbau* in my early work through my book on the *Aufbau* was, then, less about configuring Carnap as a neo-Kantian than it was doing two other things. First, it was geared toward disrupting any idea that the philosophical project of the *Aufbau* is obvious from the text and needs no further reflection or excavation. Even merely reading Carnap’s own pre-*Aufbau* published writing surely puts severe pressure on the idea that the Quinean reading of the *Aufbau* as the high point of reductionist empiricism is right. It is not plausible that someone could publish an essay claiming approvingly that “pure empiricism had lost its dominance” (Carnap 1923, 90) in our account of the foundations of scientific knowledge while, at the very same time be attempting to reinscribe pure empiricism as the best account of such knowledge in his own main project. Indeed, merely reading the first sixteen sections of the *Aufbau* (Carnap [1928] 1967) should put serious questions about Quine’s account of the *Aufbau* into the minds of careful readers, given how peculiar, unempiricist, and unlike the Russell of the External World program his epistemological claims are. Second, it was a gesture, which I acknowledged as preliminary in many ways, of attempting to augment the understanding of the philosophy of the *Aufbau* by excavating its context. We have gone some way toward further enrichment of the contextual understanding of the *Aufbau* and early Carnap in general but there is an awful lot still to be done. What sustains my interest in this is not just that early Carnap is interesting but that the work you are led to by the early work of Carnap is itself philosophically interesting.

It is this larger project of continuing to enrich the context and deepen the philosophical understanding of early Carnap’s work to which I wish to contribute in a minor way in this essay. I want to draw our attention again to the crucial sections 124 through 127 of the *Aufbau* where Carnap sketches the construction of the external world and to ask: given how different Carnap’s construction is from Russell’s, whence is Carnap deriving his version of the problem of the external world, what would count as a solution, and what means one may deploy to get there. In aid of trying to sketch some possible answers to these questions, I wish to draw our attention to an essay Carnap knew quite well, a 1922 essay by the philosopher and psychologist Karl Gerhards titled “Der mathematische Kern der Aussenwelthypothese” (Gerhards 1922). I do not think my argument will establish that Carnap is a follower of Gerhards. Rather I claim only that Gerhards is an interesting person to look at in considering where in the German epistemological context the problem of the external world was located and that Carnap was in fact well aware of Gerhards’s work. While the principal use I wish to make of Gerhards’s work here is to look in some detail at a specific and vexed passage in the *Aufbau*, I shall end with some larger

remarks on the contextual characterization of Carnap's *Aufbau* project, in light of his rather eclectic use of various philosophical resources (such as Gerhards's mathematical problem of the external world, Cassirer's logic of objective knowledge, and Russell's type-theoretical logic) that are not easily combined.

Setting the Problem

The *Aufbau* is, it seems, a solution to the External World Problem—which is, roughly and without trying to prejudge any issues of philosophical detail, what is the rational basis for our belief that there is a world of extra-mental objects, given our knowledge of our own experiential states? There are some peculiarities of the text, however, that have been widely noted and that I wish to take for granted here. Here is a list of reminders. First, Carnap, in the *Aufbau* pays homage to Russell at many points, including choosing a Russellian motto for the book: “The supreme maxim of scientific philosophizing is this: Wherever possible, logical constructions are to be substituted for inferred entities.” This motto serves to organize the whole book which claims to offer a sketch of a definitional construction of all the objects/concepts of science from an autopsychological basis. Carnap underscores these debts to Russell in his much later “Intellectual Autobiography.” After quoting from the final paragraph of Russell's *Our Knowledge of the External World*, Carnap writes (Carnap 1963, 13) that “I felt as if this appeal had been directed to me personally. To work in this spirit would be my task from now on!” A few pages later commenting upon his work on the *Aufbau* from 1922 to 1925, he writes (Carnap 1963, 19), “Inspired by Russell's description of the aim and the method of future philosophy, I made numerous attempts at analyzing concepts of ordinary language relating to things in our environment and their observable properties and relations, and at constructing definitions of these concepts with the help of symbolic logic.”

Nonetheless, two things about Carnap's crucial constructive step when he moves from the autopsychological realm into the three-dimensional realm of physical space are evident. First, his construction is very different from Russell's own. Second, his construction violates the strictures of step-by-step explicit definitional reduction. Carnap himself notes various differences between his construction and Russell's in the text of the *Aufbau*. Russell begins not with an autopsychological realm as Carnap conceives it but with a six dimensional space of perspectives that includes the unsensed sensibilia as they would appear to someone if she had occupied a point in space that is in fact not occupied. A physical object is, by Russell's construction, basically a set of its aspects as seen (heard, touched) from each place in the space of perspectives—a construction that uses, it might as well be noted, the axiom of choice. Carnap notes (Carnap 1967, §124) that it would be impossible to construct merely possible perspectives or possible aspects of a thing from the stream of experience of a given individual, and thus Russell's way is not open to him. Moreover, as he notes (Carnap 1967, § 124), his construction does not construct the individual physical objects one-by-one but rather proceeds by constructing “at once

the entire four-dimensional space-time world which comprises all events.” Stripped of its details, the Carnapian construction looks like this: We have a two-dimensional order of visual qualities at visual field points (plus a preliminary time order) already constructed in the constitutional system. We have also a various formal spaces in pure mathematics. Carnap, first, provides an argument that a 4-dimensional space-time with three spatial co-ordinates and one time co-ordinate will suffice as a field upon which to project the sensory qualities. Then the entire space-time world of events is constructed by using various methodological principles to assign qualities to the space-time points.

It is clear that precisely this projection of qualities onto space-time points, which is the key step in showing how all the objects of the sciences can be constructed from experience, however, violates the strictures on definitional reduction or translation that Carnap makes requisite for proper construction. This point was made repeatedly by Quine, who took this failure so show that the project of the *Aufbau* simply had to fail in principle. Here’s an admirably clear passage from “Epistemology Naturalized” in which Quine draws this lesson (Quine 1969, 76–7):

The fact is, though, that the construction which Carnap outlined in *Der logische Aufbau der Welt* does not give translational reduction either. It would not even if the outline were filled in. The crucial point comes where Carnap is explaining how to assign sense qualities to positions in physical space and time. These assignments are to be made in such a way as to fulfill, as well as possible, certain desiderata which he states, and with the growth of experience the assignments are to be revised to suit. This plan, however illuminating, does not offer any key to *translating* the sentences of science into terms of observation, logic, and set theory.

As Quine puts the point elsewhere (Quine 1980, 40), the “is at” relation is here a new primitive; nothing in the method Carnap outlines indicates that “Q is at (x,y,z,t)” can be translated into the language of logic and sensation.

While Quine is right, it is easy enough to think of ways in which Quine’s exact problem does not quite arise. If we think less linguistically we can see that the set of quintuples $\langle Q, x, y, z, t \rangle$ is a set that does not takes us beyond the resources of type theory and the autopsychological to form. The set is not likely (predicatively) definable in a finite way in the language of type theory but extensionally conceived it is unexceptionable as a set. Carnap’s remarks on this construction strongly suggest that this is how he was thinking at this moment of the *Aufbau*. Once we have made a more vigorous linguistic turn and we speak clearly metalogically about what is definable in the language of type theory plus the autopsychological (which terms Carnap does use early on to explain what he is up to), Carnap’s position looks delicate and confused. Here as elsewhere it appears that Carnap has no rigorous account of or precise handle on the tools of logic in the *Aufbau*. In his half-taken linguistic turn, Carnap explains much of the procedure and point of constitution in terms of linguistic notions such as definition and translation, but he often is thinking of the logical features of structures whether or not those structures are finitely describable, much less definable, from the primitive vocabulary of some given language. (In his 1929 *Abriss der Logistik*, Carnap often gives a sign-design notion of structure as an arrow-diagram; he often relies on that sort of understanding in explaining his procedures in the *Aufbau*.)

We can put the philosophical point in a somewhat different vocabulary²: If we allow Carnap the resources of impredicative definition in the *Aufbau*, you might well be able to form, on the basis of appropriate universally generalized statements covering the maxims guiding the constructions, an impredicative definition of the “is at” relation. Quine presumes, given the reductive and ultimately epistemological work Carnap’s constitutional definitions are meant to perform, that impredicative definitions are inadmissible. Carnap either has a different view of the philosophical point of definition than does Quine or he has under-described the definitional machinery he is allowing himself. There is reasonable doubt as to whether the “is at” relation is definable by the lights of the *Aufbau* depending on an argument, not actually found in the text of the *Aufbau* itself, regarding whether impredicative definitions can fulfill both the technical strictures on and philosophical point of constitutional definitions.

Second, Carnap, modulo the delicacy of his own commitments, was close to saying regarding the construction of the external world precisely what Quine said about it. Already in the 1922 manuscript “Von Chaos zur Wirklichkeit” he sketches the same sort of procedure that finds expression in the *Aufbau* immediately after providing definitions of some of the major features of the “Erlebnisbereich.” He introduces the move to “Wirklichkeit” as follows (Carnap 1922, 7):

The “realm of experience” as the realm of the first level is completed through the incorporation of further elements into a realm of the second level that is called “reality.” This completion does not occur in a thoroughly univocal way, but rather always in a certain sense with the qualification that an addition will later be corrected or omitted. Every addition occurs therefore chiefly only experimentally. These completions occur according to the following tendencies. These tendencies are not mandatory but rather more or less strong regarding the degree of the fulfillment of their conditions.

The two tendencies is then discusses are what he calls the “substance category” (conservation of state) and “causal category” (positing the same processes as hitherto posited). The language of these tendencies being “not required” [nicht zwingend] clearly distances Carnap here from good old-fashioned Kantianism but my point here is that none of this language is suggestive at all of the language of definition and translation. Indeed, in a published essay from the same period Carnap (1923) explicitly denied that the language of physics is definable in the language of experience. In 1922, as he was starting the *Aufbau*, Carnap seemed not to think of the transition from pure experience to “reality” as being a matter of definitional reduction.

²Some members of the audience in Munich did prefer this vocabulary of impredicative definitions. I think the point is only subtly different in the two ways of speaking: Either Carnap is violating the strictures on definition he gives or he has been vague on the strictures of appropriate definition and is now using a definitional form that might (depending on what we view the philosophical point of the constitutional definitions to be) not discharge the philosophical role it is meant to perform.

A Proposed Solution

So, what more is there to say? The lesson might seem to be that Carnap from the very start of the *Aufbau* project fudged at just the crucial moment in the constitution of the external world. Quine's point is only strengthened here—the project was doomed from the start in ways Carnap actually foresaw. This is not, however, the lesson I wish to draw. My lesson is this one: we must grant the mismatch between what Carnap says he is doing and what he does at this crucial step. But we should not grant that the only sensible thing for Carnap to be doing is what he says he is doing. What he actually does might also be a key philosophical project, just not exactly the one he claimed to be discharging. Historiographically considered this question then becomes: what, if we take seriously what he actually proposed as a solution, did Carnap take the problem of the external world to be?

It is fairly clear from Carnap's writings in the methodology of physics from this time period that this, to a first degree of approximation, is his view³: The business of physics is to set up a mathematical framework governed by functional relations among state variables that allows, via definitions that are univocal in the direction from the language of physics into the language of experience, for the prediction and control of the future course of experience. That is, physics is a mathematically-expressed structure that allows for the economical expression and prediction of experiences—if I may express the point in Machian language. But then what is going on in the *Aufbau* if it is not simply a failed attempt to do what Carnap elsewhere says is impossible: an attempt define the terms in the physical language directly in sensory language? Here is a conjecture based on how the procedure Carnap actually sketches proceeds: the sketched procedure is an attempt to answer the question as to what degree and in what ways the ultimate structure of physics is determined by “the structure of experience.”

This sort of view is consistent with the procedure of the *Aufbau* and it helps explain Carnap's halting use of the Kantian language of categories in “Von Chaos zur Wirklichkeit”—the categories on Carnap's 1922 view supply the conditions placed by thought that are used to enhance the structure of experience and induce the full mathematical structure of physics. The halting nature of the commitment to Kantian language indicates a degree of free play in this, which free play is spoken of in Carnap's other work at the time in the language of convention. In the text of the *Aufbau* itself, what we are given are 11 methodological maxims that guide the construction and the argument appears to be: grant me these maxims and there is a uniquely determined four-dimensional world that can be constructed from experience. This philosophical conjecture would gain some historical plausibility and some greater philosophical content if there were some circulating version of an “external world problem” in the German epistemological context at the time that Carnap's work circa 1922 could be seen as contributing to.

³For more detail see Richardson (1998, Chapter Seven).

The clue to testing this conjecture is found in the references in the crucial section 124 of the *Aufbau*. There Carnap writes: “The first to make a more precise investigation concerning the derivation of the three-dimensional space order (the “ontogram”) from the two-dimensional space order (the “phaenogram”) was [Karl] Gerhards [in his “Der mathematische Kern der Aussenweltshypothese”]” (Gerhards 1922) This essay was published in 1922 in *Die Naturwissenschaften*. Carnap was very familiar with it. There are suggestions in various drafts of the invitation to the meeting that Gerhards’s paper, along with “Von Chaos zur Wirklichkeit” was one of the papers precirculated for the March 1923 Erlangen conference on “the theory of relations as a tool for the epistemologist” that Carnap and Reichenbach organized (and at which they met face-to-face for the first time). Indeed, among these draft invitations, which appear to be written on Carnap’s typewriter, for the conference in the Carnap and the Reichenbach archives is at least one (HR 015-50-06) that claims that the “stimulus for holding the meeting followed from discussions between Gerhards in Aachen and Carnap in Buchenbach.”

Gerhards was a philosopher and psychologist at Aachen who became professor of philosophy and psychology there in 1927. He concerned himself a great deal with questions of realism and Mach’s philosophy, indeed he sought to criticize Mach’s epistemology from the standpoint of critical realism. This is neither the time nor the place for a lengthy discourse on Gerhards’s general philosophical views. Our business is to understand something about the problem Gerhards poses and attempts to solve in the paper Carnap cites—what is the mathematical core of the hypothesis of the external world and how does the problem arise?

The context that Gerhards cites in setting his problem is provided by the work of Hermann von Helmholtz and Mach. The summary statement at the start of section one provides the clue (Gerhards 1922, 423):

Sense perceptions as the most original physical experiments (Helmholtz), the persistent corporeal world as the “most simple” co-ordinated hypothesis (Mach). The problem: What is the mathematical connection between this hypothesis and its experimental foundation?

Gerhards’s account of the problem is, then, very roughly this. Helmholtz’s account of experience—and Gerhards (cf. Gerhards 1922, 425) relies here especially on Helmholtz’s late paper “Über den Ursprung der richtigen Deutung unserer Sinneseindrücke” (Helmholtz 1894)—posits that sense perceptions are experiments from which the hypothesis of a world of persistent objects is drawn through something like the process of the theoretical induction. But, says Helmholtz, this induction is “unconscious.” Gerhards (1922, 425) places special emphasis on this sentence from Helmholtz: “In this sense we can assert that the idea of the stereometric form of a corporeal object plays just the role of a concept assembled from a great series of sensible intuitive pictures, which [concept] is not held together necessarily in definitions expressible in words, as it would be constituted by a geometer, but only through the living idea of a law in accordance with which the perspective pictures follow one another.” Gerhards thinks that Helmholtz gives up the task too early here: if the corporeal world is an hypothesis based in experience then it has the character of an hypothesis; it is, in Machian terms, a symbol that is brought in to

organize the stream of experience. To leave the symbol itself as inarticulate and part of the living stream of experiences itself is to decide not to solve the problem you had set yourself in the beginning.

Gerhards sees Mach as having a firmer grasp of the issue. All hypotheses have the form of symbols and must be articulated. To say that the corporeal world is the simplest hypothesis that can be coordinated with the stream of experience in order to comprehend that stream economically is to say roughly that the symbol system embedded in the description of the world as containing corporeal things has certain virtues of economy and accuracy. Gerhards's attitude toward Mach is that having said this much Mach simply asserts this economy and accuracy and never defends or establishes it. And it is here that Gerhards finally is able to articulate his own sense of the mathematical problem embedded in the remarks of Helmholtz and Mach (Gerhards 1922, 425):

With this we see again that in that "unconscious induction" whereby we according to Helmholtz derive the persistent corporeal world from the normal run of appearances there is hidden a *purely mathematical core* that must arise from a penetrating comparison of the two structures themselves and *that illuminates the logical inevitability of that induction*. The task thus emerges to analyze out this mathematical core, that is, to show *how far* on the grounds of the one structure (the stream of appearance) *alone* already one *can univocally define* the other (the persistent world).

In the following long quotation, Gerhards clarifies once more the issue he is dealing with (Gerhards 1922, 426):

The great puzzle is just this how the assumption of the persistent corporeal world can be to such an extent an *exceptional*, prevalent intellectual fit that cannot be replaced with anything better given the factual stream of experience when it at the same time, as we have seen, *when it reaches so far beyond this stream?* This puzzle remains when Mach disputes the real validity of this assumption and explains it as a mere "thought symbol" for stream of appearances: indeed, it only becomes more puzzling that one is able most economically to symbolize the stream of appearances in such a way that by far the largest part of the symbol remains on the basis of the appearances *empty*. In order to solve this puzzle one must show precisely, first, in how far at least a certain part of the symbol is filled or covered by the appearances and, second, in how far with precisely this symbol the other part left empty by the part that is filled is co-determined in an especially simple way, so that the whole symbol can be constructed from the filled part—somewhat analogously to how from five given points in a plane a curve of the second order can be constructed in a particularly simple manner, that is, linearly.

The last remark makes reference to a theorem of projective geometry that not only says that five points in a plane determine a conic section but shows how given any five points the specific conic section can be constructed using only lines whose points of intersection are governed by the movement of points along other straight lines. The choice of such a theorem is a telling clue to Gerhards's understanding of this problem as mathematical.

Now before we briefly try to explain Gerhards's construction and what he thought it showed, we should pause briefly on the problem and its relations to Carnap's early work. First, it is easy to see that Gerhards speaks the language of both construction and definition. It is also easy to see that the operative sense of definition is not

explicit definition in the sense of Russell—the constructions within projective geometry to which Gerhards here appeals, are far removed from any linguistic notion of definition, however much any five coplanar points determine a unique conic. Gerhards's sense of definability seems to derive from and not become more explicit than the sense of unique construction in projective geometry. More than this, it is possible to imagine Carnap having something like this sort of informal notion of univocal determination in mind as a paradigm case of definition, specifying this notion in the *Aufbau* as explicit definition in the language of *Principia Mathematica*, taking for granted that the logicist reduction is going to work for the details of fields like projective geometry, and not really investigating too closely how that would work. Certainly Gerhards is fast and loose on issues of definition here even by the rather equivocal standards of Russell or Frege or early Carnap on definition.

More importantly, while I would not want to say Carnap would have agreed precisely with the problem as Gerhards states it, Gerhards's problem seems a great deal closer to Carnap's work in the 1920s than does the project of explicitly defining external objects as choice classes in the language of *Principia Mathematica* does. Carnap repeats throughout his pre-*Aufbau* publications the epistemic good that the additional structure of the physical language provides for the prediction of future experience and how it reaches beyond the resources of the language of experience, etc. In this matter, it is the *Aufbau* that seems to make surprising claims contrary to the general run of Carnapian thought. (And, of course, what got us to Gerhards was that Carnap's seeming forgetting of his commitments in respect of definition when actually constructing the space-time world.) One way in which Carnap would diverge from Gerhards is that Gerhards clearly distances himself from Mach's antimetaphysics in his statement of the problem and takes himself to be defending realism. Carnap, I conjecture, would be interested in the mathematical issue and would of course abjure the metaphysical or Machian antimetaphysical gloss—that is, converting this problem into a mathematical problem is antimetaphysics enough, we don't need further Machian language nor any realist alternative.⁴

Now, what does Gerhards's approach to the problem actually look like? Briefly, it looks like this. He considers a stream of experience (imagined as a color film of the inside of a room), which he calls the "phaenogram." He compares the mathematical features of the phaenogram then to the mathematical features of the portion of the world lines of the physical objects that appear in the phaenogram. (He calls the whole structure world lines the ontogram.) What he claims is that, under certain

⁴One of the characteristic features of Carnapian antimetaphysics here can be seen in a philosophical contrast between his work and Gerhards on precisely the psychological setting Gerhards concerns himself with. Gerhards is, that is, concerned to object to Helmholtz's notion of "unconscious inference" and to demand a properly scientific, explicit inference in its stead. Carnap is happy to let the psychology be what it may in the realm of "intuitive understanding" and to give the explicit construction in the guise of a "rational reconstruction." These remarks were prompted by Thomas Uebel, who noted in personal communication that Schlick's notes on Helmholtz in the jubilee edition of Helmholtz that Schlick co-edited are directly critical of Helmholtz along Gerhards's line. Here Schlick seems closer to Gerhards than to Carnap.

conditions, the local topological features of the phaenogram match the local topological features of a portion of the ontogram, which portion he calls *Ao* (for *Ausschnitt* of the ontogram). This is not in general true, of course, and what he requires is that the phaenogram be “normal.” What is normality? If we follow Carnap and speak in two distinct languages in explanatory contexts we can say this. In realistic language—the film is taken by a camera that moves throughout the room so that portions of room that look next to one another from one perspective are shown not typically to need to be next to one another from another perspective. (This is Gerhards’s version of Helmholtz’s free mobility). Gerhards’s attempts to capture this within the language of the topology of the phaenogram itself by saying that a normal phaenogram is one in which there are “inner deformations and overlappings.” When a phaenogram is normal, then, Gerhards believes he can establish two things (Gerhards 1922, 429):

1. Every individual line in *Ao* corresponds to a line of the same colour in *P*, and vice versa.
2. If any two lines in *Ao* are next to one another, then the corresponding lines in *P* are next to one another throughout the whole of the stream, and vice versa.

From this Gerhards (1922, 429) concludes “The two structures *Ao* and *P* are in the most general geometrical sense, that is in the sense of topology or analysis situs, equivalent to one another.”

Thus, Gerhards claims to establish the first part of what he wants: the local topological features of *P* correspond to and thus fully determine the local topological features of a portion of *O*, namely *Ao*. Thus, there is no scientific or metaphysical hypothesizing involved in moving from the local topological features of *P* to *Ao*; these features are simply revealed or, to speak a more constructive language, assigned from the features of *P*. Gerhards’s second question is then to what extent do these topological features of *Ao* determine the topological features of *O* as a whole. Here things are, not surprisingly, even more complicated. He now considers the individual photos that make up the film *P* or the corresponding *Ao* to be stacked upon one another and asks his question in the language of “Totalization” (Gerhards 1922, 446): can we in some univocal way use the information in *Ao* (or *P*) to complete or totalize the topology of *O*? His answer is roughly this: If we imagine *P* to be a film of the entirety of a closed surface—his example is again the surfaces in a room—so that each surface in the room is filmed for some portion of *P*, then *O* is univocally determined by the topological features of *P*. By this he means that if we take the only locally determined topological features of *P* as revealed in the portion of the film in which they are revealed and project the lawful relations among those features into the remainder of the ontogram, you get a single topologically determinate ontogram. Here’s his claim (Gerhards 1922, 449):

The question of to what degree a progressively totalizable phaenogram allows of being augmented univocally at all into an ontogram is equivalent to the purely topological question, in how far do surface pieces that overlap one another in particular parts allows a surface to be univocally put together. If we are dealing with the special case of normal sight perception of closed corporeal surfaces, then the phaenogram is, in the earlier sense,

“normal.” Therefore, the space-time total process of the surfaces—including its not immediately perceived parts—*solely* from the stream of appearances is univocally progressively topologically definable insofar as every piece of the surface comes eventually at least once immediately into appearance.

The constructive element of this is important here. Gerhards seems, perhaps, to be saying that only one ontogram is consistent with the portion of the ontogram whose topological properties are given in the phaenogram. But he is not saying that at all. All he is saying is that there is only one univocal way to extend A_o to a well-defined O from the properties of A_o alone. Again, a long quotation is useful here (Gerhards 1922, 449):

In fact: we can imagine for example an evil genius that, while we film the room with our camera, brings about the most marvelous changes behind our back, but always brings things back to right order so that we never have a clue: we can add such and additional fantasies to the given stream of perceptions, P . But we cannot univocally define all those augmentations that are logically consistent with P solely on the ground of P , as we have with O . In this sense, O is actually “hypothesis free”, especially metaphysics free, as soon as we consider any normal P : our augmentation remains in the mode of expression of Kant, throughout within the bounds of “possible experience” grounded in P .

To recap, then: The problem Gerhards finds in Helmholtz and Mach is a problem of determining an augmented three-dimensional spatial world of things that in some way is uniquely the simplest or most economical. He rephrases this question as a question of the degree to which the local topological structure of (primarily visual) experience does or does not uniquely determine a unique local topological structure for physical space. He argues that in certain special cases (the ones that fulfil the normalcy constraint) there is such a uniquely determined structure. Two aspects of this problem situation are worth noting in respect of Carnap’s construction of the external world in the *Aufbau*.

First, this question of the constraints placed on the local topology of physical space by the local topology of experience is not presented by Gerhards as a technical problem that arises in the context of explicating Poincaré’s conventionalism and Einstein’s theory of relativity. He, rather, presents it as a long-standing general issue of the hypothesis of an external world from the work of Helmholtz and Mach. The setting here is an experimental understanding of experience and a question of the external world as the *Ur*-scientific hypothesis. The question is not whether the external world hypothesis is epistemically justified but whether any version of the external world hypothesis has the precise virtues that Mach ascribes to it.

Second, the sort of unique determination at issue here is not a linguistically understood notion of uniquely defined. It is rather the question of whether there is an ontogram whose structure stands in the simplest possible relation to the structure of the phaenogram: no complications in the structure of the ontogram are posited that are not induced by the complications of the structure of the phaenogram. This is the sort of simplicity or economy of the posit that is at stake. It might not be too much of a stretch to present the issue as: is there a uniquely laziest world compatible with the structure of experience? This, of course, is one of the ways that Quine (1980, 40) expresses what Carnap is actually doing in the *Aufbau*’s construction of

the “is at” relation. Indeed, the methodological claims in points one through eleven of the *Aufbau*’s sections 126 and 127—the methodological rules used to assign colors to space-time points—stand in more than simply an analogy to Gerhards constructions. Points four through ten seem to make explicit the construction based on “totalization” that Gerhards actually sketches in terms of continuous temporal world lines and occlusion and overlapping. Of course, because it eventuates in a well-behaved logical object, Carnap does not view this construction as an hypothesis and thus, in that sense, not an alteration of method or violation of Russell’s supreme maxim.

Conclusion

The argument of this essay is not a replacement argument: I am not arguing that the best interpretation of the *Aufbau* replaces Russell’s external world problem with Gerhards’s. Rather, I have simply attempted to bring to our attention that there were other questions about the relation of the external world to experience that were enunciated in the German epistemological context and that Carnap know very well. He does not merely cite Gerhards in the crucial section, Gerhards and Gerhards’s paper played a role in the background to the project of the *Aufbau*. As mentioned earlier, there is evidence that Carnap’s own proto-*Aufbau* manuscript and Gerhards’s paper were two essays circulated in advance of the 1923 Erlangen meeting at which Carnap sought to express his understanding of the proper business and proper tools of epistemology. Gerhards, as noted above, attended this meeting.

The Erlangen meeting is less studied than it should be.⁵ It was the first joint effort of Reichenbach and Carnap to forge a scientific community of philosophers in Germany. Its theme was “the theory of relations as a tool for the epistemologist” (HR 015-50-06). In the invitation, Reichenbach and Carnap offered the following list of earlier literature that “goes in the direction” of the use of the theory of relations in epistemology: Edmund Husserl’s *Logical Investigations*, Ernst Cassirer’s *Substance and Function*, Hans Dreisch’s *Ordnungslehre*, Russell’s *Our Knowledge of the External World*, and Richard Gätschenberger’s *Symbola*. One thing that is clear from that odd list of works is that it is very hard to find a common philosophical project in the work that Carnap took to have inspired his vision of the use of logic in epistemology.

In fact, the Gerhards-Mach-Helmholtz connection in sections 124–127 is an interesting moment of Carnapian eclecticism, given the explicit options open in German epistemology at the time. It is of interest that in *Substance and Function*, Cassirer ([1910] 1953, 289) cites the very same passage in Helmholtz that Gerhards objects to in which Helmholtz contrasts the constructions of geometry with the unconscious and inarticulate inferences of the projection of the external world (see page 12 above). But Cassirer’s objection is far deeper than is Gerhards: Cassirer

⁵On the Erlangen meeting see Thiel 1993.

doesn't wish to make mathematically explicit what Helmholtz leaves to subconscious inference; Cassirer wishes to argue that Helmholtz has gotten the whole philosophical problem the wrong way around. There is, for Cassirer, no hope to be found in any attempt to project the objective order from a subjective starting point. Rather the subjective is always discovered through a complicated dialectic process in which any particular stage of objective understanding lacks a univocal and universal lawful structure. Insofar as Carnap is taking the Gerhards-Helmholtz problem seriously, he differs from Cassirer on this point. Indeed, from this point of view Carnap seems to be using the technical formal logic of Russell to discharge the general epistemological function of Cassirer's logical of objective knowledge by showing how to use it to solve a particular epistemological puzzle that Cassirer thought unsolvable in principle. My narrow conjecture in this paper is that the procedures of sections 124–127 of the *Aufbau* form in part Carnap's type-theoretic attempt to make precise some aspects of Gerhards's own work on the external world problem within a general context of exhibiting the (neo-Kantian-inspired) logic of objective knowledge. My wider point here, as elsewhere, is that reading the *Aufbau* against only a narrow range of Carnap's influences obscures both interpretatively complicated issues within the text and our proper sense of its philosophical import.

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What Carnap Might Have Learned from Weyl

Thomas Ryckman

Aufbau §176 “demonstrating” the non-constructability of the real (as a mind-transcendent) concept had §17 of Weyl’s 1926 book, *Philosophie der Mathematik und Naturwissenschaften* squarely in its sights. Weyl had argued that postulation of a real, external world is both necessary for natural science and that such an objective world can be constructed, but only in abstract mathematical symbols far removed (“distilled”) from immediately given content. This world is a “symbolic construction of exactly the same kind as that which Hilbert carries through in mathematics”. For Hilbert, the mathematics of the infinite, and for Weyl, the world portrayed by fundamental physical theory, are twentieth century manifestations of the hypothetical employment of reason in the *Transcendental Dialectic*. But a regulative maxim of systematic unity cannot be accommodated within *Aufbau*’s brute partition of all statements of science into disjoint empirical and logical-analytic components.

Introduction

Some years ago, Alberto Coffa (1991, 207) drew an informative contrast between Carnap’s list of intellectual influences on his early development presented in the retrospective “Intellectual Autobiography” (1963) and the very different list compiled in a letter to Hugo Dingler of 20 Sept 1920. To Dingler, Carnap wrote that he was currently studying Kant, Riemann, Helmholtz, Mach, Poincaré, Natorp, Ostwald, Einstein and Hermann Weyl. Indeed, in the writings of Carnap in the early to mid-1920s, there are readily discernible traces of close study of numerous works of Weyl, both books and papers. These leave little doubt that at least in the initial part of his philosophical career, Weyl’s treatment of relativity theory and theory of space,

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as well as his writings on foundations of mathematics were an important influence on Carnap's philosophical development.

On the other hand, Weyl is but rarely cited by Carnap after 1930 and, where he was, it is nearly exclusively as a proponent, together with Brouwer, of intuitionism in mathematics.¹ However grouping the names of Brouwer and Weyl together under a common banner of "intuitionism" is unwarranted, then or now, as any careful scrutiny of their respective positions will show.² Moreover, whatever Weyl meant by "intuitionism", it is a position he abandoned – in print – even before *Aufbau* was published. Such monotypic reference to Weyl in the writings of the later Carnap is remarkable in the light of the early Carnap's documented familiarity with a wide-ranging variety of Weyl texts. It is even more striking given Weyl's extensive contributions to foundations of mathematics, pure mathematics, and theoretical physics in the first half of the twentieth century, all areas of concern to any "scientific philosophy". That stature has not diminished with time, according to a recent assessment by Fields Medalist Sir Michael Atiyah. Reviewing Weyl's significance, nearly 50 years after the latter's death in 1955, Atiyah wrote in 2002:

(T)he passage of time makes it easier to assess the long-term significance of Weyl's work, to see how his ideas have influenced his successors and helped to shape mathematics and physics in the second half of the twentieth century. In fact, the last fifty years have seen a remarkable blossoming of just those areas that Weyl initiated. In retrospect one might almost say that he defined the agenda and provided the proper framework for what followed.³

It is therefore rather difficult to understand the later Carnap's reticence regarding Weyl, except as an exponent of a philosophy of mathematics he surely should have been known to have abandoned. Inspired by Hilbert's formalist metamathematics, in 1925–1927 Weyl articulated a "symbolic mathematics" as his own characteristic attempt to mediate a compromise between the Platonism of modern axiomatic mathematics and the more epistemically secure methods of constructivism, intuitionism, or finitism. It is a concession to mathematical practice informed above all by Weyl's vocation as a working mathematician, and in this regard "symbolic mathematics" reflects a sober assessment of the limits of constructive methods, as well as a skepticism that individual mathematical sentences on their own admit of complete justification in terms of what Weyl referred to as 'Evidenz'. In sharp contrast to Weyl's existential awareness of these epistemological limitations by 1925–1927 stands the unrestricted claim of *Aufbau* to have provided the outline of a constitutional system capable of reconstructing all the individual statements of empirical science ultimately in terms of "elementary experiences", assuming as its

¹E.g., Carnap (1937, 46, 148, 305) and Carnap (1939a, 184). Weyl is not mentioned at all in Carnap's encyclopedia monograph (1939b) on foundations logic and mathematics. The sole mention of Weyl in Carnap's "Intellectual Autobiography" is a reference to the intuitionism of Brouwer and Weyl (1963, 48).

²See Mancosu (1998, 122, 2010, 292 and especially note 36, 543), and van Atten et al. (2002).

³Atiyah (2002, 3).

constitutive tool a logical framework essentially equivalent to Cantor's theory of transfinite ordinals.

1. It is not difficult to find acknowledgment of Weyl's influence in the writings of Carnap in the period 1922–1925. In *Der Raum* (1922) for example, Carnap singled out the 3rd (1919a) edition of Weyl's monograph on the general theory of relativity *Raum-Zeit-Materie* (RZM) as the foremost reference (“in the first instance”) on the problem of space in the general theory of relativity. A far more specific indebtedness to Weyl (and to Husserl's influence on Weyl) is manifested in *Der Raum*'s space of “essential insight”, in particular, in the latter's postulation of the necessarily a priori infinitesimally Euclidean structure of intuitive space; in support of this conception both RZM and Weyl's remarks on Riemann in Weyl's (1919b) edition of Riemann's habilitation lecture are cited,⁴ Several further works of Weyl are listed in *Der Raum*'s expansive bibliography.

The 1923 paper “Über die Aufgabe der Physik” presented Carnap's schematic attempt to portray an ideal structure of physical knowledge. This structure is envisaged as consisting in three volumes; the first representing physical laws as a formal axiomatic system, the second comprising a “dictionary” associating observable qualities to physical magnitudes derived from the theory, and the third providing a “time slice” connecting two states of the world (essentially Cauchy surfaces) at two arbitrary instants. This paper reveals that Carnap was clearly impressed by Weyl's “world geometry” encompassing gravitation and electromagnetism and by Weyl's geometrical (as a “four dimensional vector field”) conception of all physical state magnitudes. Moreover, Weyl's theory of 1918–1923 seeking to unify gravitation and electromagnetism (Carnap noted “and accordingly, all physical processes”) into a common space-time geometry, provided an illustration (as did Hilbert's earlier work in 1915–1917, inspired by Gustav Mie's electromagnetic theory of matter⁵) that “these two fields are determined by a single world law”. Both the Hilbert and the Weyl theories are regarded in 1923 as prototypes of axiomatic unification of physical theory. In fact, commenting on this paper of Carnap, Howard Stein referred to Weyl's RZM (to be sure, to the definitive 5th 1923 ed.) as “a book that reasonably resembles Carnap's ideal first volume ... and that succeeds not only as a systematic formulation but even as a pedagogical instrument”.⁶

Again in the introductory section of his 1924 “Dreidimensionalität des Raumes and Kausalität” Carnap pointed out that a significant precursor to the paper's guiding idea, to connect the idea of the dimensionality of space with the concept of physical lawfulness, had been Weyl's attempt (in RZM 3rd ed. (1919a) and later) to show that, that only the simplest integral invariants of an action integral (what Weyl called a “world function”) in 4-dimensional space-time allow the validity of Maxwell's theory of electromagnetism. In RZM, Weyl had stated that the general

⁴As pointed out by Michael Friedman in his annotations to the translation of Carnap (1922, 189–190).

⁵For details, see Brading and Ryckman (2008).

⁶Stein (1994, 637).

theory of relativity had left open the question of the topology of the space-time manifold; he sought to close this door with his theory of gravitation and electromagnetism. To be sure, Carnap omits important relevant details of Weyl's proposal (it crucially involves what Weyl termed a "gauge invariant" action principle),⁷ but even so, it is clear that Carnap paid close attention to even the more recondite parts of Weyl's treatise RZM.

2. Direct Weylian influences on the *Aufbau* are somewhat difficult to discern. Yet Weyl's *Philosophie der Mathematik und Naturwissenschaften* (1926) is among several references in *Aufbau's* extensive Bibliography annotated as "especially suitable for study of problems connected with construction theory", and indeed it is the sole work listed in both "logical" and the "epistemological" categories and, to be sure, in both cases, in the "Advanced" subcategory. That distinction alone merits a much more comprehensive study than can be given here of the possible relations of *Aufbau's* project of a "constitution theory" (Konstitutionstheorie) to Weyl's philosophical and scientific works. What follows focuses only on *Aufbau's* §176, entitled "The Metaphysical Concept of Reality".

In the previous section (§175), Carnap had distinguished "empirical" and "metaphysical" concepts of reality. The empirical or constitutional sense in which an object may be called "real" is that it fulfills the stated constitutional, i.e., empirically ascertainable, conditions for that accolade; the concept of reality is said to correspond to "the customary usage of the empirical sciences". The second concept of reality is familiarly characterized in terms of an object's "independence from the cognizing consciousness"; unlike the former, this sense is problematic in that the question may arise whether objects real in the first sense are also real in the second. Differing opinions over whether objects are real in the second sense and, if so, which objects these are, characterize the competing schools of realism, (subjective) idealism, and "phenomenalism", Carnap's idiosyncratic denomination of Kantian and neo-Kantian transcendental idealism; such a phenomenalism holds that "reality must be ascribed to 'things-in-themselves', whose appearances are physical objects". §176 simply asserts that the concept of reality of idealism is to be rejected out of hand as not being in conformity with the customary usage of the empirical sciences. But Carnap then purports to demonstrate that the second, transcendent, concept of reality, rejected by idealism but required by both realism and phenomenalism, is not constructible within a constitutional system; hence it is not scientific but metaphysical. The argument can be briefly summarized: Every scientific concept can be constituted; the concept "independence of the cognizing consciousness" cannot be constituted; accordingly, the latter concept is not scientific; hence it is metaphysical. The argument merits a closer look.

In the background to §176 lies *Aufbau's* presupposition that the objectifying framework of a theory of constitution is the Whitehead-Russell theory of logical types; this gives "constitution" a precise meaning within the language of *Principia*

⁷For details, see Ryckman (2005, 83–84).

Mathematica. In particular, through a process of “rational reconstruction” each concept of empirical science (not merely physical science) is definable in constructive step-by-step fashion from concepts themselves constructed at lower levels, and ultimately in terms primitive concepts pertaining to the stream of “elementary experiences” of a cognizing subject. This constructive process grounds the core assertion that any and all concepts of empirical science can be constituted, i.e., reconstructed purely in terms of elementary experiences and logic. In particular, any question regarding the meaning of an empirical concept can be answered by showing how the concept can, beginning from its position in the constitutional system, be reduced to phenomenalist empirical content; the question can then be translated into one pertaining to “elementary experiences”, i.e., immediately given determinations of experience.

§176 accordingly begins with the claim to be demonstrated, that “(t)he concept of reality (in the sense of independence from the cognizing consciousness) does not belong within (rational) science, but within metaphysics”. The “demonstration” is an argument of the following form:

- (i) The constitutionally permissible sense in which an object constituted on the basis of my experience can be said to be “independent of my consciousness” is that its constitution does not depend on my will, i.e., I cannot effect changes in the object by merely willing them.
- (ii) However this constitutionally sanctioned sense of “independent of my consciousness” is satisfactory neither to realism (nor by implication, to “phenomenalism”), nor to idealism.
- (iii) Realism will object that, on this definition, a physical body held in my hand (e.g., Descartes’ “ball of wax”) would not be real since I can change it by an appropriate act of will (e.g., squeezing it). No mention is made of phenomenalism in §176 but presumably Carnap considers that it shares this objection of realism to (i).
- (iv) What is the objection of idealism? Carnap has told us in the previous section (§175) that in discussing idealism he means “subjective” (i.e., Berkeleyan), not “objective”, idealism, the latter is an Hegelian idealism that “ascribes reality to a superindividual absolute subject, which is not constructed in our system.” For this reason, “objective idealism” is not further discussed. Idealism in the subjective sense then holds that only heteropsychological objects, but not physical objects, are real. Hence subjective idealism’s objection to (i) is that it permits “any physical thing” to be “real” even though such a thing may lie beyond our heteropsychological (“technological”) reach. Carnap provides an example of such an object: a crater in the moon). Of course such objects are real in the sense of i), in conformity with ordinary usage in the empirical sciences.
- (v) Carnap finally asserts that any other attempted constitutional definition of the second reality concept (“in the sense of independence of my consciousness”) cannot jointly satisfy realism and idealism (in the specified sense). The claim is strengthened to say that no definition of a concept of reality adequate to both realism and idealism can be constituted in any experiential constitutional system (not necessarily one with an autopsychological basis, as in *Aufbau*).

The conclusion of §176 is accordingly

The (second) concept of reality cannot be constituted in an experiential constitutional system; this characterizes it as a nonrational, metaphysical concept.

The rhetorical device, associating “rationality” with “constructability” within an *Aufbau*-style constitutional system, is notable and may be presumed to be intentional; it reminds of Bohr’s almost exactly contemporaneous attempts to legislate complementarity as the sole “rational” understanding of quantum mechanics.⁸ The association underscores the fact that the purportedly demonstrated claim became one of the most widely known assertions of *Aufbau*, and one of the precious jewels of logical empiricism. §9 of Carnap’s *Pseudoproblems of Philosophy* served to highlight its prominence. More importantly, the 1929 manifesto of the Vienna Circle, *Wissenschaftliche Weltauffassung*, gave perspicuous pride of place to the claim in its précis of *Aufbau*:

It turns out that the concept of reality, as it is used in the doctrines of realism, idealism and phenomenalism (...) cannot be constituted; these doctrines cannot be retranslated into statements about the given and therefore have no meaning. The same holds for all metaphysical doctrines that go beyond the given.⁹

Given the eminence and far-ranging purported philosophical significance of the claims of §176 in subsequent logical empiricism, we are nonetheless given pause by the fact that in the annotations to that section, Carnap saw fit to make reference to a dissenting voice, that of Hermann Weyl.

3. The “References” to section §176 are illuminating in several ways. Ostensibly, their general tenor is to show that agreement on the non-constructability of the second concept of reality is rather widespread. Specific reference is made to various works of Russell, who also merits a brief paragraph of discussion. Interestingly, after listing these works of Russell, Carnap noted “Cf. also Weyl”, citing p. 89 of *PMNW* (*Philosophie der Mathematik und Naturwissenschaften*). A second short paragraph invokes the names of Mach, Ostwald and Bavinck as positivists who share the conclusion that the concept ‘reality independent of my consciousness’ is meaningless. Here I shall only discuss Russell and then Weyl.

Regarding Russell, Carnap noted an apparent agreement regarding the non-constructability of the concept of a non-empirical reality, providing in support of this claim a page citation (“120 ff.”) to the English edition of Russell’s 1914 Lowell Lectures, published as *Our Knowledge of the External World as a Field for Scientific Method in Philosophy*. However, neither in the indicated place, nor in the surrounding chapter (“Lecture IV: The World of Physics and the World of Sense”) did Russell make such a claim, at least in the form intimated by Carnap.

We recall that the concern in Russell’s fourth Lowell lecture is with the “verifiability of physics”, an issue Russell recognized to be quite distinct from that of the

⁸Cf. Beller (1999, particularly Ch. 9).

⁹Stadler and Uebel (eds.) (2012, 93).

truth of physical claims.¹⁰ Of course, the distinction between verifiability and truth parallels Carnap's own distinction between the two concepts of reality. The problem for verifiability is that physics makes use (according to Russell) of three kinds of unverifiable hypotheses: (i) how objects would appear, when no observer is present; (ii) how they would appear at times when no one could observe them; and finally (iii) hypotheses about objects unobservable in principle. Now if physics is to be verifiable, each of the three hypothetical kinds of entity "must be capable of being exhibited as logical functions of sense-data" (Russell 1914, p. 111). To be sure, Russell, carried away by phenomenalist rhetoric, at times conflates verification and ontology; this occurs a few pages further on (within the scope of pages cited by Carnap), where he summarizes his discussion as follows:

If such constructions are possible, then mathematical physics is applicable to the real world, in spite of the fact that its particles, points, and instants are not to be found among actually existing entities. (p. 122)

Prima facie, this is an astonishing statement; the applicability of mathematical physics (an indisputable fact since the seventeenth century) is deemed conditional upon the admittedly "tentative and suggestive" outline given in this lecture of logical constructions from sense data! But what Russell presumably meant, more charitably, is that the idealizations of mathematical physics – treating particles as point masses, points of space as extensionless, instants of time as arbitrarily small magnitudes entering into differential quotients – are not actually existing entities. What Russell, with greater clarity, might have said is that if the indicated logical constructions are possible (and only a very rudimentary outline is presented in this lecture), then they may serve as verifiable constructed proxies for these idealizations of mathematical physics. In any case, although this statement does not quite say that the concept of non-empirical reality cannot be constructed, it may suggest such a construal, as Carnap apparently thought.

Russell is then criticized by Carnap for inconsistency, for in other publications (Carnap provided an impressive list), despite the apparent rejection of the second (metaphysical) concept of reality, Russell nonetheless continued to ask questions whose answers in fact presuppose that conception of reality. As any reader of Russell knows, this is indeed the case. On the other hand, it is difficult to see in Russell's inconsistency anything other than other instances of the rhetorical conflation of verification and truth (or ontology) mentioned above or, in works after 1917, a departure from his phenomenalist "external world" period.

4. As noted above, immediately after leveling the charge of inconsistency against Russell, Carnap provided, without further comment, a quite specific and brief page citation to Weyl: "cf. Weyl [PMNW] S.89". As Weyl neither then nor at any time previously had engaged in anything like Russell's phenomenalist logical

¹⁰Russell (1914, 110–111): "Now verifiability is by no means the same thing as truth; it is, in fact, something far more subjective and psychological. For a proposition to be verifiable, it is not enough that it should be true, but it must also be such as we can discover to be true. Thus verifiability depends upon our capacity for acquiring knowledge, and not only upon the objective truth."

construction of the world, it is far from obvious quite why Carnap did so. The distinctive place accorded Weyl's book in the References to *Aufbau* surely can be taken to provide evidence that Carnap recognized it to be a philosophical work of substance and of special relevance to the *Aufbau* project. But what, precisely, did Carnap intend in making this reference? After all, in the cited section of *Philosophie der Mathematik und Naturwissenschaften* (1926), Weyl affirmed that non-empirical reality can be, is, and must be (as a matter of belief, see below) symbolically constructed in theoretical physics. Is Weyl then, like Russell, to be accused of being inconsistent? Or, if Weyl's claim is regarded as a counterexample to the purported demonstration of §176, why is it not specifically addressed?

Now Weyl, as Russell, would be "inconsistent" in countering Carnap's thesis of the non-constructability of the concept of the real only if it were the case that Weyl is committed to a purely phenomenalist or perhaps purely phenomenological epistemology. But Weyl never supported phenomenalist construction in Russell's sense, while in Weyl's most phenomenologically influenced works (*Das Kontinuum*, RZM), one would be hesitant to label his epistemological views as purely phenomenological. And even if that were so, it would be clear from Husserl's *Logical Investigations* on that phenomenology places no phenomenalist strictures on meaning. Just possibly, however, Carnap may have had in mind that Weyl, deemed by Carnap (as late as 1963) an intuitionist like Brouwer in mathematics, should not have condoned the "metaphysical" concept of reality in empirical science. This would seem to be the only conceivable basis for including Weyl in the indictment of inconsistency levied against Russell. It is, of course, a faulty premise, since intuitionist strictures pertain solely to meaningful (i.e., constructive) logical and mathematical concepts, not across the board to concepts of empirical science. Weyl himself provides an instance of this bifurcation, for even in the heyday (1920–1924) of his brief allegiance to intuitionism (which, in any case, Weyl understood somewhat differently than Brouwer, see note 2 above), Weyl freely used non-constructive mathematics when working in theoretical physics and in pure mathematics. But Weyl, as he tells us in *PMNS*, is no longer an intuitionist in mathematics, though he would (even as late at 1946) continue to praise Brouwer for having

opened our eyes and made us see how far classical mathematics, nourished by a belief in the 'absolute' that transcends all human possibilities of realization, goes beyond such statements as can claim real meaning and truth founded on evidence.¹¹

We turn now to what might well have occurred to Carnap to be the operative passage on the cited p. 91 of Weyl's 1926 book. There we find

... axiomatics reveals itself once again (compare S.49) as the method of a refined realism that posits a transcendent Being (*Sein*) but is content with its reconstruction (*Nachbildung*) in symbols.

¹¹ Weyl (1946, 275).

The passage continues,

The postulation of the 'I', 'thou', and the external world is without influence on the cognitive processing of reality, it is a matter of metaphysics; not judgment, but rather an act of recognition or of belief (...). However this belief is the soul of all knowledge.

For purposes here, there are two principal items of interest about this passage:

- (i) as Weyl's internal reference on p. 89 to p. 49 (in § 10 of his book) makes clear, to say that axiomatics is "the method of a refined realism", postulating a "transcendent Being but ... content with its reconstruction in symbols", is an allusion to the ideal elements postulated within Hilbert's axiomatic method, and the generalization of that method to a completely symbolic mathematics, in Hilbert's incipient program of metamathematics.
- (ii) that this conception of reality (the transcendent Being of the external world, i.e., its independence of the cognizing consciousness) but as well, the postulation of the cognizing ego and the being of the other are indeed metaphysical postulates, not as a matter of judgment but of belief; nonetheless this belief is "the soul of all knowledge".

We shall discuss these two points in turn.

Let's turn to the significance of the internal reference to §10 entitled "Symbolic Mathematics"; this section contains Weyl's explicit discussion of Hilbert's "metamathematics", which, Weyl states, turns the purely formal game of symbols into knowledge, in particular, to the knowledge that the game of symbols never leads to contradiction. Section §10 is largely Weyl's reaction to Hilbert's "Neubegründung der Mathematik: Erste Mitteilung" (1922) and to Hilbert's "Über das Unendliche" (1925).¹² In the earlier paper, Hilbert clearly distinguished, for the first time, between logico-mathematical axiomatic formalism and "contentual" (inhaltlich) mathematics. In "contentual mathematics" as in elementary number theory (quoting Hilbert) "we simply have concrete signs as objects, we operate with them, and we make contentual (inhaltliche) statements about them" (Ewald translation, 1123). Then, to recover the furthest reaches of classical analysis, algebra and higher arithmetic, Hilbert required a strict axiomatic formalism of the entire mathematical theory, including its proofs and rules of inference. These purely formal formulae and proofs, like the strings of strokes contentually representing numbers, are themselves to become the objects of contentual thinking through the use of what Hilbert would call "finitist methods" whose sole purpose is to show that an inconsistent statement cannot be derived within the thus formalized theory. Weyl observed that for Hilbert (and Weyl clearly agreed) mathematics proceeds as if unrestricted existential and universal quantifiers were meaningful.

¹² Sieg (1999) pinpoints this paper as the first published presentation of Hilbert's finitist program of metamathematics.

Hilbert's (1925) paper deals with the “transfinite” axiomatic non-contentual part of mathematics. There, Hilbert wrote that

The role left to the infinite... is merely that of an idea – if, according to the words of Kant, one understands by an idea a concept of reason (Vernunftbegriff) transcending all experience and supplementing the concrete **in the sense of totality**.

We should recall what Weyl surely knew, that Hilbert's axiomatic method was not merely a manifestation of the typical mathematical concern with rigorous explicit statement of a theory (not necessarily a purely mathematical theory), but rather also connoted a specifically logical and epistemological method of investigation for ‘deepening the foundations’ (Tieferlegung der Fundamente) of a theory. This was a method of investigation that Hilbert pioneered, and which he saw as closed tied to the nature of thought itself. (footnote Hallett). As in Kant's clipped summary of cognition at A702/B730,¹³ the epigram to Hilbert's 1899 monograph *Grundlagen der Geometrie*, Hilbert in 1922 viewed the nature of thought as beginning with ‘facts’, i.e., singular judgments about “something ... already ... given to us in representation (in der Vorstellung): certain extra-logical discrete objects intuitively present as an immediate experience prior to all thinking”.¹⁴ Analysis then determines concepts under which the given facts can be classified and arranged. Finally, a most general framework of concepts (Fachwerk von Begriffen), crowned with the fewest possible, independent principles or axioms serves to present the theory in a way that highlights the self-sufficiency of the mathematical subject matter, which then can be developed autonomously. Hilbert is particularly insistent that within the axiomatic method axioms are to be considered bereft of all intuitive content or contentual thinking, and in this regard they are to be understood as ideas in Kant's regulative sense. The above remark from “On the Infinite” expressly states this for the axiom or concept of the infinite: it is “concept of reason transcending all experience and supplementing the concrete in the sense of totality”, i.e., according to the demand of reason for unity.

Weyl's agreement with Hilbert's appeal to the regulative meaning of Kantian Ideas, the role of supplementing the given in the interest of totality, is implicitly affirmed in 1926, but it is clearly proclaimed a year after *Aufbau* was published.

I hope I am in agreement with Hilbert when I interpret this [the above remark from “On the Infinite”) as analogous to the construction by which I imbed the objects which are actually given to me in my consciousness into the totality of an objective world which comprises many things that are not immediately present to my mind. From the point of view of pure consciousness, it is also here not at all easy to understand what this supplementation really means.¹⁵

¹³“Thus all human cognition begins with intuitions, goes from there to concepts, and ends with ideas.”

¹⁴Hilbert (1922, Ewald translation, 1121).

¹⁵Weyl (1929, 157).

Section (§10) therefore concludes with a declaration Weyl would make many times, when distancing himself from Brouwer, while at the same time motivating the idea of “symbolic construction” modeled on Hilbert’s “symbolic mathematics” (1926, 49–50; cf. 61–2)

... mathematics is to be at the service of the natural sciences. The propositions of theoretical physics, however, certainly lack the character that Brouwer requires for those of mathematics, namely, that each bears completely within itself its own enforceable meaning. Rather, there [with the propositions of theoretical physics] it stands that when a proposition is to be confronted with experience, only the **system as a whole** comes into question. Obviously we must sharply distinguish between **phenomenal knowing**, intuitive insight – and **theoretical construction** (Gestaltung). Knowledge furnishes truth, its organ is ‘vision’ (‘Sehen’) in the widest sense.

This passage echoes an earlier declaration of Weyl in 1925.¹⁶ Reflecting on the use of mathematics in natural science, Weyl affirmed that at least insofar as theoretical physics is concerned, an individual proposition does not bear its “own enforceable meaning completely within itself” but rather only the system of propositions as a whole permits confrontation with experience. Of course, this holist conception of evidential meaning and confirmation stands in sharp contrast to *Aufbau*’s guiding conception that the meaning of each statement of empirical science can be constructed logically out of elementary experiences. That conception is surely methodologically analogous to Brouwer’s view of mathematics, according to which each individual statement must carry its own relation to the direct evidence of intuition. But this is just the issue on which Weyl sought to distinguish the method of theoretical physics. Contemporary readers of this passage surely anticipate invocation of the name of Duhem at this juncture but that expectation will be disappointed. Rather the operative lineage of Weyl’s recognition of holism in theoretical physics is distinctively different. It is first expressed by Weyl’s own understanding of the relations of geometry to physics in the theory of general relativity already in the first (1918a) edition of *Raum-Zeit-Materie*. But secondly, the term “axiomatics” signals to us that Weyl, student of Hilbert, viewed holism as an inevitable consequence of the use of implicit definition in Hilbert’s axiomatic method.

Under the influence of Hilbert’s incipient program of metamathematics, in remarks following Hilbert’s 1927 lecture in Hamburg, Weyl announced his agreement with Hilbert, extending the holist conception of meaning and evidence, characteristic of the axiomatic method and symbolic metamathematics of Hilbert, to

¹⁶ Weyl (1925, GA II, 540): “Without doubt, if mathematics is to remain a serious cultural concern, some *sense* must be connected to the Hilbertian formulae game. And I see only *one* possibility of attaching an independent intellectual significance (*geistige Bedeutung*) to it, including its transfinite components. In theoretical physics we have before us the great example of cognition of an entirely different imprint than the common intuitive or phenomenal knowledge that expresses purely what is given in intuition. While here every judgment has in intuition its own completely realizable meaning, this is by no means the case with the single propositions of theoretical physics. Rather there it stands that when a proposition is to be confronted with experience, only the *system as a whole* comes into question.”

statements of mathematics as well, publically stating his departure from Brouwer and intuitionism.

I am very glad to confirm that nothing separates me from Hilbert in the epistemological situation thus created. ... [who] furthermore pointed with emphasis to the related science of *theoretical physics*. Its individual assumptions and laws have, separately in intuition, no immediate fulfilling meaning; in principle not the isolated propositions of physics, but only the theoretical system as a whole is confronted with experience. What is achieved here is not intuitive insight into particular or general states of affairs or a faithful *description* of the given, but a theoretical, ultimately purely symbolic, *construction* (*Konstruktion*) of the world.¹⁷

In short, Weyl's notion of symbolic construction, following the recent precedent of Hilbert's incipient metamathematics, aimed to provide an account of mathematics and theoretical physics that supplements, albeit indirectly and symbolically, an experiential epistemological basis of what is 'given' to the cognizing subject with the "belief in the 'absolute' that transcends all human possibilities of realization" necessary to both classical mathematics and theoretical physics. Such a supplementation, of course, cannot be constructed through a chain of logical definitions proceeding from a single basic relation (remembrance of part-similarity) between elementary experiences, but by definition transcends any experiential basis. theoretical physics and symbolic mathematics stand as "symbolic constructions" attempting to give satisfaction to the "creative urge directed upon symbolic representation of the transcendent".¹⁸ This then is "the method of a refined realism", a realism that projects a transcendent reality (of an external world "independent of my consciousness"; of a transfinite mathematics that completes a finitist mathematics in the interest of totality) but is "content to represent it in symbols". One might argue, on behalf of such a refined realism, that this "creative urge" to represent the transcendent is a, if not necessary, then at least a frequently encountered motivation of the theoretician or, perhaps, more broadly, a stated aim of the goal of science. Similar statements are easily found among Einstein's remarks on the aim and nature of physical theory as a complete description.

Regarding point (2) we may be brief: To Weyl, the postulate of the external world, but also of the cognizing ego and as well the being of the intersubjective other are indeed metaphysical postulations, as a matter of a belief that is "the soul of all knowledge". As postulates, these are propositions that cannot be demonstrated. They are therefore matters of belief, not of judgment. On the other hand, Weyl here, and elsewhere, expresses a conviction that without such postulates, whose pragmatic utility cannot be denied, nothing resembling knowledge can arise. This conviction, "the soul of all knowledge", stems from an existential awareness, informed by an assessment of the limits of constructive methods, regarding the possible reach of epistemological or indeed, philosophical illumination and analysis. This existential awareness not only makes the project of the *Aufbau* alien to Weyl, it also ultimately distances him from Husserl and the pretension of ultimate phenomenological explanation.

¹⁷Weyl (1928, Bauer-Mengelberg and D. Føllesdal translation, 484).

¹⁸Weyl (1925, GA II, 542).

Conclusion

The bold claim of *Aufbau* §176 to have shown the “nonrational, metaphysical” character of the concept of a reality “independent of my consciousness” tends to bring a wan smile to the face of the contemporary philosopher of science. Carnap’s reference to Weyl in that section however remains puzzling. It is plausible to think that Carnap naturally recognized something of relevance to the *Aufbau* project in Weyl’s discussion of symbolic construction in mathematics and theoretical physics. However, whatever Carnap thought that was, he surely saw that it conflicted with his own ironclad commitments to logicism and strict empiricism. To be sure, it may not have been entirely clear to Carnap, as to many others who read Weyl, exactly what Weyl’s philosophical views were. Weyl is difficult to read, with his widespread use of literary allusions, his invocations of Fichte and Meister Eckhard, not to mention Husserl and Leibniz. But his claim that the exact sciences (mathematics and theoretical physics) are symbolic constructions is, after all, the principal theme of Weyl’s 1926 book. It is a viewpoint at which Weyl himself had only recently arrived but it marked the public end of his adherence to intuitionism, and – crucially – it had been inspired by Weyl’s appreciation for Hilbert’s recently initiated program of metamathematics. Contemporary philosophers of science can speculate with fondness on what Carnap might have learned if he had explicitly attempted to engage with Weyl’s notion of symbolic construction.¹⁹

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Wiener and Carnap: A Missed Opportunity?

Sébastien Gandon

Norbert Wiener (1894–1964) is remembered today mostly as a first class mathematician who made lasting contributions as much in abstract mathematics as in more applied domains (like stochastic processes, communication theory, and signal processing). His name is usually associated with the Massachusetts Institute of Technology (where he spent his whole career) and also with cybernetics, which he claimed to have founded in his 1948 paper. He is known as well for his precociousness: Wiener got his PhD on philosophical logic in 1913, at the age of 18 years old, under the supervision of Josuah Royce,¹ and he made his first contribution to mathematics (to the theory of Lebesgue's integral) at the age of 25.

This paper is devoted to a lesser known part of Wiener's works, namely his early involvement in Russell's constructionalist program. Wiener met Russell just after his PhD at Cambridge, where he spent six months in 1913. The two men did not get on well at first, as you can see from these two quotes:

Wiener to his father (25/10/1913)²: 'I have a great dislike for Russell; I cannot explain it completely, but I feel a detestation for the man... His mind impresses one as a keen, cold, narrow logical machine, that cuts the universe into neat little packets, that measure, as it were, just three inches each way.'

Russell to Ottoline (1913): 'The prodigy [Wiener's nickname] is disgusting, I don't know why; I hardly know how to be civil to him.' (479–80 of Correspondence, Vol. I)

Yet it seems that, as time goes by, Russell and Wiener manage to collaborate. In fact, the interaction remained asymmetric. At the time, Russell placed all his hope in Wittgenstein, and seemed to consider Wiener more as a gifted young mathemati-

¹On Wiener's PhD, see Grattan-Guinness (1975).

²The letter is kept at the Russell Archives, McMaster University, Hamilton. I thank the Archives for having given the permission to use the document.

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cian than as a deep philosopher and logician.³ On the other hand, Russell was very important for Wiener. During the agitated period which preceded his first important mathematical works, Russell's constructionalist program was the fixed point of Wiener's intellectual life. Indeed, no less than four papers (see the list below), written mainly in the 1913–1916 period (even if certain pieces were published later), are explicitly devoted to extending Russell's and Whitehead's program.

In what follows, I will first describe the main lines of Wiener's reception of Russell's constructionalist project. I will insist on Wiener's quite radical interpretation of the aim of Russell's constructionism, and on his application of the method to the sensorial experience. In the second part, I will draw a comparison between Wiener's achievements and Carnap's construction in *Aufbau*. I will stress the similarities, but I will emphasize some differences as well. In a third conclusive part, I will use this material to make some remarks on the debate about the influences of Russell on Carnap. The reader interested in Carnap could skip section “[Wiener's early works: a summary](#)”, focused on Wiener and which is technical at times, to start directly with the Carnap-Wiener comparison (section “[Wiener on the measurement of psychological quantities](#)”) and its discussion (section “[Conclusion](#)”). But as the material presented in section “[Wiener's early works: a summary](#)” is not, to my knowledge, available elsewhere, I prefer starting with a presentation of the main features of Wiener's interpretation of Russell's constructionism.

Wiener's Early Works: A Summary

The young Wiener wrote not less than nine papers devoted to different topics in philosophy and logic during the period 1913–1916.⁴ In most of them, Russell's ideas were discussed and sometimes criticized. Four articles, which were later considered by Wiener himself as the most important ones, are, however, explicitly dedicated to the extension of Russell's constructionalist program. There were two pieces from 1914 to 1915: *A contribution to the theory of relative position* (1914b), *Studies in synthetic logic* (1915a); and two papers published later in 1921 and 1922, but which were written during the war time: *A new theory of measurement* (1921)⁵ and

³Yet, Russell did help Wiener on several occasions. For instance, in the report of Wiener's 1921 paper to the London Mathematical Society, he wrote: ‘Dr. Wiener is the first to consider, with the necessary apparatus of math logic, the possibility of obtaining numerical measures of [psychological] quantities. His solution of the problem is, so far as I can see, complete and entirely satisfactory’.

⁴Wiener dealt with various subjects: philosophy of mathematics, general epistemology but also metaphysics and even moral philosophy. See Wiener 1914c, d, 1915b, 1916 in the bibliography below. For more on Wiener's works, see the *Collected Papers* (1976).

⁵The main body of (Wiener 1921) had been worked out in 1914. In his (1953, 201), Wiener wrote: ‘I returned to Cambridge in January [1914]... This time I tried to use the language of the PM to describe series of qualities, such as those found in the color pyramid, which escaped from a treatment of series given by Whitehead and Russell because they were not infinitely extensible in both

the long piece entitled *The relation of space and geometry to experience*.⁶ I will focus here mainly on 1914b and 1915a since as they exhibit the features which are relevant for a comparison with Carnap's project, as well as the seeds of what is developed later (especially in 1921). I will firstly insist on Wiener's conception of logical construction, and secondly on Wiener's theory of sensory intensities.

Logical Constructions

1913, the very year Wiener came to Cambridge, is the year that Russell elaborated his constructionalist program. Here is the way Russell summarized this process in *My Philosophical Development* (1959, p. 103):

As regards points, instants, and particles, I was awakened from my dogmatic slumbers by Whitehead. Whitehead invented a method of constructing points, instants, and particles as sets of events, each of finite extent. This made it possible to use Occam's razor in physics in the same sort of way in which we had used it in arithmetic. I was delighted with this fresh application of the methods of mathematical logic ... Having been invited to deliver the Lowell Lectures in Boston in the spring of 1914, I chose as my subject "Our Knowledge of the External World" and, in connection with this problem, I set to work to utilize Whitehead's novel apparatus.

What were previously considered as inferred objects non-directly knowable by acquaintance were now seen as complicated logical and set-theoretical constructs, whose basic elements are sense data. It is this line of research that Wiener sought to develop just after his meeting with Russell. He was especially interested in investigating the relations between the 'abstract' instants and the 'concrete' events. A footnote appended to the title of 1914b says that the paper 'is the result of an attempt to simplify and generalize certain notions used by [Russell] in his treatment of the relation between the series of events and the series of instants' (p. 441).

What exactly was the problem tackled by Wiener? Russell (1914, pp. 123 sq.) attempted to define the relation of strict total order between temporal instants from a weaker relation of ordering between intervals of time (or events). Wiener formalized and generalized Russell's reasoning. The first task was to characterize the weak order relation between intervals. Let us call complete succession a relation that an interval has to another interval if the first ends before the other begins. What conditions should we set upon a binary relation P on a set X so that P is a complete succession? Let I_P be the relation of incomparability derived from P , that is, the relation

directions. What I found necessary was a logical treatment of systems of measurement in the presence of thresholds between observations whose differences were barely noticeable.'

⁶This paper comes from a series of conferences given in Harvard in the fall 1915. Here is the way Wiener describes his attempt in (1953, 230): 'Besides my regular courses, I also gave what was called a Docent course in constructive logic. ... It was my intention to supplement postulational methods by a process according to which the entities of mathematics should be constructions of higher logical type, formed in such a manner that they should automatically have certain desired logical and structural properties.'

that x and y belonging to X have iff $\neg xPy \ \& \ \neg yPx$ (in English, two intervals x and y have the relation I_p if they overlap). Now, one can easily verify that if P is a relation of complete succession, then (1) P is irreflexive and (2) P is such that the composition of P , I_p , and P (in short PI_pP) is included in P^7 – a condition that you can see as a weak form of transitivity.⁸ But Wiener goes further than that since he takes the two ‘algebraic’ conditions (1) and (2) as a definition of the relation of complete succession. This characterization is not given in Russell, and it represents a great achievement. Indeed, Wiener anticipates by more than sixty years Fishburn’s definition of the notion of an interval order.⁹

After having formally characterized the relation of complete succession, Wiener can formally define the notion of an instant. Stated in plain English, the construction amounts to this (Russell 1914, 124–125):

Let us take a group of events of which any two overlap, so that there is some time, however short, when they all exist. If there is any other event which is simultaneous with all of these, let us add it to the group; let us go on until we have constructed a group such that no event outside the group is simultaneous with each other. Let us define this whole group as an instant of time. [...] We shall say that one instant is before another if the group which is the one instant contains an event which is earlier than, but not simultaneous with, some event in the group which is the other instant.

Wiener generalizes Russell’s definition, and he makes it more rigorous. Let’s P be any relation (not necessarily an interval order); and let I_p defined as before. Wiener defines C_p as the non-empty set of all the subsets c_p of X which satisfies the two following conditions¹⁰:

- (i) $\forall x \forall y ((x \in c_p \ \& \ y \in c_p) \rightarrow xI_p y)$
- (ii) $\forall x (\forall y (y \in c_p \rightarrow xI_p y) \rightarrow x \in c_p)$

In other words, using the terminology of graph theory,¹¹ c_p is a clique of $\langle X, I_p \rangle$ (condition (i)), which is maximal (condition (ii)) with respect to I_p . In the terminology of Carnap’s *Aufbau*,¹² c_p is a similarity class of the similarity structure $\langle X, I_p \rangle$. Wiener then defines the binary relation $<_p$ on the class C_p in the following way: ‘one instant precedes another when and only when some event belonging to the one entirely precedes some event belonging to the other’. Wiener then shows that if P is a complete succession (in the sense that it satisfies the conditions (1) and (2) above), then $\langle C_p, <_p \rangle$ is a strict total order.¹³

⁷In other words, the condition (ii) amounts to say that if a is wholly before b which overlaps with an element c that is wholly before d , then a is wholly before d .

⁸Indeed, P is transitive means that PP is included in P .

⁹See (Fishburn and Monjardet 1992, 169).

¹⁰The symbol ‘ c_p ’ is what, in Wiener’s formal construction, corresponds to Russell’s ‘instant’; and C_p is thus what corresponds to the class of all the instants.

¹¹And then supposing P to be symmetrical.

¹²In order to use Carnap’s concept, one should suppose P to be such that I_p is a reflexive and symmetric relation. See Leitgeb (2007) for more on this.

¹³The relation ‘ $<_p$ ’ is what corresponds to the time order relation.

With the exception of the definition of complete succession, Wiener did not go much further than Russell.¹⁴ But a look at the way Wiener describes his own construction shows us that it would be a mistake to reduce his work to a mere formal rewriting of Russell's development.

In 1914b, Wiener introduced a function 'inst' which associates the induced strict total order $\langle C_P, <_P \rangle$ to any interval order $\langle X, P \rangle$. The function 'inst' is thus a kind of operator which, when applied to a non-regular relation (in this case, a relation which fails to be total) gives a more regular ordered relation (here a total order). Wiener says that Russell called this process (deriving a more regular relation from a non-regular relation) 'fattening out a relation'. Now, it is natural to ask whether any other kinds of relations can be fattened out. The answer is yes, and I will rapidly present two other constructions made by Wiener.

The first is contained in a footnote of 1914b. Wiener says that one can devise an operator which, when applied to any binary relation, gives us a strict total order (and which is such that, when applied to a relation which is already a total order Q , generates a total order isomorphic to the original total order Q). The reasoning is not explained by Wiener, but it has been deciphered by Fishburn and Monjardet in their (1992, 175–176). Let R be a binary relation defined on X ; and let I_R, C_R, C_R and $<_R$ be defined as above. Of course, R not being a complete succession, $<_R$ is not necessarily an order. But now let us consider another structure $\langle C_R, T_R^* \rangle$, by defining T_R^* as the asymmetrical part¹⁵ of the transitive closure¹⁶ of $<_R$. Wiener applies the operator 'inst' a second time, to the newly defined structure $\langle C_R, T_R^* \rangle$ – that is, he defines a new relation of incomparability $I_{T_R^*}$, a new class of maximal cliques $C_{T_R^*}$, and a new relation $<_{T_R^*}$ on $C_{T_R^*}$. He then rightly claims (without proving it yet) that $\langle C_{T_R^*}, <_{T_R^*} \rangle$ is a total order.¹⁷ To summarize, Wiener applies the operator 'inst' twice here: to the binary relational structure $\langle X, R \rangle$, and to the result, slightly and cleverly modified, of the first application.

The second construction takes place in *Studies in synthetic logic* (1915a). There, Wiener shows how one can 'fatten out' any ternary relation to obtain a relation which has all the formal properties of the betweenness relation, and how one can perform the same operation for obtaining a separation relation (a projective order) from any tetradic relation. By want of space, I won't explore the detail of these beautiful constructions, and I refer the interested reader to (Fishburn and Monjardet 1992). Let me just quote what Wiener said about this work in his later work (1953, 211):

About this time I had my first experience of the concentrated passionate work that is necessary for new research. I had the idea that a method I had already used to obtain a series of higher logical type from an unspecified system could be used to establish something to

¹⁴Note that Russell's definition (here formalized by Wiener) is one which has certainly influenced Carnap. In his (2007, 209–211), Leitgeb considers Russell's construction as an early example of (successful) quasi-analysis; see his (2007, 209 sq.)

¹⁵That is: $x T_R^* y$ iff $x <_R^* y$ and $\neg y <_R^* x$.

¹⁶That is: $x <_R^* y$ iff there exist $x_1 = x, x_2, \dots, x_m = y, m \geq 2$, such that $x_i <_R x_{i+1}$, for all $i < m$.

¹⁷And furthermore, that if R is a total order, $\langle C_{T_R^*}, <_{T_R^*} \rangle$ is isomorphic to R .

replace the postulational treatment for a wide class of systems. The idea occurred to me to generalize the notions of transitivity and permutability, which had already been employed in the theory of series, to systems of a larger number of dimensions. ... I soon become aware that I had something good ... The resulting paper, which I entitled *Studies in Synthetic Logic*, was one of the best early pieces of research which I had done.

Wiener was certainly aware, in 1915, that he did push Russell's program well beyond Russell's own achievements.¹⁸ More precisely, Wiener explicitly contrasted the program (Wiener spoke of a 'method' in 1953) illustrated by his constructions to the Hilbertian postulationist approach. Wiener's goal was indeed to use logic (Russell's type theory) to generate some entities which have 'neat' properties, that is, properties that are usually obtained by setting axioms.¹⁹ This is clearly implied by the conclusion of the first half of 1914b (the part describing how to regularize any ternary and tetradic relations), where Wiener explained that synthetic logic should be seen as an alternative to Hilbert's method (1914b, 22):

We are able to construct a between-relation or a separation-relation from any triadic or tetradic relation respectively [...] Logically [...] this fact has a considerable interest, for it gives a hint of another method of defining mathematical systems than by the use of postulates; given our fundamental logical postulates to start with, we may be able to select the fundamental 'indefinables' of a mathematical system in such a manner that whatever values they may assume within their range of significance, the fundamental formal properties of the system will remain invariant.

So instead of defining a mathematical structure (total order, let's say) by setting out postulates, one can define an operator, which, when applied to any relation of a certain type, gives a relational structure with the 'neat' properties. The only needed postulates are the axioms of the ramified type theory – all the supplementary content is brought in by the process of 'fattening out' relations. Construction (what he called synthetic²⁰ logic) is then viewed by Wiener as a method destined to replace Hilbert's axiomatic approach, which was at the time very popular among the American mathematicians.²¹ I will soon come back to this opposition between Russell's construction and Hilbert's axiomatization which plays a central role in *Aufbau* as well.

Wiener on the Measurement of Psychological Quantities

There is a second remarkable topic in Wiener's reception of Russell: the application of Russell's method to the construction of the sensorial subjective experience. This is presented for the first time in the second part of 1915a and is fully developed in 1921. More precisely, Wiener wanted to account for 'the synthesis of the series of

¹⁸Note that the construction of betweenness and separation relation was connected to Wiener's construction of geometrical space published in (1922).

¹⁹On this contrast between construction and axiomatization, see Linsky (1999).

²⁰It is likely that the term 'synthetic' comes from 'synthetic geometry'. On the importance of synthetic geometry for Carnap's program, see Mormann (2004).

²¹On this, see below.

sensation-intensities from the relations between sensations given in experience' (1915a, 23), that is, to show how one can define an intensity of brightness, for instance, starting from the basic experiences of color sensations. This is a difficult task because perception is vague: two color sensations can seem to have the same intensity of brightness while not being really identical. The brightness order between color sensations has a threshold feature, and this fact prevents us from associating one color sensation to one and only one degree of brightness.

At first sight, there is a connection between this problem and the construction of instants from events we have just talked about. It is easy to check that the relation of being noticeably brighter which holds between colored objects is an interval order of the same kind as the one governing the ordinal relation between events in time. To derive intensity from sensations, one could then use the operator 'inst'. But this won't do, explains Wiener. Indeed, a temporal interval belongs to different maximal cliques (it is associated with many different instants), while one does not want to have a color sensation associated with many different brightness-intensities. The fact that one cannot associate a unique intensity to a sensation is wholly due to our cognitive and perceptual limitation, not to the fact that a color sensation has different intensities. The threshold feature of perceptual phenomena is thus not comparable to the structure exhibited by intervals of time: far from being considered as an interval of intensities, a sensation is viewed as a determinate intensity confusedly perceived.²²

As a matter of fact, Wiener's discussion finds its source in Fechner's analysis of the measure of sensation intensity.²³ In Fechner's time, the idea that we could order sensations according to their intensity (that we can judge a sensation as more intense than another) was universally accepted. To measure sensations, however, more is needed: one should find a way to introduce an additive structure on the order set of sensations. This was considered an impossible task: philosophers used to say that sensations were not divisible.²⁴ Fechner succeeded to get round circumventing this obstacle by using the threshold feature of perceptual phenomena. Fechner's starting point was provided by Weber's discovery according to which the just noticeable difference (jnd), or differential threshold, between two weight perceptions was approximately proportional to the weights. Thus, if the weight of 105 g can (only just) be distinguished from that of 100 g, the jnd is 5 g. If the mass is doubled, the jnd also doubles to 10 g, so that 210 g can just be distinguished from 200 g. Fechner's innovation was to stipulate that the differential threshold is constant. Let A and B be two different perceptions; let A' and B' be the intensification of A and B of just one jnd (caused by a different augmentation of the stimuli); according to Fechner, the difference between the sensation-intensities A' and A and B' and B are the same. Starting from 0, one can associate the measure 1 to the sensation which is just noticeable, the measure 2 to the sensation which differs from the sensation 1 by one jnd, etc. In other words, Fechner used the differential threshold as a unit allowing

²²In other words, Wiener espoused an epistemic view of vagueness, according to which blurry boundaries are the result of ignorance. On this, see Williamson (1994).

²³On Fechner, see Heidelberg (2004) and Stevens (1986).

²⁴This has a long history, which goes back to Aristotle. On this, see Solère (2001).

him to construct a scale of sensation. I won't deal here further with the detail of Fechner's works and with its complicate reception. My aim is only to establish that the threshold feature, which Wiener focused on in (1915b), played a central role in Fechner's psychophysics.

Let me come back to Wiener's formal discussion. For the reasons I have just explained, Wiener does not want to use the operator 'inst' to generate a total order from an interval order. He has then to devise a new construction, more adjusted to his need. Let $\langle X, P \rangle$ be a relational structure. The strong similarity relation S_p associated to P is defined in this way:

$$xS_p y \text{ if and only if } \{z \in X : zI_p x\} = \{z \in X : zI_p y\}$$

Thus for instance, two colored objects x and y have a strong similarity relation if and only if each of the things which is indistinguishable from x is indistinguishable from y and vice versa. It is easy to check that strong similarity is an equivalence relation. This has an important consequence. Let us consider c_s of X such that: (i) if x and y belong to c_s , then $xS_p y$; (ii) c_s is maximal in the sense that if x belongs to c_s and if $xS_p z$, then z belongs to c_s . Now, as S_p is an equivalence relation on X , the family C of all such subsets c_s forms a partition of X , that is, the division of X in different subsets c_s is exclusive (there is no element of X which belongs to two different subsets) and exhaustive (each element of X belongs to one subset). Logicians say that C is the quotient set X/S_p .

In plain English, the elements of X are the color sensations and the elements of C are the color intensities. Because of the threshold features of perceptions, many different sensations of color can correspond to the same brightness intensity – the relation P on X is not a total order. Now, Wiener's goal is to define a total order on C : if the comparison between sensations exhibits thresholds, it is not the case of the comparison between intensities. It is not an easy task, however, to induce from $\langle X, P \rangle$ the appropriate relation on C . Wiener, in 1915a, lays down that two intensities α and β in C have the relation $>_p$ if and only if there is an $x \in \alpha$ and a $y \in \beta$ such that $xI_p y$ (that is, if x is indistinguishable from a sensation z which is noticeably greater than y). Wiener shows that if (1') the composition of I_p and P is transitive, and if (2') the composition of P and I_p is included in the composition of I_p and P , then $\langle D, >_p \rangle$ is a total order.

The rest of the analysis is devoted to justifying the two conditions (1') and (2'). Wiener claims that (1') does not present any problems. The other condition is more complicated to legitimize, but Wiener notes that it is a direct consequence of the Weber-Fechner law. More precisely, it is equivalent to Fechner's hypothesis that the size of the threshold is constant – thus, rather than adopting Fechner's much debated assumption, it is better to accept this more formal condition.

Wiener, in his (1921), deepened and extended his first analysis. He refined the framework of Russell's and Whitehead's theory of measurement presented in part VI of *Principia Mathematica*,²⁵ and proved two major results: that it is possible to

²⁵ See Gandon (2011).

measure sensation intensities which are below the threshold; that the measurement of sensation intensities is independent from the Fechnerian assumption of the constancy of the threshold.²⁶ I don't have the place, however, to explain in detail all these beautiful advances.²⁷ Instead, I want to focus on the philosophical import of this construction.

When reading Wiener's research on sensory intensities, a rapprochement with modern psychophysics comes to mind. At the end of his article, Wiener explains that (1915a, 57):

The interest and importance of this work on sensation-intensities lies in the fact that it is often naively assumed by psychologists that the series of sensation-intensities is in some wise a datum of experience, and not a construction. As a result, they are led into the most grotesque interpretations of such numerical formulae as Weber's law. A series of sensation-intensities is often treated as if it were, in some sense or other, a series of sensation-quantities, without any analysis whatsoever of the basis on which this series is put into one-one correspondence with the series of 0 and the positive real numbers, in order of magnitude. It is at any rate a necessary preliminary to this exceedingly complex problem to know what the series of sensation-intensities really are, and what their relation to our experience is: without this analysis, no psychophysics is possible.

In other words, Wiener's basic idea is to find the minimal conditions on the 'noticeably greater' relation that gives rise to a linear order of intensities – and, in 1921, to the measurement of sensory intensities. This line of research was taken again by several mathematicians in the fifties, notably by R. Duncan Luce (see his (1956)) and the measurement theorists.²⁸ The works of Wiener and Luce constitute two attempts to put Fechnerian psychophysics on a firm logico-mathematical basis. Furthermore, Luce (like Carnap(1923),²⁹ Goodman (1951)³⁰ and Russell(1940)³¹) uses the very same definition of strong similarity in terms of indifference. Not only the goal (using mathematics for clarifying Fechnerian psychophysics), but also the way to reach it (defining a relation of strong similarity) are then, remarkably close.

But modern psychophysics is not the only context to which one should refer Wiener's analysis of sensory scale. There is another line which should be taken into account in order to understand the significance of Wiener's move. Contrary to Russell, Wiener did not consider the sense data (which corresponds to sensation intensities here) as the basic building blocks of the scientific construction. Sense data were for Wiener constructed from more elementary elements. Let me quote Wiener (1953, 191):

²⁶This assumption of the constancy of the threshold is central in Fechner's works and has been widely discussed in the literature – see for instance Stevens (1986).

²⁷I refer the interested reader to Fishburn and Monjardet (1992) and Gerlach (1957).

²⁸See for instance (Suppes and Zinnes 1968), who referred to Wiener's pioneering works.

²⁹On this, see Mormann (2009).

³⁰See *The structure of appearance*, chapter 9.

³¹See *Inquiry into Meaning and Truth*, chap. 6. Russell does not refer to Wiener in his book. But it is likely that Wiener's works were behind his mind.

I have always considered sense data as constructs, negative constructs, indeed, in a direction diametrically opposite to that of the Platonic ideas, but equally constructs that are far removed from unworked-on raw sense experience.

Compare with (1921, 183):

In taking [the relation noticeably brighter than] as our primitive experience, we do not mean to assert [...] that this relation is given as such in our experience, and that no further analysis of it is possible: what we do assert is that it represents a much more minute analysis of the basis of our measurements of sensation-intensities than any given, and forms a convenient starting point for a theory of sensation-intensities.

And with an MS dated from 1914:

Is 'this' the whole of my present experience, or some elementary part thereof? If the latter, what criterion have I whereby I may know when any part of my present experience is not subject to further analysis? [...] It surely cannot be said that the atomic character of any portion of my present experience is obvious on the face of it; psychology incessantly shows hidden complexities in the experience which we thought to be simple, and we have no means of knowing where this analysis will stop if it stops at all.

At the time, Wiener seems attracted by a sort of holistic position close to what one finds in James and Royce (his former teacher) according to which what is given in experience is the whole stream of consciousness. This view, reminiscent of the one defended in England by Bradley, was of course completely foreign to Russell's atomistic approach. To apply the constructionalist program to the sensation-intensities is thus a very strange move, since it amounts to applying Russell's methodology against Russell's epistemology. I will return to this below. But let me recall for the moment that psychophysics was, for Wiener, not only a scientific field which called for conceptual clarification; it was also a means to show that sense data, the starting point of Russell's whole construction, concealed 'hidden complexities'.

A Comparison Between Wiener's Early Papers and Carnap's *Aufbau*

Enough has been said previously on Wiener to draw a comparison with Carnap. Of course, what makes this rapprochement relevant is the common reference to Russell. But beyond this shared reference, one can detect three main points of convergence between Wiener and Carnap.

Construction as Conceptual Clarification

Scholars have insisted on the fact that Carnap, unlike Russell, did not view logical construction as a means to promote a kind of empiricist philosophy, but as an instrument of conceptual clarification. Even if one can doubt that Russell ever adhered to

the empiricist program, it is true that Carnap puts much more emphasis than his predecessor on the fact that goal of the 'Aufbauer' is not to reduce the theoretical terms to sensory experience, but to relate the various scientific concepts into one unique system so that the idle pseudo-problems raised by metaphysicians disappear. Thus, Carnap emphasizes the connection between the works of the scientist and the task of the system-builder. He thus claims, in §179, that the system-builder starts from already existing procedures, which he gradually purifies and rationalizes.³² Now, this is exactly what Wiener attempted to do in his analysis of Fechnerian psychophysics. Logical construction was here, just used as a way to justify and rationalize the conceptual framework of psychology. In the §157, Carnap goes a bit further – the ordering of concepts produced by the constructional system helps clarify, and thus eliminate problems:

The virtue of the constructional system [...] does not lie in the presentation of materially new insights, which could then be used for the solution of [certain] problems. What it achieves is actually only a uniform *ordering of concepts* which allows a *clearer formulation of the question for each problem and thus brings us closer to a solution*.

This again completely fits Wiener's own assessment. Let me quote the conclusion of 1921 (204–205), which resumes the conclusion of 1915a:

One of the great defects under which [psychophysics] at present labours is its propensity to try to answer questions without first trying to find out just what they ask. The experimental investigation of Weber's law is a case in point: what most experimenters do take for granted before they begin their experiments is infinitely more important and interesting than any results to which their experiments lead. One of these unconscious assumptions is that sensations or sensation intervals can be measured, and that this process of measurement can be carried out in one way only. As a result, each new experimenter would seem to have devoted his whole energies to the invention of a method of procedure logically irrelevant to everything that had gone before: one man asks his subject to state when two intervals between sensations of a given kind appear different; another bases his whole work [on another method], and so on indefinitely, while even where the experiments are exactly alike, no two people choose quite the same method for working up their results.

The logical analysis of the scale of sensation-intensities, by making us understand more clearly the scale's nature, helps us to eliminate the pseudo-problems that constantly arise in experimental psychophysics and threaten its development.

In this respect, the two men seem very close. There is however, something which is distinctively Wienerian: the stress put on the problems caused by the use of various scientific jargon. This issue was already insinuated in the passage quoted above, when Wiener deplored the fact that each psychologist adopts his own method of measurement. But it becomes prominent in Wiener's subsequent works. Let me quote the first pages of *Cybernetics* (1946, 4):

For many years [I have had] the conviction that the most fruitful areas for the growth of the sciences were those which had been neglected as a no-man's land between the various established fields. [...] Today a man may be a topologist or an accoustician or a coleopterist.

³² See *Aufbau*, §179: 'in the actual process of science, the objects are taken from the store of everyday knowledge and are gradually purified and rationalized, while the intuitive components in the determination of these objects are not eliminated, but are rationally justified'.

He will be filled with the jargon of his field, and will know all its literature and all its ramifications, but, more frequently than not, he will regard the next subject as something belonging to his colleague three doors down the corridor [...].

These specialized fields are continuously growing and invading new territory. The result is like what occurred when the Oregon country was being invaded simultaneously by the United States settlers, the British, the Mexicans and the Russians – an inextricable tangle of exploration, nomenclature and laws. There are fields of scientific work [...] which have been explored from the different sides of pure mathematics, statistics, electrical engineering, and neuro-physiology; in which every single notion receives a separate name from each group, and in which important work has been triplicated or quadruplicated, while still other important work is delayed by the unavailability in one field of results that may have already become classical in the next field.

Unlike in Carnap, Wiener shows no interest in developing a unified global picture of the sciences. But, throughout his career, Wiener did develop a strong interest for interdisciplinary research. Logic and mathematics were constantly used by him as a means to explore the numerous ‘no-man’s lands between the various established fields’. So, if Carnap, as Wiener, shared the idea that logical construction is a means to organize the various scientific disciplines and to clarify the relations between the basic concepts, Wiener seemed more attracted by using this insight in a more local way – to promote the development of new interdisciplinary theories in elaborating a common framework in which the various jargon would be dissolved at a more restricted level.³³

Construction as an Alternative to Axiomatization

As is well documented, Carnap criticized in his (1928) Hilbert’s theory of axiomatic or implicit definition. Axiomatization has a defect: it does not characterize a definite object, but a class of them. Let me quote *Aufbau* §15:

The purely structural definite descriptions which I have here discussed are closely related to the *implicit definitions* which Hilbert has used for his axiomatic geometry [Grundlagen] and whose general methodology and scientific importance have been discussed by Schlick [Erkenntnis.] 29 ff. An implicit definition or definition through axioms consists in the following: one or more concepts are precisely determined by laying down that certain axioms are to hold for them. ... Strictly speaking, it is not a definite object (concept) which is implicitly defined through the axioms, but a class of them or, what amounts to the same, an “indefinite object” or “improper concept”; cf. Carnap [Uneigentl.].

Russell’s constructional method is contrasted, in this respect, to the axiomatic approach: ‘A structural definite description, in contradistinction to an implicit definition, characterizes (or defines) only a single object’. Carnap is even more specific

³³As Friedman (1999) has emphasized, Carnap considered that an objective proposition must be an intersubjective and public judgment: intersubjectivity is seen as a condition for objectivity. Now, one might regard Wiener’s demand to eliminate jargon by elaborating a formal framework as a plea for promoting intersubjectivity as a more restricted level: the different experts of different disciplines should be able to understand each other.

in his (1927), where, drawing inspiration from Frege and Russell, he explains that improper concepts (concepts implicitly defined) are variables (372):

The essential difference [between proper and improper concepts] consists in the fact that improper concepts are variables, while proper concepts are constants. ... Sentence-like forms with one or more symbols for variables ... are not sentences at all (but rather symbols for 'propositional functions').

One finds the same opposition between Hilbert's and Russell's method in Wiener. Recall Wiener's conclusive comment of the first part of 1915a: the construction of betweenness and separation relation 'has a considerable interest, for it gives a hint of another method of defining mathematical systems than by the use of postulates'. Instead of defining ordered structures by setting postulates, Wiener, starting from type theory, fattened out typed variables to recover the structures he wanted to obtain. It is clear that Wiener viewed this approach as an alternative to Hilbert's method.

Now, this opposition between implicit definition and logical construction was already present in Frege's criticism of Hilbert 1899 (see Frege 1980), and in Russell's criticism of Peano axiomatization of arithmetic. But in both cases, the argument was not general, and was connected to a particular issue, i.e., the discussion about geometrical space in Frege, the conception of numbers in Russell. In neither case, did the opposition between the constructional approach and the structuralist view reach the methodological level. It is then likely that Carnap and Wiener were the first to point out this contrast. How to explain this convergence?

The importance taken by Hilbert within the very different intellectual worlds in which Wiener and Carnap evolved seems to explain this fact. Carnap stressed his opposition to Hilbert, because Schlick gave Hilbert a central place in his *Allgemeine Erkenntnislehre*. (see the extract above, in which Schlick is quoted). As for Wiener, the contrast he drew between construction and axiomatization must be understood against the background provided by the enthusiastic adoption of Hilbert's method in America. What is sometimes called the American Postulationists (among which one should count E. H. Moore, O. Veblen, E. Huntington³⁴) attempted to rewrite algebra, geometry, analysis, etc. along Hilbert's line. In 1915, Wiener reacted against this tendency: contrary to what his fellow countrymen believed, axiomatization was not the only way to introduce logical rigor and unity into mathematics.³⁵

The intellectual environment surrounding the thoughts of Carnap and Wiener were different. But, in both contexts, Hilbert's *Grundlagen* won a central place: it was used in Germany as a means to reform epistemology; it was viewed in America as a model of mathematical text. This feature explains why one finds both in Carnap and Wiener the idea that Russell's constructional method is an alternative to axiomatization. But it explains as well, the difference between the ways the two philosophers develop the opposition. From the beginning, Carnap placed the debate in the epistemological and logical field: Hilbert's axiomatization should be abandoned

³⁴ Huntington was one of Wiener's mathematics teachers in Harvard.

³⁵ In Wiener (1922), the constructionalist method is applied to geometry.

because it does not guarantee the uniqueness of the definition. Wiener is more interested in devising alternative treatments of mathematical concepts, and seems to ignore the epistemological issue.³⁶

Construction and the Given

As it is well known, Quine viewed *Aufbau* as a continuation of classical British empiricism. Since then, this diagnosis has been widely criticized. If the choice of an autopsychological basis shows that Carnap was not foreign to the kind of considerations usually associated to the names of Hume, Berkeley, Mill, etc., many features of *Aufbau* do not fit the empiricist conceptual framework. In particular, Carnap did not share with Russell and the British empiricists the view that our experience can be wholly decomposed into elementary sensory atoms. Thus, in §67, Carnap explains that the basic elements of the system are not the most simple sensations, but ‘experiences themselves in their totality and undivided unity’. He calls ‘elementary experiences’ these ‘experiences of the self as units’, and attempts to define the various sense-data as constructs from this basis – this method is Carnap’s notorious quasi-analysis.³⁷

In this respect, Wiener is once again very close to Carnap. As we have seen, sense data conceal ‘hidden complexities’, and should not be taken as the ultimate building blocks of our experience. Furthermore, the whole project of the second part of (1915a) and (1921) is to explain how it is possible to generate sense data (sensation intensities) from a more coarse and rough notion of experience – and could thus be seen as the analog of Carnap’s quasi-analysis. The idea, then, that the basis of the constructional system is provided by a certain kind of holistic elementary experience from which sense data are obtained as by-products, is common to Wiener and Carnap.

There remains a difference between the two philosophers. Carnap makes it clear (in §67 especially) that his choice of holistic elementary experiences is linked to the works of the Gestaltists. Wiener’s criticism of Russell comes from two other sources: from Bradley’s and Royce’s holistic theory of experience, on the one hand; and from the need to clarify the meaning of Fechner’s psychophysical law, on the

³⁶Note, however, that in his (1915b), Wiener argues that his constructionalist view is compatible with monism, while the Hilbertian approach is not.

³⁷See *Aufbau* §67: ‘One could perhaps think of choosing the final constituents of experience at which one arrives through psychological or phenomenological analysis (such as the most simple sensations, as in Mach [Anal.]) [...]. However, upon closer inspection, we realize that in this case we do not take the given as it is, but abstractions from it (i. e., something that is epistemically secondary) as basic elements. [...] Since we wish to require of our constructional system that it should agree with the epistemic order of the objects (§54), we have to proceed from that which is epistemically primary, that is to say, from the ‘given’, i.e., from experiences themselves in their totality and undivided unity. [...] The basic elements, that is, (which will be more precisely delineated in the sequel), we call *elementary experiences*.’

other. I have already spoken on the latter source above. Let me say a word on the former.

For Bradley, reality, far from being composed of independent and isolated elements, was conceived as a systematic and integral whole. Every piece of experience was for him internally related to the other pieces. Let me quote Wiener expounding and endorsing what Russell criticized in (1903)³⁸ under the name of the ‘doctrine of internal relation’ (1914c, 563–564):

The introduction of self-sufficiently given relations between the self-sufficiently given terms of our experience would in no way render it a coherent experience, as Bradley has so well pointed out. If I know ‘black’ and ‘darker’ and ‘white,’ I do not, *eo ipso*, know ‘black is darker than white,’ nor any objective situation these words may represent. These terms and this relation would give me just as readily, ‘white is darker than black.’ ... It is clear that this method of proceeding will give us no results: from the terms and their relation we can never get to the terms in their relation. To be brought into connection by a given relation, the terms of that relation must be known initially as related, and hence our knowledge of each of them by itself cannot be mere knowledge by acquaintance.

This holistic trend was not uncommon in America at the end of the XIXth Century. James, who held an anti-atomistic approach of the mind and the conscious life, took issue with Bradley on his doctrine of internal relation,³⁹ while Josuah Royce, Wiener’s own supervisor, endorsed Bradley’s view.

As a matter of fact, it is likely that Wiener’s knowledge of Bradley came from Royce, who developed a very original interpretation of Bradley’s view. In the Supplementary Essay of his (1901), Royce criticized Bradley for having denied that we could have any knowledge of the relations between the parts and the whole within the Absolute. For him, Dedekind’s mathematics, and more particularly, his definition of the infinite set in Dedekind (1888), leads to a more positive characterization of Bradley’s Absolute. I don’t have here the space to expound Royce’s very interesting characterization of the Absolute as self-representative system (for more on this, see Gandon(2009)). The essential point for us is that Royce, if he endorsed Bradley’s monism, did not share Bradley’s distrust for mathematics and logic. Let me quote Royce (1901, 526–527)⁴⁰:

It is so easy for the philosopher to put on superior airs when he draws near to the realm of the mathematician. ... The mathematician, one observes, is a mere ‘computer.’ His barren Calcul, what can it do for the deeper comprehension of truth? Truth is concrete. As a fact, however, these superior airs are usually the expression of an unwillingness even to spend as much time as one ought to spend over mathematical reading. ... The truth is indeed concrete. But if *alle Theorie* is, after all, *grau*, ... the philosopher, as himself a thinker, merely

³⁸ See, in particular, (1903, chap 46).

³⁹ On this, see Girel (2006).

⁴⁰ Royce continues his reasoning in this way (1901, 527): ‘The foregoing observation as to the parallelism between the structure of the number-series and the bare skeleton of the ideal Self, is due, then, in its present form, rather to Dedekind than to the idealistic philosophers proper. It shall be briefly expounded in the form in which he has suggested it to me, although his discussion seems to have been written wholly without regard to any general philosophical consequences. And the present is the first attempt, so far as I know, to bring Dedekind’s research into its proper relation to general metaphysical inquiry.’

shares with his colleague, the mathematician, the fate of having to deal with dead leaves and sections torn or cut from the tree of life, in his toilsome effort to make out what the life is. The mathematician's interests are not the philosopher's. But neither of the two has a monopoly of the abstractions; and in the end each of them and certainly the philosopher can learn from the other. The metaphysic of the future will take fresh account of mathematical research.

Wiener's construction of the sense data in 1915a, which articulates a holistic view of the experience with the use of very refined logical and mathematical techniques, is of course in tune with the program sketched by Royce in the last sentence. This very unlikely (at least from a Russellian perspective) alliance between the Bradleyian metaphysics and the new logic and mathematics is an important part of Wiener's intellectual background.

Conclusion

This volume is supposed to explore the multifarious influences that philosophers have had on the author of *Aufbau*. Now, since Carnap probably never read him, Wiener did not have any influence on *Aufbau*. One should go even further: nobody at the time read Wiener's early writings. As a matter of fact, Wiener himself did not pursue this constructionist line in his subsequent research. Why then devote an article to study a work that not only had no influence on Carnap, but that also had no influence on anything at all during the XXth Century?

To this question, I have two answers. The first one has to do with the discussions which have recently agitated Carnap's scholarship. The extent to which Russell has influenced the *Aufbau* is a debated issue, and taking Wiener's early papers into account could shed new light on this complicated question. Wiener shared with Carnap some key beliefs which were not held by Russell. For both men, construction was a way to clarify philosophical trouble (not a verificationist program aiming at reducing reality to sense-data).⁴¹ For both men, construction was a logical method wholly opposed to Hilbert's axiomatization approach (one does not find this in Russell). For both men, construction did not start with atomic sense data. The first and the third of these theses are usually considered as showing the deep differences between Carnap and Russell, and as revealing an influence of the German neo-Kantian background.⁴² But if these very claims are shared by a neglected American Russellian epigone, who did not know anything about the Marburg or the Baden school, then this interpretation, which aims at downplaying Russell's influence on Carnap, is weakened. That two persons as different as Carnap and Wiener could

⁴¹ That Russell endorsed the verificationist thesis and the reductionist program is a discussed issue. But it is true that one finds in Russell considerations which go in that direction (for instance (1914, 70 sq.)), and that there are no equivalent developments in Wiener or Carnap.

⁴² See Friedman (1999) and Richardson (1998).

extend Russell's works in the same way suggests that there is more in Russell than what is literally present in it.

In other words, as defended by Pincock (2002), one should distinguish between Russell's epistemology (and metaphysics) and Russell's constructionism. The fact that one does not adhere to the former does not mean that one rejects the latter. In order to make this distinction, it seems that the best strategy is to develop a comparative study of the various uses of Russell's constructionism (by Carnap, by Whitehead, by Wiener, by Nicod, ... and by Russell himself). In order to determine the extent and delineate the peculiar nature of Russell's influence on Carnap, one should then consider *Aufbau* as one of several attempts to achieve the constructionalist program. In each of these attempts, the program is developed along lines that integrate elements coming from the specific scientific and philosophical contexts in which it unfolded. Debates over the status of percepts in England during the Edwardian era were thus very important in Russell's development of perspectivism.⁴³ Neo-kantian discussions about objectivity occupy a central place for Carnap.⁴⁴ And, we have just seen the role played by American philosophy and mathematics in Wiener's thought.⁴⁵ In each case, the constructionalist framework is tied to a particular epistemological, metaphysical, and scientific background. But in each case, it is still the constructionalist program, as it was initially described by Russell, that is brought to fruition.

The first reason to read Wiener's papers is thus that they indirectly help us assess Russell's influence on Carnap. But there is a more straightforward reason to exhume these works: they are good and very original. In particular, they show us that the constructionalist program could be seen as a remote ancestor of the mathematization of psychology in the late fifties. Let us conclude by explaining this point.

As is well-known, Wiener, during the Second World War, did pioneering work in signal theory. In this framework, one finds the same kind of pattern that Wiener used in his constructionalist period: the starting point is provided by the raw data given in experience (a mixture of noise and signal), and the task is to extract from it a more regular shape (the signal) by using mathematics and formal methods. The constructionalist schema and noise/signal model are not the same,⁴⁶ but the way they are routinely described is quite similar: what appears at first as something given (sensation intensities/signals) is shown to be the result of a very complicated process (logical constructions/removal of certain components of a random distribution). Think, for instance, of the role played by the concept of a filter in signal theory. In his (1949), Wiener defined a certain class of filters, which are today called Wiener filters. The explicit purpose of a Wiener filter is to filter out noise of a corrupted signal. Its function then, is akin to the one performed by the operator 'inst'

⁴³ On this, see Nasim (2009).

⁴⁴ On this, see Friedman (1999) and Richardson (1998).

⁴⁵ In future works, I intend to show how Nicod, in his (1924), confronted Bergson's and Poincaré's analyses of space.

⁴⁶ In particular, noise and signal are formalized as distributions of random variables. Now, Russell's constructionalist framework has nothing to do with probability theory.

in the fattening out program of (1914b): in both places, Wiener attempts to devise a very general process by which some irregular functions or relations are regularized. It is interesting to note that, since Wiener's first pioneering works in the forties, signal detection theory has become the standard framework in experimental psychology (on this, see McNicol 2005). It seems to me that this strengthens the connection I bring forward: a sense datum (a pure sound, a pure color, etc.), which was regarded by the young Wiener as a result of a construction grounded on the highly irregular materials given in experience, are seen by psychologists today as a signal surrounded by noise.

To summarize: Wiener, in his early papers, gave a thorough and deep mathematical analysis of Fechner's psychological law; the same Wiener, in the forties, laid the foundation of signal detection theory, which not only nicely fits in the basic elements of a constructionalist approach, but also soon became the standard framework of experimental psychology. It is then tempting to make a conceptual connection between the way Wiener used Russell's program in his early works, and the role played by formal methods in psychology today. The suggestion is of course, not that signal detection theory is a direct extension of Wiener's research about Fechnerian psychology. The claim is much weaker than that. It is that, looking at Wiener's early works, while keeping in mind the future development in psychology that Wiener's own subsequent research made possible, helps us to draw a connection between two intellectual achievements that are today never considered as connected: the constructionalist program, on the one hand; the mathematization of experimental psychology in the fifties, on the other. I don't claim that these two movements are historically related. I suggest that, were Wiener's articles on constructionalism and on psychophysics measurement more widely read, the conceptual affinities between these two important intellectual trends would have been recognized as a topic worth studying further by anyone working in the field.⁴⁷

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⁴⁷I would like to thank the anonymous referee for helpful comments on an earlier version of this manuscript. I also thank Dawn Boxall for helping me with the English.

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Neurath's Influence on Carnap's *Aufbau*

Thomas Uebel

Considerations of influences on Carnap's *Aufbau* typically extend to longer-term ones effecting either the gestation of the entire project or prompting significant changes in the early stages. But one may also wonder what role, if any, his new colleagues in the still to be so-called Vienna Circle played in the final stages of its production. Is it possible to detect the influence of any one individual rather than the Circle's general atmosphere which, somewhat idealized, Carnap paid homage to in the *Aufbau*'s Preface? If we are concerned to understand not only the trajectory of Carnap's philosophical development but also the role that his first major work played in and for the Circle, such questions should not be neglected. My concern here lies with Neurath.¹ However preposterous the question may appear, the answer as to whether and what influence he had on the *Aufbau* is not obvious. On the one hand, there is at least one concrete contribution to its final published version that we can confidently attribute to him. On the other hand, there is much leeway for speculation as to what that contribution means. The case presented here argues that Neurath's intervention was significant, but cautions against over-interpretation.

Before the Circle

In October 1923, in what seems to be his first letter to Carnap, Neurath wrote of Carnap having sent him—sufficiently long ago for Neurath to admit guilt about not having responded earlier—some “delightful things, prompted by our dear Munich friends”.

¹Another new colleague whose influence it would be interesting to investigate is, of course, Schlick.

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Especially the treatise on spatial objects I read with great interest. I and also my wife are in agreement with a great lot [of what you say], even though we don't really understand [the need for] the Kantian twist! But the connection of concrete reality and mathematical and logical matters [which you develop] corresponds in many respects to our view which ultimately is oriented towards Poincaré, Duhem and the other conventionalists. To be sure, I would formulate the delimitation of the most universal sentences differently from how you tend to do it.²

Carnap's initial letter does not appear to have been preserved. It can be noted, however, that at this point in time the "delightful things" are likely to have included, if we concentrate on philosophy, only a copy (whole or part) of his dissertation, *Der Raum. Ein Beitrag zur Wissenschaftslehre*, published in 1922 as a supplementary monograph volume of *Kant-Studien*, and perhaps the 1923 essay in *Kant-Studien* itself, "Über die Aufgabe der Physik und die Anwendung des Grundsatzes der Einfachheit".³ Both Neurath's appreciation of the way Carnap brought logico-mathematical concepts to bear on empirical matters and his conventionalist opposition to Carnap's Kantian sympathies were clearly expressed.

But Carnap's mail is likely to have contained political articles as well, for Neurath also wrote:

You probably know from Roh how great my interest is in the efforts which your circles are concerned with, but I'm coming more and more to the view that there is in process, on the broadest basis, a fundamental change in our age and that what we intellectuals think is only one weak element in its inner working—which it is imperative to gain a better understanding of, not in the least also for action!⁴

²"Alte Schriften durchblättern stosse ich auf die Namen Hasselblatt, Kurella, Ahlhorn und den Ihren—alte Schuld fällt mir ein! Sie haben mir über Anregung unserer lieben Münchner Freunde rfreuliche [sic!] Dinge geschickt. Insbesondere die Abhandlung über die räumlichen Gegenstände las ich mit grossem Interesse. In gar vielem sind ich und meine Frau mit Ihnen darin einverstanden, wenn uns auch die Wendung ins Kantische nicht recht ein will! Aber den Zusammenhang von konkreter Wirklichkeit und Mathematisch-Logischem ist in vielem durchaus unserer Anschauung entsprechend—die letzten Endes an Poincaré orientiert ist, an Duhem und den anderen Konventionalisten. Freilich möchte ich gerade die Abgrenzung der allgemeinsten Sätze anders formulieren als es bei Ihnen üblich ist." Neurath to Carnap, 19 October 1923, RC 029-16-07 ASP, p. 1. (Unless otherwise noted, translations of previously untranslated materials are by TU, with the originals of so far unpublished material given in footnotes).

³See Carnap (1922a) and (1923). Given the exploratory nature of Carnap's mail it is unlikely that he sent what would have had to be, in his day, a carbon copy of the ms for "Dreidimensionalität des Raumes und Kausalität: Eine Untersuchung über den logischen Zusammenhang zweier Fiktionen" published in the following year (1924).

⁴"Sie wissen wohl von Roh, wie gross mein Interesse für die Bestrebungen ist, die in Ihren Kreisen gepflegt werden, aber ich komme freilich immer mehr zur Anschauung, das seine grundsätzliche Aenderung unserer Zeit auf breiter Basis vor sich geht und dass das was wir Intellektuellen ausdenken nur ein schwaches Element dem ganzen Getriebe ist, dessen Wesen besser zu erkennen vor allem wichtig ist—auch für die Tat." RC 029-16-07 ASP, p. 2.

Two sentences earlier Neurath spoke of “the Free-Germans close to you” meaning the German Youth Movement in which Carnap had played a part.⁵ So it is not impossible that Carnap’s mail contained a copy of some of his political writings.⁶ Of course, Neurath’s reference may have been prompted by what he had learnt about Carnap from their common friend Franz Roh. (Neurath’s own friendship with Roh dated back to when Neurath was Head of the Central Economic Administration in the final weeks of the revolutionary Bavarian Republic in March and April of 1919.)⁷ Yet at this early stage in their acquaintance it would have been unusual for Neurath to refer to Carnap’s views on such matters without some prompting from Carnap himself.

While a fair number of unclarities remain, then, Neurath’s letter suggests that even before they met in person, Carnap expected and Neurath confirmed a certain broad rapport in philosophical and political matters. Neurath expressed the wish to discuss matters further in person or writing.⁸ No additional letters between them have been preserved from Carnap’s pre-Vienna period,⁹ but it seems significant that when Carnap came to Vienna for two weeks in January 1925 he sought him out on the second day and visited him often.¹⁰

⁵ On Carnap’s involvement with the “freideutsche” youth movement, see Gabriel (2004) and Carus (2007, 50–58).

⁶ On Carnap’s involvement with *Politische Rundbriefe* see Carus (2007, 59–63). His mail to Neurath may have included “Carnap’s Völkerbund—Statenbund”, a two-part contribution to *Politische Rundbriefe* from 1918a that discusses how the “Free-Germans” might view the imminent “negotiations ... for the organization of the world” and the founding of the League of Nations (1918a). Another possibility (one suggested by Neurath’s phrasing “what we intellectuals think”) is a copy of Carnap’s ms “Deutschlands Niederlage. Sinnloses Schicksal oder Schuld”, which was also intended for *Politische Rundbriefe* but remained unpublished, for there Carnap explicitly addressed the role of the intellectual in the political domain (see 1918b and the discussions in Mormann 2010 and Uebel 2012).

⁷ On Neurath’s role in the Bavarian revolution, see, e.g., Fleck (1979); on Franz Roh see Dahms (2004) with further references.

⁸ Neurath’s letter added: “I would very much like to discuss these matters with you, by writing if it should be impossible otherwise. ... For a start I send you a few opuscula which make a somewhat tentative start and require rounding off.” Original: “Ich würde gar gerne mit Ihnen derlei besprechen, wenn es nicht anders geht schriftlich. ... Zunächst sende ich Ihnen ein paar opuscula zu, die etwas tastend entstanden der Abrundung noch bedürfen.” RC 029-16-07 ASP, pp. 1–2. What “opuscula” these were is unknown.

⁹ Christian Damböck (personal communication) suggested that their first personal meeting took place when Carnap attended the Esperanto Congress in Vienna in August 1924.

¹⁰ Carnap’s diary notes that not having found Neurath at home first time around, he subsequently spent six afternoons or evenings at his flat. Neurath’s and his wife’s presence at his first circle presentation is noted explicitly (alongside that of Schlick, Hahn, Menger, Feigl, Neumann—a Viennese mathematician—“an Englishman”, and Kaufmann); and while no individual participants are mentioned their presence at the second talk can be presumed; see Carnap’s diary for 1925 (RC 025-72-04 ASP).

In the Circle

Carnap went to Vienna at the invitation of Schlick who previously had agreed to support his *Habilitation*.¹¹ Carnap ended up giving two talks to his circle. The first was pre-arranged and concerned the topology of space-time, the second was added to present his research project and proved “difficult and long”.¹² In his autobiography Carnap reported:

From the beginning, when in 1925 I explained in the Circle the general plan and method of *Der logische Aufbau*, I found a lively interest. When I returned to Vienna in 1926, the typescript of the first version of the book was read by members of the Circle, and many of its problems were thoroughly discussed. Especially the mathematician Hand Hahn, who was strongly interested in symbolic logic, said that he had always hoped that somebody would carry out Russell’s program of an exact philosophical method using the means of symbolic logic, and welcomed my book as a fulfillment of these hopes. Hahn was strongly influenced by Ernst Mach’s phenomenalism, and therefore recognized the importance of the reduction of scientific concepts to a phenomenalist basis which I had attempted in the book. (1963, 20)

As Carnap explained in the *Aufbau*, he set out to develop a constitution system of objects on a phenomenalist basis in order to reflect the relations of “epistemic primacy” that hold between the objects of our cognition (1928a/2003, 94; cf. § 54). His “methodological solipsism” was precisely this: methodological—and his new Viennese friends can be assumed to have been fully apprised of this, including Neurath who soon was to take a somewhat critical stance.

I’ll return to Carnap’s comment about Hahn briefly in the conclusion and turn to Neurath’s contribution to the pre-publication discussions of the *Aufbau* presently. First let’s consider his considered reaction to the published work for it prompts certain expectations about what his earlier contribution may have been which we will do well to confront. Still before that, however, let me note some stations on the road to the published book that Carnap had to pass over the next three years.

In the post-presentation phase we may distinguish two stages: the first leading up to the submission of his manuscript for the *Habilitation* in December 1925 and the second revising and shortening that text for delivery to the printers in January 1928.¹³ It may be noted that when Carnap delivered his “Prolegomena to a

¹¹ See Schlick to Carnap, 9 August 1924 and notes of Carnap’s *Besprechung* with Schlick on 16 August 1924 for the latter, and Schlick to Carnap, 22 November and 25 December 1924 for the former (RC 029-32-50, 029-32-51 and 029-32-47, 029-32-44 ASP, respectively).

¹² See Carnap’s diary for 15 and 22 January 1925. About the latter it notes: “Evening lecture: Prolegomena to a constitution theory. Difficult and long (½ 9 until 10; discussion until ½ ??), stimulating discussion.” Original: “Abends Vortrag: Prolegomena zu einer Konstitutionstheorie. Schwierig und lang (½ 9 bis 10; discussion until ½ ??), anregende Discussion.” (RC 025-72-04 ASP).

¹³ See Carnap to Schlick, 2 and 11 December 1925 and Carnap’s diary for 27 December 1925 and 27 January 1928 (RC 029-32-33, 029-32-32, 25-72-04 and 025-72-02 ASP respectively).

Constitution Theory” in January 1925 he was well aware that his ideas about were “not yet worked ... all out”.¹⁴ With his manuscript “requiring a thorough elaboration”, its submission for *Habilitation* was repeatedly delayed, twice to later in the summer semester 1925, and then to the winter semester 1925/1926.¹⁵ Finally it was decided to submit only “Vol. 1”—“pp. 1–346, the formal problems without the outline of the constitution system”—with the rest to be handed in later for supplementary purposes only.¹⁶ By the time his then so-called “Konstitutionstheorie” was finished, it had grown from “ca. 300” to “566” typewritten pages.¹⁷ Carnap returned to Vienna in May 1926 and by July had passed the formalities of *Habilitation* but due to further delays (not of his making) did not receive his confirmation from the Ministry of Education until November, just before he started teaching.¹⁸ Schlick had studied his entire manuscript by early March and the manuscript began making the rounds of members of his circle, beginning with Waismann.¹⁹ Unfortunately, no copy of this version of “Konstitutionstheorie” appears to have remained in existence and it requires circumstantial reasoning to establish the changes it underwent to become the *Aufbau* we know.²⁰ The second post-presentation stage was taken up by revisions of the manuscript and a tedious search for a publisher. It is into that period that Neurath’s pre-publication criticism falls.

¹⁴ About the second meeting Carnap reported to Reichenbach who had, incidentally, helped to set up his *Besprechung* with Schlick the previous August: “Then another evening was added and I had to report about ‘constitution theory’ which was difficult, of course, since I have not yet worked it all out. These ideas too met with greater interest and, importantly, understanding than one can expect to find in philosophical circles elsewhere. The Viennese tradition of exact philosophy (Mach-Boltzmann-Schlick) seems to be at work here.” Original: “Dann wurde noch ein Abend eingelegt und ich musste noch über die ‘Konstitutionstheorie’ etwas berichten, was natürlich schwierig war, weil ich selbst noch nicht damit fertig bin. Auch diese Gedanken begegneten grösserem Interesse, und vor allem, Verständnis, als man es sonst in philosophischen Zirkeln erwarten kann. Die Wiener Tradition einer exakt fundierten Philosophie (Mach-Boltzmann-Schlick) tut da wohl ihre Wirkung.” 10 March 1925 (RC 102-64-11 ASP).

¹⁵ “.. gründliche Ausarbeitung nötig”. Carnap to Schlick, 21 April 1925 (RC 029-32-41 ASP). See also 31 May, 12 July, 23 September 1925 (RC 029-32-43, 029-32-40, 029-32-38).

¹⁶ See Carnap to Schlick, 2 and 11 December 1925 (RC 029-32-33 and 029-32-32 ASP).

¹⁷ See Carnap to Schlick, 21 March 1925 and 28 May 1926 (RC 029-32-41 and 029-32-21 ASP).

¹⁸ Carnap passed his habilitation examination on (“Colloquium”) on 17 June, gave a 20 min long exemplary lecture (“Probevorlesung”) on 2 July, and started teaching logic on 19 November 1926; see Carnap’s diary (RC 025-72-05 ASP).

¹⁹ See, e.g., Schlick to Carnap, 7 and 14 March 1926 (RC 029-32-27 and 029-32-17 ASP). Incidentally, apart from remarks on the introductory sections in May 1926 (RC 102-64-10 ASP), Reichenbach did not comment on the entire ms until February 1927 (RC 102-64-02 ASP).

²⁰ Besides the original sketch “Von Chaos zur Wirklichkeit” of July 1922, there exists a three-page plan “Entwurf einer Konstitutionstheorie der Erkenntnisgegenstände” dating from January 1925 and the notes for two of three lectures given in June and early July 1926 in Vienna, titled “Thesen zur Konstitutionstheorie” (RC 081-05-01, 081-05-02 and 081-05-07 ASP, respectively).

Neurath's Review of the *Aufbau*

When the *Aufbau* finally was published in the summer of 1928, Neurath was its first reviewer.²¹ Combined with a mention of Carnap's *Scheinprobleme* (1928b), Neurath's review appeared in the Austro-Marxist monthly *Der Kampf* in the fall of 1928. Exhorting its readers to study both books reviewed and more generally the "empirical rationalism" of the "'Vienna school' around Moritz Schlick" so as to render it "useful for Marxism" (1928/1981, 296–7), Neurath placed Carnap's work in the context of the Enlightenment struggle against theology and metaphysics and quoted liberally from the rousing final paragraphs of the *Aufbau*'s Preface.

As to its philosophical content, Neurath introduced Carnap's *Aufbau* as an attempt "to characterize completely systematically and comprehensively the foundations of exact empirical knowledge". He continued:

Carnap seeks to show how to arrive at a consistent view of the world once we discount all accidental and variable sense impressions. He undertakes to characterize sense impressions on the basis of certain order-structures, order-structures in which "red", "hard", "loud", "cis" etc. do *not* appear, but only facts which can be captured by mathematical-logical means—and *that suffices!* Carnap consciously turns away from taking empathy in any form, or personal attitudes, as his starting point. He only knows that kind of insight which can be grasped by every human being! Structural order is what is most common, what is most universal in our experience of things! (Ibid., 296, orig. emphasis)

What obviously impressed Neurath was Carnap's abstraction from all subjective elements of experience, his thoroughgoing objectification-by-structuralization of knowledge by the logico-mathematical means deployed. Given his own long-standing opposition to the categorical separation of the *Geistes-* from the *Naturwissenschaften*, it is not at all surprising that Neurath found Carnap's project in the *Aufbau* very congenial.²² (He appears to have overlooked the concessions Carnap still made to Rickert.)²³ One of Carnap's purposes was, after all, to establish that all the sciences shared the same constructional system of concepts—which provided valuable support for Neurath's cherished idea of unified science. But it is also of great significance that Neurath appreciated what followed from Carnap's structuralist methodology: the centrality of intersubjectivity to all scientific knowledge. By stressing that Carnap "only knows that kind of insight which can be grasped by every human being" Neurath evidently attempted to preempt the potential dismissal of Carnap's methodological solipsism as a bourgeois Robinson Crusoe-fantasy by comrades familiar with Lenin's *Materialism and Empirio-Criticism* published in German translation only a year earlier (1927).

²¹ According to the list in Benson (1963, 1059) he seems to have been the first. Schlick's review followed in 1929 as did Kaufmann's, and Dubislav's review followed in 1930; Reichenbach's somewhat misrepresentative review (not listed there) did not appear until 1933.

²² See Neurath (1910/2005, 267).

²³ For differing evaluations of Rickert's role for Carnap see Mormann (2007) and Carus (2007, 106–108).

To be sure, methodological solipsism is not mentioned as such in Neurath's review, but subtle criticism of it can be detected. It lies behind the following highly dense passage which, on the face of it, only objects to apparent anticipation of an "ideal language" and "complete insight".

In his desire to execute the logical construction of the world [Carnap] also grapples with the 'ideal language' and aims to show how one has to proceed with 'complete insight'. Starting from a presupposition of having complete insight, he tends to view our current situation as a kind of precursor state.

Perhaps this attitude stems from the fact that, basing himself on physics and the natural sciences in general, he does not analyze the social sciences in any detail. Otherwise he would have produced more careful formulations, and would have considered in particular the question of how one is to promote knowledge while one still has to use 'clean' and 'unclean' ways of thinking without being able to keep them apart—something which perhaps will always be necessary!

The cleanliness of logical order grants definiteness! That is true! But how is one to overcome the ambiguity which in other areas, for example in the social sciences, confronts us already in our selection? In reality, the time- and class-bound ideology takes the place of logical definiteness! Collectivism gives a backing to the individual which cannot, and probably never will, flow from the subject matter itself. (1928/1981, 296)

Clearly, for Neurath, Carnap did not paint a realistic picture of scientific knowledge. Just why he thought so is, of course, another matter; indeed, it might even appear that the only trouble with Carnap's sketch was that it did not encompass the social sciences in their actual state. And it might even be countered that Carnap's "rational reconstruction" explicitly abjured the aim of capturing scientific reasoning in real time—it was just this orientation, after all, that allowed Carnap to dismiss empathy as irrelevant even though he conceded its practical indispensability in several areas. So far from embarrassing methodological solipsism, Neurath may appear to be barking up the wrong tree altogether—but this impression would be misleading.

The charge that Carnap relied upon "complete insight" focused on two aspects of Carnap's methodology which allowed him to disregard the vagaries of actual, historically developed theories. The first is that Carnap proceeded on the assumption that the reconstructive theorist has available a list of the extension of the basic predicate of remembered similarity for a given epistemic subject, and that, corresponding to this assumption, this subject possessed an infinite memory. This was clearly an idealization of completeness. Secondly, Carnap presupposed that the reconstructive theorist had knowledge of what the world was like in order to construct the definitional framework with the help of which knowledge claims were evaluated against the basis of a subject's actual experience. This was clearly another idealization of completeness. Both idealizations were plain fictions, not mere extensions of characteristics of existing states of affairs. Yet Carnap's project depended upon them: only these fictions made his starting point, the phenomenal given, amenable to his structural treatment.²⁴

²⁴This analysis is further elaborated in Uebel (2007, 37–42).

In addition Neurath charged that Carnap worked with the idea of an “ideal language” which was fully cleansed of the ambiguities of natural languages. Neurath himself recognized the need and promoted efforts to clear up the linguistic tangles which fostered metaphysical confusion, as indicated by his own long-standing and notorious *Index Verborum Prohibitorum*.²⁵ But the clarity required for an ideal language, Neurath felt, was of a wholly unrealistic degree: as he put it, we cannot always separate “clean” and “unclean” ways of thinking. It was only the idealization of complete knowledge that allowed Carnap to presuppose clean ways of thinking where no indefiniteness or vagueness was allowed. In short, Carnap’s account was not only fictitiously complete, but also fictitiously definite.

Consider now Neurath’s charge that, by contrast, theory choice does not “flow from the subject matter itself”. Unpacked this means that theory choice does not flow from the experience of a solitary individual. In the *Aufbau*, all for Neurath at least partially conventionally and so socially determined theory choices were comprehended in the idealizing assumption that the rational reconstructor knew what must be the end result of constitution theory and determined the reductive definitions accordingly. Knowledge “flowed from” its subject matter only because the results of historically prior theory choice were appropriated in this way. So what lies at the bottom of Neurath’s criticism of the *Aufbau*—its fictitious completeness and determinacy—were suspicions about the philosophical assumptions packed into the position of methodological solipsism: the Cartesian idea of the epistemic self-sufficiency of a solitary individual.²⁶ Now to say so explicitly, of course, would have been to accuse Carnap precisely of what he sought to protect him from—indulging in the very *bürgerliche Robinsonaden* castigated by Lenin—so Neurath carefully recast Carnap’s rational reconstruction as a philosopher’s anticipation of future science. For the price of a slight misrepresentation Neurath saved the potential of “empirical rationalism” for the comrades.²⁷

Neurath’s Pre-publication Criticism

In light of this discrete but pretty fundamental criticism made of the *Aufbau* more or less upon its publication, it is of interest to consider a little document found in Carnap’s Nachlass called “Neurath über Konstit[utions]theorie”. Written in Carnap’s shorthand and dated “21. 11. 26” it records what appear to have been Neurath’s comments about the circulating typescript of what Carnap later called “the first version” of the *Aufbau*. The most relevant parts read as follows:

²⁵ See Neurath (1941 [1983, 217]) for reflections on its motivation and origin in his early years, his (1944, 51) for a list of prohibited terms and Reisch (1997) for discussion.

²⁶ Note that this objection is of an epistemological nature and did not mistake Carnap’s thesis as an ontological.

²⁷ Neurath’s review is discussed in greater detail in Uebel (2007, 105–112).

My exposition is turned unfortunately more against realism than idealism. Too much emphasis on methodological solipsism. That sounds too individualistic. Emphasize more the 'objectivism'. *Say right at the start that the goal is an objective world, the same for all individuals.* Erl[ucidate].

§224. *The realism of the physicist remains intact*, but only will be corrected in the direction of objectivism. Perhaps as follows: the lawful connections are objective, i.e., do not depend on the will of the individual; but there is no matter to which 'reality' could be ascribed; that is a metaphysical concept.²⁸

Neurath also made further presentational suggestions and commented favorably on the holistic nature of the constitution of space on this occasion but, except for the latter point, these can be neglected here.²⁹ What is of interest here is that Neurath was obviously concerned that it should be plain and evident that the construction system of the *Aufbau* terminated in the concepts of an objective physical world. On this point Neurath did not only look backwards (recalling Kantian sympathies) but especially forwards. That nowadays the *Aufbau* should be remembered most widely for its phenomenalist reduction instead of its achievement of objectivity was precisely what he feared.

²⁸“Meine Darstellung sei leider mehr gegen Realismus als gegen Idealismus gewendet. Zu starke Betonung des method[ischen]. Solipsismus. Das klinge zu individualistisch. Mehr den ‘Objektivismus’ betonen. *Gleich zu Anfang sagen, dass das Ziel eine objektive Welt, die gleiche für alle Individuen sei.* Erl[äutern?]”

§224 *Der Realismus des Physikers bleibt bestehen*, nur wird er korrigiert zu einem Objektivismus. Die gesetzmässigen Zusammenhänge sind objektiv, d.h. dem Willen des Einzelnen entoben; es gibt aber keine Materie, der man ‘Realität’ zuschreiben könnte; das ist ein metaphysic[scher] Begriff.”

So recorded in Carnap's shorthand (with his underlining here given as italics). There follow two further short paragraphs the texts of which are reproduced in the next footnote. “Neurath über Konsti[tutions]theorie”, 21 November 1926 (RC 029-19-04 ASP). I thank Jerry Heverly for the transcription. The published *Aufbau* does not contain a §224, of course.

²⁹“§143 ff. *Shorten the logisti[cal] demonstration of the system*: combine the fomulae, maybe in smaller print in an appendix; give commentaries only ever to several formulae at a time. That would allow dropping the long elucidations between the formulae.

Cut Part V? Maybe, but then work its important bits into the front sections.

Good: that space as a totality is const[ructed] in one go; do not combine a whole out of parts! Instead the parts gain their significance only in the whole. (That is anyway the fundamental attitude of the theory of relations: the members gain their character only by their position in the whole.)”

Original: “§143 ff. *Die logisti[sche] Darstellung des Systems kürzen*: Die Formeln zusammenschreiben, vielleicht in Kleindruck in einem Anhang; immer zu mehreren Formeln auf einmal kurzen Kommentar. Damit fallen die langen Erläuterungen zwischen den Formeln weg.

V. Abschnitt streichen? Vielleicht ja, aber dann das Wichtigere daraus in die vorderen Abschni[te] verarbeiten.

Gut ist: Dass der Gesamttraum auf einmal konst[ruiert] wird; nicht ein Ganzes aus Teilen zusammensetzen! Sondern die Teile bekommen erst ihre Bedeutung aus dem Ganzen. (Das ist ja überhaupt eine grundsätzliche Einstellung der Relationstheorie: Die Glieder bekommen ihren Charakter nur durch ihre Stellung im Ganzen.)“ RC 029-19-04 ASP.

Needless to say, it would need to be determined here too just which sections of the published *Aufbau* correspond to §§143ff and Part V.

But did Neurath's pre-publication criticism of the overemphasis of methodological solipsism mean that Carnap's work merely *sounded* too idealistic or that it still *was* too idealistic? It does not seem to be the case that already at this stage Neurath found missing any recognition of the fact that any suitable comprehension of our own experience requires that we think in terms of an intersubjective world—the fulcrum of Wittgenstein's later *Philosophical Investigations* and Quine's *Word and Object* that was anticipated by Neurath in 1931.³⁰ However, already his review of 1928 had criticized the epistemological conception that informed the *Aufbau* as too “individualistic”—a term also used in Carnap's note about Neurath's 1926 criticism. This may suggest that the latter also went along the lines pursued in his review. (That was that Carnap's reconstruction discounted unduly the conventionalist and social element in theory choice.)

It is of related interest that while the *Aufbau* was in print, in late February/early March 1928, Carnap sent Neurath a copy of an enclosure of a letter to Schlick from the previous December in which he had raised the question of its title and indicated that he had planned a later study of a constitution system with a physical basis.³¹ Carnap remarked that he sent it to Neurath “since you will have particular interest in the conceptual system with a physical basis. I take it that we will be in agreement concerning the advantage, but also the disadvantage of this system in comparison with that on an auto-psychological basis.”³² This suggests that Carnap and Neurath had previously discussed the relative advantages of these systems. If Carnap's assumption (“I take it”) is correct, then Neurath did not as yet dispute his claim that the physical constitution system had the disadvantage that its “ordering of objects” was not “a correct reflection of the epistemic relation” (1928a/2003, 96).

The advantage of the physical constitution system was described in Carnap's letter to Schlick:

The point of this system is a different one: it does not serve epistemology but empirical science. Its basic domain is the only one that exhibits comprehensive and determinate lawfulness of its processes.³³

In the *Aufbau*, Carnap put the matter thus:

it uses as its basic domain the only domain (namely, the physical) which is characterized by a clear regularity of its process. In this system form, psychological and cultural events become dependent upon the physical objects because of the way they are constructed. Thus they are placed within the one law-governed total process. (1928a/2003, 95)

³⁰For Neurath's private language argument and Carnap's response, see Uebel (2007, 226–252).

³¹Manninen (2002, fn.14) argues persuasively that it was a copy of the enclosure “Frage über die Wahl des Buchtitels” of the letter Carnap to Schlick, 23 December 1927. The enclosure of the letter to Neurath has not been preserved.

³²“Ich schicke Ihnen das Blatt ..., da Sie, wie ich vermute, gerade besonderes Interesse haben werden für das Begriffssystem mit physischer Basis. Ich vermute, dass wir über die Mehrleistung, aber auch über die Wenigerleistung dieses Systems im Vergleich zu dem mit eigenpsychischer Basis einig sein werden.” Carnap to Neurath, 25 February–3 March 1928 (RC 029-16-05 ASP).

³³Carnap to Schlick, 23 December 1927, quoted in Manninen (2003, 145).

Carnap concluded that, “from the standpoint of empirical science”, the system with a physical basis provides “a more appropriate arrangement of concepts than any other” because

the task of empirical science (natural science, psychology, cultural science) consists, on the one hand, in the discovery of general laws, and, on the other hand, in the explanation of individual events through their subsumption under general laws (ibid.).

This advantage of the system with a physical basis is clearly related to the “objectivism” that Neurath had been urging in 1926—the subject-independence of the physical realm.

In the *Aufbau*, Carnap did not specify the point further in the context of discussing different system forms but only later on, in the course of erecting the system with an autopsychological basis (and then only in passing). That realm, he noted, does not exhibit a “clear regularity of its process” because it is not closed causally.

There is, however, a remarkable feature of the domain of psychological objects in which it differs from the physical world and especially the world of physical science: in the former case, thoroughgoing regularity can be obtained neither completely nor even in asymptotic approximation. Certain events (namely perceptions) occur always spontaneously and never as a result of preceding ones. (Ibid., 204)

Having read the entire manuscript, Neurath can be presumed to have understood Carnap's point—though he may also have been aware that still in *Der Raum* not being “characterized by a clear regularity of process” meant that the given was conceived as standing outside the “one law-governed process” altogether.

But be that as it may, the indications are that Carnap and Neurath had raised the idea of an alternative constitution system to the one on an autopsychological basis. So while the precise concern raised by Neurath for the adoption of methodological solipsism in 1926 (as opposed to his review of 1926) is not yet clear, the direction of travel is. We arrive at the following question. Did Neurath urge something like physicalism and did his influence on the *Aufbau* consist in prompting its author to introduce physicalism into it—albeit in a fairly tentative form?

The Published *Aufbau* and Physicalism

It might be wondered with what justification this suggestion associates physicalism with the *Aufbau*. Wasn't the *Aufbau* a phenomenalist undertaking? The answer here would direct us to the very section of the *Aufbau* just quoted from: §59, entitled “A system form with a physical basis”. There Carnap wrote (I now quote in context various bits used previously):

Since all cultural objects are reducible to psychological, and all psychological to physical objects, the basis of the system can be placed with the domain of physical objects. ... A materialistic constructional system has the advantage that it uses as its basic domain the only domain (namely, the physical) which is characterized by a clear regularity of its processes. In this system form, psychological and cultural events become dependent upon the physical objects because of the way they are constructed. Thus they are placed within the one law-governed total process. Since the task of empirical science (natural science,

psychology, cultural science) consists, on the one hand, in the discovery of laws, and, on the other hand, in the explanation of individual events through their subsumption under general laws, it follows that from the standpoint of empirical science the constructional system with a physical basis constitutes a more appropriate arrangement of concepts than any other. (For the basis problem of this system, cf. §62.) We cannot here give a more detailed description of this system and its importance for science. (1928a/2003, 95, trans. of last sentence amended)

Carnap concluded this section by stating that “science . . . needs both an experiential and a materialistic derivation of all concepts” (ibid., 96). So the *Aufbau* recognized both the possibility and a certain necessity of a materialistic constitution system.

Yet this passage raises numerous questions. We must ask: what is the nature of this “need”? (Why is it not enough that the regularity of processes be attained once the physical level has been reached from the auto-psychological by construction?) And why can “a more detailed description of [the materialistic] system and its importance for science” not be given “at this time”? Even supposing what the text hints at, namely, that what makes a materialistic constructional system more “appropriate” for empirical science is that its “order of construction” reflects the causal order of the “law-governed total process” (just as the system with an autopsychological basis reflects the presumed epistemic order), leaves the second question unanswered. In §62 Carnap presented clear proposals for three kinds of possible physical bases for a constitution system: was it simply lack of space and time that prevented Carnap from providing an explicit characterization of such a system? One may suspect that the standing of the system with a physical basis was less than fully worked out.

Moreover, we must ask: would even the mere availability of a constitution system with a physical basis be sufficient grounds to speak of physicalism in the *Aufbau*? Consider what Carnap called “physicalism” in *Unity of Science*: the thesis that the statements of the languages of all the sciences are translatable into the language of physics.³⁴ So physicalism, for Carnap, is, first of all, a *metalinguistic* thesis that, secondly, declares the *primacy of the physical language*. Neither of these characteristics are satisfied by the possibility of a materialistic constitution system that Carnap described on the *Aufbau*—nor would they be satisfied by its actuality.

That noted, let’s consider whether what might be considered a precursor of physicalism can be detected in the *Aufbau*. Carnap confidently wrote, as we saw, of “all psychological objects” being reducible to “physical objects”. Indeed, a few pages earlier he wrote that “physical objects are reducible to psychological objects and vice versa” (title of §57) and spoke of “their mutual reducibility” (1928a/2003, 93). On pain of being “suspended in the void” epistemologically, “statements about physical objects can be transformed into statements about perceptions (i.e., psychological objects)” and “every statement about a psychological object can be transformed into a statement about those indicators” from which it is “inferred” (ibid., 92–93). So while in the *Aufbau* Carnap did not as yet defend an explicitly metalinguistic thesis nor consider one object domain to be primary, he did announce the intertranslatability

³⁴ See Carnap (1932a/1934, 67).

of talk of psychological and physical objects. Not yet drawing the distinction between object- and metalanguage, Carnap intended his reduction of object types to be equivalent to the reduction of the concepts corresponding to them: object reduction amounted to linguistic translatability.³⁵ The question now is how far this “mutual reducibility” can take us. Does it amount to a pre-metalinguistic version of physicalism (that also abjures any primacy claims)?

There are two readings of what we can call the intertranslatability thesis, a weak and a strong one. The *weak version* simply says that (i) there exist two constitutional systems, one taking elements and relations of the physical domain as basic and one taking elements and relations of the psychological domain as basic, such that (ii) in the system with a physical basis the reduction of psychological to physical objects and in the system with a psychological basis the reduction of physical to psychological objects are effected. Moreover, (iii) there exists a recursive procedure for each constitution system to furnish some statements that are extensionally equivalent to statements of the other (they have the same truth value). In consequence of (i)–(iii), neither of the two systems can be held to possess overall primacy.³⁶

The *strong version* of the intertranslatability thesis derives from Carnap's assertion of the mutual reducibility of physical and psychological objects also the further claim that (iv) the basic language of the system with a physical basis and the basic language of the system with a psychological basis are mutually translatable. It then follows that (v) for all statements formulatable in one system an extensionally equivalent one can be formulated in the other. The strong and the weak versions being distinguished by whether the extensional equivalences of all statements are held to be formulatable or not, it is clear that pre-metalinguistic physicalism requires the strong version of intertranslatability to be observed.

Which of the two readings of the intertranslatability thesis is appropriate for interpreting the *Aufbau*? Two further facts are relevant here. The first is that Carnap distinguished between two types of constructional systems with a psychological basis: one with “auto-psychological objects” as its fundamental domain (first-person experiences) and one with “hetero-psychological objects” as its fundamental domain (other minds) (§58). So to be true to the *Aufbau*, strong intertranslatability asserts the mutual translatability of the language speaking of physical objects with the languages speaking of either type of psychological object (and the extensional equivalence of all of their statements). The second fact is that in the system of the *Aufbau* the auto-psychological and the hetero-psychological objects play different roles in relation to the physical objects. The hetero-psychological objects are reducible to physical objects while the latter in turn are reducible to auto-psychological objects. So it is not the same type of psychological object that is both reducible to

³⁵ Carnap stated that “the word ‘object’ is here always used in the widest possible sense, namely, for anything about which a statement can be made” (1928a/2003, 5) and that “it makes no logical difference whether a given sign denotes the concept or the object, or whether a sentence holds for objects or concepts” (ibid., 10).

³⁶ In this sense the intertranslatability thesis was invoked for expository purposes in Uebel (2007, 38). The distinction between the weak and the strong versions was not drawn there, however.

and constitutive of physical objects. This asymmetry in the reduction relations between the physical objects and the two types of psychological objects is significant.

Strong intertranslatability takes Carnap's remark that physical and psychological objects are "mutually reducible" to suggest that the languages basic to the two constitution systems are fully intertranslatable. This suggestion trades, however, on treating "the psychological" as interchangeable under the different guises of first-person and third-person mental attributions—as indeed we do in ordinary parlance. Yet Carnap did not offer even an outline of the reduction of auto-psychological objects to physical objects anywhere in the *Aufbau*. So the strong intertranslatability thesis suggested by Carnap's bold statement ("all psychological objects...") disappears under analysis as a misleading and ultimately false conceptualisation of what the *Aufbau* provided, for the psychological pole of the strong intertranslatability thesis is not univocal. After all, it is not the language which speaks of auto-psychological objects that is reducible to the language speaking of physical objects and it is not the language that speaks of hetero-psychological objects that the latter reduces to.

Strong intertranslatability cannot be sustained because (iv) is not supported: the basic language of the constitution system with an auto-psychological base was not shown to be translatable into the basic language of the constitution system with a physical base. To be sure, weak intertranslatability, according to which two radically different constitution systems may nevertheless formulate some pairs of extensionally equivalent statements, still holds. But the important point is that in the *Aufbau* Carnap went no further for (v) is also not supported: it is not the case that for all statements formulatable in the constitution system with an auto-psychological base an extensionally equivalent one can be formulated in the constitution system with a physical base.

Without support for the strong intertranslatability thesis the suggestion that the *Aufbau* in some sense presents a physicalism *avant la lettre* is fatally weakened: even when we hold to the functional equivalence of talk of objects and concepts, any form of physicalism will demand that all psychological statements be translatable into the physical language. (It is hardly physicalism without this requirement.) Elsewhere I considered various moves to compensate for Carnap's missing demonstration that auto-psychological objects can be reduced to physical objects and found all of them wanting.³⁷ I conclude that in the *Aufbau* Carnap simply lacks the resources to effect such a reduction. Such a reduction could only be effected in a constitution system with a physical basis—and that is a system the *Aufbau* does not provide.

Would it be enough for what we might then call "virtual" precursor-physicalism that there exists the mere possibility of providing a constitution system with a physical basis? To be sure, when he gave the outlines of constructional systems on a physical basis, Carnap indicated no reason why such constructions should run into principled difficulties.³⁸ Even so, I find implausible the suggestion that there was nothing more

³⁷ Space constraints demand that I refer the reader to Uebel (2014) even though I would now prefer alternative formulations to some of the points made there.

³⁸ Carnap's candidates in §62 for basic elements and relations of the system with a physical basis were these: (i) electrons (including protons) and their-spatio-temporal relations; (ii) space-time

to the inability of the *Aufbau* to pronounce on the reducibility of the auto-psychological to the physical than that, as a mere matter of contingent fact, its author did not get around to develop the constitution system in which that reduction could have been pursued. Carnap was not simply caught out by a promissory remark that he did not redeem but could have. Object reduction and translatability came apart in the case of the auto-psychological. There are, moreover, good reasons to doubt that Carnap was willing to translate auto-psychological into physical sentences, even though he was happy to so reduce hetero-psychological objects (and perhaps even auto-psychological ones), for such a translation was precisely one of the problematic issues that Carnap saw arising for a constructional system with a physicalist basis.

Still after he had already adopted a metalinguistic standpoint in 1930 and 1931 Carnap felt that he had reasons to exempt the auto-psychological from being translated into the physical. Both in unpublished drafts and in discussions of the Circle Carnap held that the auto-psychological language resisted such translation because some of its non-negligible content was lost thereby.³⁹ Characteristically for this period, Carnap entertained a dualism of universal languages (languages able to translate all other languages) where, however, the physical language had its universality limited to languages expressing states of affairs that are “intersubjectively recognizable”: the original domain of the autopsychological language was excluded from its reach.⁴⁰ Now if those worries in 1930 and 1931 were not new ones—as I think we can safely assume—we can conclude that the constructional lacuna of the *Aufbau* documented above was not unpremeditated. Carnap's own objections to the full intertranslatability of the physical and the auto-psychological languages were overcome only in the winter of 1931/1932 by his introduction of the distinction between the formal and the material mode of speech. As he once put it to Neurath: “Only due to the sharp distinction and the rejection of the material mode has the elimination of the dualism of the two languages become possible.”⁴¹ The position reached thereby, of course, is Carnap's fully-fledged physicalism. By contrast, his earlier position was not even a virtual pre-metalinguistic physicalism.

points of the four-dimensional continuum and their relative locations in the continuum and the many-one relations between real numbers and space-time points corresponding to the individual components of certain functions; (iii) and world points as elements of world lines of physical points (following Minkowski) and relations of coincidence and local time-order. Carnap also noted that the basic elements of (i) were constructable out of the elements of (ii) and the basic elements of (ii) out of the elements of (iii).

³⁹For documentation and discussion of these worries and their overcoming, see Uebel (2007, 191–200, 200–212 and 238–246).

⁴⁰“... jeden Sachverhalt beliebiger Art, der intersubjektiv erkennbar ist.” Carnap, RC 110-03-22 ASP, 20; for discussion see Uebel (2007, 194).

⁴¹“Erst auf Grund dieser Trennung und der Verwerfung der inhaltlichen Redeweise ist aber die Überwindung des Dualismus der beiden Sprachen möglich.” Carnap to Neurath, 2 March 1932, RC 029-12-60/61, p. 2. The preceding sentence makes clear that the dualism in question is that of the physical language and the auto-psychological protocol language.

No Physicalism, No Neurathian Influence?

What we find then, in Carnap's *Aufbau*, is not an early form of physicalism at all but "merely" a form of empirical parallelism.⁴² To be sure, Carnap's was a pretty sophisticated version of such a view, its sophistication consisting in resolutely resisting any philosophical "interpretation" of it.⁴³ So Neurath's physicalist sympathies cannot have influenced the physicalism of the *Aufbau* because there was no physicalism—fully-fledged or virtual--in it. But does this mean there was no influence of Neurath at all?

To conclude this would be far too quick. Recall Neurath's comment on "§224":

The realism of the physicist remains intact, but only will be corrected in the direction of objectivism. Perhaps as follows: the lawful connections are objective, i.e., do not depend on the will of the individual; but there is no matter to which 'reality' could be ascribed; that is a metaphysical concept. (RC 029-19-04)

Now interestingly, on the back of the very page on which Carnap noted Neurath's comment, Carnap wrote (again in shorthand):

Δ to p. 566. It is occasionally said that there is a tacit realism at the bottom of the practical procedures of the empirical sciences, especially of physics. However, we must here clearly distinguish between a certain kind of language use and the assertion of a thesis. The realistic orientation of the physicist shows itself primarily in the use of realistic language; this is practical and justifiable (cf. §52). On the other hand, realism, as an explicit thesis, goes beyond this and is not permissible; it must be corrected so as to become 'objectivism': the regular connections (which in laws are formulated as implication statements) are objective and are independent of the will of the individual; on the other hand, the ascription of the property 'real' to any substance (be it matter, energy, electromagnetic field, or whatever) cannot be derived from any experience and hence would be metaphysical.⁴⁴

⁴²For a discussion of the wide acceptance of psycho-physical parallelism as an empirical hypothesis in nineteenth and early twentieth century Germany and Austria—and of the different philosophical interpretations it was often given (all of which Carnap rejected)—see Heidelberger (2003).

⁴³When he spoke without qualification of "a univocal correspondence between each property of the psychological process and some (even though entirely different) property of the brain process" and held that "all types of psychological processes have physical parallels (in the central nervous system)" (1928a/2003, 92), Carnap endorsed psycho-physical parallelism purely as an empirical hypothesis. For him, psycho-physical parallelism simply asserted a correlation which to determine the relation was the job of brain physiology, psychology and psychopathology (§21). To go further than asking "between what objects the relation obtains" (and presumably under what circumstances the relation does so) and to speculate about "what it is between the correlated objects *by virtue of which* they are connected" Carnap counted as switching, illegitimately, to an "essence question", in short, as switching from empirical science to "metaphysics" (ibid., 35, emphasis added). Later (in §§166-169) he carefully delimited the mind-body problem as arising from the demand to "interpret" (not "explain" as George's translation erroneously has it) the correlation that makes for the empirical thesis of psycho-physical parallelism: "the quest for an interpretation of that parallelism belongs within metaphysics" (ibid., 271, trans. amended).

⁴⁴"Δ zu S. 566. Es wird zuweilen gesagt, dass dem praktischen Verstehen der Realwissenschaften, insbesondere der Physik, ein unausgesprochener Realismus zugrunde liege. Hier muss aber deutlich unterschieden werden zwischen der Verwendung einer gewissen Sprache und der Behauptung einer These. *Die realistische Einstellung des Physikers* äussert sich zunächst in der Verwendung

This jotting, of course, is virtually identical to the third paragraph of §178 of the published *Aufbau*.⁴⁵ In fact, that here on the verso side Carnap even used a paragraph numbering for a cross-reference (§52) that is correct for the published version—unlike his report of Neurath's comments from 21st November 1926 on the recto side (which referred to a §224)—strongly suggests that Carnap had gone back to his old notes at a later date to formulate more precisely the point they had originally discussed for inclusion in the final manuscript.

Juha Manninen also quoted what Carnap wrote on the back of the page on which he recorded Neurath's comments, noted its virtual identity to the published passage, and wondered whether the content was “something new with respect to the original manuscript” and “how much of the passage ... belongs to Neurath and how much to Carnap” (2003, 136–7). What is clear is that the paragraph from §178 of the *Aufbau* represents a more explicit and distinctly Carnapian formulation of Neurath's comments on §224 of the ms of “Konstitutionstheorie”. But that the draft of the published paragraph for §178 seems to have been written at a later date also suggests that the point made was originally Neurath's. (The “objectivism” that Neurath defended accordingly represents a deflationist criticism of realism that has to be set alongside his presumably more strident criticisms of idealist and phenomenalist metaphysics.)

Note also that Neurath's suggestion “say right at the start that the goal is an objective world, the same for all individuals ” found a reflection at the end of §2 in the published version:

Even though the subjective knowledge origin of all knowledge lies in the contents of experiences and their connections, it is still possible, as the constructional system will show, to advance to an intersubjective, objective world, which can be conceptually comprehended and which is identical for all observers. (1928a/2003, 7)

There would have been no reason for Neurath to make his remark if the circulating draft had contained this sentence already.

So Neurath's influence on Carnap's *Aufbau* was by no means negligible. His concern about how the *Aufbau*-to-be might be read found its author receptive and his response congenial. But we must also ask whether these changes were not just presentational. And with that we are back at the question whether Neurath's pre-publication criticism pertained to the substance or just the presentation of Carnap's views.

der realistischen Sprache; diese ist zweckmässig und berechtigt (vergl. §52). Ein darüber hinausgehender Realismus als expl[izite] These ist dagegen unzulässig; er *mus*s zu einem ‘Objektivismus’ (wenn man so sagen will) *korrigiert werden*: die gesetzmässigen Zusammenhänge (die in den Naturgesetzen als Implikationen formuliert werden) sind objektiv, dem Willen des Einzelnen enthoben; dagegen würde die Zuschreibung der Eigenschaft ‘real’ an irgendeine Substanz (sei sie nun Materie, Energie, elektromagneti[sches] Feld oder was immer) aus keiner Erfahrung herzu-leiten, also metaphys[isch] sein.” RC 029-19-04 verso.

⁴⁵The two minor differences are that the published version has “(usually tacit)” (“(meist unausgesprochener)”) instead of “tacit” (“unausgesprochener”) and emphasis also on “so as to become ‘objectivism’” (“zu einem ‘Objektivismus’”). (Needless to say “Δ to p. 566” is missing there too).

The Advantage of the Physical Constitution System

Carnap, of course, did not simply rest with Neurath's "objectivist" suggestion. As we saw from his letter to Schlick of December 1927, he also added the point that the basic domain of the physical constitution system was "the only" thoroughly law-governed one. Thereby Carnap appears to have strengthened Neurath's objectivism (and perhaps even have taken an important step towards the later primacy claim for the physicalistic language). But how new was the claim that "only" the basic domain of the physical system is "characterized by a clear regularity of its process" for Carnap in 1927? And what would become of Neurath's influence (of whatever nature) if it was not a new claim of Carnap's?

In *Physikalische Begriffsbildung* (1926), where Carnap elucidated the concept formation in physics as a three-stage undertaking, physics is naturally granted the greatest generality of all empirical sciences but it was not stated that it is the only law-governed one. However, in "Three-Dimensionality of Space and Causality" Carnap distinguished what he called "the primary world" (said to "consist of sense impressions, not yet interpreted in terms of things, in their simplest ordering by distinctions in time, space, and quality") and the "secondary world" (said to consist of "the ordinary world of daily life and the world of physics").⁴⁶ Carnap stated about "the primary world", for instance, the world of sight:

It is easy to see that the course of uninterpreted sense impressions is not regulated by any determining laws. ... But not only is determinacy denied of this domain; not even constraining laws hold here. No color is in principle excluded from any place in a visual field, even after the whole remainder and arbitrarily many preceding and succeeding visual fields are fixed. (1924, 123).

So "the construction of the secondary world introduces determinacy for the first time" (*ibid.*, 130). The "construction" of the secondary world proceeded in two ways: via the formation of the "ordinary world" of human experience by the addition of the categories of substance and causality (as cause and effect) and via the development of physical theory according to conventionalist principles, the postulation of the validity of the principle of physical causality (as functional dependence). Now of these two reconstructions only the latter provided for complete determinacy, but the contrast Carnap drew between the primary world and the secondary worlds was even starker: the theoretically uncontaminated given—which he stressed was not an abstraction (*ibid.*, 109)—was without regularities whatsoever. Regularities only followed from the imposition of a structure that was ultimately freely chosen (but presumably selected for pragmatic virtues).

Importantly, Carnap's "primary world" of 1924 does not equate to the basic domain of the constitution system with an auto-psychological basis in the *Aufbau*, for the latter is by no means "untreated". The only thing untreated in the *Aufbau* are the elementary unanalyzed experiences, yet their de- and reconstruction by means of quasi-analysis is highly theoretical. As Carnap noted, the constitution of particular

⁴⁶Carnap (1924, 130; quoted with permission from a translation circulated by Michael Friedman).

types of objects, say the order of the visual field, allows for various possibilities.⁴⁷ What is not arbitrary and up for choice is the terminus of the construction, “the entire formation of reality” (1928a, 158), which, however, was to be reached along the lines of our best understanding of what this reality is—what science tells us.⁴⁸ Since most of the auto-psychological objects are constructed in this fashion (like the physical objects and later the hetero-psychological objects), it is important to note that the only untreated elements of the *Aufbau*, the elementary experiences, do not accord with Carnap's description of the original elements of the primary world as “uninterpreted sense impressions”. Rather, as that which “is present as ‘experience’”, elementary experiences were then still held to be decomposable into their elements and their relations, namely sense impressions however crudely characterized initially (1924, 108–109). The primary world assumed elements which the *Aufbau* still had to construct, so its lawlessness held no implication for autopsychological basis of the *Aufbau*.⁴⁹

Yet in what Carnap called the “first shoot” from which the constitution theory of the *Aufbau* grew—the manuscript “Vom Chaos zur Wirklichkeit” (1922b)⁵⁰—we also find a first formulation of the *Aufbau*'s conception of the lawlessness of the psychological domains. In “Chaos” Carnap assumed an original state bereft of “order and individually reidentifiable elements”.⁵¹ Only the most minimal distinctions were allowed for phenomenological “building blocks” to be discerned such that a “domain of experience” could be constructed by ordering them according to an imposed schema; later on a “domain of reality” was constructed with the addition of further elements.⁵² Again the conception of the basic level differs from that of the *Aufbau*, but of particular interest is what Carnap noted about the construction “from the domain of experience” of the “domain of psychology”, a scientific domain different from that of physics that encompassed both of what later were called auto- and heteropsychological objects. Even after it had been enlarged by a postulated “subconsciousness” so as to allow for its processes to be comprehended by laws, “one particular exception” remained.

⁴⁷“The reason for the multiplicity of possibilities lies in the fact that the real process of cognition, which we shall call intuitive in contrast to the rational reconstruction, is overdetermined. Hence the possibility and necessity of a plurality of determination each of which would be sufficient by itself.” (1928a/2003, 146)

⁴⁸“The only purpose of these constructions was to show the aim of construction theory more clearly and to illustrate the method. The detailed execution depends upon the results of the empirical sciences.” (1928a/2003, 190).

⁴⁹ See also Carus (2007, 170–171).

⁵⁰“Das ist der Keim zur Konstitutionstheorie des ‘Log. Aufbaus.’” Hand-written addition to p.1 of RC 081-05-01 ASP. According to Carus (2007, 152 n.11), Carnap (1924) “was composed just after” “Chaos” in the summer of 1922.

⁵¹“Das Chaos enthält keine identischen, d.h. als einzelne fassbaren und als diese selben festhaltbaren Elemente.” RC 081-05-01 ASP, p. 1.

⁵²The terms are “Erlebnisbereich”, “Wirklichkeitsbereich” and “Bausteine”. See RC 081-05-01 ASP, p. 3.

One peculiarity which distinguishes this construction essentially from [that of] reality lies in this that ... not all events of this domain are conditioned by others. Rather, certain events called ‘sensations’ do not obey any laws of this domain; their occurrence in this domain is unmediated and unexplained. They do not possess a property which would distinguish them from the other events. ... They gain their special status in a determinate way only due to a certain relation of coordination to certain events of reality (‘stimulus relation’). In consequence, the construction of the psychological domain presupposes in a methodological sense the construction of reality.⁵³

It is this insight concerning the lack of causal closure characterizing the psychological domain that transferred to the basic domain of the *Aufbau*’s constitution system with an auto-psychological basis even though that is structured quite differently.

But what is the significance in 1927/1928 of stressing this insight which, we now see, can also be found at the very origin of the *Aufbau* project? The 1922 manuscript and the 1924 paper avow a fictionalism open to various interpretations, but their emphasis lay on stressing in an anti-empiricist vein that the predictable regularity of human experience is due to an ordering that we impose upon its raw data.⁵⁴ In 1927, by contrast, the point was to stress what Neurath called “objectivism”. This difference is significant. If early on the lawful regularity determinative of sense impressions was revealed as not necessitated by the pure data of experience alone but freely added, now it was recognized as fixed by the subject’s position in the physical world and not legislated by the subject. This change of emphasis certainly accords with Neurath’s critical remarks on the circulating manuscript that “the lawful connections ... do not depend on the will of the individual”.

Whether this change also represents an accommodation of Neurath’s remarks is by no means clear, however. By January 1925, when Carnap first spoke about his project to Schlick’s circle, the idea of a fixed primary world with phenomenologically discernible elements and the superaddition of optional secondary worlds had been dropped.⁵⁵ What we must ask now is whether after that change had been made by Carnap on independent grounds there was substantial work left for Neurath’s criticism.

⁵³“Eine Eigentümlichkeit, die diesen *Aufbau* sehr wesentlich von der Wirklichkeit unterscheidet, liegt darin, dass ... nicht alle Vorgänge des Bereichs durch andere bedingt sind. Sondern gewisse Vorgänge, die ‘Empfindungen’ heissen, gehorchen keiner Gesetzmässigkeit dieses Bereichs; sie springen unvermittelt und unerklärt in diesem Bereich auf. Eine bestimmte Eigenschaft, durch die sie sich von den andern Vorgängen kenntlich machen würden haben sie nicht. ... Ihre Sonderstellung erhalten sie in scharf umgrenzter Weise erst durch eine gewisse Zuordnungsbeziehung (‘Reizbeziehung’) zu gewissen Vorgängen der Wirklichkeit. Das hat zur Folge, dass der *Aufbau* des psychologischen Bereiches den *Aufbau* der Wirklichkeit methodisch voraussetzt.” RC 081-05-01 ASP, pp. 12–13.

⁵⁴“To be sure, (sensible) experience necessarily exhibits a certain spatial and temporal ordering, and also certain qualitative relations of equality and inequality. By contrast, the grouping together of certain element of experiences as ‘things’ with ‘properties’, and also the coordination of certain elements to others as their ‘cause’, is not necessary—i.e. not a condition of every possible experience. It is, rather a matter of free choice whether this elaboration takes place and, also, to a large extent how it takes place.” Carnap (1924, 106–107).

⁵⁵ See Carus (2007, 168) with reference to RC 081-05-03 ASP and RC 081-05-02 ASP.

The Construction of the Non-autopsychological Worlds

There is another aspect of the *Aufbau* that seems to speak to Neurath's worry that the emphasis on methodological solipsism made Carnap's construction "sound too individualistic". Consider §66 which enlarges on the task of showing how, as the *Aufbau* put it, a constitution system with an auto-psychological basis can avoid "the danger of subjectivism" and "achieve objectivity of knowledge" (1928a, 106). There Carnap distinguished between "two senses" of objectivity which reflect the two aspects of the "objectivism" which Neurath urged. The first is "objectivity in contrast to arbitrariness: if a judgement is said to reflect knowledge, then this means that it does not depend on my whims"; the second is objectivity as "independence from the judging subject" as a "validity which holds also for other subjects". Carnap also noted there that "[i]t is precisely this intersubjectivity which is an essential feature of 'reality'" (ibid.) and announced the project undertaken later (in §§146–149) of constituting—on the basis of "certain structural properties [which] are analogous for all streams of experience" (ibid., 107)—the all-important "intersubjective correspondences" which constitute the intersubjective world.⁵⁶

Now an intersubjectivizing project of sorts (albeit not in those terms) was also already described in ever so hazy form in "Vom Chaos zur Wirklichkeit" where what obtains in the domain of reality constructed for another subject may under certain circumstances be used to "correct" what obtains in one's own domain of reality.⁵⁷ But a very significant difference obtains between the first sketch and the final product concerning the role which the mathematical structure of the world of physics plays in the *Aufbau*'s constitution of objectivity and the intersubjective world. In the *Aufbau* Carnap constituted "the space-time world" by applying the abstract space of geometry before the transition from the two-dimensional order of the visual field to the three-dimensional order of the space of visual things. He constructed "world-points" of a four-dimensional real-number space as quadruples, with the first number as a time coordinate and the remaining three as space coordinates, which serve as subjects for the assignment of colors in the build-up of visual things according to certain desiderata.⁵⁸ As Carnap stressed, his construction embeds the space of visual things in physical space instead of constructing the space of visual things piecemeal in the fashion of Russell.⁵⁹

The question arises: did the version of "Konstitutionstheorie" which Carnap circulated in 1926 contain this move? Note that Neurath commented in November 1926: "Good: that space as a totality is const[ructed] in one go; do not combine a

⁵⁶For a detailed critical analysis of this process which stresses the necessary role of the mathematical structure of the world of physics that is focussed upon below, see Richardson (1998, 76–91).

⁵⁷See RC 081-05-01 ASP, p. 11.

⁵⁸This is the point, of course, where Quine diagnosed the failure of a reductive phenomenalist project, but that is not of concern here.

⁵⁹See Carnap (1928a/2003, §125).

whole out of parts!⁶⁰ His agreement is clear, but just what Neurath found so praiseworthy is not easy to determine. There are several candidates. First, there is the thorough application of the general holistic approach to construction as opposed to Russell's atomism. Second, there is the explicitly mathematical nature of the space Carnap employs. Third, Neurath had been familiar with Carnap's *Der Raum* where physical space was constructed by making use of a distinction that is related (though not identical) to that which Carnap jettisoned by 1925, that between primary and secondary worlds, namely that between the "necessary" form of experience—what is called the "'matter of fact' of experience" ("Tatbestand' der Erfahrung")—and what is "freely chosen" to be added to it to arrive at any conception of physical space that determines the concepts of straight line or segment congruence.⁶¹ So Neurath's delight may also reflect his relief that the construction of *Der Raum* had been left behind and with it the model of a phenomenologically discernable primary world and of intuitive space.

Indications are that Neurath was apprised of all three aspects. His approval of holism is evident and we know he had been critical of the Kantianism of *Der Raum*. But could the atomism of the Russellian construction of space be avoided in any other way than by constituting the mathematically structured space of physics? It is hard to see how else, was Carnap's careful answer in the *Aufbau*.⁶² But already the outline of Carnap's talks in Vienna in June and July 1926 spoke explicitly of the space-time-world and indicated a place for it in the order of constitution that corresponds exactly to that in the published *Aufbau*.⁶³ This strongly suggests that with regard to the constitution of space all the objectivism contained in the *Aufbau* was already contained in the version of "Konstitutionstheorie" that Neurath saw.

Importantly, the *Aufbau* also constructed intersubjective correspondences between "my world" and "the world of M" (the world of the other) with reference to this physical space: "A one-to-one correspondence holds between the spatiotemporal world of physics in S [my world] and that in S_M [the world of the other]" such

⁶⁰RC 029-19-04 ASP; see fn. 15 above.

⁶¹Carnap (1922, 39; quoted by permission from a translation circulated by Michael Friedman and Peter Heath).

⁶²Carnap noted that given his more radical starting point—"We have begun our structure several levels further down"—this was the situation: "... in order to be able to follow the same route as Russell, we will first of all have to construct the aspects [of visual things] from our basic elements, namely, the elementary experiences. However, this is probably impossible for aspects 'which have not been seen', or at least, it would offer considerable difficulties." Carnap (1928a/2003, 192) Interestingly, Carnap added: "It must be admitted, however, that our kind of construction of physical points and of the physical space is by no means a fully satisfactory solution." But he did not specify what worried him: was it what posterity learnt of as Quinean worries?

⁶³See RC 081-05-07 ASP, transcription of shorthand additions by Brigitte Parakenings. To be sure, one may wonder whether the construction of physical space already plays this role in the earlier conception of "Konstitutionstheorie" that formed the basis of Carnap's second presentation to the Circle in January 1925. There he spoke explicitly of a "primitive order of space" ("primitive Raumordnung") within which physical objects were to be constituted; see RC 081-05-03 ASP, p. 2. Be that as it may be (and so possibly unlike its 1925 sketch), the "Konstitutionstheorie" of 1926 underwent no further changes of comparable significance.

that not only “the spatiotemporal relations which hold for the physical world points in S_M also hold for the corresponding world points in S ” but “that the same is true for the qualitative relations” (1928a/2003, 224). Intersubjective objects are then derived as abstraction classes of such intersubjective correspondences giving us the “intersubjective world” (ibid., 229). Without being able to call on the mathematical nature of the physical space no such one-one correspondences would be achievable, for qualitative assignments to spatial regions of visual space would be far too vague to yield agreement about a determinate subject matter (ibid., §136). This too, it seems, was already in “Konstitutionstheorie”.

Conclusion

Carnap clearly took Neurath's pre-publication criticism seriously for its thrust is discernible in the published book. And Neurath's influence did, after all, operate in the direction of travel suggested earlier, albeit in a considerably much more subtle fashion than first envisaged: as yet it was not turned forward towards physicalism but backwards, as it were, oriented towards where Carnap came from. Neurath assisted Carnap's turn away from idealism—if only, from what we can tell so far, presentationally.

However, there was one aspect of Neurath's anti-individualist criticism that was voiced in his review under the heading of “collectivism” which definitely went beyond presentational matters: that the *Aufbau*'s reconstruction of human knowledge overlooked the socially conditioned nature of conventionalist theory choice. Interestingly enough, this too was a point which Neurath had pressed already in 1926. Carnap's diary entry for 21 November 1926 specifies his criticism slightly more sharply than the note to himself we have so far discussed.

“Evening at Neurath's [place] ... Neurath says that unfortunately my book does not have the right effect ethically on those for whom it is really written, because it opposes materialism and realism much more sharply than idealism which, after all, is the worse enemy. He speaks of the world view of the new age. My book should give greater emphasis to collectivism, the ‘methodological solipsism’ is not to his taste.”⁶⁴

That the content of this criticism was less clearly articulated in Carnap's report than in Neurath's review of 1928—even though its object was more clearly indicated here: methodological solipsism!—need not mean, however, that it was as yet undeveloped. That Neurath renewed this criticism in his review indicates, of course, that he did not think that Carnap had taken it on board sufficiently.

⁶⁴“Abends bei Neurath, auch Frau Reidemeister da. Neurath sagt, dass mein Buch leider in der ethischen Einstellung nicht richtig auf die wirke, für die es eigentlich geschrieben sei, weil es dem Materialismus und Realismus schärfer gegenübertritt als dem Idealismus, der doch der schlimmere Feind sei. Er spricht davon, wie die Welyanschauung der neuen Zeit aussehen wird. Der Kollektivismus müsse in meinem Buch starker hervorkommen, der ‘methodische Solipsismus’ gefällt ihm nicht.” (RC 025-72-05 ASP).

So consider once more the *Aufbau*'s ultimately promissory note concerning a possible constitution system with a physical base. May it not be the case that Carnap bracketed the issue of "collectivist" theory choice along with others that pertained to the "importance for science" of this system which, he said, he could not discuss in "more detail" in the *Aufbau*? Indeed, may we not go further and ask what prompted Carnap in the first place to mention the possibility of such a system or even speak of the need for it? Until a copy of "Konstitutionstheorie" is found which proves otherwise (by already featuring the relevant remarks) we may be excused for suspecting that in this regard too Neurath's concerns played a decisive a role—albeit still a presentational one. (Carnap's long-standing tolerance toward different forms of language forbids claiming more on this account as well.)⁶⁵ If that were indeed the case it would stress rather dramatically that Neurath's "merely" presentational influence was by no means inconsequential but marked the beginning of Carnap's road to his later physicalism.

One further point deserves to be made in any case. Carnap's remark about Hahn's reaction to his *Aufbau* project (quoted in §1) might be taken to suggest that in Vienna his project was welcomed in a foundationalist spirit. This may hold for some in Schlick's circle, but Neurath's stance in general and his reaction to Carnap's constitution of physical space in "Konstitutionstheorie" in particular provides an important correction.⁶⁶

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⁶⁵ See Carnap's comments about his life-long liberalism concerning different forms of language in (1963, 17–18).

⁶⁶ I wish to thank André Carus for helpful comments at the conference, Christian Damböck for correspondence, Brigitte Parakenings at the Philosophisches Archiv, University of Konstanz, for transcriptions of Carnap's short-hand notes and her guidance to newly available parts of Carnap's Nachlass, and the Archive of Scientific Philosophy, University of Pittsburgh, for permission to quote from their holdings.

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Theories of Order in Carnap's *Aufbau*

Paul Ziche

From Lines of Influence Towards Unified Discourses: “Construction Theories” and “Theories of Order” in the *Aufbau*

Rudolf Carnap's *Logischer Aufbau der Welt* is packed with references to what seem to be not only multiple, but extremely divergent philosophical traditions. A prime example is § 3, very early in Carnap's book, and devoted to the “method” (in the German original, Carnap uses an even broader term, “Der Weg”) of Carnap's search for a “Konstitutionssystem”, a “constructional system of concepts”.¹ Without further discussion, this paragraph employs several terms in parallel in order to characterize the very aim of Carnap's project. What the title of this paragraph announces, namely an “analysis of reality” via a “theory of relations”, is re-phrased as the task of solving “all problems of the pure theory of ordering/reinen Ordnungslehre”. In the same paragraph, Carnap offers yet another description of his project: what he aims at is the development of a “construction theory/Konstitutionssystem”. In this paragraph, thus, great importance is given to the notion of *order*, and a quick look at other early texts of Carnap confirms the relevance of this concept. According to his *Physikalische Begriffsbildung*, it is the task of science to “collect and order” insights with the aim of constructing (in the German text, Carnap is here already using the term “*Aufbau*”) a comprehensive ordering, a “Gesamtordnung” of what we perceive (Carnap 1926, 1, 5). In *Der Raum*, it is ideas from projective geometry

¹References to the *Aufbau* are given via paragraph numbers. The English translations follow Carnap 1967; the key terms are also given in the German original. Other translations are mine. – Many thanks to the reviewer of the first version of this paper and to Thomas Mormann for constructive discussions.

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that make Carnap understand space as an “Ordnungsgefüge”, as an ordered structure (see below, section “[Order between mathematics, metaphysics, and innovative philosophico-scientific projects](#)”). In the *Aufbau* itself, the motive of order remains prominently present. A constructional system intends to present a “uniform *ordering of concepts*” (Carnap 1928, § 157) that takes place on the level of structures, not of content or of “materially new insights”. The fact that the basis of these constructions needs to be sought in relations can likewise be summarized in the notion of “Ordnungssetzungen/initial ordering concepts” (Carnap 1928, § 75).

When relating his constructional theory to other philosophical positions in the appendix to § 3 of the *Aufbau*, Carnap refers to three broad fields: “logistics”, “applied theory of relations”, and “construction theory/Konstitutionstheorie”. For the first two, the reference author is clear; in both cases, Bertrand Russell is the most important point of departure. The third field, however, opens up the horizon of references in a rather striking fashion; that the title of this paragraph is adopted for Carnap’s entire project in the *Aufbau* makes this only more remarkable. Carnap here refers to the philosopher/psychologist Theodor Ziehen² with his *Erkenntnistheorie auf physiologischer und physikalischer Grundlage*, to Hans Driesch, perhaps the most ambitious theorist of order with his transformation of philosophy into an *Ordnungslehre*, but also known as vitalist metaphysician of biology and author on parapsychology, and to Walter Dubislav, member of the “Berlin Group” of scientific philosophers and – together with Karl Wilhelm Clauberg³ – author of a *Systematisches Wörterbuch der Philosophie*.⁴ Carnap also draws connections to Edmund Husserl and Alexius Meinong, and, somewhat “more remotely”, to the “classificatory systems of concepts” of the scientist-philosopher Wilhelm Ostwald, of the psychologists-philosophers Wilhelm Wundt and Oswald Külpe and of the theologian *plus* philosopher Paul Tillich.⁵

This selection of authors is more than just remarkable. What connects them? If there are connections, how strong are they? The first point to notice is that Carnap

²Ueberweg’s history of philosophy in the edition from 1906 only briefly names Ziehen as one of the philosophical authors dealing with the status of psychology and with psychology’s role within epistemology; as far as established movements are concerned, he is related to the “immanence philosophy” of which Wilhelm Schuppe was the main protagonist (Heinze 1906, 375–6). The 12th edition from 1923 emphasizes his role in the development of “empiriocriticism” beyond its original formulation in the works of Avenarius and Mach, and stresses the positivist elements in Ziehen’s philosophy (Oesterreich 1923, 401–407). On Ziehen, see the website maintained by A. Herbst and the paper by Th. Mormann in this volume.

³While Dubislav is given due attention – with respect to his logical and methodological ideas – in Milkov and Peckhaus 2013, Part IV, his *Wörterbuch* and his cooperation with Clauberg are hardly discussed in the literature. Clauberg, a medical doctor, is sometimes wrongly identified with the NS-doctor Carl Clauberg. The Kant-Gesellschaft names him in 1920 as a new member with the profession of being a “Medizinalpraktikant”. In 1929 he became Privatdozent, in 1935 Professor for medicine in Berlin.

⁴On Driesch, Ziehen and Dubislav see in more detail section “[Getting closer to Carnap: Ziehen, Driesch, Dubislav](#)”.

⁵The inclusion of the theologian Tillich may seem surprising; however, Tillich was indeed well known in this period for his ideas on ordering the sciences (Ziche 2004).

himself introduces some caveats. The projects of Ziehen, Driesch and Dubislaw are seen as “independent” from each other (§ 3), and Carnap distances himself from their “systems”: “We will indicate agreements between our system and the just-mentioned systems on the few occasions when they occur, but our approach is, on the whole, quite different from those others because of the methodological tools which we shall employ” (§ 3). With respect to Ostwald, Wundt, Külpe and Tillich, Carnap himself explains that they remain “remote” from his own project because they lack a derivation of “concepts from one another”.

The methodological challenge posed by these references is easy to summarize: what can we learn about Carnap’s project when we start from the assumption that there are indeed important conceptual links that can support the joint occurrence of these authors and texts in the *Aufbau*? Carnap’s somewhat restrained statements as to the importance of these authors for his own project become balanced by the intricate web of cross-references, implicit and explicit, between these authors, and by the fact that the notion of “order”, one of the core concepts that Carnap himself adopts for characterizing his goals in the *Aufbau*, in all of these authors.

The recent literature on Carnap has emphasized throughout that a straightforward logical-empiricist interpretation of the *Aufbau* is highly problematic, and has devoted much work to reconstructing numerous lines of influence in the *Aufbau*. This has resulted in a considerable number of not really compatible readings of this text. Three methodological trends stand out: the singling out of individual lines of influence, either in terms of single authors or of particular movements in philosophy⁶; reading the *Aufbau* in a “reconciliatory” way, based upon viewing the text as drawing upon highly diverse contexts in an eclectic fashion (Mormann, this volume); or, which is in a way a variation of the second option, an interpretation of the text as consciously bringing together diverse traditions and thus – as is argued in Michael Friedman’s *Parting of the Ways* (Friedman 2000) – as questioning deeply engrained tensions between philosophical traditions.⁷

I propose a different approach. Taking seriously the idea that one can indeed establish a common and broadly shared conceptual core of “theories of order”, I suggest that we should distance ourselves as far as possible from thinking in terms of (more or less) clearly circumscribed forms of philosophy. This implies that we should free ourselves from feeling too greatly surprised when seeing Carnap in peaceful and fruitful interaction with apparently divergent movements. The surprise we are inclined to feel when looking at his references to those different movements is precisely a case of singling out some strands from a continuous discourse that

⁶For an analysis that is very strongly focussed on one single author – Husserl – see Haddock 2008.

⁷For an overview, see again Mormann’s text in this volume. For recent examples of this broader approach, see Carus 2007; Awodey and Klein 2004; Köchy 2010. – A clear example of an approach that – despite its considerable breadth – narrows down the field, is to be found in Coffa 1991. See f.i. p. 1: “Within the field of epistemology one may discern three major currents of thought in the nineteenth century: positivism, Kantianism, and what I propose to call the semantic tradition.” – Gereon Wolters’ (1994, 2004) discussion of various styles of philosophizing would deserve more attention in this context, though Wolters, too, is focussing quite strongly on tensions between the various styles.

does not provide clear joints at which to carve it. What requires explanation, then, is not so much how Carnap succeeded in bringing together those movements, or what he took from each of them individually, but rather why we think them as being so diverse and irreconcilable. This question cannot be answered here, but will be raised again at the end of this paper. I'll repeatedly refer to one instance in particular – the role of psychology and the alleged tension between psychology and logic or logically inspired philosophy – where the confrontations that we are wont to expect were, to a surprising extent, absent in the discourses that Carnap latches onto.

This historiographical stance makes the strong assumption that the juxtaposition of the authors in Carnap's lists of references has a function beyond being a strategy for a broad legitimization through referring to as many reference authors as possible.⁸ What this approach promises to give us is more insight into the dynamics of the philosophical discourse around 1900: a discourse that refuses to come neatly packaged and which precisely for this reason requires its participants to search for philosophically ambitious concepts that could function within this entire field, and that could hold it together. "Order" is a prime candidate here.

"Order" between Mathematics, Metaphysics, and Innovative Philosophico-Scientific Projects

"Order" is a term with a strong theological-metaphysical tradition. Around 1900, it is a term discussed by numerous thinkers: authors as diverse as Russell, Driesch, Cassirer, Ziehen, Whitehead, and many others ascribe a prominent role to this notion. Carnap's usage of the term "order" does indeed – and that will be the claim of the following discussions – refer to this broader discourse. However, widespread though discourse about "order" was around 1900, these theories were never really established in a unified form. While "order" was a highly prominent concept in this period, the history of theories of order does not amount to a genuine success story. Let's start the reconstruction of discourses about order with some significant interactions, in the name of "order", between mathematicians/logicians and psychologists.

"Order" was a key concept in nineteenth century innovations in mathematics and logic, strongly related to innovative and philosophically important issues in algebra, in the axiomatization of geometry and in set theory.⁹ In fact, it arises in a number of

⁸The equally interesting and intricate issue of Carnap's "reference politics" – raised by Mormann in his paper in this volume – is, thus, consciously left out of consideration here.

⁹In this paper, I shall focus on projective geometry as an important inspiration form mathematics. However, the highly general conceptualization given to theories of order by the various authors discussing this concept might make it possible to also discuss the way how the relationship between these sub-fields of mathematics was perceived in this period (and then, interestingly, both within mathematics proper – see, for instance, the broad range of theories that Whitehead includes in his treatise on algebra, Whitehead 1898, and outside of mathematics proper).

the key mathematical discourses in this period. One of the most prominent of these concerns *projective geometry* (see already Nagel 1939). Projective geometry studies strong generalizations of existing geometry, characterized by those properties that remain invariant under projections. As is shown in a number of beautiful duality theorems in projective geometry, statements about the relationship between lines and points can be translated into dual statements about point-line relationships; lines and points, in those theorems, become interchangeable. Metric properties do not matter here; projective geometry investigates what – in Staudt's classic from 1847 (Staudt 1847) – has been called "Lage", "situation". Situations are characterized by relational properties. The most important example of a relational notion that gains prominence in debates about projective geometry is that of "betweenness": what does it mean, for example, for a point to lie between two other points? This question became important in an investigation of the Euclidean axiomatics for geometry that fails to incorporate a notion of betweenness. Put differently, projective geometry does not talk about the traditional objects of geometry such as points or lines, but about the relations that hold between these objects.

In *Der Raum* (Carnap 1922), Carnap is very clearly working in this tradition. The formal aspects of space need to be investigated on the basis of a thoroughgoing generalization of traditional geometry that leads from talking about points, lines and planes to a "pure theory of relations" or "theory of order/*Ordnungslehre*" (the very term employed by Hans Driesch as the name for his foundational project in philosophy), clearly inspired by projective geometry (e.g. Carnap 1922, 18–21; see the extensive discussion in Mormann 2003; on a more general level, see Nagel 1939). What a formal analysis of space has to study, are "Ordnungsgefüge" (Carnap 1922, 14), ordered structures. As Thomas Mormann reminds us, Carnap's usage of the term "Ordnungsgefüge" in *Der Raum* is itself not part of the jargon of mathematics, although mathematical issues clearly are essential for Carnap's early analysis of space (Mormann 2003). While this term – again a term that is clearly influenced by Driesch's writings – is not a term proper to mathematics, it is a term indigenous in a broader discourse within which mathematics in general and projective geometry in particular can be given a place.

The thinker who perhaps best exemplifies the requirement to think in terms of "order" on all levels, from the highest abstractions in mathematics and logic down to the level of his everyday life, is the mathematician *Moritz Pasch* (on Pasch see Schlimm 2010). An order fanatic also in daily life, he set out to repair the omissions in Euclidean axiomatics, thereby giving the axioms for "betweenness" a central role; he explicitly generalized mathematics from talking about geometrical objects (in terms of what he calls "Stoffwörter", substance terms) to a relations-based mathematics (in which the "Fügemittel", the connectives, are what determines the objects; Pasch 1926, 261), and he pays close attention to logical issues such as implicit definitions. Pasch also exemplifies the complex network in which these theories unfold. In editing his collected papers, he was supported by his Giessen colleague, the Gestalt psychologist *Kurt Koffka*, and Pasch not only published in

Hans Vaihinger's Annalen, but explicitly viewed his approach to mathematics as supportive of Vaihinger's "as-if-philosophy" (e.g. Pasch 1921).¹⁰

Some general strands emerge already in these preliminary remarks on the notion of "order" as it was discussed around 1900. The driving motivation behind the innovations in mathematics appears to have been the search for a more general (if possible, for the most general) approach in mathematics, in the philosophy of mathematics, and in logic. Thinking in terms of relations, not in terms of fixed first elements, seemed to be the most promising way to achieve this generality. This implies that the basic elements within a generalized mathematics (and, analogously, in generalizations in other fields) need not be atomistically simple; complex elements are possible. The link to psychology is remarkably strong, and it is two-sided. Not only does, for instance, Pasch display no contact fear in his cooperation with Koffka. Psychologists in this period, as part of their search for a methodological basis for their field, and – perhaps even more importantly – for allies in the conflicts between various forms of science, were particularly quick to pick up innovations at the borderline between fundamental mathematics and logic (Ziche 2002; 2008 chap VI.5).

It is precisely these ideas that can be traced throughout in discussions about "order" around 1900. *Bertrand Russell* devotes a brief manuscript note from 1898 to this concept (Russell 1990). He is strongly influenced in this text by the Italian mathematician Mario Pieri and by Pieri's ideas concerning projective geometry, and Russell also refers to Staudt. Russell is interested in what projective geometry can teach us about the basic concepts of geometry in particular, and of mathematics in general. In his note, he combines more clearly geometric notions with a discussion of what minimally determines a series and what is required for establishing an unequivocal sequential order in closed or open series. The motive of generalization, the step away from objects with certain qualities individually ascribed to these objects and towards relational analyses, is crucial for his approach. Russell discusses generalized sets of axioms,¹¹ and "order" is explicitly treated as a concept of the highest possible generality in mathematics: "Order is something which all series have in common" (Russell 1990, 355). Russell is clearly aware that there might be a psychological perspective on these issues (when three points on a circle are close to each other, it seems natural – in a very basic Gestalt-like argument – to say that they have an order, but this does not work when they form an equilateral triangle (Russell 1990, 353)), but he clearly recommends a formal analysis as being more general than the psychological approach. In the *Principles of Mathematics*, Russell takes up all these problems in a chapter devoted to "The meaning of order" (Russell

¹⁰ While this may appear surprising in the light of the pessimistic and Nietzschean aspects of Vaihinger's project to reveal that our thinking is everywhere, in philosophy, mathematics, and the sciences, based upon „fictions“, there is also a strongly mathematical strand in his arguments; Vaihinger has been particularly interested in exploring his theory's basis in, and implications for, topics in mathematics.

¹¹ Take an example: from statements of the form "Any three not collinear planes determine a point", he comes to the more general one that "All space consists of a collection of points, and three qualities may be found, which are all possessed, though in different magnitudes, by different points" (Russell 1990, 346–7).

1937, 207–217; projective geometry is given a separate treatment, Russell 1937, 381–392). Again, Russell here intends to answer an extremely general question, namely: “What is order?” (Russell 1937, 207), and he answers this question in terms of the fundamental role of the relation of “betweenness” in the production of series.

With *Hans Driesch* (see section “Getting closer to Carnap: Ziehen, Driesch, Dubislaw”) and *Wilhelm Ostwald*, two further authors from Carnap’s list share Russell’s conviction that progress towards a more general and therefore more fundamental conception of science, logic and epistemology requires us to take account of these innovations in mathematics, and they both embarked upon large-scale projects to bring about this generalizing step themselves. In this context both explicitly claimed – controversially, to be sure, but not absurdly, when one considers the context – that they were the genuine discoverers of modern logic, by virtue of their theories being even more general and fundamental than those of logicians working in a more mathematical tradition (Ziche 2011). In both cases, they, too, proclaim a theory of order as providing the basis for all forms of reasoning in science and logic.

In the case of Ostwald – chemist, Nobel Prize laureate, proponent of a monistic world view, and innovator of the philosophy of nature as a philosophical sub-discipline (on Ostwald, see Görs et al. 2005, on Carnap and Ostwald see Carus 2006, 66–69, who remains strongly focussed on Ostwald as a positivist) –, the theory of order lies at the very foundation of his (pyramidal) ordering of the sciences. The science of order is more general than traditional mathematics, and also more general than the monistic foundation that Ostwald gave to the natural and cultural sciences in terms of his “energetics”, i.e. the idea that the law of the conservation of energy is the most general basis for analyzing natural (and cultural) processes. The formation of scientific concepts, on the basis of an ordering of impressions – stated in a way that is closely analogous to what Carnap discusses in *Physikalische Begriffsbildung* – is one of the topics that a theory of order has to analyze (see, e.g., Ostwald 1914, 106–123). For Ostwald, “order” is the key concept within any ordering of the sciences, not only in the elementary sense of arranging these sciences in an ordered system, but also in the sense of analyzing the most general methodological procedures that any science has to follow.¹² A particularly striking example of the generalizing attitude associated with the notion of “order” in the context of a classification of the sciences can be found in *Paul Oppenheim’s* (the wonderfully efficient co-author of classical papers together with Hempel, Kemenyi, Putnam, and others) texts from the 1920s. Under the title of a *Natural order of the sciences*, he presents an ordering scheme with a formal structure (based on a coordinate system that also allows for intricate coordinate transformations) within which all sciences can be placed onto one and the same horizontal level. Oppenheim’s ordering scheme is multi-polar. He does not assume a clear directedness from simple to complex, and does not work along dichotomies such as natural sciences vs. humanities or meta-physics vs. empirical sciences. All these fields get a place within his ordering system that Oppenheim himself can, precisely because of its horizontal inclusiveness,

¹² Given the importance of the issue of concept formation in Ostwald, I cannot accept Carnap’s negative verdict concerning the lack of derivative relations between concepts in Ostwald.

describe as being “tolerant” (Oppenheim 1926, 1928; on Oppenheim, see Müller and Ziche 2013).

Two further examples may suffice to illustrate how richly textured the field of theories of order is. From Ostwald, the self-proclaimed logician and the widely acclaimed philosopher of nature, a line can be drawn to *Alfred North Whitehead*. Whitehead discusses projective geometry (under the title “descriptive geometry”) at length in his *Treatise on Universal Algebra* (Whitehead 1898, 214–228; see also Gandon 2004), and “order” is also one of the key concepts in Whitehead’s *Process and Reality* from 1929 (Whitehead 1978). The “order of nature” develops in an organic fashion, starting from a “‘given’” that is itself a complex “conrescence of objectivations” (Whitehead 1978, 83). “Order” is a generic term; there always needs to be some specific order, not merely “order” in a vague and general sense (Whitehead 1978, 83). Whitehead also emphasizes another facet of the ideal of order: it strongly appeals to our feelings and emotions; a “lure for feeling” arises from “the enjoyment of this ideal” (Whitehead 1978, 85).

As a final example, look at *Ernst Cassirer* whose importance for Carnap’s *Aufbau*-project has been discussed in a number of important publications (Sauer 1985; Friedman 2000; Richardson 1992, on Cassirer’s reception of formal logic see Heis 2010, on his philosophy of mathematics Mormann 2008). Cassirer’s *Substanzbegriff und Funktionsbegriff* from 1910 is referred to explicitly in the *Aufbau* in the context of relational descriptions of structures (§§12, 64, 75). However, the issue of “order” ranges even broader in Cassirer’s writings. In his essay review on “Erkenntnistheorie nebst den Grenzfragen der Logik” from 1913, Cassirer places the recent advances in epistemology and logic in an existential dimension. In all areas of knowledge, the “consciousness of the general connection” has become “alive” (Cassirer 1913, 1). An insight into this general connectedness can serve as an antidote against omnipresent “Zersplitterung”, fragmentation, that can be repaired via the resources of logic, more precisely via a theory of those concepts that allow us to study the realm of knowledge, “das Ganze der Erkenntnis” (Cassirer 1913, 13), in its systematic unity. Those most fundamental and most general concepts need to be “ultimate notions of form”, “letzte Formbegriffe”, that express the possible types of relations between contents. The “object” dissolves in a texture of relations that is held together by highest rules and principles – and it is this texture that Cassirer explicitly calls “order” (Cassirer 1913, 13–15, 53). His paradigm examples are taken from the mathematical problems of serial order and from an understanding of structured manifolds. This is as much an issue in mathematics as in the physiology and psychology of perception; a “concept” is nothing but the conscious perfection (“bewußte Vervollkommnung und Durchbildung”) of this structure.¹³ Again, innovations in fundamental mathematics, the search for

¹³Cassirer uses the notion of “order” also to discuss the difference between idealism and realism (Cassirer 1913, 53): while idealism views the “cognized order/erkannte Ordnung” as that what is ultimately objective, the realist has to relate objectivity to absolute substances. Külpe’s realistic philosophy (Külpe 1912–1923) is important for Cassirer here.

ultimately general concepts, and psychological aspects – both in individual psychology and in the analysis of the spirit of an entire epoch – come together.

A sequel to this article from 1927 takes up this psychological dimension in its very title: “Erkenntnistheorie nebst den Grenzfragen der Logik und Denkpsychologie”. The term “order” continues to be crucial here (Cassirer 1927, 65, here as “Zuordnung”), and Cassirer indeed studies affirmatively the possible forms of interaction between psychology and a foundational theory of logic, motivated by mathematical innovations. What he aims at is an overarching unity of problems, a “übergreifende Problemeinheit” that covers both logic and psychology, thereby showing that he has no contact fear at all with respect to psychology.¹⁴ In this text, it is the notion of meaning, “Bedeutung”, that has to provide this unity. The web of references spun by Cassirer is comparable in complexity and range with what we encounter in Carnap: Russell, Ziehen, Külpe, Schlick are all referred to in his paper (Cassirer 1927, 50–1, 68).

These ideas remain alive in later texts by Cassirer. A particularly interesting example is a manuscript from 1940 on “basic phenomena”, “Basisphänomene” (Cassirer 1995, 111–195; on the problematic dating, see Möckel 2005, 294). According to Cassirer’s critical analysis of the Vienna circle’s positivism, basic phenomena cannot be arrived at in a formal procedure (Cassirer 1995, 118). They need to be experienced. In this context, he embeds his analysis into an extremely broad historical panorama, including both Goethe – as a witness for the idea of experientially accessible basic phenomena – and another author from classical German philosophy, Friedrich Heinrich Jacobi (together with Hume, Fries/Nelson, Dilthey), as supporting the idea of a direct access to a realm of basic phenomena. Again, psychology is a partner in his arguments; not, however, in the form of a mechanistic psychology of associations, but as a descriptive psychology à la Dilthey, Husserl, Natorp, Hönlwald (Cassirer 1995, 138sq.), or in the form of an experimental psychology of thought as developed by Oswald Külpe and his colleagues at Würzburg (Cassirer 1995, 141; on Külpe and his school see section “[Conceptual trends: Complex elements and abstract content](#)”).

Many of these ideas are taken up, in changing contexts, in later years. Even if the theory of order did not live up to become a generally acknowledged success story, we still find a chapter on “Ordering” in Nelson Goodman’s *Ways of Worldmaking* (Goodman 1978, 12–15; see also Carnap 1963, 19, on Goodman’s being the first author to propose an improved system along the lines of the *Aufbau*). Even if Goodman’s discussion of order may seem to stand in a thoroughly changed philosophical and logical context, we can still find the key ideas of the order-discourse in the 1920ies in later texts. The Dutch logician E.W. Beth addresses the issue of order

¹⁴Cassirer 1913, 36–43, gives an extensive discussion of Ziehen’s ideas concerning epistemology. Interesting for discussions about psychologism – see below, sections “[Some Carnapian implications](#)” and “[Whence demarcation? – Concluding remarks](#)” – is Cassirer’s statement (Cassirer 1913, 44) that Richard Hönlwald inverts Carl Stumpf’s claim that only what is psychologically adequate can find a place within logic, in a particularly illuminating fashion: psychology must not fail to conform to the “logical notion of truth”.

in 1960 in a paper on “Ordnung in der Logik”. In this text, he rejects, in precisely the terms that we already encountered in early Carnap, the reproach that mathematical logic itself does not present us with an “ordered structure/geordnetes Gefüge” (Beth 1962, 161) due to the co-existence of various theories in the foundations of logic (intuitionist, classical, multi-valued, modal). Beth in particular intends to criticize this thesis, and he, too, requires us to advance the level of generality on which we have to deal with philosophical issues. He introduces a category of “abstract philosophy”, dealing with, in an open list of issues, general-particular, necessity, set, category, infinite-finite, and many more, thereby emphasizing that many discussions of these issues in the classical texts of philosophy bear close resemblance with modern mathematical logic.¹⁵

Conceptual Trends: Complex Elements and Abstract Content

For Carnap’s constructional system, just as for all the authors mentioned so far, the basic elements of the system need not be simple in the sense of being ultimate atomistic objects or representations. The other key idea that all the theorists of order share is the conviction that we need to analyse reality in terms of *relations*, not of substances or ultimate atoms. Finally, the possibility to have *experiences* of these complex ultimate states is addressed by all the authors mentioned so far. This turns out to be the core of the theories of order as they were discussed around 1900: we can and should indeed begin with complex elements that can be experienced in their very character of being first foundations. In the perspective of many of the authors in the 1920ies, it was precisely the generality of the theories that could be built from these assumptions that made it possible to neglect further technicalities (for instance the questions how ‘structures’ might relate to ‘relations of order’). Carnap’s *Aufbau*-theory of “Elementarerlebnisse” that need to be thought of in an anti-atomistic fashion and that are unanalysable in the atomistic sense but that nevertheless allow for a further study via quasi-analysis, as presented with explicit reference to discussion in psychology in §§ 67–9 of the *Aufbau*, on the one hand fits this context, while Carnap can also be read as exploring how far we can get in further exploring these notions in a logic-inspired framework.

Via their experiential dimension, the theories as presented so far become related to two further discourses, namely that of psychology (or more precisely the discourse at the intersection between philosophy and psychology, without being intended to be psychologistic at least), and to the idea that there is a direct experience of logical certainty. The conviction that we not only need, but also can experience complex basic states binds together virtually all of the protagonists of the debate about order.

In which sense and to which extent this experiential aspect is taken up in the *Aufbau* should be an issue for further discussion. Carnap himself refers to authors

¹⁵The metaphysical and theological dimensions also remain present, see e.g. Schmidt 1956, who at the same time emphasizes the relevance of logic.

working in this line. A particularly strong statement to the effect that basic logical or epistemological notions have an experiential dimension can be found in the writings of *Johannes Volkelt*. In his small 1922-booklet on *Gefühlsgewißheit*, Volkelt discusses the possibilities and limitations of experiencing intuitive certainty. It is in fields such as metaphysics, aesthetics or “the science of values/*Wertwissenschaft*” that intuitive certainty is particularly valuable. But also in these fields, intuition needs to be employed under the continuous control of thinking. However, we encounter important aspects of intuitive certainty also in the realm of logic. There is, according to Volkelt, a distinctive “feeling for the logical”, a “*Gefühl für das Logische*” which is – in agreement with the anti-atomistic tendencies that have already been stated – not a feeling for individual facts, but for their connection (Volkelt 1922, 24).¹⁶ In the work Carnap refers to in the *Aufbau*, Volkelt's *Gewissheit und Wahrheit* from 1918, Volkelt discusses the issue of intuitive certainty (Volkelt 1918, 538–558; he, too, refers to Jacobi in this context, p. 544) in the context of an argument directed at finding, yet again, the most general form for philosophical theorizing. Volkelt argues for epistemology as occupying this prominent place, and for epistemology's thus being even more general than a theory of order (Volkelt 1918, 108). The fundamental statements of epistemology are explicitly called “neutral”, they are not based upon an emphatic concept of subjectivity, and they should be seen as being pre-logical (Volkelt 1918, 59–64).

At this point it is worthwhile to make a brief excursion and discuss another author on Carnap's list, *Oswald Külpe*. Best known in philosophical circles in his time for his project in realistic philosophy (Külpe 1912–1923), he was also hugely influential as an experimental psychologist of thought, and it is in this function that Cassirer discusses him. Külpe and his group in Würzburg, in which the first generation of Gestalt psychologists got their training, claimed to have established experimentally that human thought is not built up from simple atomistic elements; irreducible thought states can be vividly experienced as giving direction to our thought even if the telos of these directed thoughts itself is not represented (for an overview, see Ziche 1999). These states are devoid of concrete content, where “concrete” is understood in the sense of consisting of simple sense experience. Still, those states have a distinctive phenomenal character in their being directed towards some cognitive goal, i.e. they themselves are characterized by being strongly relational. Külpe's and his school's work is important in its implications for the relationship between psychology and philosophy. In distancing itself from associationist and empiricist theories of the genesis of mental content, their thought psychology could even claim to experimentally test philosophical theories such as Husserlian phenomenology without being troubled by anxieties concerning a psychologistic fallacy (Ziche 1998).

¹⁶ Again, the historical contextualization is broad and complex; let me only point out some features: again, Volkelt explicitly refers – as Cassirer also did, see above – to Jacobi, but places him in a long list also containing mystics (Paracelsus, Guyau). Fichte, Driesch, and Husserl are also among the authors he refers to (Volkelt 1922, 11, 14).

In summarizing the conceptual trends discussed so far, we started with the idea of *complex elements*. A precisely analogous characterization can be given of the generalized theories in fundamental mathematics: a more fundamental theory in mathematics can be said to be richer in content than the more derivative ones, the kind of abstraction involved in arriving at these generalized theories may be called a *contentful abstraction*. In ordering the sciences or in admitting forms of psychology that may enter into a constructive dialogue with logic, these projects display a high degree of tolerance, but of a tolerance that is at the same time embedded into a project for arriving at the very foundation of scientificity and that we may thus dub a form of *rigorous tolerance*. With the idea of tolerance, we see a particularly clear example of a term that originates in an integrative discourse aimed at bringing together the various sciences, and that then acquires a far more technical meaning in, for instance, Carnap's own syntactical and semantical considerations. The same holds for notions such as "relation" or "structure", "function" and other related concepts that all function both as technical terms within the technical contexts of logic and the philosophy of mathematics *and* as generalizing terms in broader debates. However, we should be aware that many participants in the debates that are reconstructed here would not accept the idea that a stronger focus on logical precision would get us outside the broadly shared conceptual framework.

Getting Closer to Carnap: Ziehen, Driesch, Dubislav

How are these ideas reflected and worked out in the authors Carnap refers to more affirmatively in § 3 of the *Aufbau*? Let's start with *Theodor Ziehen*, an author who occupies in many respects an intermediary position. Ziehen, medical doctor, psychiatrist, private philosopher, explicitly deplors the lack of attention devoted to the notion of "order" in the context of mathematics, more specifically within set theory (Ziehen 1917, 25). The only author he refers to here is Driesch. This lack of a clear analysis of the mathematical/logical meaning of "order" is the more problematic because, according to Ziehen, this notion is as fundamental for set theory as that of cardinality. Many of the then current suggestions for a definition of the notion of "order" are dismissed by Ziehen as being tautologies or mere stipulations. Ziehen himself, however, does not give a definition either; the most specific hints one gets from his text are the insistence on similarity as essential for talking about order, and a reference to the well-ordering theorem (Ziehen 1917, 27–30) – and it is clear, yet again, that Ziehen views an answer to the question as to the relationship between logic and set theory as essential for understanding which kind of theory is the most fundamental in mathematics.

Ziehen's enormous epistemological treatise from 1913, *Erkenntnistheorie auf psychophysiologischer und physikalischer Grundlage* – the Ziehen-text Carnap refers to in the *Aufbau* –, clearly participates in all the discourses discussed so far. I shall highlight three issues: the search for generalized concepts and theory forms; the role of intuitive certainty; the notion of reduction.

1. One of the first features that strikes the reader are the numerous neologisms that Ziehen suggests as replacements for traditional epistemological notions. All traditional conceptions in epistemology are bound to induce misleading prejudices (Ziehen 1913, 1–2). In place of “sensations”, “Empfindungen” (a term he still employs in his psychological writings), he suggests a new term, “Gignomene”, appropriated by Ziehen into German in a consciously awkward way as “Werdnisse”. The “Gignomene” provide the “general factual basis/allgemeinen Tatbestand” for all forms of epistemology, and it is epistemology’s task to “classify” and “order” these ultimate elements (Ziehen 1913, 3).¹⁷ Again, the sources Ziehen refers to are numerous and include, among others, Jacobi – again! – and Jacobi’s critique of Kant (Ziehen 1913, 2), Vaihinger, the British empiricists, and Avenarius who engaged in similarly neologicistic projects (Ziehen 1913, 9).

These most general notions, however, do not yet solve the problem of also providing the “most general representation” that we can entertain (Ziehen 1913, 499). What these notions do not provide, namely, is a most general property. Ziehen’s argument departs from the conviction that all our representations need to have content and therefore cannot be completely general (Ziehen 1913, 44, 499). It is here that Ziehen occupies a transitory position: the most general elements of epistemology are not themselves able to support a most general account of what can be known; genuine unity and universality are possible, but only in the form of a “Weltbild”, not in the sense of a general property. This “Weltbild” is itself the result of an ordering process consisting of collecting the “Gignomene” as completely as possible, and of then classifying them (Ziehen 1913, 516).

2. The step towards increasingly more general forms of epistemology has a surprising epistemological implication: It distances the entire project from the search for certainty. In the preface, Ziehen goes as far as to state that an epistemology in the sense of a “theory of certainty” does not exist (Ziehen 1913, V). His argument for this strong claim derives from the idea that any attempt to establish objective certainty refers us back to forms of subjective certainty, more specifically to the “feeling of certainty/Gewißheitsgefühl” and to consistency in making associations (Ziehen 1913, 497). What an epistemology should strive at, if certainty is unattainable, has already been stated: the ordering of the “Gignomene” (Ziehen 1913, 498). Hardly anywhere can we find a stronger statement as to the promises that could be attached to the project of ordering: the result of the process towards ever more general forms of epistemology can replace the traditional goals of any form of epistemology.
3. The status of the “Gignomene” at the basis of all epistemology raises difficult questions for any attempt at a reductionist analysis of, e.g., sensations. Ziehen deems it possible to further analyze the “Gignomene” into different constituents without assuming yet another layer of elements. Thomas Mormann has worked

¹⁷Ziehen introduces quite a number of other novel concepts; one of the most interesting ones is that of a “Koinade” (Ziehen 1913, 15–6), which stands for a clearly demarcated complex of sensations. – In the supplements to Ziehen 1913, he refers, among other authors, to Hermann Grassmann, thereby making explicit his indebtedness to new foundational discourses in mathematics.

out in detail how Carnap's notion of quasi-analysis can be understood as pursuing a comparable project (Mormann, this volume).

The arguments start getting repetitive when we turn towards the most outspoken order-theorist of this period, *Hans Driesch*, from whose writings, as has already been stated, Carnap derives important terms.¹⁸ Driesch himself gives an interesting and diverse pedigree for his own *Ordnungslehre*: Meinong and his pupils; Russell, as far as logic in a narrow sense – restricted to the applicability of mathematics – is concerned; the Neo-Kantians Nicolai Hartmann and Johannes Rehmke; Henri Bergson, but with him there are only occasional points of contact (Driesch 1923, 10).

“Ordnungslehre” is Driesch's term for “logic” (Driesch 1923, 2). In introducing this term, his claims clearly go beyond just a change of labels. A theory of order, as conceived by Driesch, is far more general than traditional logic; it comprises what “logic”, ‘ethics’, ‘aesthetics’ are, taken together”, if only one frees logic from epistemology which is an alien ingredient as far as logic is concerned (Driesch 1923, 4).¹⁹ In particular, in its very generality, it goes beyond the psychologistic dualism between the normative and the descriptive (Driesch 1923, 4–5). At the same time, the “Ordnungslehre” replaces traditional epistemology by a more general form of philosophical theory. A theory of order is not about cognition, and would remain intact even if the solipsistic stance were to hold. Truth issues remain undiscussed; correctness in thinking is warranted via an “immediate knowledge of correctness”, a “unmittelbares Richtigkeitswissen” (Driesch 1923, 5), which is stated in terms reminiscent of Külpe's school in psychology. In the highly general sense of being founded upon self-reflection (“Selbstbesinnung”) with the possibility of getting access to this “consciousness of being directed” as the basis for correct thinking, also logic has a psychological basis. Psychology and logic both come to mutually support each other; in its function of being a “reflection on one's own self/Selbstbesinnung”, psychology comes before logic, while logic is prior if understood as “science of laws/Gesetzeswissenschaft” (Driesch 1923, 6sq.). The issue of truth or falsity is eclipsed by the fact that a theory of order is so general as to go beyond issues of cognition and of certainty. Thus, the epistemological debate that first gave rise to the psychologism controversy is of no relevance for his account (Driesch 1923, 8).²⁰

¹⁸On the role of Driesch for *Der Raum* see also Stone 2006, with a good account of the status of Driesch in his time. Driesch has produced an autobiography which informs in detail about his career (Driesch 1951).

¹⁹The theory of order also determines the fundamental categories of metaphysics. See Driesch 1922, III: “Theory of order, or logic, that can also be called – in the broadest sense of the term – theory of experience or theory of science”/“Ordnungslehre oder Logik, die auch, im weitesten Sinne des Wortes, Erfahrungslehre oder Wissenschaftslehre heißen kann”, provides the basic structure of the “Wirklichkeitslehre”, the theory of reality.

²⁰This point is made very forcefully in Driesch 1913 (this text is almost entirely structured along the Würzburg School's ideas on experimental thought psychology): when taking the theory of order as a foundation, it becomes clear that many researchers, “logicians” as well as “psychologists”, work in the same direction, and Driesch consequently emphasizes the surprising agreement

Again, it is the notion of order that supports this going beyond traditional notions of certainty, and towards a generalized form of philosophy that transcends the divide between logic, epistemology, and psychology. Driesch defines “knowledge” via the experience of order: “I know when I consciously have something ordered before me” (“Ich weiss, wenn ich bewußt Geordnetes mir gegenüber habe”; Driesch 1923, 1). This experience of order also yields the definiens for “science/Wissenschaft” as that kind of “knowledge that is consciously present as being complete and organically structured/das bewußt vollständige und gefügesthaft gegliederte Wissen” (Driesch 1923, 16). Order can and needs to be experienced (“geschaut”), in the form of syntheses that are not produced consciously by the person who has the experience. Again, it is important to be aware of the degree of generality Driesch is operating upon here: we may no longer think in terms of a contrast between the conceptual and other forms of experience (Driesch 1923, 29–30, with reference to Vokelt’s “Gefühlsgewißheit”). Various forms of elements can all be perceived as being “ultimately ordered”, with the “Tone der ordnungshaften Endgültigkeit” (Driesch 1923, 320): both intuitive (green, red, c-flat, warm, sweet, pain) and abstract (“this”, “such”, “related”, “different”, “because”, ...) qualities can be perceived in this way. None of those elementary qualities is simple, we always encounter “complexes” (Driesch 1923, 321). Külpe’s Würzburg School and Gestalt psychology form an important historical context for these arguments (Driesch 1923, 341).

In Carnap’s list of order theoreticians in § 3, the author whose contribution to a theory of order is most difficult to place is probably *Walter Dubislav*. Dubislav gives an extensive discussion of a theory of structures in his *Die Definition* from 1931 where he devotes an entire chapter to a “structural theory/Strukturtheorie” of the coordination of signs and objects via definitions (Dubislav 1931, 96–106). The text referred to by Carnap, Dubislav/Clauberg’s *Systematisches Wörterbuch der Philosophie*, likewise departs from a theory of definitions, and intends to “systematically” present the key concepts of philosophy, following the techniques used to define concepts within axiomatic definitions, and at the same to analytically describe existing usage without falling into dialelles, i.e. giving circular definitions. “Definition” itself is defined (not in an introduction, but in the lemma “definition” itself; in fact, the introduction continuously refers to the lemmata in the dictionary that thereby comes to include its own theory) as a reduction of a complex symbol to primitive symbols (Clauberg and Dubislav 1923, 117). The dictionary is primarily organized in terms of “definition chains/Kettendefinitionen”, where a “Kettendefinition” is defined in order-theoretic terms as “an ordered set whose elements are definitions” (Clauberg and Dubislav 1923, 117). Ordered sets themselves become defined via axioms (lemmata “Ordnung” and “Menge, geordnete”, the axioms on p. 293). What Dubislav and Clauberg aim at, is an ordered set of definitions that can order and arrange all fundamental concepts in philosophy in a way that (a) stands up to the demands required by a theory of definition, and (b) does justice to the existing usage of these terms. The impetus towards order is

in their views (Driesch 1913, V–VI). What he intends to present under the title of a “logic” is a concept that *both* logicians and psychologists claim as theirs.

spelled out in the broad discussion of the classification of the sciences (Clauberg and Dubislav 1923, 538–543) which is supported by extensive diagrams. A rather striking feature of their definitional project is the absence of a list of primitive concepts; they apparently see their project as completed once they succeeded in arranging existing definitions into a clearly ordered whole.

Some Carnapian Implications

It has already been shown that the notion of “order” does indeed pervade the *Aufbau*, and that Carnap uses it repeatedly for characterizing the *Aufbau*’s project as a whole. Strong evidence for the importance of this notion can be derived from Carnap’s discussion of “problems of essence” in §§ 158sq. Thinking in terms of order helps solve, or dissolve, traditional metaphysical problems. “Order forms” are what lies at the basis of the traditional distinction between types of objects; order is imposed upon “the one, unified domain of elements which are propertyless and merely connected through relations” (§ 162). Consequently, there are infinitely many forms of order, and traditional dualistic modes of thinking – mind-body dualism, in particular – dissolve when faced with the far more flexible and integrative notion of being an object that follows from conceiving of object types as order forms. Terms from the order theorists discussed so far are taken up and modified by Carnap in this context; an example is Carnap’s discussion of “Parallelverläufe” in § 168 which can be compared to Ziehen’s notion of “Parallelveränderungen” (Ziehen 1913, 25, 28).

This kind of anti-dualist argument provides a basis for the various forms of tolerance and neutrality that Carnap propagates. In the present context, the neutrality with respect to different theories of how we should understand reality is particularly remarkable: “*Construction theory represents the neutral foundation which they [“the so-called epistemological schools of realism, idealism, and phenomenalism”] have in common*” (§ 178).²¹ In the same terms that were used by the order theorists for describing the role of the notion of “order” as the most fundamental concepts of all, Carnap envisages the status of his construction theory as the fundamental theory lying behind all epistemological stances. The differences between these stances does, then, in fact not lie on the level of epistemology, but derives from metaphysical tenets that are added upon the basic structure only at a later moment. This is stronger than just the claim for metaphysical abstinence or anti-metaphysics; Carnap argues from the intrinsic structure of the project of finding the ultimate common core of philosophical theories. Similar arguments and concepts return in a number of key passages in the *Aufbau*. Carnap frames his argument for the availability of various “system forms” (§§ 59–60) in terms of different “orders of concepts” or “of

²¹ Similar ideas are voiced in Ernst Mach’s *Analyse der Empfindungen* that is addressed in the *Aufbau* a number of times (also in § 3 where Carnap explicates his indebtedness to theories of order). For Mach, whether a (in itself neutral) element becomes a sensation or a physical object, depends on how it enters into functional dependencies to other elements (Mach 1922, 13).

construction" (§ 59) that all have their individual merits and difficulties. Within an order-theoretic framework, it is not required that we unequivocally ascribe to one of these system forms an ultimate or exclusive correctness – this would get us away from epistemology and into metaphysics. As in a number of the theories presented here, the questions of truth and certainty fall outside the constructional framework.

Of particular interest in the current context is the position Carnap himself takes as regards psychology. In § 151 of the *Aufbau*, he emphasizes strongly that his construction theory must not be understood as being psychologistic. Interestingly, Carnap clearly sees the need to refer explicitly to the potential danger of being read as a psychologist.²² The anti-psychologistic argument that he employs is again derived from order theory: what finally repudiates the charge of psychologism, is the differentiation of different spheres of objects; construction theory leads to higher-level objects, and thus does not support any form of reduction in terms of lower-level objects (or states), as claimed by psychologists. The same holds for values (§152).

Emphasizing the difference with psychologism becomes particularly pressing when one considers that the techniques Carnap himself uses in his quasi-analysis are indeed related to theories in psychology. Via the shared interest in a general, mathematics-based theory of what a science is or has to be, even the more clearly logical techniques (such as definition by abstraction or implicit definitions) do not stand unrelated to psychology. The strength of Carnap's remarks in favour of Gestalt theory in the *Aufbau* has recently been questioned (Mormann 2003, 18–9). In § 67 (which is not directly addressed by Mormann; see also Carnap 1963, 16 on the influence of Gestalt theory on his project), Carnap states very clearly that what is ultimately given are "experiences in their totality and undivided unity". These cannot be analyzed as being built up from discrete elements; all we can state is that they are relationally positioned in a "stream of experience". Two points need to be made here: First, Carnap himself does not reckon Gestalt theory among the (usual) psychological theories. He is talking about "Gestalttheorie", not about Gestalt psychology, and views this theory as being more general than psychological theories: it certainly has effects within psychology, but is also of great relevance for areas other than psychology (§ 67; in the same paragraph, he is also referring to Driesch). Second, the method of quasi-analysis occasionally uses vocabulary that is clearly influenced by the Würzburg school of thought psychology. This is particularly clear in § 71 when Carnap discusses the example of hearing a chord: what we perceive are not "constituents", but "different directions in which we can proceed from it to other chords". Taken together with the earlier discussion of order theories presented here, there is no need to take apart a more logical (Frege/Hilbert/Russell) and a more psychological approach to these methodological issues. This, however, only helps to make the question as to how precisely these authors relate to each other even more urgent.

²²There is a real issue here; Martin Kusch's discussion of the intricacies of the psychologism-debate has Carnap pretty strongly on the side of the anti-psychologists, but also gives evidence that Carnap was indeed charged with being a psychologist (Kusch 1995, 7), though only much later.

Whence Demarcation? – Concluding Remarks

The conclusion from looking at the closely-knit network of related theories and arguments, centering around the notion of “order”, clearly cannot be that one can or should gloss over the differences between these theories in a light-handed fashion. What the historical field-studies can clarify, however, is the type of question that should be asked in order to structure these debates. This involves *both* appreciating those ideas and notions that were intended to hold an extremely broad and internally diverse discourse together, *and* getting a clearer view of the specificities of individual positions and of the dynamics that lead to the formation of groups or movements that come to oppose each other. The crucial unifying factor in these arguments has been the search for a form of theory that is more general than existing theories (as regards the foundations of mathematics, as regards forms of philosophy, as regards the different forms of scientific disciplines), and that therefore lies beyond the tensions that exist between these theories. Carnap clearly participates in this discourse, and the claims as to “tolerance” and “neutrality”, so important for the *Aufbau*’s project, mark this commitment to unifying discourses. At the same time, tolerance and neutrality have to be pursued on the basis of, and with the aim of, consistently adopting scientific ways of reasoning.

This only makes the question as to where, why, and when the various discourses start to part company – to take up Friedman’s metaphor for the philosophical dynamics of this period – more urgent. Take the problem of direct experience: the extremely broad usage of this term, and its mystical connotations, is definitely no longer universally shared; but where are the points of rupture? Take the psychologism-issue: is it indeed sensible to think in terms of broad tolerance in the light of Husserl’s and Frege’s anti-psychologistic invectives? Hasn’t anti-psychologism been crucial for establishing modern logic and modern philosophy of mathematics? What the discussions in the 1920s can and should teach us, is that we rather invert the burden of proof: how did it come that anti-psychologism (or particular brands of logical empiricism, neopositivism...) could acquire the status of becoming the unquestioned basis for twentieth century scientific philosophy? Issues in the reception and self-reception of Carnap’s thinking in the 1920s become important here: to which extent does his autobiography (Carnap 1963) contribute to a more streamlined picture? To which extent is Quine’s (speculative) suggestion adequate that Carnap started as a “single-minded phenomenalist” who was then pressed by Neurath towards a more physicalist stance (Quine 1994)?

These questions cannot be answered here. What the study of the 1920s-debates minimally teaches is that many of the apparently clear disjunctions between schools, forms of science or forms of philosophy only start being introduced later; and, more ambitiously, that at the very least authors from numerous fields worked hard to establish a scientifically (of course: under a suitably generalized notion of science) informed type of philosophy that could transcend those disjunctions.

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Carnap's *Aufbau* and the Early Schlick

Matthias Neuber

Introduction

In this paper I confine myself to merely giving a rough sketch. It is my aim to explore what kind of influence the early writings of Moritz Schlick might have exerted on Rudolf Carnap's *Der logische Aufbau der Welt*. Usually, the story is told quite differently. Herbert Feigl, for example, reports that the later (Viennese) Schlick was influenced by Carnap. Feigl writes:

Schlick's *Allgemeine Erkenntnislehre* [...] struck me like a thunderbolt. In the beautifully lucid and magnificently penetrating book Schlick argued essentially for a critical empirical realism, presenting trenchant objections to what he called the philosophies of immanence – that is, mainly the positions of Mach, Avenarius, and the early Russell. This, together with his views on the analytic nature of mathematical truth, his empiricist critique of Kant and the Neo-Kantians, and his profound understanding of modern science motivated me to become his student at the University of Vienna in 1922. But I was acutely distressed to witness Schlick's conversion to positivism in the late twenties. This conversion was largely due to the influence of Carnap and Wittgenstein. (Feigl [1963] 1981, p. 39)

In what follows it will be shown that Schlick was not at all 'converted' by Carnap (in the case of Wittgenstein, to be sure, the situation was another one). Rather, it was Carnap who, at least to some extent, stood under the influence of Schlick. But the Schlick who played that influential role wrote in middle and late 1910s. In other words, it was the early (pre-Viennese) Schlick who, in certain respects, inspired Carnap's *Aufbau*.

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Schlick's Proposal: "Der logische Aufbau der Welt"

The most obvious – and at the same time most superficial – influence has to do with the title of Carnap's book. Carnap himself had decided for 'Konstitutionstheorie' (see Mormann 2000, p. 87) but this, Schlick thought, was a bad idea. Thus, in the correspondence between Carnap and Schlick we find an extended exchange concerning the book's title. The first relevant letter in this connection is from Schlick to Carnap, dated March 14, 1926. In that letter, Schlick points out that the title is "not very practically chosen", since it could also be the title of a chemistry or medicine book. A more philosophical title would be more practical. So, Schlick proposes, "What about 'Der logische Aufbau der Welt'?"¹ Carnap's reaction was reservedly positive. In a letter dated March 19, 1926, he told Schlick that he intends to put the title thusly: "Der logische Aufbau der Welt. Versuch einer Konstitutionstheorie der Begriffe." Nevertheless, he was not sure if this will be his final decision.² In a letter, dated December 1927 (written in Davos), Carnap makes explicit why he is still doubtful concerning Schlick's proposal: 'Der logische Aufbau der Welt' would be apt for another book project he is planning, namely the exposition of a constitutional system with a physicalist (or materialist) basis. The system of the present work, however, has a phenomenalist basis and is accordingly concerned with the logical structure of *cognition*. Something like 'Erkenntnislogik' or 'Der logische Aufbau der Erkenntnis' would therefore be better suited.³ However, Schlick insisted on 'Der logische Aufbau der Welt.' In a letter dated January 4, 1928 (written in Kitzbühel), he hinted at the 'suggestive force' of book titles in general and made clear that 'Der

¹Moritz Schlick to Rudolf Carnap, March 14, 1926. The German original reads as follows: "Der Titel Ihrer Arbeit, auf den benanntlich in mancher Hinsicht viel ankommt, scheint mir nicht sehr praktisch gewählt zu sein, da auch ein chemisches oder medizinisches Werk 'Konstitutionstheorie' heißen könnte. Ein Name, der über den philosophischen Charakter der Schrift keinen Zweifel lässt, wäre gewiß praktischer. Wie wäre es mit 'Der logische Aufbau der Welt'? Daß es sich um eine Konstitutionstheorie der Erkenntnisgegenstände handelt, könnte dann der Untertitel sagen. Vielleicht nehmen Sie zu diesem Vorschlag Stellung. Ein mehr philosophischer Titel wäre unter allen Umständen zweckmäßig."

²Rudolf Carnap to Moritz Schlick, March 19, 1926. The German original reads as follows: "Ihrem Rate folgend möchte ich den Titel des Manuskripts so fassen: 'Der logische Aufbau der Welt. Versuch einer Konstitutionstheorie der Begriffe'. [...] Ob hiermit die endgültige Lösung des Titelproblems gefunden ist, weiß ich noch nicht. Darüber würde ich gern später mal mit Ihnen sprechen. Für Ihren Rat und Vorschlag bin ich Ihnen sehr dankbar."

³Rudolf Carnap to Moritz Schlick, December 1927. The German original reads as follows: "Der bisher beabsichtigte Titel 'Der logische Aufbau der Welt. Versuch einer Konstitutionstheorie der Begriffe' scheint mir in Konflikt zu geraten mit einer Arbeit, die ich für später plane. [...] An einer Stelle des Buches deute ich kurz an, dass ein anderes Konst.-system möglich ist; mit physischer ('materialistischer') Basis. [...] Welches der beiden Systeme verdient mehr den Namen eines 'Aufbaues der Wirklichkeit'? [...] Ich möchte den Buchtitel jetzt schon mit Rücksicht auf diesen späteren Plan wählen. Vielleicht jetzt 'Erkenntnislogik'; das Spätere 'Wirklichkeitslogik'? Dazu der frühere Untertitel? Oder: 'Der logische Aufbau der Erkenntnis', später: 'Der logische Aufbau der Welt'? Ist 'Erkenntnislogik' oder 'Logik der Erkenntnis' zu blas? Für Vorschläge wäre ich sehr dankbar."

logische *Aufbau* der Welt' would be the ideal solution in this respect. By this title, the intended "principled foundation" would be signified most adequately.⁴ As a matter of fact, Carnap followed Schlick's advice and the book was published with the title 'Der logische *Aufbau* der Welt,' albeit without the intended subtitle 'Versuch einer Konstitutionstheorie der Begriffe'.⁵

It is worth mentioning that Schlick reviewed Carnap's book in a very favorable light. The review appeared 1929 in volume 17 of the prestigious German journal *Die Naturwissenschaften*, stressing the "unique" character of Carnap's contribution (see Schlick 1929, p. 550). As Schlick correctly observed, 'Der logische *Aufbau* der Welt' stood in the tradition of Leibnitz's *mathesis universalis*. Its originality had to be seen in the application of modern logic and the resulting successful repudiation of metaphysical 'pseudo-problems' (see *ibid.*, pp. 550–51). In short, Schlick was really pleased with Carnap's book. But does that mean that he became 'influenced' by it? Does it mean that Schlick was, as Feigl claims, 'converted' by Carnap and his 'constitutional point of view?' As will be shown in the following sections, it was rather the other way round: Carnap benefited from certain insights he could find in Schlick's early, pre-Viennese writings. The Viennese Schlick, on the other hand, welcomed Carnap's contributions, to be sure, but at the same time kept distance to most of their central systematic claims.

The Early Schlick's 'Critical Realism'

According to Michael Friedman, the early Schlick's philosophical position is best characterized as that of a 'structural realist.' Friedman writes: "Schlick was not a positivist or strict empiricist in 1918, but a neo-Kantian or 'critical' realist – his viewpoint is perhaps best described as a form of 'structural realism'." (Friedman 1999, p. 20) I agree: Rather than being a follower of Comte or Mill, the early Schlick, and especially his *Allgemeine Erkenntnislehre* from 1918, stood in the Kantian tradition. The issue of 'structural realism' will be readdressed in the next

⁴Moritz Schlick to Rudolf Carnap, January 4, 1928. The German original reads as follows: "Dass der Verlagsvertrag Deines Buches endgültig abgeschlossen ist, war mir eine sehr willkommene Nachricht. Über den Titel des Werkes möchte folgendes sagen: Ein Buchtitel hat nicht bloß [*sic!*] die Aufgabe, den Inhalt des Werkes richtig zu bezeichnen, sondern auf das wichtigste des Inhaltes oder der Absicht mit suggestiver Kraft hinzudeuten – ja dies letztere ist sogar die Hauptsache. Ich würde daher von den Titeln, die Du am Schlusse Deines Zettels vorschlägst, entschieden abraten; sie sind in der Tat zu blass. Das Grundlegende an Deinem Buche [...] sind doch die allgemeinen Ausführungen über die Prinzipien der Konstitution, und daran schließt sich erst der *Aufbau* des Erkenntnisystems. Für diese prinzipielle Grundlegung [...] scheint mir nun 'Der logische *Aufbau* der Welt' doch der geeignete Titel zu sein, wobei diese Worte allerdings so zu verstehen sind, dass es sich in erster Linie um die Prinzipien eines solchen Aufbaus überhaupt, weniger um seine wirkliche und spezielle Durchführung handelt."

⁵As Carnap reports to Schlick in a letter dated August 6, 1928, it was the publisher Wilhelm Benary who suppressed or merely forgot to include the subtitle. Carnap himself, when reading the proofs, did, as he points out in the letter to Schlick, not realize that the subtitle was lacking.

section. For the time being, however, it is important to understand, what Friedman means when he characterizes the early Schlick as a ‘critical realist.’

To begin with, critical realism can be regarded as an autonomous current in what might be called *transcendental revisionism*. By ‘transcendental revisionism’ I mean the late nineteenth, early twentieth-century attempts to reconcile the original Kantian epistemological doctrine with the developments of modern mathematics (the advent of non-Euclidean geometries, in the first place) and modern physics (the advent of relativity theory, in the first place).⁶ There were, to put it bluntly, two dominant versions of transcendental revisionism in late nineteenth-, early twentieth-century philosophy in the German-speaking area. There was, on the one hand, the sort of critical (or ‘logical’) idealism, as it was primarily defended by the members of the so-called Marburg school of Neo-Kantianism (Hermann Cohen, Paul Natorp, Ernst Cassirer). According to the critical idealist agenda, it was the Kantian conception of the *A Priori* which stood in need of revision. The respective revisionary idea of a ‘relativized’ *A priori* has been widely discussed in recent scholarship (see, for example, Ferrari 1994; Friedman 1994, 2001; Ryckman 2005). However, critical idealism was not the only revisionary project. The (nowadays less-known) current of critical *realism* aimed at a revision of the Kantian theory of knowledge as well. Yet, according to the critical realist agenda, it was not the Kantian conception of the *A Priori* but rather the Kantian conception of ‘things-in-themselves’ (*Dinge an sich*) that stood in need of revision. More precisely, critical realism was *critical* insofar as it reflected on the preconditions of scientific knowledge, thereby contributing to the more comprehensive project of a ‘scientific philosophy’ (*wissenschaftliche Philosophie*).⁷ Furthermore, critical realism was *realistic* insofar as it assumed the knowability of Kantian things-in-themselves. Painting with a rather broad brush, Erich Becher, one of the defenders of critical realism, straightforwardly *defined* realism as “the doctrine that things-in-themselves are knowable” (Becher 1914, p. 69). It was this ‘knowability thesis’ which distinguished critical realism from its idealist revisionary counterpart.

It is impossible in so short a space to go into the details of the critical realist program.⁸ Suffice it to notice that it was a quite widespread point of view around 1900. Thinkers such as Wilhelm Wundt (1832–1920), Alois Riehl (1844–1924), Gustav Störing (1860–1946), Oswald Külpe (1862–1915), August Messer (1867–1947), Willy Freytag (1873–?), Max Frischeisen-Köhler (1878–1923), Bernhard Bavink (1879–1947), Victor Kraft (1880–1975), the already mentioned Erich Becher (1882–1929) and Aloys Wenzl (1887–1967) subscribed to the critical realist agenda. It is noteworthy that many of them were psychologists (namely Wundt, Störing, Külpe, Messer, and Becher). Moreover, it should be seen that the knowability thesis was not at all compatible with the original Kantian doctrine: According to Kant, things-in-themselves are definitely beyond the scope of theoretical

⁶ Here and in what follows I heavily draw on Neuber 2011, 2012.

⁷ For the historical details of the project of a ‘scientific philosophy’ (and its Kantian roots) see Richardson 1997 and Friedman 2012.

⁸ For a detailed reconstruction, see Neuber 2014.

knowledge.⁹ However, critical realism was not intended as an exegetical project. Rather, its principal aim was to 'update' the Kantian theory of knowledge in the face of the developments of modern science. The knowability thesis was a case in point: Findings both in pure geometry and in experimental psychology (see, in this connection, especially Külpe 1893) seemed to prove that the role of sensible *intuition* was largely overestimated by Kant.¹⁰ By severely downgrading its epistemic impact the way to a *purely conceptual cognition of things as they are in themselves* seemed to be free.

Given these preliminary remarks, we are now in a position to shed some light on the early Schlick's approach toward the critical realist agenda. To be sure, Schlick never spoke of himself as a 'critical realist.' But it is more than obvious that he shared the critical realists' programmatic core assumptions. Thus, in his 1915 article on 'The Philosophical Significance of the Principle of Relativity', he emphatically praised Kant's critical method and its extension to the revolutionary developments in modern physics. Schlick writes:

We have known since the days of Kant that the only fruitful method of all theoretical philosophy consists in critical inquiry into the ultimate principles of the special sciences. Every change in these ultimate axioms, every emergence of a new fundamental principle, must therefore set philosophical activity in motion [...]. [T]he Kantian Critical Philosophy may itself be regarded as a product of the Newtonian doctrine of nature. It is primarily, or even exclusively, the principles of the exact sciences that are of major philosophical importance, for the simple reason that in these disciplines alone do we find foundations so firm and sharply defined, that a change in them produces a notable upheaval, which can also acquire an influence on our world-view. (Schlick [1915] 1979a, p. 153)

Einstein's principle of relativity was, according to Schlick, a paradigm case in this connection. In a certain sense, Einstein played a similar role for Schlick as Newton did for Kant. As is well known, Schlick, not at least because of his seminal *Space and Time in Contemporary Physics* (1917¹, 1918², 1920³, 1922⁴), became one of the most influential philosophical interpreters of Einstein's theory of relativity. The following assessment by Michael Friedman should therefore be taken very seriously:

In 1922, largely on the strength of his work on the philosophical significance of the theory of relativity, which had been enthusiastically endorsed by Einstein himself, Schlick was named to the Chair for the Philosophy of the Inductive Sciences previously occupied by the scientists Ernst Mach and Ludwig Boltzmann at the University of Vienna, where he became the leader and guiding spirit of what we now know as the Vienna Circle of logical positivists. We might say, in this sense, that Schlick was the very first *professional* scientific philosopher. (Friedman 2012, p. 2)

⁹See, for example, Kant [1787] 1998, B 66: "It is [...] indubitably certain and not merely possible or even probable that space and time [...] are merely subjective conditions of all our intuition, in relation to which therefore all objects are mere appearances and not things given for themselves in this way; about these appearances, further, much may be said *a priori* that concerns their form but nothing whatsoever about the things in themselves that may ground them."

¹⁰The corresponding diagnosis of a 'crisis of intuition' is extensively discussed in Neuber 2012, ch. 1.

So Schlick joined in with the critical realists' – but also critical idealists' – promotion of the idea of a scientific philosophy (for further details, see Neuber 2012, pp. 60–67). What is more important, though, is that Schlick endorsed the critical realists' *knowability thesis*. The most explicit articulation of this endorsement can be found in his 1919 article “Erscheinung und Wesen.” There, Schlick declares:

[T]he only natural continuation of Kant's theory of knowledge, to which his system points from various angles, lies not in the idealist but the realist direction, and we arrive at it by a revision of Kant's utterances about the so-called thing-in-itself and its knowability. (Schlick [1919] 1979a, p. 282)

Moreover, Schlick also endorsed the critical realists' degradation of the role of sensible intuition. To quote again from “Erscheinung und Wesen”:

Kant has uncritically presupposed that in order to know an object, an *intuition* of the object is ultimately in some way necessary. [...] But in truth intuition gives us no knowledge whatever; it is wholly inessential for this purpose. It provides, to be sure, an *acquaintance* with objects, but never a knowledge of them. (*ibid.*)

As a consequence, Schlick ends up with a conception of scientific knowledge as *purely conceptual* knowledge. His theory of 'implicit definitions' and the corresponding account of cognition as 'unique coordination' (*eindeutige Zuordnung*) sets the stage for the elaboration of this conception (see, for further details, Ryckman 1991; Neuber 2012, pp. 70–77).¹¹

All of this indicates that Schlick and the critical realists were allied in some sense. However, there were also differences. The most obvious difference is that Schlick did not join in with the critical realists' predilection for a 'substantialist' view of scientific objects.¹² Instead, he argued in terms of a 'relationalist' point of view. Thus, in his *Allgemeine Erkenntnislehre*, Schlick points out:

[A]n object is always a complex of relations. These relations, on Kant's theory, are not immediately given, but must be charged to the account of thought, judgments and concepts. According to the Criticist view, therefore, relations originate in judgments, whereas according to our concept of knowledge judgments are simply correlated with relations, which exist outside of this correlation. (Schlick [1918] 1974, p. 360)

Thus, for Schlick, relations (and not substances) have the status of things-in-themselves. They exist independently of our knowledge of them but are at the same time knowable by means of unique conceptual coordination.

This is not the place to go into the details of Schlick's relationalism. However, it should at least be mentioned that it was this relationalism that stood in the background of Schlick's celebrated interpretation of Einstein's theory of relativity (see, for further details, Neuber 2012, ch. 2). Furthermore, it can, as Friedman does, be claimed that it was Schlick who paved the way for current 'structural' realism. The view that an

¹¹ Interestingly enough, Schlick, by establishing the conception of scientific knowledge as purely conceptual knowledge in his *Allgemeine Erkenntnislehre*, refers the reader to Külpe's theory of scientific concepts as “fixed coordinations between signs and signified objects” (see Schlick [1918] 1974, § 5, footnote 2 and Külpe 1912, p. 226).

¹² For the critical realists' 'substantialism,' see Neuber 2012, p. 69.

object is “always a complex of relations” comes pretty close to what James Ladyman calls *ontic* structural realism (see Ladyman 1998). However, it is far from clear if this was really what Schlick intended by taking the relationalist point of view. As a matter of fact, he thought of himself as an epistemologist, not as a metaphysician. Ontic structural realism, it should be noted, would imply (at least a ‘naturalistic’ brand of) metaphysics (see, in this connection, Ladyman and Ross 2007). Maybe, then, the Schlickian line of reasoning amounts to what Ladyman calls *epistemic* structural realism (see, again, Ladyman 1998). However, it is beyond the scope of the present paper to deliver a satisfying answer to this (rather intricate) question.

Schlick’s Influence on Carnap

So let us come back to Carnap and to the question to what extent he might have been influenced by the early Schlick. In Carnap’s autobiographical notice one can read the following: “Schlick’s important philosophical work has unfortunately not found the attention it deserves. His very first book (*Erkenntnislehre*, 1918) contains many ideas that anticipate the core of later, more elaborate and formalized developments by other authors.” (Carnap 1963, p. 21) It is more than plausible that Carnap himself was among these “other authors.” More concretely, Schlick anticipated essentially Carnapian ideas in the following three respects: (1) concerning the relation of definition and structure; (2) concerning the relation of the perceptual and the physical; (3) concerning the relation of “empirical” and “metaphysical” realism.

Structure and Definition

In § 11 of the *Aufbau*, Carnap introduces the notion of “structural description” (*Strukturbeschreibung*), which, as he points out, forms part of the logic of relations and which, in § 14, is illustrated by the famous railway map example. In § 15, Carnap points out that by the method of structural description it becomes possible to attach concepts to empirical objects, whereby these very objects are *determined* first of all. This procedure, Carnap supplements, is akin to David Hilbert’s conception of definition by axioms (see Hilbert 1899) which in turn was generalized by Schlick in the context of his theory of ‘implicit’ definitions (see Schlick [1918] 1974, § 7). However, in contrast to both Hilbert and Schlick, Carnap insists that by the method of implicit definitions it is not individual objects but only *classes* of objects which become defined. His own, Carnap’s, procedure of structural definition, on the other hand, enables the definition of individual objects and thus requires more than merely analytical connections between concepts. It requires, in other words, the consideration of “empirical findings” and is therefore to be characterized as synthetic. (See also Carnap 1927, in this connection; further the reconstructions in Howard 1996, 156–161; Richardson 1998, pp. 43–47; Carus 2007, pp. 192–196).

Thus Carnap did not fully agree with Schlick's account of implicit definitions. Nevertheless, it can be stated that 'structuralism' was the connecting link between the early epistemologies of Carnap and Schlick. According to Carnap, all statements of science are "structure statements" (Carnap [1928] 1968, § 16), and it is, Carnap maintains, structure alone that accounts for the quest for *objectivity*.¹³ In § 75 of the *Aufbau*, Carnap stresses the priority of "basic relations," thereby referring the reader to Ernst Cassirer's relationalist (or 'functionalist') account of scientific concepts (see Cassirer 1910). But he could also have referred the reader to Schlick who, in his *Allgemeine Erkenntnislehre*, categorically claims: "In the last analysis, all knowledge is a matter of relations and dependencies, not of things or substances." (Schlick [1918] 1974, p. 285) As has been shown elsewhere (Neuber 2013), structure (*viz.* relation) is the common ground on which Carnap, Cassirer, and Schlick develop their early epistemological conceptions.

The Perceptual and the Physical

According to Schlick, the relation of the perceptual and the physical is of central epistemological interest. As he points out in his *Allgemeine Erkenntnislehre*, the physical must be conceived of as being "constructed" out of perceptual singularities (see Schlick [1918] 1974, § 31). This does not mean that Schlick is an ontological 'constructivist' in any philosophically serious sense. Quite the contrary: What Schlick intends to argue for is that the physical *as such* is completely independent from our conceptual system, that is, *transcendent*. Nevertheless, the conceptual system itself is built upon the singularities within our diverse perceptual fields. Objective knowledge is nothing but the unequivocal coordination between the thusly constructed conceptual system and the realm of transcendent physical objects. The method by which this coordination is effected, Schlick calls the "*method of coincidences*" (*ibid.*, p. 272) which, in his view, "is of the greatest significance epistemologically" (*ibid.*).

Schlick's method of coincidences (and its epistemological significance) is meanwhile well-explored territory (see, for example, Ryckman 1992; Friedman 1997, 2002; Howard 1999; Pulte 2006; Seck 2008, pp. 142–144, Neuber 2012, pp. 108–126); but it is, at first sight, not so clear where the connection to Carnap's *Aufbau* lies. However, by looking closer at the issue, it becomes obvious that Carnap was in fact acquainted with this method. Thus, in § 130 of the *Aufbau*, he remarks:

The problem of assigning tactile qualities to world points to which only visual qualities (colors) were originally assigned and, furthermore, the assignment of still other sensory

¹³ See Carnap [1928] 1968, p. 29: "[S]cience wants to speak about what is objective, and whatever does not belong to the structure but to the material (i.e., anything that can be pointed out in a concrete ostensive definition) is, in the final analysis, subjective. One can easily see that physics is almost altogether desubjectivized, since almost all physical concepts have been transformed into purely structural concepts."

qualities can also be formulated as the problem of the mutual correlation of the various "sense spaces". This problem is discussed by Poincaré [Wert], Schlick [Raum und Zeit] 95 ff. (Method of Coincidences) and Jacoby [Ontol.] (Carnap [1928] 1968, p. 201)

The mentioned contributions by Henri Poincaré and Günther Jacoby (a nowadays forgotten anti-Kantian ontologist) notwithstanding, it is important to take into consideration the passage from Schlick's *Space and Time in Contemporary Physics* to which Carnap is referring here. What one can read in this passage is, among other things, the following: "It is obvious that in the first instance only the intuitional psychological spaces and times are given us; and we must inquire how we have, by starting from them, arrived at the construction of the objective space-time manifold." (Schlick [1917] 1979a, pp. 261–62) The jargon of "construction" is well motivated: According to Schlick, the concept of physical – objective – space is generated by applying the method of coincidences, which correlates the diverse psychological – subjective – spaces of our respective perceptual fields. The *empirical result* of this application of the coincidence method is the purely quantitative, abstract four-dimensional scheme of relativistic physics, i.e., the Riemann-Minkowski-Einstein spacetime structure.¹⁴

Now it is quite interesting to see that Carnap, in the *Aufbau*, argues along very similar lines. § 136 is titled "The World of Physics" and begins as follows:

The perceptual world is constructed through the assignment of sense qualities; from it we must distinguish the *world of physics*, where physical state magnitudes are assigned to the points of the four-dimensional number space. This construction has the purpose of formulating a domain which is determined through *mathematically expressible laws*. They are to be mathematically expressible in order to allow us to *calculate* certain elements from those other elements which determine them. Furthermore, the necessity of constructing the world of physics rests on the circumstance that only this world, but not the perceptual world [...], can be made intersubjective in an unequivocal, consistent manner [...]. (Carnap [1928] 1968, p. 209)

Nevertheless, Carnap, like Schlick in the context of his method of coincidences, realizes that the starting point for the construction of the physical world is always the perceptual world. Carnap writes: "The construction of the physical world, aside from the regularity to which it is to lead, is essentially determined through a special relation which holds between it and the perceptual world: this relation we want to call *physicoqualitative correlation*." (*ibid.*, p. 210)

¹⁴The essential passage in this connection reads as follows: "In order to fix a point in space, we must in some way or other, directly or indirectly, *point* to it: we must make the point of a pair of compasses, or a finger, or the intersection of cross-wires, coincide with it (i.e., bring about a time-space coincidence of two elements which are usually apart). Now these coincidences always occur consistently for all the intuitional spaces of the various senses and for various individuals. It is just on account of this that a 'point' is defined which is objective, i.e. independent of individual experiences and valid for all. [...] Upon close investigation, we find that we arrive at the construction of physical space and time by just this method of coincidences and by no other process. The space-time manifold is neither more nor less than the quintessence of objective elements as defined by this method. The fact of its being a four-dimensional manifold follows from experience in the application of the method itself." (Schlick [1917] 1979a, pp. 262–63).

Yet in order to obtain *objective knowledge*, we must completely abstract from the peculiarities of our sense organs. We must, in other words, conceive of the world of physics in a purely quantitative – conceptual – way. Schlick’s method of coincidences can be regarded as Carnap’s model for thinking about the relationship of the perceptual world and the world of physics in the way he does.¹⁵ One might even go as far as to claim that the method of coincidences served as a blueprint for the entire constructionist project in the *Aufbau*. At any rate, it cannot be denied that Carnap’s project and Schlick’s method are strikingly close to each other (for a similar appraisal, see Friedman 1999, p. 43).

Empirical versus Metaphysical Realism

As we have seen, the early Schlick favored some sort of critical empirical realism, arguing along epistemological, non-metaphysical lines. Much the same can be said of Carnap and his argumentation in the *Aufbau*. Thus, in § 52 he points out:

The realistic language, which the empirical sciences generally use, and the constructional language have actually the same meaning: they are both neutral as far as the decision of the metaphysical problem of reality between realism and idealism is concerned. It must be admitted that, in practice, linguistic realism [*sprachlicher Realismus*], which is very useful in the empirical sciences, is frequently extended to a metaphysical realism; but this is a transgression of the boundaries of science [...]. There can be no objection against such a transgression, as long as it influences only the mental representations which accompany the scientific statements; this transgression is objectionable only if it influences the content of the statements of science. (Carnap [1928] 1968, pp. 86–87)

To be sure, the early Schlick would not have used the term ‘linguistic realism.’ In the period of his *Allgemeine Erkenntnislehre*, he was still miles away from any form of ‘linguistic turn.’ Furthermore, it is sometimes rather difficult to decide whether Schlick argues *consequently* within the intended epistemological agenda. That is, Schlick is sometimes ‘more metaphysical’ than he seems to realize.

But these are only side aspects. The really interesting point is that Carnap accepts a certain form of realism and that he *explicitly endorses Schlick’s interpretation of Kantian things-in-themselves and the assumption of their knowability*. Since this might sound quite bold (if not absurd) in the face of the established view of Carnap

¹⁵ In the remarks on the references to § 136, Carnap states: “That the world of physics is completely free from sense data is shown by Schlick [Raum und Zeit] 93 f. and Carnap [Phys. Begr.]; the latter also gives reasons for the transition from the qualitative perceptual world to the quantitative physical world (p. 51 ff.)” Carnap, in the mentioned little book on *Physikalische Begriffsbildung* (1926), refers (in the bibliography) to both Schlick’s *Space and Time in Contemporary Physics* and to the latter’s “Naturphilosophie” from 1925. The passage to which he refers in § 136 of the *Aufbau* reads as follows: “The objects of physics are [...] *not* the data of sense: the space of physics is not in any way given with our perceptions, but is a product of our conceptions. [...] Physics does not use colour as a property of the object with which it is associated, but only frequencies of the vibrations of electrons. Nor does it work with qualities of heat, but only with kinetic energy of the molecules etc.” (Schlick [1917] 1979a, pp. 260–61).

as an anti-realist (see in this respect, for example, Friedman 2007), it is appropriate to quote the following passage from § 176 of the *Aufbau*:

If things-in-themselves are defined as real objects which are not given (as is done by Schlick [Erkenntnisl.] 179), then they must indeed be counted among the cognizable objects and thus must be placed within the domain of (rational) science and not within metaphysics; for then they coincide with the constructed real objects. (Carnap [1928] 1968, p. 284)

Admittedly, Carnap qualifies this remark by adding that “it seems to us that this definition is not very practical, since it deviates altogether too much from customary usage (*ibid.*)”. However, the deviation from “customary usage” notwithstanding, Carnap obviously accepts a certain *interpretation* of Kantian things-in-themselves. It is the interpretation delivered by Schlick in his *Allgemeine Erkenntnislehre*. In Schlick’s view, things-in-themselves (relations!) should be interpreted as real but not immediately perceived objects and *not* as the metaphysical – substantial – ‘bearers’ of the objects’ properties. The respective passage in the *Allgemeine Erkenntnislehre* is worth quoting in full length:

Now objects whose reality is asserted without their being directly *given* are called (in our meaning of the term) *things-in-themselves*. At any rate this is the meaning we wish to assign to the term from now on. It seems to me that this definition brings out most clearly the problem that attaches to the concept. In what follows, the reader should at no time forget that the expression ‘thing-in-itself’ is to be understood in the stipulated sense alone. (Schlick [1918] 1974, p. 195)

And Schlick continues:

The term [‘thing-in-itself’; MN] can indeed be taken in many other senses. For instance, we may, with Mach [...] believe that it must mean something that is left over when we think of a thing with all of its properties removed. This we are not concerned with. When we plead for the existence of things-in-themselves, we are saying merely that we may speak of real objects without thereby meaning that they are, in our sense, “given” as objects to a subject. Thus we are not postulating a hidden, unknown “bearer” of properties, an “absolute” in some metaphysical sense. (*ibid.*)

The latter, ‘absolutist,’ understanding of things-in-themselves would indeed *not* be compatible with Carnapian ‘constructed objects.’ Rather, it would have to be placed in the ballpark of metaphysics and thus in “the extrascientific domain of theoretical form” (Carnap [1928] 1968, p. 284).

So Carnap, like Schlick, rejects the assumption of metaphysically absolute – substantial – things; but he explicitly allows the possibility of objects which are constructed but not immediately given and thus (in the Schlickian meaning) transcendent. This enables a distinction to be made between ‘transcendence’ in the sense of *empirical* realism and ‘transcendence’ in the sense of *metaphysical* realism.¹⁶ On the first reading, which both Carnap and Schlick embrace, transcendence would imply the assumption of independence from immediately given sensory data (perceptual qualities). Physical spacetime would be a good example in this respect. On the second reading, which both Carnap and Schlick reject, transcendence would

¹⁶I have to thank Clinton Tolley for helpful comments in this regard.

imply the assumption of independence from all possible experience in favor of ‘substances’, ‘essences’, and related metaphysical obscurities. On the whole, the empirical realist reading leads more or less directly to Carnap’s closer determination of “empirically real objects” in § 177 of the *Aufbau*. According to this closer determination, empirically real objects (be they sensory objects or the theoretical objects of science)

- can be clearly distinguished from dreams, hallucinations, etc.;
- can be “intersubjectivized” (i.e., are intersubjectively accessible);
- are independent of being actually experienced;
- are integrated in a “physical causal chain” (i.e., are not deliberately changeable);
- enable predictions of future observable events.

For Carnap, empirical realism and his own “construction theory” agree in all these five respects. From the standpoint of the early Schlick, there would certainly be no objections to this.

A further (and last) remark concerning the rejection of metaphysics is in order. In the penultimate § 182 of the *Aufbau*, Carnap makes the following statement:

Some philosophers call metaphysics a such and such delineated area of (conceptual) science. In view of the fact that this word, through its historical past, contains for many a suggestion of the vague and speculative, it would be more appropriate not to call such areas of philosophy which are to be treated with strict scientific concepts “metaphysics”. (Carnap [1928] 1968, p. 295)

And Carnap adds: “Other philosophers use the name ‘metaphysics’ for the result of a nonrational, purely intuitive process; this seems to be the more appropriate usage.” (*ibid.*) Carnap mentions Henri Bergson’s *Introduction à la métaphysique* (1903) in this connection and points out that Schlick has given an “especially clear account” of the difference between this kind of ‘intuitive metaphysics,’ on the one hand, and true, i.e., purely conceptual *knowledge*, on the other. This is a very well-known issue. Suffice it to note that Schlick, as early as 1913, criticized the Bergsonian (as well as the Husserlian) conception of ‘intuitive knowlegde’ as a *contradictio in adiecto* (see Schlick [1913] 1979a, p. 146; further Schlick [1918] 1974, p. 83).

Had Carnap Any Influence on Schlick?

By reading Carnap’s autobiographical notice one might come to the conclusion that Schlick, in consequence of his move to Vienna in 1922, radically changed his philosophical position. Thus, Carnap reports:

[Schlick] and Reichenbach, like Russell, Einstein and many of the leading scientists, believed that realism was the indispensable basis of science. I maintained that what was needed for science was merely the acceptance of a realistic language, but that the thesis of the reality of the external world was an empty addition to the system of science. Under the influence of our discussions, Schlick abandoned realism. (Carnap 1963, p. 46)

One should be careful here: Schlick never claimed that he had ever “abandoned realism.” Quite the contrary: As he points out in his essay “Positivism and Realism” from 1932, he still thinks that “empirical realism” is a viable position, namely one that is compatible with what he calls “coherent empiricism” (see Schlick [1932] 1979b, p. 283). What is ruled out by this compatibilist view is *metaphysical* realism, on the one hand, and radical *positivism*, on the other.

So, Feigl’s assertion of a Schlickian “conversion to positivism,” which we quoted at the beginning of the present paper, cannot be sustained. Moreover, the associated assumption that Carnap had any influence on Schlick’s change in points of view is far from plausible. Suffice it to think of the existence of two ‘wings’ within the Vienna Circle, with Carnap and Neurath on the ‘left’ wing and Schlick and Waismann on the ‘right’ (see Uebel 2004). In the context of the famous protocol-sentence debate, this schism became most evident (for the details, see Uebel 2007, ch. 10).

However, it would be false to conclude that the early and the Viennese Schlick *coincided* in terms of philosophical outlook. As can be easily reconstructed from his Viennese writings (both published and unpublished), the later Schlick was deeply impressed by Wittgenstein and especially by Wittgenstein’s conception of philosophy as an “activity” (see, for example, Schlick [1930] 1979b). Thinking of philosophy in that way, though, was flagrantly at odds with Carnap’s (Tarskian) conception of a meta-language. Yet, to go into the details of this issue would require a paper of its own.

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Carnap's *Aufbau* in the Weimar Context

Thomas Mormann

Introduction

The *Aufbau* was once described as an attempt “to account for the external world as a logical construct of sense-data” (Quine 1969, 74), Russell (1994 (1914), 115)). Consequently, the most important influence on the *Aufbau* could be precisely named as “Russell”. Those times have passed. The task of providing a balanced and comprehensive interpretation of the *Aufbau* has turned out to be more difficult than most people imagined 40 years ago, when Quine’s interpretation of the *Aufbau* was popular.

It is my thesis that the original core of the *Aufbau* project rested on a problem that had haunted German philosophy since the end of the nineteenth century. In terms fashionable at the time, the problem was characterized as a polarity between *Leben* and *Geist* (*Life and Spirit*). It became particularly acute in the turbulent years of the *Weimar Republic*, when neo-Kantianism, still arguably the leading current of academic philosophy in Germany at the time, came under heavy fire from various currents of *Lebensphilosophie* (philosophy of life) and related philosophical currents such as Heidegger’s fundamental ontology.¹

Carnap, one of the younger and more ambitious philosophers of the time, was also engaged in the project of overcoming the conflict between *Leben* and *Geist*. His attempts were characterized by a certain eclecticism; he frequently used conceptual devices and ideas from very different currents of science and philosophy. This eclecticism makes it difficult to identify the influences that contributed to the *Aufbau*. The aim of this paper is to draw attention to three influences that have been neglected in the literature: *Lebensphilosophie*, South-West neo-Kantianism, and a

¹A succinct presentation of the philosophical landscape in Germany in the 1920s can be found in Schnädelbach (1984).

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specific version of Machian monism as presented by the German philosopher and psychologist Theodor Ziehen in his *Erkenntnistheorie auf psychophysiologischer und physikalischer Grundlage* (Ziehen (1913), henceforth *Erkenntnistheorie*). For very useful information on Ziehen's life and work see the website http://www.stork-herbst.de/sides/_thziehen.html, maintained by A. Herbst.

At first glance, these influences form a strange triad. Even if one were to admit that they had some influence on the *Aufbau*, it is not clear what brings them together. The answer is that all three theories are essential ingredients in the unpublished manuscript *Vom Chaos zur Welt* (Carnap RC 081–05-0, henceforth *Chaos*), which was, according to Carnap, the “germ of the *Aufbau*”, or as I contend, *Chaos* may be characterized as the “*Ur-Aufbau*”. The general thesis of this paper is that bringing into focus the triad of *Lebensphilosophie*, South-West neo-Kantianism, and monism á la Ziehen sheds new light on the meaning of Carnap's first *opus magnum*.

At that time, the situation in German philosophy might be described as a quarrel between academic, broadly scientific-minded philosophy on the one hand and more or less irrationalist currents such as *Lebensphilosophie* on the other. More precisely, the academic philosophy sought to confine the effect of the growing tide of *Lebensphilosophie* on the cultural and intellectual scene in Germany.²

While *Lebensphilosophie* tended to assume an unbridgeable gap between *Leben* and *Geist*, most currents of established academic philosophy were prepared to recognize only a relative independence and autonomy for the sphere of *Leben*. As discussed below, academic philosophers generally sought a reconciliation of *Geist* and *Leben* in a world in which both had a legitimate place.

Among the philosophers engaged in overcoming the antagonism between *Geist* and *Leben* were Cassirer (*Philosophie der symbolischen Formen*, 1923–1929), Rickert (*System*, 1921), Vaihinger (*Die Philosophie des Als Ob. Ein System der theoretischen, praktischen, und religiösen Fiktionen der Menschheit*, 1920⁶), and Husserl (*The Crisis of European Sciences and Transcendental Phenomenology* (1936) and earlier lectures).

Carnap was aware of many of these works. It would not be unjustified to ascribe to his early work a certain eclecticism, as the exegetic work of several authors has revealed, Carnap used arguments from many different philosophical quarters. I will argue that this eclecticism was held together by the underlying aim of overcoming the antagonism between *Leben* and *Geist*.

The *Aufbau* project covered an extended period, from approximately 1922–1930.³ It can hardly be expected that Carnap's philosophical convictions would

²An impressive account of the fascination that Heidegger's lectures exerted on the German academic youth at that time is given by Hannah Arendt: “[His] name travelled all over Germany like the rumour of a secret king. [...] The rumour that attracted [the students] first to Freiburg to the *Privatdozent* and somewhat later to Marburg, told that there was one who really achieved the thing that Husserl had proclaimed” (Arendt (1969, 893). The tone of many comments about Heidegger's performance at the “Davoser Disputation” is similar. Many hailed him as the prophet of a new (philosophical) age. This prediction was fulfilled a few years later, but perhaps not in the way that many had hoped for (cf. Gordon (2011), Wolin (2001, 2006)).

³This claim may need some explanation. After all, the *Aufbau* was published in 1928, and one may assert that the story ends there. However, the tentative date of 1930 is given to assert that for a short

remain constant throughout this entire period. I contend that in the early *Aufbau* project, Carnap sought a harmonious reconciliation of “*Geist*” and “*Leben*” in a meaningful world in which both had a legitimate place. Over time, however, the project retreated to the more modest goal of providing a rational reconstruction of scientific knowledge, neatly separated from the realm of *Leben*, that allowed for the peaceful co-existence of *Leben* and *Geist*. The two realms nevertheless remained related to each other in some manner, as expressed in the enigmatic closing phrase of the *Manifesto*: “The scientific world conception serves life and life receives it” (cf. Mormann (2013)).

The outline of this paper is as follows. In section “[Weimar Polarity](#)”, the global situation of German philosophy in the *Weimar Republic* is characterized in broad terms as a polarized spectrum that ranged from scientifically oriented (neo-Kantian) philosophy to a group of loosely defined irrationalist, anti-scientific philosophical currents that may be subsumed under the heading of *Lebensphilosophie*. For the purposes of this paper, I include in this group various authors such as Bergson, Scheler, Spengler, Nietzsche, Simmel, Dilthey, and even Heidegger may be subsumed under this imprecise philosophical heading. For these thinkers in a rather woolly sense, *Leben* – in a not purely biological sense – was the primary and even the only important topic of philosophy in a way that transcended the purely biological sense.

When it emerged, most academic philosophy ignored *Lebensphilosophie* and its growing influence on the cultural and intellectual life of Germany. Eventually, however, it became clear that this stance was no longer tenable. Academic philosophy was forced to adopt a definitive attitude towards *Lebensphilosophie* that went beyond disregard or refusal.

For Carnap, one particularly important attempt to address the problem of *Leben* was put forward by the South-West neo-Kantian Heinrich Rickert in his two books *Die Philosophie des Lebens* (Rickert 1921a) and *System* (Rickert 1921b). In these books, Rickert attempted a partial integration of *Lebensphilosophie* into a comprehensive system of scientific-minded philosophy. Whether Rickert was successful is up for debate (cf. Kusch 1995), but Rickert was important to Carnap's *Aufbau* project.

As section “[Chaos as the Germ of Aufbau](#)” demonstrates, an early version of the *Aufbau* project has interesting affinities with Rickert's project. Indeed, there are striking similarities between Rickert's *System* (1921) and Carnap's *Chaos*. For instance, both conceptualize the “*Aufbau*” of an ordered rational world as emerging from a “chaos of *Erlebnisse*” and both describe the motif for such an “*Aufbau*” as a pseudo-Nietzschean “will to order” or “will to system”.

In the *Aufbau* project, Carnap also attempted to integrate central claims of *Lebensphilosophie* into what the *Manifesto* later called a comprehensive “scientific world conception”. In *Chaos*, Carnap addressed a challenge similar to the one Rickert confronted in *System*: to bring about a reconciliation of *Geist* and *Leben*. In

time after 1928, the *Aufbau* was still a living option among the members of the Vienna Circle. Indeed, the *Manifesto* claimed that the *Aufbau* would play the role of a formal frame of *Einheitswissenschaft* to be carried out in the future (cf. *Manifesto*, Frank 1955).

other words, both sought to construct an ordered and rational world (*kosmos*) from an original *chaos* of *Erlebnisse*.

It goes without saying that the details of Rickert's and Carnap's projects are very different. Indeed, *Chaos* can be characterized as an attempt to synthesize a range of theories: Rickert's neo-Kantian account, a specific version of Machian neutral monism as presented by Ziehen in his *Erkenntnistheorie auf physiopsychologischer und physikalischer Grundlage* (Ziehen 1913), certain requirements of *Lebensphilosophie*, and the conceptual tools of relational logic inaugurated by Russell and Whitehead.⁴ What exactly this means will be clarified in the following sections.

In the longer, unpublished version of his *Intellectual Autobiography* Carnap characterized *Chaos* as "the germ of the *Aufbau*". He noted that in *Chaos* he formulated, for the first time, the constitutional method of "quasi-analysis" which played an essential role in the constitution theory *überhaupt*. This claim is in need of qualification. As shown in section "*Chaos as the Germ of Aufbau*", the essential ingredients for this theory can already be found in Ziehen's *Erkenntnistheorie*.

Section "*Values in the Aufbau*" contains further evidence that Rickert's *Wertphilosophie* had a considerable influence on the *Aufbau* project. I argue that, much like Rickert, the *Aufbau* was engaged in the constitution of values and other cultural objects. Indeed, Carnap pointed out that the basic constitutional method of quasi-analysis may be characterized as a kind of valuation as it was practiced in Rickert's *Wertphilosophie*. On the other hand, from a formal perspective the method of quasi-analysis can be conceived as a defining and clarifying of Ziehen's "Koinadenprinzip". *Chaos* can therefore be seen as a synthesis of Rickert's voluntarism, Ziehen's positivistic monism, and *Lebensphilosophie*.

Weimar Polarity

Near the end of the *Weimar Republic*, one of its most influential philosophers and public intellectuals, Ernst Cassirer, offered the following diagnosis of the situation of philosophy in Germany:

Again, it has become evident how strong our "modern" and most modern philosophical thoughts are rooted in romanticism and how they depend, consciously or unconsciously, on romanticist patterns. Again, the great anti-thesis of *Natur* and *Geist*, the polarity of *Leben* and *Erkenntnis* occupy center-stage in philosophical considerations⁵ – and still the

⁴Ziehen was the psychiatrist who took care of Nietzsche after he had a mental breakdown in 1889 and was admitted to psychiatric care.

⁵Unwittingly, Carnap became a witness for the correctness of Cassirer's diagnosis as demonstrated by the fact that, some years later, Carnap published in the journal *Natur und Geist* (sic) the paper *Theoretische Fragen und praktische Entscheidungen* (Carnap 1934).

conceptual tools forged by romanticism, and the categories created by this period determine the problem and its solution. (Cassirer (1930, 186))⁶

Cassirer noted that there were several ways to address this polarity. One was to dissolve it in favor of a unipolar approach. As paradigmatic examples of one-sided strategies he considered, on the one hand, the irrationalist version of *Lebensphilosophie* put forward by Ludwig Klages in his monumental *Der Geist als Widersacher der Seele* Klages (1929–1933, app. 1500 pages) and the radically physicalist versions of logical empiricism espoused by the Vienna Circle, on the other hand. While Klages considered *Geist* to be the deadly enemy of *Leben*, the logical empiricists considered everything that could not be expressed in physicalist language to be metaphysical nonsense.

In addition to these radical and one-sided proposals of overcoming the fundamental polarity, Cassirer took into consideration a quite different class of proposals, namely those that intended to bring about a reconciliation between *Leben* and *Geist*. It is not difficult to see that Cassirer favored such a solution when he put forward the rhetorical question:

Romanticism versus positivism; “reason and science” versus the opposition to both, even their contempt, mysticism vs. “physicalism” – this is the whole theme of the philosophy of the last 150 years (1781–1931). Do we have to subscribe to one of these alternatives – or is there a kind of “reconciliation” that is principally different from an eclectic mixture of these two ingredients? (Cassirer 1995, 131)

The spectacular culmination of this confrontation between *Lebensphilosophie* and *academic philosophy* was the famous “Davos Disputation” of Heidegger and Cassirer in Davos (Switzerland) in 1929 (see for example Gründer (1988), Friedman (1999), Gordon (2011), Skidelsky (2008)). Many contemporary witnesses considered the encounter between Heidegger and Cassirer to be a major philosophical event, which amounted to a philosophical sea-change and defined a new philosophical era. The general impression was that Heidegger, representing the new way of doing philosophy, was the winner in the Davos showdown, although I do not discuss the assertion here. For the purposes of this paper, it is important only to note that Carnap also participated in the Davos event. This suggests that he was vividly interested in the fundamental antagonism between the two currents that characterized philosophy in German-speaking countries and beyond at the time and that he was at pains to find his own stance in this dispute and overcome the aporetic controversy.

In this respect, he was one of the many philosophers of the time who were engaged in overcoming the aporetic polarity between irrational *Leben* and rational *Geist*. Many of them tackled this problem from a developmental perspective in which the problem was how from a basic stratum of *Leben* higher strata of reason and knowledge could be built up compatible with *Leben*. This brought into play the

⁶Similar ideas also appeared in Husserl's lectures on *Natur und Geist* that he gave in 1919 and 1927.

concept of construction or constitution, i.e., how the categories of reason or rationality could be constituted from more elementary categories of *Leben*. With respect to this issue I would like to put forward the following thesis:

The *Aufbau* was Carnap's proposal of how the polarity between *Geist* and *Leben* could be conceptualized in a fruitful way. Carnap's solution was of a reconciliatory nature: *Geist* was neither the "enemy of life" nor could life be completely subordinated to *Geist*.

As explained above, such a project was far from original in the 1920s. Many currents of academic philosophy in Germany were engaged in analogous projects of coming to terms with *Leben*. For example, the Baden school of neo-Kantianism, in particular Rickert; the Marburg neo-Kantianism, with Cassirer's "philosophy of symbolic forms"; and Husserlian phenomenology. My thesis is that the *Aufbau* project was essentially informed by this specific constellation of German philosophy, culture, and politics of the *Weimar Republic*.

This contention is far from new. Twenty years ago, Peter Galison noted that the specific historical situation of *Weimar* period was a core influence on the *Aufbau*'s philosophical content. He argued, convincingly, that the "Der logische *Aufbau* der Welt" is not adequately translated palely as "The Logical Construction of the World" (cf. Galison 1996).

A more recent attempt to embed Carnap's work in a specific historical and cultural context is the work of Gottfried Gabriel. (cf. Gabriel (2003, 2004)). According to Gabriel:

Carnap's early philosophy ... can be regarded as a configuration of influences – a cross-fertilization of modern logic, neo-Kantian constitution theory, and the critique of metaphysics stemming from *Lebensphilosophie* – highly specific to a particular time and place: Jena in the first two decades of the twentieth century, when Carnap grew up and went to university there. Gabriel (2004, 6)

Gabriel's description of the cultural context from which Carnap's early philosophy emerged points to some interesting ingredients that have been neglected in the past. Regrettably, however, he addresses the *Aufbau* only in passing and I would not place as strong an accent on "Jena" as he does. Rather, I contend that overcoming the aporetic antagonism between *Lebensphilosophie* and scientifically minded philosophy (in a broad sense) was not a special problem of the Jena philosophical configuration but an urgent problem for the entire field of academic philosophy in the *Weimar Republic*.

Instead of focusing on the concept of "*Aufbau*", as Galison did, I will concentrate on the concepts *Erlebnis* and *Chaos*, which point rather directly to the strong influence of *Lebensphilosophie* on Carnap's thinking. To set the stage, one should keep in mind that Carnap spent his philosophical apprenticeship in a philosophical arena somewhat alien to his later philosophical company. At the time, he studied under the influence of the South-West school of neo-Kantianism, beginning with Bruno Bauch in Jena, continuing with Rickert in Freiburg, and returning to Bauch and Frege in Jena. This influence continued well into the 1920s and is still visible in the *Aufbau* project, especially in its early stages. Later, in the second half of the 1920s, Rickert fell out of favor with Carnap, although it is not clear why. One plausible explanation would be the growing anti-neo-Kantian influence of the Vienna Circle, in particular the influence of Neurath, to which Carnap was exposed.

Carnap's attack in *Overcoming Metaphysics* on *Wertphilosophie* was clearly directed against both Rickert and Heidegger. Eventually, in Carnap's *Intellectual Autobiography* (Carnap 1963), Rickert was implicitly deemed philosophically irrelevant; he was not mentioned at all. However, let us return for a moment to when Carnap appears to have held Rickert's philosophy in higher esteem, namely immediately after Rickert published *System* (Rickert 1920) and *Philosophie des Lebens* (1921).⁷ In these works, Rickert not only outlined his own philosophical system but also attempted to come to terms with *Lebensphilosophie*. He recognized the philosophical importance of the topic of *Leben* in general and of *Erlebnis* in particular:

Every systematic thought seeks to begin with something immediately given which does not permit any further derivation. Using a word fashionable today, this immediately given is called "the experience" ("das Erlebnis"). This need not to be objected. (*System*, 311).

Carnap's argument for choosing *Erlebnisse* as the basic elements of the constitutional system in the *Aufbau* was virtually identical to Rickert's:

... [S]ince we wish to require of our constructional system that it should agree with the epistemic order of the objects (§54), we have to proceed from that which is epistemically primary, that is to say, from the "given", i.e., from *Erlebnisse* themselves in their totality and undivided unity. (*Aufbau*, § 67)

Rickert's assertion that he "didn't object" to calling "the given" "*Erlebnis*" was, he hoped, a clever attempt to bring *Leben* – conceived of as a "stream of *Erlebnisse*" – back under the control of scientific philosophy. For this endeavor, he sought help from Nietzsche, who may be considered a strange ally because he was one of the protagonists of *Lebensphilosophie*. According to Rickert, in the realm of philosophy, the Nietzschean "will to power" expresses itself as a "will to the system":

What we immediately "experience" ("erleben"), is, after having subtracted all conceptualizations a completely disordered turmoil of impressions that constantly change [...]. For a scientifically minded individual, the world, thought as totally unsystematic, is a ... *chaos*. Most people do not realize this fully due the fact that from birth on we encroach in a stable organization of the world (Rickert 1920, 6/7)

...

Hence, the will for the philosophical consideration of the world is necessarily connected with the will to the system. (ibid. 10) (my emphasis, TM)

...

Philosophy has to think the world in such a way that from the chaos of *Erlebnisse* a *kosmos* arises that is ordered and articulated by principles (ibid., 50).

Like Rickert, Carnap assumed that the "chaos" from which the fictitious *Aufbau* of *Wirklichkeit* was to emerge was minimally structured so that the "will to order" had a base from which to begin the construction process:

The chaos does not contain identical elements that can be grasped as isolated ones. In order that the chaos can be ordered at all, there must nevertheless exist differences in it on which it depends which places of the ordering schema are related to which parts of the chaos.

⁷The full title of Rickert's book reads *Die Philosophie des Lebens. Darstellung und Kritik der philosophischen Modeströmungen unserer Zeit*. This title sounds more dismissive with respect to *Lebensphilosophie* than the book really is. To a rather large extent, Rickert offered a knowledgeable and not unfair presentation of *Lebensphilosophie*.

...
 We ascribe to the chaos as few basic differences as possible, namely, only as many as are necessary for the constitution of reality. (*Chaos*, p. 2)

Compared with Rickert, however, Carnap was much more explicit about what this minimal structure of “chaos” had to look like to permit the construction of a higher strata of *Wirklichkeit*. This is where Ziehen’s *Erkenntnistheorie* enters the stage. Carnap adopted the basic formal structure that was assumed by the system of *Erlebnisse* to get the constitution process started in Ziehen’s monistic account (cf. Ziehen 1913). This process will be discussed in detail in the next section.

Both Rickert and Carnap sought to design a constitution theory that could be used as a frame for constructing an ordered and meaningful world that retained at least some of the features characteristic of the world propagated by philosophers of *Lebens*. In the *Aufbau* project, Carnap sketched the constitution of a meaningful world in which values and other “cultural objects” played an essential role.

The origins for the constitution of such a comprehensive world can already be found in the *Uraufbau*, or the *Chaos* manuscript. In *Chaos*, Carnap responded to the challenge of *Lebensphilosophie*: that concepts such as intellect, conceptualization, reason, and rationalization were “dead” or, even worse, devices for “killing life” via ingenious trickery. According to Carnap, *Erlebnisse*, as parts of *Leben* or, alternatively, *Leben* as a stream of *Erlebnisse* (*Erlebnisstrom*), had “living” and “dead” components. He stipulated that, for every *Erlebnis* there is:

... a first basic difference, namely that what we call the living and the dead part of the *Erlebnis*. ... The living part means what later is called sensation, and the dead part means representations (*Vorstellungen*). In both cases, however, those parts of *Erlebnisse* that later are distinguished as accompanying feelings or volitions ... are still included.

Thus, every *Erlebnis* possessing a dead and a living component the allegedly unbridgeable abyss between *Leben* and *Geist* could be overcome.⁸ As explained in detail in the next section, Carnap took this idea from Ziehen, in his *Erkenntnistheorie*, who had introduced it for very different reasons.⁹

Chaos as the *Germ of Aufbau*

In this section, I’d like to show that the essential ingredients of Carnap’s *Chaos* were Rickert’s *System* and Ziehen’s *Erkenntnistheorie*. Indeed, *Chaos* may be conceived of as an attempt to synthesize Ziehen’s *Erkenntnistheorie* and Rickert’s project of the constitution of an ordered world (cosmos) from the “chaos” of a tangle of

⁸ A similar argument – that an antagonistic clash between *Leben* and *Geist* as advocated by Klages and his partisans is inconsistent – can also be found in Cassirer (1995).

⁹ Ironically, the living/dead distinction was given up in the *Aufbau*. Apparently, Carnap no longer considered it necessary to respond slavishly to all requirements of *Lebensphilosophie*.

experiences (*Erlebnisse*). Carnap wrote in the right margin of the first page of *Chaos*, apparently after 1928:

*This is the germ of the constitution theory of the "Log. Aufbau!"*¹⁰

This is virtually the only quotation from *Chaos* of which commentators take note.¹¹ As I want to show that *Chaos* contains more than this one line that may be useful in elucidating some intricate interpretative issues in the *Aufbau*.

The *Chaos* manuscript is a promising field for speculations concerning influences because the author made no effort to comply with the usual academic requirements of providing references, quotes, or sources. For instance, one may speculate that Husserl's phenomenology may also have influenced its content (cf. Mayer (1992), Rosado Haddock (2008)).

The central theme of *Chaos* is a sketch of the constitution of an epistemically ordered world ("*Wirklichkeit*") from an epistemic *Chaos* of *Erlebnisse*. This constitution is not meant to be a realistic description of what really happened in the cognitive history of the individual or the species. It is a "fiction" in the sense of Vaihinger. It can be seen as an extrapolation of the more common situation that arises when we are confronted with discrepancies between our cognitive expectations and experiences. In a Nietzschean vein, Carnap described it as follows:

The will to achieve a new order and to eliminate the gross inconsistencies is what gives rise to the epistemological considerations and the fictions that appear in them such as the chaos as a point of departure and the order principles according to which the (ordering) process develops.

This will to overcome the inconsistencies of reality by reconstructing it is also the irrational starting point of our theory. (*Chaos*, 1, emphasis mine, TM)¹²

This echoes Rickert, who in *System* and *Die Lebensphilosophie* asserted:

... [T]he will for the philosophical consideration of the world ... is necessarily connected with the "will to the system".¹³ (*System*, 10, emphasis and translation mine, TM)

...

Philosophy has to think the world in such a way that from the chaos of *Erlebnisse* a *Kosmos* arises that is ordered and articulated by principles.¹⁴ (*System*, 50, translation mine).

The similarity between the general programs of Rickert's *System* and Carnap's *Chaos* should be obvious.

¹⁰Das ist der Keim zur Konstitutionstheorie des "Log. Aufbau!"

¹¹An exception is Tennant (1987), who quotes an entire passage from *Chaos* but without interpreting it.

¹²German original: „Dieser Wille zur Neuordnung, zur Beseitigung der großen Unstimmigkeiten ist es, der die erkenntnistheoretische Ueberlegung und die in ihr auftretenden Fiktionen vom Chaos als Ausgangspunkt und von den Ordnungsprinzipien, nach denen der Bau geschehen ist, geschieht, und geschehen soll, veranlasst.

Dieser Wille, die Unstimmigkeiten der Wirklichkeit durch Umbau der Wirklichkeit zu überwinden, ist auch der irrationale Ausgangspunkt unserer Theorie.“

¹³German original: „So ist mit dem Willen zur philosophischen Betrachtung der Welt der „Wille zum System“... notwendig verknüpft.“

¹⁴German Original: „Die Philosophie hat die Welt so zu denken, daß aus dem Chaos der Erlebnisse ein nach Prinzipien geordneter und gegliederter Kosmos entsteht.“

Let us now consider Ziehen's contribution to *Chaos* in some detail. Theodor Ziehen (1862–1950) was a very prolific philosopher, psychologist, and psychiatrist.¹⁵ Today, Ziehen has fallen into almost complete obscurity as a philosopher, and, in particular, as a possible influence on Carnap.¹⁶ He considered himself a “critical positivist” in the line of Mach and Avenarius. According to him, it was of outmost importance for a scientifically acceptable epistemology to begin with the “given” without smuggling in hidden assumptions that relied on linguistic or conceptual suggestions of the vocabulary used. To avoid succumbing to the various conceptual temptations that may arise from conceptual associations of vocabulary, he expressed his account in quite artificial technical terms. For Ziehen, the directly given basis of epistemology was a class of “gignomena”. In psychological language, which Ziehen was at pains to avoid at the beginning of his system, a “gignomenon” was something like a sensation (*Empfindung*) or, in a different interpretation, an idea (*Vorstellung*). Ziehen preferred to avoid these charged concepts. Instead, he chose to maintain a strictly “neutral” language that could serve as a perfect mirror of the immediately given, namely the gignomena which may be considered as counterparts of the *Aufbau's* *Erlebnisse*. *Gignomena* do not suffice, however, to build an epistemology that deserves this name:

After having accepted the gignomena as a matter of fact, epistemology has the task to classify and order them. For this purpose, the principle of classification has to be clearly stated and justified. In particular, the introduction of a hypothesis – for instance the hypothesis of an cognizing ego or something like that – has to be avoided. The classification has to be only an ordered description. (Ziehen 1913, 3, 4)

The central question then becomes: according to what principles is the “ordered description” of the gignomena to be carried out? Ziehen, driven by his positivist conviction not to rely on any “subjective” order for ordering the gignomena, insisted that only the most austere principle for an “ordered description” of gignomena was to be used:

The principle of classification is only one – that of difference and similarity. The idea of difference, equality, and similarity, respectively is, leaving aside spatial and temporal relations, which cannot be used for classificatory purposes, ...the only general and original relation. (Ziehen 1913, 3–4).

According to Ziehen, therefore, not only the basic elements – the gignomena – but also the basic relation between them – the similarity relation between gignomena – belonged to the given. In other words, Ziehen subscribed to a type of structural realism according to which the basis of the “system of the world” was the class of gignomena endowed with a similarity relation.¹⁷

¹⁵Ziehen obtained a PhD in medicine (psychiatry) in 1885. Later he habilitated with Otto Binswanger and became his assistant at the psychiatric clinic in Jena. One of his patients there was Friedrich Nietzsche, after he had suffered a breakdown in Turin in 1889.

¹⁶Useful general information on Ziehen's life and work may be found on the website http://www.stork-herbste/sides/_thziehen.html maintained by August Herbst. For some pertinent remarks on the relation of Ziehen's *Erkenntnistheorie* and Carnap's *Aufbau* and Ziehen's role in the then contemporary debates on the concept of „order“ the reader may consult Paul Ziche's *Theories of order in Carnap's Aufbau* (this volume). On the other hand, Carnap's references in the *Aufbau* don't shed much light on Ziehen's role for his thought. Things become clearer if we have a closer look on *Chaos*.

¹⁷By contrast, Carnap, in the *Aufbau*, subscribed to a mixed pedigree of the basic ingredients of his constitutional system. According to him, the basic elements – *Elementarerlebnisse* – were

From this basic level of *gignomena cum* similarity relation, higher order objects could be constructed as Koinaden of *gignomena*. In other words, classes of similar *gignomena*, then Koinaden of Koinaden of *gignomena*, and so on. Carnap was later to explain this hierarchy more clearly in *Chaos* and in the *Aufbau*. Ziehen was content to illustrate the process of constitution with the following intuitive example. Consider a checkerboard, with white and black squares. A single square is constituted as a class of similar *gignomena*, their similarity given by the fact that they all have the color black, say. In Ziehen's terminology, such a similarity class is a "Koinade", more precisely, a Koinade of the first order. The checkerboard itself is characterized as a Koinade of second order because all its squares are more similar to each other than they are to the *gignomena* that occurred in their neighborhood (cf. Ziehen (1913, 16f)).

Ziehen did not invest much effort in giving a precise description of this constitution process. He was content to note the importance of his "Koinadenprinzip" in general terms. According to Ziehen, the objects of the world were to be constituted by a single principle – the *Koinadenprinzip* – based on the irreducible concept of similarity between *gignomena*. This *Koinadenprinzip* may be considered as an informal version of Carnap's quasi-analytical constitutional method.

Ziehen's specific version of a Machian neutral monism enabled Carnap to develop the constitutional method of quasi-analysis. What Carnap did in the *Ur-Aufbau* was to replace Ziehen's clumsy terminology, such as "gignomena" and "Koinaden", with a more appealing terminology inspired by the fashionable terms of *Lebensphilosophie*. Ziehen's original structure remained essentially intact. Carnap demonstrated in *Chaos*, and later in the *Aufbau*, that the tools of modern relational logic could be applied to this structure.

Indeed, one may set up a neat translation manual between the basic vocabulary of Ziehen's *Erkenntnistheorie* and Carnap's *Chaos* in which Ziehen's neutral "scientific" terms are translated into terms that obviously did not intend to be "neutral". Instead, the new terms were heavily charged with connotations inspired by *Lebensphilosophie*. One might obtain the following translation manual:

	<i>Ziehen</i>	<i>Carnap</i>
Basic elements	Gignomena	Erlebnisse
Sensation	Empfindungsgignomen	Living part of Erlebnis
Representation	Vorstellungsgignomen	Dead part of Erlebnis
The given	Set of Gignomena	Chaos of Erlebnisse
Basic relation	Similarity relation	Similarity relation G
Higher order object	Koinade	Quality class
	2nd order Koinade	
	

The most important correspondence between Ziehen's and Carnap's systems is the "main similarity relation" ("*Hauptgleichheit*") G. The binary relation G is to be reflexive and symmetric but not necessarily transitive. In psychological language, the state

contributed by positivism, and the basic relation – *Ähnlichkeitserinnerung* – was a contribution of "transcendental idealism" (cf. *Aufbau* § 75). For Ziehen, both the elements and the basic relation of similarity belong to the "given".

of affairs *Gab* between two building blocks a and b obtains if and only if they are similar with respect to (at least) one sensational aspect, for instance, if a and b share the same shadow of blue in the visual field or the same sound in the acoustic field. In *Chaos*, Carnap was already well aware that *Erlebnisse* a and b, and b and c, respectively, may belong to the field of the similarity relation, i.e., *Gab* and *Gbc* may obtain, but *Gbc* not, since a and c do not share a common aspect that renders them similar.

The relation G enabled the fictitious *Aufbauer* to constitute so-called quality classes as elements of the next higher level of the constitutional system: A class q of building blocks is a quality class if and only if it satisfies the following two conditions: any two elements of q stand in the relation G to each other; every building block that stands in relation G to all elements of G, also belongs to q. This is exactly the same definition of the quasi-analytical constitution of quality classes that later was to appear in the *Aufbau*.

The most important novel feature of Ziehen's account is to conceive "higher order" entities as constituted as classes of similar gignomena; these classes are called "Koinaden" (from the Greek "koinos" = "common"). In *Chaos*, Koinaden are renamed "quality classes", and they are defined as maximal classes of similar *Erlebnisse*. Already, Ziehen had recognized that, in order to avoid an infinite regress of gignomena, such as properties of gignomena, properties of properties of gignomena, and so on, one had to take the similarity concept as a primitive relational concept. That is to say, similarity was not explained further by referring to properties that similar gignomena had in common. This idea of conceiving similarity as a basic relational primitive is the core of the quasi-analytical constitution method. Ziehen took similarity as a primitive relational concept in the sense that two gignomena a and b are similar or they are not similar. At the beginning of the process of constitution there are no properties of gignomena that may serve as "carriers" of the similarity relation in that gignomena are similar if and only if they have a property in common.

Carnap renamed Ziehen's "Koinaden" "quality classes" and defined them precisely as maximal similarity classes.¹⁸ If the underlying similarity relation happened to be a transitive relation, then the resulting maximal classes are just equivalence classes. Thus, Ziehen's "Koinadenprinzip" of constituting (maximal) classes of similar gignomena, classes of classes of similar gignomena, and so on, may be understood as a generalization of the Frege-Whitehead method of constitution by equivalence classes. The following lengthy quote demonstrates that the basic idea of quasi-analysis was already present in *Chaos*:

We have disassembled the present experience in components due to the distinctions between "living vs. dead" and "finished vs. unfinished". We will call these components ... building blocks (*Bausteine*) because they are used for the construction (*Aufbau*) (of *Wirklichkeit*).

¹⁸A similarity structure (S, \sim) is given by a set S and a binary reflexive and symmetrical relation \sim on S, and a subset $T \subseteq S$ is a maximal similarity class (or similarity circle) if and only if it satisfies the following requirements: $\forall a, b, c (a, b \in T \Rightarrow a \sim b)$ & $(a \in T \Rightarrow a \sim c) \Rightarrow c \in T$). Informally, T is a maximal similarity class if and only if all elements of T are similar to each other, and if there is an element that is similar to all elements of T, then it is already an element of T.

We don't go further in the process of dismantling the present experience. Rather, we consider the building blocks as indivisible totalities, although they comprise everything that the later abstraction distinguishes as the seen, the heard, and so on, and also as the partial sounds of a tone, the color spots of a visual field and so on. We too have to arrive at these concepts, but rather than doing so by analysis, we do so by synthesis (*Aufbau*). For us, they are not parts of building blocks but classes of them that are constituted by certain relations that exist between the building blocks (Emphasis mine, TM).

In the *Aufbau*, this general schema of constitutional theory is simplified considerably and simultaneously elaborated in detail for the simplest remaining case. The "basic building blocks" are restricted to *Elementarerlebnisse*, and there is only one similarity relation. The objects of the next level are certain subsets of *Elementarerlebnisse* or similarity classes. Because the objects of this level are sets, a natural similarity relation can be defined by stipulating that two sets of *Elementarerlebnisse* are similar if and only if they have a non-trivial intersection. Obviously, this can be iterated, thereby enabling quasi-analytical constitutions on all levels.

Ziehen was content to invoke a general "Koinadenprinzip", according to which higher order objects were constituted from lower ones as "Koinaden" of similar elements whereby the underlying similarity relation was "somehow" defined by taking into account certain unspecified "continuities" and "discontinuities". Carnap, however, offered an apparently much more precise account of quasi-analytical constitution. In fact, he carried out only the constitution of the first (next to base) level in terms of relational logic. Then, he fobbed off the reader by noting that he was only interested in giving a sketch of how constitution might work and not in working out detailed chains of constitution. With respect to full-fledged constitutions of higher order objects, the reader is not much better off with the *Aufbau* than with Ziehen's *Erkenntnistheorie*. Both accounts are sketches interested mainly in the principal features of the method, not in elaborated applications.

In the part of Carnap's *Intellectual Autography* in which he addresses the origins of the method of quasi-analysis, Ziehen is not mentioned. In the *Aufbau*, Carnap addresses only the simplified version of the method rather than the more complex version that he had developed in the *Ur-Aufbau*:

I developed a method called "quasi-analysis", which leads, on the basis of the similarity-relation among experiences, to the logical construction of those entities which are usually conceived as components... (Carnap 1963, *Autobiography*, 16–17)

In the longer, unpublished account of the *Intellectual Autobiography*, one finds the following more detailed remarks on the origin of this method in 1922:

There was a heated debate on the question whether a momentary experience could contain sense-data as actual parts or not. Hertz declared actual components indispensable, while Lewin rejected them emphatically from the point of view of gestalt psychology. Reichenbach tried to reconcile the two sides by the conception that the controversy was largely a question of terminology. I tried to show that a certain method of logical analysis, which I called "quasi-analysis" did justice to the justified demands of both sides by preserving on the one hand the experiences as indivisible units and on the other hand, constructing certain complexes of experiences that correspond to the traditional components. (D21ff)

Ziehen is not mentioned, even though ‘constitution by quasi-analysis’ is merely a more precise version of the constitution by Ziehen’s “Koinadenprinzip” (cf. Ziehen 1913). As Joelle Proust, Nelson Goodman, and others have noted, quasi-analysis may be considered the most important formal innovation of *Aufbau*. (cf. Proust 1989; Mormann (1994), Leitgeb (2008), Mormann (2009)). Proust asserted, with good reasons, that:

the true interest in the *Aufbau* lies not in the example of a constitution system it offers but in the set of formal procedures that it is the function of the example to illustrate. (Proust (1989, 185))

The most important of these “formal procedures” is certainly the quasi-analytical constitution method. This, is not generally recognized, however. For instance, Carus (2007) and Rosado Haddock (2009) do not mention the issue of quasi-analysis at all. This is certainly a loophole; in the opening paragraphs of the *Aufbau*, in which Carnap explained the aim of the work (“a constitutional system of concepts” (§1)), the meaning of “constitution” (§2), and the method to be employed (“the analysis of reality with the aid of the theory of relations” (§3)), he left no doubt that he considered the issue of “method” to be of utmost importance. Moreover, he was convinced that the *Aufbau* would make an important contribution in this area:

... [T]he reduction of “reality” to the “given” has in recent times been considered an important task and has been partially accomplished, for example, by Avenarius, Mach, Poincaré, Külpe, and especially by Ziehen and Driesch (to mention only a few names). The present study is an attempt to *apply the theory of relations to the task of analyzing reality*. (*Aufbau*, §3)

This quotation exhibits an interesting strategy for emphasizing the importance and novelty of the *Aufbau*’s method. First, quite a few predecessors are named, suggesting that many more could have been named. This move implicitly devalues and/or relativizes the philosophical originality and value of their work. All existing approaches are then characterized negatively as lacking an essential feature, which is, unsurprisingly, a strategy of Carnap’s devising.

A closer look at Ziehen’s *Erkenntnistheorie* reveals, however, that things are more complex in the case of quasi-analysis. Ziehen is not simply a predecessor, he does offer a relational description via a basic similarity relation between the basic elements of his system (i.e. gignomena). What Ziehen’s system distinguishes from a constitution system à la *Aufbau* is a precise characterization of the “Koinaden” as “quality classes”, i.e., as maximal similarity classes with the help of relational logic.

Let us take stock and summarize the senses in which *Chaos* goes beyond Rickert’s *System*, Ziehen’s *Erkenntnistheorie*, and Russell’s *Our Knowledge of the External World*:

- Rickert’s vague proposal that the emergence of order is based on valuational principles is replaced by a more precise description of order generation by quasi-analytical constitution based on a similarity relation.
- Ziehen’s conceptual apparatus is simplified and cast into a form that is suited to applying the calculus of relational logic. The vaguely-characterized *Koinaden* are replaced by precisely defined quality classes.

- *Chaos* goes beyond Russell's programs by applying the apparatus of relational logic in a concrete and specific way to similarity structures, instead of providing only general programmatic recommendations.

Values in the *Aufbau*

In the preferred constitutional system of the *Aufbau*, the world is constituted as a structure consisting of four layers of objects: autopsychological, physical, heteropsychological, and cultural objects (cf. *Aufbau*, Summary, pp. 241/242). Most interpretations of the *Aufbau* have concentrated on the constitution of the autopsychological and the physical, whereas the higher layers of the heteropsychological and the cultural have generally been ignored. I do not feel this is justified. Even if the constitutions of the higher layers are sketchy, they shed interesting light on the internal history of Carnap's *Aufbau* project. They demonstrate that at least in the beginning the *Aufbau* project aimed at the constitution of a world that understood physical objects not only as logical constructs from sense data but also as cultural objects, thereby rendering it a meaningful world in a comprehensive sense.

Among so-called cultural objects, particularly one finds values (§ 152). Although they belong to the fourth constitutional level of the system, their constitution is based on items belonging to the lowest level of the constitutional system, namely *Elementarerlebnisse* of a special kind:

The construction of values from certain *Erlebnisse*, namely *Werterlebnisse*, is in many ways analogous to the construction of physical things from "perceptual experiences" ... For the construction of ethical values, for example, we must consider (among others) experiences of conscience, experiences of duty or of responsibility, etc. For aesthetic values, we take into account experiences of (aesthetic) pleasure or other attitudes in the appreciation of art, experiences of artistic creation, etc. The particular nature of the value experiences of the different value types is investigated by the phenomenology of values... (*Aufbau*, § 152).

This programmatic passage is clearly inspired by Rickert's *Wertphilosophie* and Husserl's *Phänomenologie*. Without doubt, the constitution of values originally belonged to the core of the constitution program. Carnap considered it to be essential for constitution theory in general that this was the case, regardless of the specifics of a constitution system. He explicitly noted that values could be constituted not only for constitution systems with an autopsychological basis but also for systems with a physical basis, a point allegedly shown by Ostwald's "energeticist" *Werttheorie* (cf. *Aufbau* § 59, Ostwald (1913)).¹⁹

¹⁹Carnap was at pains to ensure that values could be constituted for all kinds of constitution systems, not only for autopsychological ones but also for physicalist ones. This demonstrates that at least until 1925, the constitution of values was very important to him,:

It could seem to be an open question whether in a constitutional system with physical basis there is room for the domain of values. This doubt, however, has been removed by Ostwald [Werte] with his derivation of values of several types upon a basis of energetics ... From a

Nevertheless, in the published version of the *Aufbau*, Carnap's vigorous defense of a two-tiered constitution of values was already showing cracks as evidenced by the strange "pseudo-reference" to Rickert in the §42 of the *Aufbau*. This paragraph is labeled "can be omitted", as if Carnap wanted to avoid mentioning Rickert at all costs:

Fundamentally, the difference between being and holding, of which so much has been made in recent philosophy, goes back to the difference between object spheres, more precisely, to the difference between proper objects and quasi objects. For, if a quasi object is constructed on the basis of certain elements, then it "holds" for these elements; thus, it is distinguished as something that holds from the elements which have being. ...

Despite his dismissive attitude towards "the difference between being and holding, of which so much has been made in recent philosophy", Carnap boasted that he had gone beyond Rickert:

Construction theory goes beyond the customary conception of being and holding by claiming that this contrast does not arise only once, that there is only one boundary between being and holding, but that this relationship, constantly repeated, leads from level to level... Hence, the concepts being and holding are relative and express the relation between each constitutional level and the succeeding one. (§ 42)

In an almost Hegelian style, he then concluded that "construction theory explicated the logically strict form of the dialectic of the conceptual process" (*ibid.*).

In 1928, this interpretation of the quasi-analytical constitution as a kind of valuation in the style of Rickert was already on the verge of being abandoned, as evidenced by the "can be omitted" label on §42. However, around 1925, in an earlier phase of the *Aufbau*, "quasi-analyzing as valuating" was an integral part of the "logic of constitution forms". This is evidenced by the unpublished manuscript *Entwurf einer Konstitutionstheorie der Erkenntnisgegenstände* (Carnap 1925, RC 081-05-02) in which "Sein und Gelten" appears as one among twelve sections of the chapter *Die Logik der Konstitutionsformen*.

The precarious situation of values in the later *Aufbau* project should not simply be interpreted as if Carnap was moving from a cognitivist to a non-cognitivist ethical standpoint. Rather, by denying them the status of objects of a constitutional

philosophical standpoint, it must be admitted that there is a methodological justification and fruitfulness, not only for the experiential "phenomenological" but also for the energetic derivation of values. (We shall employ the phenomenological method in the outline of our constitutional system, cf. § 152. The decision between the two is not a question of validity but one of system form; the difference lies merely in the way in which the problems are posed and the concepts constructed. Science as a whole needs both theories to exhibit both directions of logical reducibility, just as it needs a behavioristic as well as an introspective psychology; in general, it needs both an experiential and a materialistic derivation of all concepts. (*Aufbau*, §59).

This project of the constitution of values left no trace in Carnap's later work. This is not to say that the issues of values and valuations did not occupy him till the end of his career; see the discussions with Morris and Kaplan on this topics in Carnap (1963).

system, Carnap denied values a rational status in a broader sense. Values were no longer considered worth of being explicated in a rational way.

Values were only one type of cultural object that originally belonged to the realm of objects constituted in the *Aufbau*. For the constitution of cultural objects such as habits, manners and similar manifestations of the “objective spirit”, Carnap relied on Wilhelm Dilthey and, in particular, on Hans Freyer’s *Theorie des objektiven Geistes* (Freyer 1923). Indeed, Carnap’s readiness to accept cultural objects (and possibly other types of objects, see §162 of the *Aufbau*) as an independent class of objects of constitutional systems shows that, at least for some time, he subscribed to a liberal ontological pluralism according to which the traditional dualism, which recognized physical and psychological objects, remained incomplete:

The philosophy of 19th century did not pay sufficient attention to the fact that the cultural objects form an autonomous type. The reason for this is that epistemological and logical investigations tended to confine their attention predominantly to physics and psychology as paradigmatic subject matter areas. Only the more recent history of philosophy (since Dilthey) has called attention to the methodological and object-theoretical peculiarity of the area of cultural science. (*Aufbau*, §23)

The only, rather sketchy, example of the constitution of a “primary cultural object” Carnap gives in the *Aufbau* is the constitution of the “custom of greeting through the lifting of one’s hat” (cf. *Aufbau* § 150). This example and many of the concepts for describing the envisaged constitution of cultural objects were taken from Freyer’s *Theorie des objektiven Geistes* (Freyer 1923) (cf. 54–55).²⁰

The project of the constitution of cultural objects was abandoned after 1928, although it is not clear why. One reason may be that the friendship between Carnap and Freyer dissolved in the late 1920s, most likely due to political differences.²¹ Be that as it may, by 1932 the concept of “objective spirit” had changed for Carnap from a decent concept that could be constituted by the method of “manifestation” (as a variant of quasi-analysis) to a metaphysical pseudo-concept:

[Sciences such as sociology] often in their present form contain pseudo- concepts, viz. such as have no correct definition, and whose employment is based on no empirical criteria; ... such (pseudo-)concepts cannot be reduced to the given, are therefore void of sense. Examples: “objective spirit”, “the meaning of history”, etc. (Carnap 1934, 73)

Carnap never provided an argument for this thesis. One might speculate that he did not mean Freyer’s “objective spirit” but its “obviously” metaphysical Hegelian namesake. This interpretation is implausible, however, because Carnap took “objective spirit” as a sociological rather than a philosophical concept. The fact that Freyer

²⁰ Freyer suggested a close parallelism between Carnap’s *Aufbau* of the objective world of physical objects and the constitution of the objective world of cultural objects constituted in the course of history. He considered his account, which he described as a systematic “Kulturphilosophie” as a kind of complement to Dilthey’s *Aufbau der geschichtlichen Welt in den Geisteswissenschaften*“ (Freyer (1923, 10, 11)). Freyer literally aimed at a “structural theory of the *Aufbau* of the cultural world”, i.e., a structural theory of the world of cultural objects (ibid.).

²¹ Freyer moved politically to the extreme right in the immediate neighborhood of National Socialism (cf. Muller 1987).

had been appointed to the newly established first chair of sociology at a German university in 1925 (in Leipzig) should remove any doubts that the “objective spirit” addressed above was Freyer’s.

In summary, one might say that in the early phases of the *Aufbau* project Carnap opted for a “comprehensive scientific philosophy”. According to this philosophy, not only empirical facts but also values and other cultural objects belonged to the ken of scientific philosophy. Around 1930, Carnap must have come to the conclusion that this program was not feasible. From then on, he favored a “restrictive scientific philosophy”, according to which values dropped out of the realm of reason and were no longer considered respectable objects of study for scientific philosophy. Instead, they were relegated to the realm of poetry, music and other non-rational endeavors through which one could express *Lebensgefühl*. Consequently, scientific philosophy was restricted to philosophy of science in a narrow sense.

The original balance between the domain of irrational *Lebensgefühle* and the domain of concepts that could be rationally constituted became unstable around 1928, and the border between the two domains shifted. The territory of values, which once had belonged to the domain of constitution, was occupied by irrational *Leben*. The neo-Kantian constitutional projects were tacitly given up. Values, phenomenological constitutions, and other cultural objects disappeared from the agenda of constitution theory.²²

This move did not mean that Carnap had lost interest in the “value-laden” issues of society, culture, and politics. To the contrary, Carnap’s political commitment to the Vienna Circle, the *Ernst Mach Society*, the *Bauhaus* and similar institutions reached its peak in the early 1930s. However, his commitment was based on his *Lebensgefühl*, it was not based on the results and methods of scientific philosophy.

The expulsion of values and other cultural objects from the realm of constitution theory led to a strict separation between the domains of *Leben* and *Geist* that replaced their originally envisaged polarity. By eliminating values from the realm of objects, which can be constituted, an explicit and rational discussion of these issues fell outside the realm of rational discourse. Values, valuation, and related concepts no longer belonged to the realm of respectable philosophical topics. Instead, they were relegated to implicit and intuitive decisions dependent on one’s *Wertgefühle*.²³

²²For the later Carnap’s means of dealing with values see Carnap (1963), Kaplan (1963), and Mormann (2006).

²³This is not to say that Carnap’s account of values and valuations in the *Aufbau* were satisfying in any sense: A telling example is Ostwald’s “energetic” constitution of values. Carnap mentioned Ostwald’s approach as a successful “physicalist” constitution, although Max Weber had already, in 1909, launched a devastating critique of Ostwald’s “energetic Kulturtheorie” (which included the theory of values) (cf. Weber (1909)). Similarly, Carnap’s meager remarks on a “phenomenology of various kinds of values” (*Aufbau*, §152) cannot be considered a full-blown theory of values and valuations. But, at least, these spurious remarks left open the possibility of further development.

Concluding Remarks

Carnap's descriptions of his philosophical influences are not always reliable. This is particularly true of his formative years in Jena, Freiburg, and Vienna. His volatile attitude in the 1910s and 1920s towards the various currents of neo-Kantianism, phenomenology, and other philosophical currents, later characterized as "continental", such as *Lebensphilosophie*, are not fully understood. The evolution of his thought did not always follow the straight paths he described in his *Intellectual Autobiography*.

Over the years, the radical rhetoric of his early years was replaced by more sober language. The impact of *Lebensphilosophie* is mitigated, although it did not fully disappear. The Nietzsche/Vaihinger "fictitious constitution of an ordered world out of chaos" (*Chaos*, 1) became in the *Aufbau*: a "rational reconstruction of reality..." (*Aufbau*, §100). Traces of chaos, however, survived in the new context. For instance, in the preface of the *Aufbau*'s first edition, Carnap described the basic orientation of the *Aufbau* and related work of his fellow logical empiricists in Vienna as marked by an attitude:

which demands clarity everywhere, but which realizes that the fabric of life can never be quite comprehended. (*Aufbau*, xvii)

This can be read as the implicit claim that *Leben* could not be completely subordinated to rationality. Rather, *Leben* and *Geist* were to remain two independent spheres, and more generally, the *Aufbauer* recognizes the "existence and importance of the remaining, irrational spheres ...".²⁴

Interpreting the *Aufbau* project as an attempt to overcome the specifically Weimar polarity of *Leben* and *Geist* suggests that it is important to take into account its quite specific historical, cultural, and philosophical context when attempting to understand the *Aufbau*.

A localized interpretation on this basis has the advantage of viewing the *Aufbau* project as one stage in Carnap's on-going philosophical development, which led, in the following years, to the partially realized program of *Einheitswissenschaft*. Carnap's reconciliatory intentions in the *Aufbau* project, which aimed at a peaceful and fruitful co-existence between *Geist* and *Leben* (cf. §181ff and *Manifesto* p. 30).

The task of contributing to the improvement of life remained on the agenda of the Vienna Circle until its dissolution (cf. Romizi (2012)), although not even the most ardent partisans of Vienna logical empiricism can claim that it was overly successful in this endeavor. Does this mean that, all in all, the *Aufbau* program should also to be considered as a failure? I do not think so.

One of the best arguments for a more optimistic assessment remains the one put forward by Goodman long ago:

²⁴ See, for instance, the approving quotation from the *Tractatus* on the last page of the *Aufbau* (§ 183): "We feel that even if all possible scientific questions be answered, the problems of life have still not been touched at all. Of course, there is then no question left, and just this is the answer. "(*Tractatus*, 6.52).

The *Aufbau*, for all its fragmentary character, and for all its defects, is still one of the fullest examples we have of the logical treatment of problems in non-mathematical philosophy. But its significance in the long run will be measured less by how far it goes than by how far it is superseded.

...

The *Aufbau* cannot yet, however, be relegated to the status of a monument having purely historical interest. Its lessons have not been fully enough learned. (Goodman 1963, 588)

The essential point of this argument is Goodman's insight that the *Aufbau* was one of the first (and fullest) "examples we have of the logical treatment of problems in non-mathematical philosophy". I would put the accent in a slightly different way by saying that the *Aufbau* offers some highly interesting examples of the mathematical treatment of non-mathematical problems in philosophy. To put it bluntly, the *Aufbau* is an early example of a mathematical philosophy, i.e., a philosophy that employs qua philosophy methods (and results) of mathematics.

Contemporary interpretations of the *Aufbau*, however, usually shy away from the task of dealing in detail with the mathematical aspects of this work. According to many theorists, Goodman finished with the issue of quasi-analysis once and for all. There are few exceptions, such as Proust (1989), Leitgeb (2008), and Mormann (1994, 2009).

Goodman's thesis invites us to reverse the perspective on "influences". Instead of considering influences as solely connections to the past, one may ask what influence the *Aufbau* may have on the future development of philosophy. Indeed, this may be the more interesting half of the task of determining the "influences" on a philosophical work. Arguably, the most promising candidate for such an influence on future philosophy is the quasi-analytical method, notwithstanding the fact that, for a long time, quasi-analysis was considered one of the Carnap's many ingenious projects that had been definitively shown not to work. The key witness for this claim was (and sometimes remains) Goodman's criticism of the method (Goodman 1951, chapter V).

Proust (1989) is most likely the first paper in which the definitiveness of Goodman's verdict is put into doubt. Since then, other authors have argued that quasi-analysis is not the dead horse Goodman would have us believe (See e.g., Mormann (1994), Leitgeb (2008), Mormann (2009)). A promising strategy in this endeavor is to show that the method of quasi-analysis is not restricted to the simplistic version discussed in the *Aufbau*. In 1923, Carnap had already presented, in *Die Quasizerlegung – Ein Verfahren zur Ordnung nichthomogener Mengen mit den Mitteln der Beziehungslehre*, (Carnap 1923, RC-081-04-01), a sophisticated version of quasi-analysis that overcame many of the allegedly insurmountable difficulties that Goodman, and other critics, had put forward. In pursuing the task of updating the quasi-analytical method, it is necessary to use formal means taken from a variety of mathematical theories. The resulting mathematical philosophy, modeled on Carnap, may differ considerably from traditional Carnap exegesis, but this need not be a disadvantage.

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Carnap and Phenomenology: What Happened in 1924?

A.W. Carus

When Carnap first sketched out the *Aufbau* program, in early 1922, the observational *basis* of the system was developed phenomenologically. The logical construction of qualities by quasi-analysis only picked up from there; there was no attempt to apply logic directly to subjective sensation itself, as in the published book.¹ In the early phase (1922–1924), Carnap distinguished a fixed “primary world” of immediate experience, delineated phenomenologically, from the various “secondary worlds” (or “realities”) that could be constructed by quasi-analysis on this fixed basis.

Sometime during 1924 there was a drastic change of course. The distinction between primary and secondary worlds was dropped; Carnap decided that the two-dimensional primary world was every bit as constructed as the secondary worlds, so could not be distinguished as “primary” or more authentically immediate.² (In the terms of *Der Raum*, then, this is the point where intuitive space departs from the stage, leaving only formal and physical space.)³ At Carnap’s job talk for Vienna, in January 1925, we find a new fundamental principle: “Overcoming Subjectivity

¹See more detailed discussion in Carus (2007), pp. 148–54, 160–77. In what follows, archival references are abbreviated as “ASP” or “UCLA”; see bibliography below for list of cited archival items from each source.

²Carnap 1928a, §124; further discussion of this passage and the elimination of the “primary/secondary world” distinction in Carus (2007), pp. 170–71.

³“In the constitution system the peculiar quality of spatiality, though such an essential feature of the external world in experience, makes no appearance *as* a quality, any more than other qualities do: colors, pitches, feelings, etc. For the constitution system concerns itself only with the structural, which in the case of space means only with the formal features of this configuration. But nothing knowable, i.e. conceptually capturable, is thereby lost to the constitution system. For the non-structural cannot, according to the thesis of constitution theory, be the object of a scientific statement.” (Carnap 1928a, §125).

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[*Überwindung der Subjektivität*]” as well as a new emphasis on “Unity of the Object Realm [*Einheit des Gegenstandsbereichs*]” (ASP 1925b). And the published book (largely written in 1925) took that route, of course; Russell’s “construction principle,” as Carnap called it, became the book’s motto.

Why this abrupt change in the book’s basic approach? There is nothing obviously unstable or inconsistent about applying quasi-analysis to a phenomenologically derived basis. After all, the published *Aufbau* remained inhomogeneous, too: the ascent from two to three dimensions remained a transition from explicit definitions to constrained optimization, just as in the 1922 version, and contrary to the program announced in the opening pages. So couldn’t the basis have received a different treatment as well?⁴

This paper will begin by reviewing the direct evidence available for Carnap’s change of mind, but that will turn out to be rather limited. So the next step is to situate the question in the larger context of Carnap’s development in the early 1920s. In particular, it will be useful to distinguish the constructive role of subjective consciousness in the two main traditions he drew on, as represented by Husserl and Russell. The outcome of Carnap’s 1924 abandonment of phenomenology was, perhaps somewhat surprisingly, not to *drop* Husserl in favor of Russell. Instead he effected a quite original synthesis between them—while rejecting *both* their larger philosophical projects. Moreover, this synthesis outlasted the immediate context of the *Aufbau* and became the central underlying motif behind the principle of tolerance in the early 1930s and thus of Carnap’s entire later philosophy.

The Evidence

Carnap evidently discovered Husserl sometime in 1920, soon after the master’s-level dissertation on geometry he wrote early that year and a few months before he submitted his doctoral dissertation *Der Raum* late that year.⁵ The earlier dissertation, essentially a first draft of *Der Raum*, is more single-mindedly Kantian, with no mention of Husserl, while *Der Raum* introduces *Wesenserschauung* as a more precise specification of the Kantian “intuition” underlying intuitive space (in the earlier dissertation it had been called “pure” space—the object of pure intuition). Regarding the axioms of intuitive space, Carnap writes:

Experience does not supply the justification for them; the axioms are independent of experience. More precisely, they are independent of the “quantity of experience” (as Driesch puts

⁴The first extensive published discussion of the *Aufbau*, Kaila’s (1930) book on the Vienna Circle, in fact suggests precisely that, though Kaila was probably unaware that this had been Carnap’s starting point a few years earlier.

⁵The earlier 1920 dissertation on geometry (UCLA 1920) is described in some detail in Carus (2007), pp. 109–15; it is compared with *Der Raum* on pp. 127–38. Carnap’s encounter with phenomenology is discussed there on pp. 129–131 (also pp. 148–53); the present paper supercedes that discussion in certain respects.

it), i. e. knowledge of them does not, as in the case of empirical statements, become progressively more secure with repeated experience. For as Husserl has shown, this is not a question of facts in the sense of empirical reality, but rather a question of the essence (“*eidos*”) of certain items given to us, which can be immediately grasped in its qualitative being even from a single instance. So just as I can determine from a single perception (even an imagined perception) of specific shades of dark green, blue, and red that the first resembles the second more closely than the third, so I discover when imagining spatial figures that a number of curves go through two points, that on any such line there are additional points, that a simple line segment—unlike a surface—is separated into two segments by a point lying on it, and so on. The particular fact is not what we are focussed on here, so it is not e.g. the shade of color seen here and now that we are after, but only its atemporal character, its “essence.” So it can be important to distinguish this kind of grasp from intuition in the narrower sense, focussed on the fact itself, by calling the former “immediate grasp of essences” (in Husserl’s sense) when confusion seems possible. In general, though, the term “intuition” can include immediate grasp of essences, as it has been customary since Kant to use it in this broader sense. (Carnap 1922, pp. 22–3)

It seems clear that the phenomenological terminology has been imported here to serve a specific, defined purpose within what remained an essentially (if minimally) Kantian framework.⁶ Carnap’s larger philosophical aims in *Der Raum* (as in the earlier dissertation), however, have little in common with Husserl’s agenda⁷; there is no evidence for the suggestion (e.g. Haddock 2008; Stone 2010) that Carnap was a follower or disciple of Husserl at this point. The eidetic reduction of *Ideas* is prominent in *Der Raum*, for instance (as in the quotation above), but the phenomenological reduction is hardly in evidence. Husserl was grist for Carnap’s mill, as were Driesch, Vaihinger, Natorp, Cassirer, Poincaré, Dingler, and many others. Carnap makes no attempt to develop any space conception immanently even along

⁶The note to the beginning of section IV may appear to be an exception, as Carnap here seems indirectly to endorse Husserl’s ontological categories or “regions” (nature, subjectivity, culture): “*Die Lehre vom R—vom R’—vom R’’* als Fall des allgemeineren Wissenschaftsverhältnisses: „*formale Ontologie—regionale Ontologie—Tatsachenwissenschaft*“, so Husserl [*Logical Investigations, Prolegomena*] 30 f., 111 f., [*Ideas*] 221 ff. . . . 248 ff. (hier ist aber die irrige, für den Gedankengang der ausgezeichneten Darlegung jedoch nicht wesentliche Auffassung zu beanstanden, daß ‘unser Raum der Erscheinungswelt’, also wohl R”, unbedingt als euklidisch anzusehen sei).” (Carnap 1922, p. 85) However, this remark can just as well be seen as a further use of Husserl to refine the basic Kantian notions of intuition and concept, in this case to distinguish two kinds or stages of “intuition” and make room for the “primary world” (i.e. of the unformed *Tatbestand*), which as he points out elsewhere “neo-Kantian philosophy does not recognize,” as its view that “the forms of second-stage experience are necessary and unique prevents it from grasping the difference between the primary and the secondary world.” (Carnap 1924, p. 108 [written in 1922; see section “Two Conceptions of Subjective Consciousness” below])

⁷While there are interesting shifts in emphasis between the first (Husserl-free) and second (Husserl-laden) dissertations (more detailed comparison in Carus 2007, pp. 127–38), there is hardly a difference in the basic philosophical position; the conclusions are worded almost identically (ibid., pp. 135–6). One difference worth mentioning is that Kantian pure intuition seems still to have played a residual role in the earlier dissertation (ibid., p. 110), though Carnap carefully sidesteps a commitment to either Kant on the one hand or the Marburg conception on the other with respect to this issue. So Husserl probably played a role in Carnap’s further articulation of the “primary world” idea (not yet called by that name in *Der Raum*).

Poincaré's lines, let alone Husserl's.⁸ Even the axioms of intuitive space are obtained top-down, by starting with Hilbert's and limiting them to what might seem intuitively discernable, rather than bottom-up from immediate space perception, as Husserl proceeds in the *Ding und Raum* lectures and in his outline of a "Systematische Raumkonstitution" from 1916 to 1917.⁹

Carnap's deeper engagement with phenomenology began, rather, with the *Aufbau* project. A page of notes from about the time he first encountered Husserl's writings, in mid-1920, indicate that he had already assimilated the idea that pure sensation is not an intentional relation.¹⁰ In his first sketch of the *Aufbau* system in mid-1922, Carnap evidently just took for granted that there was no alternative to phenomenology,¹¹ and indeed the whole project of "constitution" has characteristically Husserlian overtones.¹²

But we should beware of reading any philosophical conviction into even this more deliberate use of phenomenology. Carnap appears quite early to have had an attitude of philosophical indifference, and to have regarded the different philosophical "languages" he found himself talking to different friends in as *façons de parler*, requiring nothing like ontological commitment, or indeed *any* sort of commitment. He had learned to communicate quite well in some of these languages, but did not take any of them at face value:

I was surprised to find that this variety in my way of speaking appeared to some as objectionable and even inconsistent. I had acquired insights valuable for my own thinking from philosophers and scientists of a great variety of philosophical creeds. One day a friend seemed somewhat disturbed by some formulations which sounded to him positivistic or even materialistic. I told him that indeed my conceptions about the foundations of science, especially mathematics and physics, were strongly influenced by physicists like Kirchhoff, Boltzmann, Mach, etc., but on the other hand, also by neo-Kantians like Natorp and

⁸ It is striking that in this respect the Carnap of 1920, despite his considerable debt to Poincaré, followed the Marburg school (e.g. Natorp 1910) rather than the much more bottom-up construction of our intuitive conception of space described in Part II of *Science and Hypothesis* and spelled out more precisely in Poincaré (1898).

⁹ Husserl (1973); see also the discussion of this approach to the constitution of space in Claesges (1964)

¹⁰ "Bei einigen der Erlebnisse kann ich statt ihrer selbst eine Seite an ihnen betrachten: ihr "Objekt". (Also nicht 'intentionale Beziehung'); diese Erlebnisse heißen 'Vorstellungen'." (ASP 1920a) Cf. *Ideas* I, e.g. "über jenen sensuellen Momenten [liegt] eine gleichsam 'beseelende' *sinngebende* (bzw. *Sinnggebung* wesentlich implizierende) Schicht. ... durch die aus dem *Sensuellen*, *das in sich nichts von Intentionalität hat*, eben das konkrete intentionale Erlebnis zustande kommt." (*Ideen* §85; cf. *Logical Investigations* V §15(b) and Mulligan (1995, p. 182).

¹¹ Elsewhere, he makes this explicit. In a summary of his planned talk at the Erlangen conference, written in Mexico in the autumn of 1922, Carnap wrote: "Um die Wirklichkeit strukturell nachzubauen, ist von einer (möglichst kleinen) Anzahl undefinierter Grundbegriffe, *deren Inhalt nur durch phänomenologischen Hinweis anzudeuten ist*, und von Grundbeziehungen zwischen solchen auszugehen, und dann sind in stufenweisem *Aufbau* in Gestalt von Definitionen mit den Mitteln der Beziehungslehre und der reinen Strukturlehre die weiteren Begriffe von Erkenntnisgegenständen zu bilden." (ASP 1922e, part (c), my emphasis)

¹² The *locus classicus* is *Ideas* II; cf. e.g. Sokolowski (1964), Mohanty (2011, Part I), and Rang (1990).

Cassirer. When he asked me which philosophical position I held myself, I was unable to answer. (UCLA 1957a, p. E20; corresponds to Carnap 1963, p. 17)

The friend turns out to have been Wilhelm Flitner,¹³ and the reported conversation (which took place on a holiday in the Austrian Alps in August 1924) turns out to have been a little more of a serious turning point than Carnap here lets on. That was the point, he writes 30 years later, “where it perhaps first became clear to me that there was a serious problem here.”¹⁴ It is possible that this was also, accordingly, the point where Carnap began to become more self-conscious about his use of phenomenological language. It was a revelation to him, apparently, to discover, after thinking about it for a while, that it simply *didn't matter* to him which of the philosophical languages he used. He decided, therefore, to use several different ones in his exposition of the *Aufbau*.¹⁵ Interestingly, however, he stresses that the language of symbolic logic is “neutral” among these options. Unlike the others, it suggests no misleading implications beyond the language itself. We will come back to that.

It does seem as if this Alpine conversation with Flitner in August 1924 catalyzed Carnap's rejection of ontology and made it self-conscious. In the pre-1925 *Aufbau* fragments, there is no explicit discussion of the unity or disunity of the universe of discourse, the class of elements or “building blocks [*Bausteine*]” (ASP 1922b) of the primary world, which in turn provides the fixed foundation for all the secondary worlds. And as we will see in more detail in the next section, there was actually room in the 1922 version of the *Aufbau* system for different articulations of the *Bausteine* for physical science on the one hand and psychology on the other. In January 1925, his Vienna job talk, by contrast, opens with a “first thesis” that there is “*Only one object realm* [universe of discourse]. All objects are complexes of the same basic elements.”¹⁶ And the title he gave his talk was “Gedanken zum Kategorienproblem. Prolegomena zu einer Konstitutionstheorie.” Of the multiple ways entertained in the *Aufbau* of reconstructing the Kantian (or Aristotelian) idea of “categories” (Carus 2007, pp. 173–7), he has now evidently settled on the solution, consistent with his flight from ontology, of identifying “category” with “basic relation,” as in the published book (§83), and had already embarked on the attempt to reduce the number of basic relations to a minimum, reinforcing the unity and

¹³Carnap makes this explicit in his original shorthand notes for the autobiography (UCLA 1956b, p. E6). Flitner was a member of the same Youth Movement group as Carnap when they were both students in Jena before 1914; see Carus (2007), esp. Ch. 1 and 3.

¹⁴“wo mir vielleicht zum ersten Mal klar wurde, daß hier ein ernstes Problem lag.” (UCLA 1956b, p. E6)

¹⁵“Sehr langsam, im Laufe der drei folgenden Jahre, wurde mir dann klar, daß *meine Denkweise neutral war gegenüber den traditionellen philosophischen Kontroversen*: Realismus-Idealismus, Nominalismus-Platonismus (Realismus der Universalien), Materialismus-Spiritualismus, usw. Und schließlich kam ich zu dem Beschluß, die verschiedenen Sprechweisen nebeneinander anzuwenden, so daß jeder die Beschreibung in der ihm geläufigen Sprache finden könnte.” (UCLA 1956b, p. E7)

¹⁶“Nur *ein Gegenstandsbereich*. Alle Gegenstände sind Komplexe derselben Grundelemente. Bisherige Gegenstandsarten; Probleme.” (ASP 1925a)

homogeneity of the *Gegenstandsbereich*.¹⁷ This new emphasis, in turn, reinforcing the elimination of ontology, must have played a role in the decision to drop the phenomenological description of the basis, which would have looked, in this new light, too much like an ontologically motivated partition of the universe of discourse.

What about Carnap's direct contacts with Husserl's circle during these years? In Carnap's diaries for 1920–1922, Husserl appears not to be mentioned. Carnap was in contact with Moritz Geiger, and invited him to the 1923 Erlangen conference,¹⁸ but there is no correspondence with him in Carnap's *Nachlaß* and I have found no references in other documents. Insofar as there was any direct, personal mediation of Husserl's ideas it seems to have come via Bernhard Merten, the founding director of the Freiburg *Volkshochschule* and, during this period, quite a close friend of Carnap's. Merten evidently had a strong background in mathematics,¹⁹ and sympathized at least to some degree with Carnap's philosophical efforts during this period; when Carnap organized the first meeting of "scientific philosophy" in Erlangen in 1923 with Reichenbach, one of the more technical position papers he wrote for the conference listed Merten as co-author (ASP 1922e).

In any case, it seems unlikely that Carnap had any direct contact with the Husserl circle before 1923, for when Carnap first begins to mention Husserl in his diary for November of that year, it sounds very much like a first introduction; he goes to a lecture, doesn't like it very much (ASP 1923b, 13 November). Then Merten tells him about Husserl's seminar, and Carnap decides to ask Husserl's permission to join it (ASP 1923b, 17 November). Husserl gives permission, but impatiently brushes off Carnap's request to discuss his own projects; "it's all in my lectures," he says to the bewildered Carnap, leaving him standing in a hall doorway (ASP 1923b, 21 November). Carnap studies Husserl's books in preparation for the seminar (ASP 1923b, 20 November), and begins to take an active part, e.g. with a seminar presentation on quasi-analysis (ASP 1924b, 23 January). At a tea for his students soon afterwards, Husserl sits across from Carnap and they exchange pleasantries (ASP 1923b, 25 November).²⁰ Of perhaps greater moment, in January 1924 Merten began

¹⁷The system presented in Vienna in January 1925 still had five basic relations (this must be the version Carnap refers to in *Aufbau* §83 as the "earlier sketch of the constitution system"), but it is likely that the reduction of those five to a single one (described in §83) was arrived at soon afterwards.

¹⁸Geiger was unable to attend as he was abroad at the time of the meeting (ASP 1923a).

¹⁹Many years later he published a popular introduction to mathematics.

²⁰It was presumably during this initial period of Carnap's contact with Husserl, in late 1923, that he presented Husserl with an inscribed copy of *Der Raum*: "Herrn Geh.-R. Prof. Edmund Husserl in dankbarer Verehrung überreicht v[om] V[erfasser]," which Husserl does appear actually to have glanced at, since there is a note "Beispiele, S. 49 ff." in his handwriting on the title page. There is no evidence that Husserl ever looked at Carnap (1924), let alone Carnap (1932), of which offprints with even more impersonal inscriptions from Carnap are in Husserl's papers. To judge by his library, Husserl does not appear to have looked at the *Aufbau* or any other of Carnap's writings, despite his harsh evaluation of Carnap in the later 1920s (see footnote 53 below). Thanks to Thomas Vongehr for providing this information from the Husserl Archive in Leuven.

hosting an informal circle that met in the evenings after Husserl's seminar, on "Erkenntnistheorie." These meetings were, at least initially, very intense and lively, and often went on late into the night. The other participants appear to have been mainly Husserl students; one was Ludwig Landgrebe (ASP 1924b, 17 January). Carnap's weekly trips to Freiburg for Husserl's seminar continued into late February of 1924, though the mentions of it are more and more perfunctory. The meetings on "Erkenntnistheorie" with Merten and the Husserl Circle seem to have continued somewhat longer, perhaps into April.²¹

Unfortunately there is nothing in the diaries that conveys what was going through Carnap's head during all these conversations and seminars. Husserl seems to have been a somewhat remote figure, and nothing in the interactions with him inspired much comment. Soon after he began to participate in the seminar, Carnap visited Husserl at home, but his only remark on their conversation is that Husserl "sees himself in the role of Galileo as the founder of scientific philosophy."²² It seems safe to conclude, however, that Carnap's more intense conversations with Landgrebe and other Husserl students acquainted him to some degree, at least, with the contents of *Ideas II* and *III*, and perhaps also Husserl's recent turn toward "genetic" (or hermeneutic) phenomenology (Welton 2000). It is also safe to conclude, given that he read *Sein und Zeit* soon after its publication, that Carnap heard in some detail about the directions phenomenology was being taken by Heidegger (including the word of mouth about the "secret king"), though Heidegger himself had just left for Marburg.

Nor is there any direct evidence in Carnap's diaries (or in any letters known to me) about why he decided to restructure the *Aufbau* system so radically in 1924. There are a few indications, though, that the change was not sudden, but gradual, and had begun some time before the encounter with Husserl's seminar. The paper on three-dimensionality and causality (Carnap 1924) had been conceived at the same time as the original *Aufbau* sketch. Carnap describes its "Grundgedanke" at this point (April 1922) as follows:

We construct the (3 + 1)-dimensional physical realm from the (2 + 1)-dimensional realm of the sense impressions.

This construction is completely free, bound only by principles of logic and simplicity.

It follows necessarily from this, though, that the physical world, insofar as its construction has followed certain rules, is determined not only by the (2 + 1)-dimensional realm of impressions, but also by some other (2 + 1)-dimensional realm, e.g. the state of the world at an instant.

²¹That there was extensive contact and discussion with Landgrebe, at least, is confirmed by Landgrebe himself; in 1932 he wrote to Husserl "Aber jetzt ist ja auch noch Carnap [in Prag], der trotz ganz anderer Einstellung die Phänomenologie doch schätzt und sich von seiner Freiburger Zeit wohl noch an mich erinnern wird. Ich habe damals viel mit ihm diskutiert." (Husserl 1994, vol. IV, p. 298, letter of 11 November 1932) Thanks to Thomas Vongehr for pointing out this passage.

²²"er sieht sich in Galileos Rolle als Begründer der wissenschaftlichen Philosophie." (ASP 1923b, 29 December).

*That means: causality only determines the physical world because we have artificially introduced a further dimension into it! The perceived world is not determined by laws!*²³

But although he sent the paper to the *Annalen* in June of 1922, and it was accepted in August (those were the days!), he obviously still had some doubts, and revised the paper after discussion with Merten, Broder Christiansen, and Karl Gerhards the following April, soon after the Erlangen conference, where the paper was available to participants, and perhaps discussed along with the 1922 *Aufbau* sketch (ASP 1924a). We don't know exactly what these revisions were. But we do know that the heavily underlined "Grundgedanke" of the original paper—with an idealistic ring compatible with *Ideas* (though also with *Vaihinger*), and incompatible with the basic Helmholtzian principle of empiricism (see footnotes 45 and 49 below)—is, at best, somewhat muted in the published paper.

By itself, this would be a rather ambiguous indication of a shift in Carnap's attitude toward phenomenology. More germane against this background, though, is a notable change in position between the construction of "reality" in the 1922 *Aufbau* sketch and the revised (published) version of the three-dimensionality paper. In 1922, a "scientific" reality is constructed on the basis of the "ordinary [*gewöhnliche*]" reality, which in turn is constructed on the basis of the given "primary world." In the published three-dimensionality paper, in contrast, a scientific reality is a separate *and parallel* construction directly from the "primary world." The earlier order corresponds more closely to Husserl's constitution of science in *Ideas* II, so perhaps the influence of phenomenology was already waning by the spring of 1923. Certainly the Erlangen conference, if nothing else, would have suggested to Carnap the feasibility of a very different kind of "scientific philosophy" from Husserl's (and the availability of a very different kind of reference group from the Husserl circle); over 30 years later, Carnap still remembered it as an exciting occasion, in which a movement of "scientific philosophy" came to self-consciousness (Carnap 1963, p. 14).

It is worth adding, perhaps, that 1924 marked a major caesura in Carnap's personal life. His mother died in January. She had been the dominant figure in his early life. It was with her that he had discussed intensely through the war years his increasing disillusion with the Lutheran church (which out of deference to her he eventually left only after the war ended) as well as his changing political views. Another personal shock for Carnap in 1924 was the increasingly evident disintegra-

²³"Aus dem (2+1)-dimensionalen Bereich der Sinnesempfindungen konstruieren wir das (3+1)-dimensionale physikalische Bereich.

Diese Konstruktion geschieht vollständig Wahlfrei, nur gebunden durch Prinzipien der Logik und Einfachheit.

Daraus folgt dann allerdings notwendig, daß die physikalische Welt, wofern nur die Konstruktion nach bestimmten Regeln erfolgt ist, bestimmt ist nicht nur durch das (2+1)-dimensionale Bereich der Empfindungen, sondern auch durch irgendein anderes (2+1)-dimensionales Bereich, z.B. durch den Zustand der Welt in einem [Augenblick].

D.h.: Die Kausalität herrscht nur dadurch in der physikalischen Welt, daß wir in diese künstlich eine weitere Dimension eingeführt haben! In der Welt des Wahrgenommenen herrscht keine Gesetzmäßigkeit! (ASP 1922a)

tion of his marriage (of 7 years). It is hard to believe that the two things together would not have made Carnap reflect on his life plans and ambitions, and perhaps see certain things in a different light, though the diary gives no explicit hints. All we can say, then, is that the materials were there for a basic change of attitude, but there is no direct evidence how or why the change came about.

Two Conceptions of Subjective Consciousness

So to understand Carnap's change of course in 1924, we have to look at the larger context of his development in the early 1920s. He began this period seeking to bridge the abyss between two mutually alienated, and in some ways deeply opposed, traditions: on the one hand, the specifically philosophical tradition since Descartes, which was largely humanistic, on the other hand the tradition of scientific skepticism (Husserl at the time of *Ideas* called it "naturalism," pretty much in line with our current usage). This distinction will be taken for granted here, without any attempt to make it precise, as both Husserl and Carnap took it for granted. The two traditions had sharply opposed conceptions of subjective consciousness for the purpose of constituting an objective system of nature from the subjective given. For naturalists, as e.g. for Russell, Avenarius, or Mach, it was pretty much taken for granted that subjectivity is, ultimately, part of nature, of which science gives us a larger and more systematic picture than any individual's collection of subjective experiences, however subtly analysed and articulated. For the Husserl side, post-1907 or so, subjectivity was to be taken seriously on its own terms, without any assumptions, beyond what it disclosed directly, about its "object."

This crude characterization of the abyss Carnap sought to bridge²⁴ will have to suffice here, except to point out a specific challenge facing those on the "naturalistic" side regarding their conception of subjectivity and its role in constituting an objective "external" world. Naturalists, in Husserl's sense, have mostly been empiricists of one sort or another. The difficulty facing these empiricist versions of naturalism has always been that ultimately we, as a species, can access "nature" only through subjective experience. So empiricist naturalisms are caught in a dialectical trap, from which they can only escape by (a) finding a principled way of isolating the specific sectors of experience or aspects of consciousness they need for achieving knowledge of "nature," and then (b) finding some reason for awarding cognitive

²⁴Carnap's own characterization was a bit more picturesque; he used the wartime metaphor of the officers at headquarters (the philosophers) vs. the troops in the trenches at the front (the scientists). The latter know that the maps used by the former are always out of date and often irrelevant, but are generally themselves in no position to provide better ones. Russell and Husserl are both singled out by Carnap as among those few who are now trying to overcome this chaotic situation (ASP 1920b). More detail on this characterization and Carnap's bridging aspiration more generally in Carus (2007), Ch. 3.

privileges to those sectors or aspects while denying them to the rest.²⁵ Let us call this problem the “Naturalistic Predicament.” Before Carnap, few empiricists (apart perhaps from Avenarius) had even taken it seriously, let alone attempted to address it systematically.

Carnap addresses it in the *Aufbau* by choosing his basis to serve the specific purpose of what he calls “erkenntnismäßige Primarität” (epistemic priority); the Machian or Humean starting points are disqualified on these grounds, for instance (§67), since the perceptual atoms they take as their basis are already abstractions from something epistemically further down, something more “ursprünglich.” Carnap has no problem at all, of course, with alternative bases *for other purposes*, but as long as epistemic priority is the purpose of the construction, *Ursprünglichkeit* is paramount. This strand of the *Aufbau* is obviously very much on the Husserl wavelength, and it is no accident that Carnap gave his project the Husserlian name of a *Konstitutionssystem*.

But there is, of course, another strand to the *Aufbau*—one that is inherently neither phenomenological nor “naturalistic,” but something quite different from, orthogonal to, the two opposed conceptions of subjective consciousness. This was the—very high-profile—structural component. It, too, was there from the beginning in 1922. In principle, it was compatible with both views of subjective consciousness, or either. Given Carnap’s acceptance of Fregean anti-psychologism, logic did not in any way depend on subjective consciousness; and this immunity of logic to Husserlian bracketing was further reinforced as Carnap’s conception of logic (and structure) took on a more Wittgensteinian form in the mid-1920s. But in conjunction with Carnap’s new repudiation of ontology in 1924, as we will see, the structural component of the *Aufbau* project became incompatible with Husserl’s purely immanent approach to constitution of the empirical world, and probably played a role in Carnap’s abandonment of it.

Even back in 1922, Carnap’s conception of *Wissenschaft* considered only structural properties to be “rational”—by which he meant capable of being identified and communicated “without reference to intuition [*ohne Hinweis auf Anschauung*]”. While pure and applied “Strukturlehre” were proposed as potentially fruitful not only for the theory of knowledge, but specifically for phenomenology (ASP 1922e), the explicit criterion of *Wissenschaftlichkeit* clearly excludes phenomenology:

Sensory intuition supplies the material of knowledge even in science, it is true, but the definition of every scientific concept is to be regarded as merely preliminary [*bloß vorläufig*] as long as it is not yet free of intuitive elements. ... The pure and applied theory of structures [*Strukturlehre*] therefore comprises the entire realm of (rational) science. In place of the

²⁵ Husserl, of course, thought these conditions could not be met, so this may also be viewed as a highly schematic and over-simplified summary of Husserl’s own motivations for ultimately rejecting the positivistic conception of subjective consciousness to be found in Avenarius and Mach (cf. the extended discussions of them in the *Prolegomena* and Book V of the *Logical Investigations*), to which he had initially been quite sympathetic; see Sommer (1985) for a detailed analysis, well informed about the conceptions of subjectivity in Avenarius, Mach, and Husserl in their historical context.

Kantian dictum that seeks to confine science to the mathematical and quantitative, we must say: every science is only a science insofar as the theory of structures is contained in it.²⁶

In the published *Aufbau*, the conflict between these two tendencies is perhaps the most noticeable (and most noticed) internal tension; though *Ursprünglichkeit* and *Struktur* are mostly not in open or direct conflict (apart from the notorious §§153–5), the tension simmers under the surface. In 1922, the cohabitation Carnap conceived between them had been quite straightforward: phenomenology pertains to the primary world, the realm of *Ursprünglichkeit*, while logic (“*Strukturlehre*”) pertains to all the structural extensions from that fixed base. So *Ursprünglichkeit* and *Struktur* each has its own proper realm, the primary and secondary worlds, respectively. And despite the radical pronouncement, quoted above, about what true science consists in, the actual construction in the 1922 *Aufbau* fragment was in fact largely phenomenological. The logical tools are applied only *after* a phenomenological *Vor-Logik* (Driesch 1913) has cleared the way and guaranteed their applicability on immanent grounds. It is not *pure* Husserl, of course, as occasional “fictions” are introduced along the way (see footnote 25 below), but these are ostentatiously kept to a minimum. The basic strategy for addressing the “Naturalistic Predicament” was to employ phenomenology uniformly on the subjective basis, and then to extrapolate by quasi-analysis from those aspects of subjectivity so articulated that are singled out as having “epistemic priority.”

And in fact, Carnap’s 1922 procedure of constitution meets Husserl’s requirements in *Ideas* much more closely than the 1925 version or the published *Aufbau*. Like the *Aufbau*, the 1922 version starts off with no self or “*ich*” at all at the level of the immediate “*Erlebnisbereich* [realm of experience],” just holistic experiences. Unlike the *Aufbau*, though, it doesn’t just leave the identity of the perceiver to arise from the dispensations of the objective world, once constructed; it actually attempts to *construct* an “*ich*” immanently, i.e. with only the materials available in immediate subjectivity. Only after the experiential realm (*Erlebnisbereich*) of first level—which, remember, is unique—is filled in (*vervollständigt*) to result in the (also unique) second-level “reality” do we arrive at the construction of bodies (*Leiber*), then of my body (*mein Leib*, ASP 1922b, p. 8) on the basis of further completions (*Vervollständigungen*) to the first-level order on the basis of the order achieved at the second level. Other bodies are distinguished by analogy, and “what [the particular person] L_1 designates [*das von L_1 bezeichnete*]” is “a subset of the quality-classes ordered correspondingly to a subset of the reality realm (‘words of L_1 ’).”²⁷ On this basis, we undertake further completions following guidelines of analogy and

²⁶“Zwar liefert die Anschauung auch in der Wissenschaft das Material der Erkenntnis, aber die Definition jedes wissenschaftlichen Begriffes ist so lange als bloß vorläufig anzusehen, als sie noch nicht frei von Anschauungselementen ist. ... Die reine und die angewandte Strukturlehre umfassen daher zusammen das ganze Gebiet der (rationalen). Wissenschaft. Anstelle des Kantische Wortes, das die Wissenschaft auf das mathematisch-quantitative beschränken will, müssen wir sagen: jede Wissenschaft ist nur soweit Wissenschaft, als Strukturlehre in ihr enthalten ist.” (ASP 1922e)

²⁷“eine einem Unterbereich des Wirklichkeitsbereichs (‘Worte des L_1 ’) entsprechend geordnete Untermenge der Qualitäts-Klasse.” (ASP 1922b, p. 10)

similarity (to the first-level realm) to obtain a new *third-level* experiential realm of a particular person L_1 (*Erlebnissbereich des L_1*) and then by analogy to the construction of the second- from the first-level realm (and using the same principles of continuity²⁸ as in that case), we construct a *fourth-level* “reality realm of L_1 [*Wirklichkeitsbereich des L_1*]”—and only at these third and fourth levels have we arrived at the experience of a particular observer in a form amenable to systematization and quasi-analysis (ASP 1922b, p. 11).

This is quite different from the published *Aufbau*. Here we find, e.g. in §65 (where Carnap addresses the problem of objectivity, which is to be guaranteed by considering only the form, and not the content, of subjective experience), that while individual subjectivities differ widely from each other—are in principle not even comparable—their *structure* is similar in certain respects, and it is these respects alone that will concern the constitution system: “Only on the basis of this insight is the system form with autopsychological basis acceptable – the insight that *science is essentially the study of structures* and that *there is therefore a path by which, proceeding from the individual stream of experience, it is possible to constitute something objective.*”²⁹

Now it could certainly be argued that this difference between 1922 and 1928 is merely apparent. The immediate *Erlebnissbereich* at Level 1 (*Bereich α*), whose elements (*Bausteine*) are indivisible, does not permit the abstraction operation needed for quasi-analysis; it is thus redescribed in relational terms (as the *Bereich β*) to get quasi-analysis off the ground. There is no difference between α and β , Carnap says; the same things are described in a different language (ASP 1922b, p. 6).³⁰ One could be excused for wondering, though, whether by redescribing the *Erlebnissbereich* in logical terms, the move from α to β essentially *sneaks in* the same structural reduction that is made *explicit* in the published book. Perhaps. The point here is not that the 1922 construction was successful, but that in 1922 Carnap was clearly attempting to be more phenomenologically conscientious, and was *trying* to develop as much as possible as immanently as possible, and avoiding the kind of brusque dismissal of the subjective we see in the later §65. Although the principle that “all science is structural science [*alle Wissenschaft ist Strukturwissenschaft*]” was already prominent in 1922, as we saw, there was no talk of the structural similarity among different subjectivities, no introduction of structure *immediately* into the *Erlebnissbereich* of pure subjectivity without any attempt to develop it immanently from immediate experience.

²⁸The “tendencies [*Tendenzen*]” to preserve “uniformity of state [*Zustandsgleichheit*]” (which Carnap offers as a version of the Kantian category of substance) and “uniformity of process [*Ablaufsgleichheit*]” (as a version of the category of causality) are essentially the only “fictions” consciously employed in the 1922 construction (ASP 1922b, pp. 7–8); more detail in Carus (2007), pp. 152–3.

²⁹“Nur auf Grund dieser Erkenntnis, daß *Wissenschaft ihrem Wesen nach Strukturwissenschaft* ist und daß es *daher einen Weg gibt, vom individuellen Erlebnisstrom ausgehend Objektives zu konstituieren*, ist die Systemform mit eigenpsychischer Basis annehmbar.” (Carnap 1928a, §65)

³⁰“Die Bereiche α und β haben den gleichen theoretischen Inhalt; es sind nur zwei verschiedene Darstellungsformen des ‘*Erlebnissbereiches*.’” (ASP 1922b, p. 6)

The effort to work from the ground up, and the sympathy with Husserl's critique of empirical psychology, is also evident in Carnap's 1922 approach to the constitution of psychology (ASP 1922b, pp. 12–13).³¹ Psychology is explicitly constructed (*unlike* the various levels of "reality" in this 1922 picture) in *parallel* with "reality" as a distinct construction from the experiential realms at levels 1 and 3. This avoidance of integrating psychology with natural science, and the emphasis on the present lack of a principled basis for any such integration,³² strongly echoes Husserl's "Philosophie als strenge Wissenschaft." It is also interesting as the last shadowy vestige of anything like a Cartesian dualism in Carnap. While it is not literally a dualism, as the *Erlebnissbereich* itself remains uniformly homogeneous, the idea that the physical and the psychological employ different construction principles harks back to the dual-aspect approaches (on a uniform substrate) of Avenarius and Mach.³³

Though sharply diminished from its 1922 stature, the phenomenological tendency to *Ursprünglichkeit* did not disappear altogether in the published book. The starting point for the basis, in the *Aufbau*, shows that Carnap still retains an awareness of the "Naturalistic Predicament," and makes explicit reference to Husserl:

For the basis no distinction will be drawn among experiences distinguished on grounds of later constitution as perception, hallucination, dream, etc. ... At the beginning of the system experiences are just to be accepted as they present themselves; the real posits and unreal posits occurring in them will not be taken at face value but "bracketed"; in other words, the phenomenological abstention ("ἐποχή") will be practiced (§64, p. 86)³⁴

But Husserl's "principle of principles" in *Ideas*, to which Carnap is clearly alluding here, is not just about the starting point. Experience, for Husserl is not just "simply to be accepted ... as it presents itself"³⁵ but also "only within the bounds in

³¹Which, like the published *Aufbau*, leaves room for psychoanalysis, i.e. provides for the construction of an unconscious mind in addition to a conscious one.

³²The construction of the "psychische Bereiche" from the *Erlebnissbereiche* at levels 1 and 3 is still in quite a primitive state, Carnap writes; unlike the construction of the *Wirklichkeitsbereiche*, it is not undertaken "schon im vorwissenschaftlichen Denken," but only in science – and that in a very undeveloped science, psychology. "Dadurch ist es zu erklären, daß die Konstruktion bei weitem noch nicht vollständig vollzogen ist. Ja es herrscht noch nicht einmal Einigkeit über die Grundsätze, nach denen sie geschehen soll, und sogar über die Frage, ob sie überhaupt vorgenommen werden soll." (ASP 1922b, p. 12)

³³A similar multiple-aspect view (with monistic substrate) is attributed to Husserl himself by David Woodruff Smith (1995). The struggles of late-nineteenth century philosophers, neo-Kantian as well as positivist, to find ways around Cartesian dualism are well captured in Sommer (1985), pp. 11–14, 33–76.

³⁴"Für die Basis wird kein Unterschied gemacht zwischen den Erlebnissen, die auf Grund späterer Konstitution als Wahrnehmung, Halluzination, Traum, usw. unterschieden werden. ... Zu Beginn des Systems sind die Erlebnisse einfach so hinzunehmen, wie sie sich geben; die in ihnen vorkommenden Realsetzungen und Nichtrealsetzungen werden nicht mitgemacht, sondern 'eingeklammert'; es wird also die phänomenologische 'Enthaltung' ('ἐποχή') im Sinne Husserls ausgeübt" (Carnap 1928a, §64, p. 86)

³⁵"einfach hinzunehmen ... als was es sich da gibt" Husserl (1913), §24, p. 51.

which it presents itself.”³⁶ And that requires maintaining the focus on the “immanent mode of givenness [*immanente Gegebenheitsart*]” (*Ideen* I, §42), and thus excluding, among many other things, all tools of logic and mathematics from the constitutional procedure:

Formal logic and the whole of [mathematics] more generally we can include in the explicitly bracketing *ἐποχή*, and in this respect we can be secure in the rightness of the norm we resolve to follow as phenomenologists: *To employ nothing but what we can gain essence-conveying insight into by means of consciousness itself*, in pure immanence.³⁷

The whole idea of Carnap’s book is, in sharpest contrast, predicated on the employment of logic, which he regards as immune to Husserlian bracketing (see footnote 43); the constitution system—the residuum of Carnap’s version of bracketing—is logic, endowed with a model by its contact with empirical reality at the single point of the *Ähnlichkeitserinnerung*.³⁸ Indeed, in the very next section of the *Aufbau*, we find the passage from §65 quoted above. So while Carnap still nods in Husserl’s direction and remains provisionally committed to a form of *Unmittelbarkeit* (modulo §§150–53), his conception of *Unmittelbarkeit* has shifted considerably, and he no longer even tries to accommodate Husserlian standards of immanence in his constitutional procedure.

Did this mean that Carnap no longer thought he needed to address the “Naturalistic Predicament”? No, he addressed it all right, but did so in the way that would become characteristic for the rest of his career—he sought to discredit the question. In 1922, his answer had been phenomenology (plus specification of a purpose for logical-structural extrapolation from the phenomenological raw material), and then, in a second step, the “schematization” of the results from phenomenological bracketing to allow quasi-analysis. Without his growing self-awareness about ontology, that might well have remained his answer, as similar combinations did for others who were committed to a kind of Husserlian starting point while rejecting Husserl’s restriction to purely immanent construction, e.g. Hermann Weyl or Moritz Geiger. But Carnap’s avoidance—and after August 1924 his positive rejection—of ontology added a new dimension. It made him aware of the dualistic connotations of the

³⁶“auch nur in den Schranken, in denen es sich da gibt.” (ibid.)

³⁷“Die formale Logik und die ganze Mathesis überhaupt können wir also in die ausdrücklich ausschaltende *ἐποχή* einbeziehen und in dieser Hinsicht der Rechtmäßigkeit der Norm gewiß sein, der wir als Phänomenologen folgen wollen: *Nichts in Anspruch zu nehmen als was wir am Bewußtsein selbst, in reiner Immanenz uns wesensmäßig einsichtig machen können.*” (Carnap 1928a, b; Husserl 1913, §59, p. 127)

³⁸“Durch den Kontakt zwischen dem Realbegriff und den Axiomen (indem jener diese befriedigt) ist dann mit einem Schlage auch die Verbindung zu dem ganzen aus dem [Axiomensystem] beruhenden Theorie-Schema hergestellt. Das Blut der empirischen Realität strömt durch diese Berührungsstelle ein und fließt bis in die verzweigtesten Adern des bislang leeren Schemas, das dadurch in eine erfüllte Theorie verwandelt wird.” (Carnap 1927, p. 373) Of course it was only by the desperate measures of §§153–5 that the “purely structural descriptions” of the *Aufbau* were converted to implicit definitions; otherwise they had a built-in model. But given §§153–5, their status is somewhat uncertain, so we can regard them as at least *potentially* pure logic, endowed with a model only by the empirical character of *Ähnlichkeitserinnerung*.

division of labor he had envisaged between phenomenology and logic. From this viewpoint, it came to seem far more attractive to employ a single approach throughout than to retain the two-step approach of 1922. The Naturalistic Predicament, meanwhile, was addressed by the dissolution of the two opposed conceptions of subjective consciousness. Where they disagreed was, after all, at the level of ontology—what is it we are conscious *of*, in the end? A physical world, an ideal world, or something else? Carnap had arrived at the idea, fundamental to his entire future development, that this question can be given no practical meaning.

Carnap's Synthesis

Though we are unable to observe Carnap's change of mind by direct evidence, we can now reconstruct it from the evidence of the published *Aufbau*. One of the striking ironies of the situation just described, we can now see, is that although Carnap's new, post-1924 stance shifted toward structure at the expense of *Ursprünglichkeit*, Husserl himself appears to have contributed significantly to that very stance. For what Carnap applied in the *Aufbau* was Husserl's own bracketing strategy,³⁹—except that the residuum of Carnap's version of bracketing is not pure subjectivity, but pure structure, i.e. logic, or, in other words, *language*—and the bracketing strategy is turned against Husserl's own philosophical, anti-naturalistic agenda. Everything beyond the *constitution system* itself is bracketed. The constitution system alone constructs an objective world from what is available to us in subjectivity, but it remains entirely neutral vis-a-vis the metaphysical interpretations that go beyond that constitution itself, such as Husserl's own transcendental, anti-naturalistic program.

What had most appealed to Carnap in 1920–1922 about Husserl's bracketing strategy was the prospect of *neutrality* it held out, which dovetailed perfectly with Carnap's attitude of regarding the various philosophical doctrines as *façons de parler*. The bracketing strategy purported to limit itself to neutral ground and refrain from tendentious interpretations beyond that neutral ground: let's just stick with *den Dingen!* On top of that, Husserl had offered the hope, at least, that despite this austerity, the objective world could be constituted from the materials given to us in pure consciousness; even the empirical, corporeal ego could be constituted *within* the realm of pure consciousness resulting from the phenomenological reduction. As we saw, Carnap actually tried something very like this in 1922. But when he was confronted with the actual Husserl and his followers in late 1923 and early 1924, certain questions would inevitably have arisen in his mind. On what grounds, for instance, can one—if one is being transcendently abstemious, and sticking with the things themselves—attribute essences to the intentional objects of pure consciousness?

³⁹As others have noted, e.g. David Woodruff Smith (2010, pp. 15–18).

Why distinguish “regions” of nature, subjectivity, and culture?⁴⁰ Why deny so vehemently that Helmholtz’s *Zeichen* are signs of “something”? Why insist that there is no distinction between Locke’s “picture” theory and Helmholtz’s *Zeichentheorie*, when the obviously structural character of the latter was the subject of widespread discussion?

Behind all these questions lurks the more fundamental one about Husserl’s own curious arbitrariness in the presentation of his bracketing strategy, especially the constraints he explicitly imposes on it, e.g. when he compares his strategy of phenomenological reduction to Descartes’ strategy of universal doubt:

In place of the Cartesian attempt at a universal doubt we could put the universal “epoché,” in our sharply delineated and new sense. But we *limit* the universality of this epoché, for good reasons. For were it as comprehensive as it could possibly be, there would be no room any more for unmodified judgements, let alone a science—since every judgement can be modified, every judgeable objecthood can be bracketed. Our purpose, though, is precisely the discovery of a new scientific domain, one that is gained by the *method of bracketing*, but a definitely bounded such method.⁴¹

We can summarize Carnap’s new doubts about Husserl in 1924 by saying that he rejected such restrictions on the scope of *epoché*. Husserl’s argument for restriction would not have impressed him, and the particular restriction Husserl proposes⁴² would have struck him as highly arbitrary. Husserl (e.g. *Ideas* I, §20) accuses the positivists of arbitrariness, after all, for not subjecting their own meta-level criterion of acceptable knowledge to the standard they hold object-level knowledge to; he accuses them, essentially, of failing to address the “Naturalistic Predicament.” But by imposing limits on his bracketing strategy, Husserl faces his own version of that same predicament. Carnap would have seen in Husserl’s proposed restriction of phenomenological *epoché* an arbitrariness tantamount to any empiricist selection of primary, subjective data that awards cognitive privileges to some parts of it at the expense of others. In both cases an ad hoc restriction is proposed solely because a certain result follows from it, not because the restriction itself naturally arises from

⁴⁰It may appear tendentious to call the distinction among these regions “ontological,” but that is Husserl’s own frequent practice, and he is followed in this by many interpreters, e.g. David Woodruff Smith (2007), Ch. 4.

⁴¹“An Stelle des Cartesianischen Versuchs eines universellen Zweifels könnten wir nun die universelle ‘epoché’ in unserem scharf bestimmten und neuen Sinne treten lassen. Aber mit gutem Grunde *begrenzen* wir die Universalität dieser epoché. Denn wäre sie eine so umfassende, wie sie überhaupt sein kann, so bliebe, da jede Thesis, bzw. jedes Urteil in voller Freiheit modifiziert, jede beurteilbare Gegenständlichkeit eingeklammert werden kann, kein Gebiet mehr für unmodifizierte Urteile übrig, geschweige denn für eine Wissenschaft. Unser Absehen geht aber gerade auf die Entdeckung einer neuen wissenschaftlichen Domäne, und einer solchen, die eben durch die *Methode der Einklammerung*, aber dann nur einer bestimmt eingeschränkten, gewonnen werden soll.” (*Ideen* I, §32)

⁴²“Mit einem Worte ist die Einschränkung zu bezeichnen. ... Die zum *Wesen der natürlichen Einstellung gehörige Generalthesis setzen wir außer Aktion*, alles und jedes, was sie in ontischer Hinsicht umspannt, setzen wir in Klammern: *also diese ganze natürliche Welt*, die beständig ‘für uns da,’ ‘vorhanden’ ist, und die immerfort dableiben wird als bewußtseinsmäßige ‘Wirklichkeit,’ wenn es uns auch beliebt, sie einzuklamern.” (ibid.)

the envisaged process of constitution, or emerges as an artefact of the considerations guiding or constraining that process. Husserl's proposed restriction of *epoché* is not even motivated by considerations internal to phenomenology; it is not based on any finding of pure subjectivity but is explicitly *meta*-phenomenological.⁴³ And what is the payoff? Remember that in Carnap's 1922 conception of *Wissenschaft*, only structural properties matter—only what was capable of being identified and communicated “ohne Hinweis auf Anschauung.” *Ursprünglichkeit* might be a constraint, but it could hardly, in Carnap's view, be the object of a *Wissenschaft* (other than, perhaps, the kind of purely conceptual or structural framework for empirical psychology Husserl had appeared to be proposing in “Philosophie als strenge Wissenschaft”).

It would appear to have been Carnap's newly self-conscious rejection of ontology, however, that in late 1924 focussed his mind on the extension of *Wissenschaft*, in this sense, to the basis itself. Before then, as we saw, he was content to assume that there was no alternative to starting from “undefined basic concepts whose content can only be hinted at by phenomenological indication.”⁴⁴ But this had given rise to a discontinuity between pure subjectivity (the fixed “primary world” of Carnap's early writings) and the objective “realities” or “secondary worlds” constructed on the fixed basis. This discontinuity, while different in details, recapitulated precisely the discontinuity among Husserl's “regions,” which Carnap now rejected as tendentially ontological.

So we can distinguish two phases in Carnap's progressive rejection of ontology between 1920 and 1924. In the first phase, Carnap adopted the phenomenological reduction as a natural extension of the bracketing of ontological questions inherited from Kant (as later reformulated in Helmholtz's *Zeichentheorie*). Carnap's conception of a “primary world” is a kind of fusion between Husserl's “real content” in pure phenomenological consciousness (e.g. *Logical Investigations* V, §16) and Helmholtz's purely sensory *Zeichen*. These are usually regarded as incompatible (e.g. Rang 1990), but Carnap saw no contradiction in bracketing all external reference of immediate sensation, in the first instance (in the manner of Husserl), but then subsequently also making such sensation amenable to set-theoretic reorganization by quasi-analysis, i.e. usable as the basis for constructing theoretically-framed “realities,” in which, as in Helmholtz, any difference in perception is assumed to

⁴³It could be objected (thanks to an anonymous reviewer for pointing this out) that Carnap's exemption of logic from the *epoché* might be considered equally arbitrary from Husserl's perspective; see Husserl's explicit bracketing of logic and mathematics in the quotation from *Ideen* I, §59 in section 2 above. However, Carnap (in this respect a loyal student of Frege) did not regard logic as in any way embedded in subjectivity *at all*; to think otherwise was to fall into precisely the psychologism that Frege had accused Husserl of in his review of *Philosophie der Arithmetik*. And by the time of the *Aufbau*, Carnap had assimilated the early Wittgenstein's view of logic (in which Carnap, like other Vienna Circle members, included mathematics) as simply an *artifact* of representation that attributes no properties to *Sachverhalte* but only pictures their logical form, and so cannot be “bracketed” in Husserl's sense.

⁴⁴“undefinierter Grundbegriffe, deren Inhalt nur durch phänomenologischen Hinweis anzudeuten ist” (see footnote 11 above for the passage from which this phrase is taken).

reflect a difference in some (not otherwise accessible) structurally isomorphic environment the theory seeks to model.⁴⁵

It was in this first phase, also, that ontological theses were regarded as stipulations for languages to be used as *façons de parler* in various contexts, according to convenience. In 1924, however, this indifferent attitude gave way to a second phase, the positive rejection of ontology.⁴⁶ This may have come about at least partly because Carnap realized, upon meeting Husserl and his circle first hand, that his own compatibilism regarding Husserl and Helmholtz was not shared there.⁴⁷ Husserl himself vehemently rejected the Helmholtzian *Zeichentheorie* (e.g. *Logical Investigations* V, §21; *Ideas* I, §§43, 52, 68) and its Kantian predecessor: “What Kant calls ‘appearance,’ the object of experience, is a subjectivistically (or anthropologically) interpreted object, while actually it is the one and only thing it makes any sense at all to talk about.”⁴⁸ Perhaps this was because Husserl had himself begun with the *Zeichentheorie* and developed his post-1907 transcendental standpoint in reaction against it (Rang 1990; see footnote 45). In any case, from his new perspective, the distinction between “signs” or “appearances” and their “intentional objects” had

⁴⁵ Bernhard Rang (1990, pp. 187–94) calls this Helmholtzian principle (see footnote 49 below for references and Hermann Weyl’s endorsement of it) the *Konstanzannahme* and portrays its rejection as a central motif in Husserl’s gradual development of transcendental phenomenology between 1890 and 1910. According to Rang, Husserl had accepted the *Konstanzannahme* (as well as the *Zeichentheorie*) in his earlier work (cf. also Sommer 1985), and was influenced by Hering’s critique of Helmholtz in his gradual rejection of it (and more generally of the distinction between *Empfindung* and *Wahrnehmung*). Rang’s detailed case is well documented and highly suggestive, but appears not to have received much attention. Nor can it be discussed here in the detail it deserves, though it should perhaps be pointed out that the distinction between sensation and perception, attributed by Rang specifically to Helmholtz (as the main protagonist against whom Husserl “overcame” this distinction), is actually not only traditional (e.g. Hatfield 1990, pp. 32–45), but has been largely taken for granted, outside the phenomenological tradition, since Husserl as well (e.g. Gregory 1997).

⁴⁶ In my book (Carus 2007, pp. 143–5), this development is attributed to the influence of Russell’s *Our Knowledge of the External World*. While Russell’s impact on the *Aufbau* strategy was clearly significant in many other respects, I now think that regarding ontology in particular, Husserl played a more significant role than Russell; also, I now think there is insufficient emphasis in the book on the impact of this growing resistance to ontology on the overall strategy of the *Aufbau*.

⁴⁷ Their rejection of Carnap’s Helmholtzian appropriation of phenomenology was no doubt reinforced by the transformation of Husserl’s conception just at the time of Carnap’s encounter with him, from a “static” to a “genetic” (or hermeneutic) phenomenology, as discussed by Welton (2000). Landgrebe, the member of Husserl’s circle with whom Carnap appears to have had the most contact, was among the first to point out this change in Husserl’s view (Landgrebe 1962), and was presumably aware of it at the time; according to Landgrebe and Welton, it first appears in the lectures on “Erste Philosophie” Husserl was giving just as Carnap was first persuaded by Merten to try Husserl’s lectures out; it is hardly surprising he was put off—he had been attracted to the project of the “constitution of nature” (Mohanty 2011, Ch. 3), and would have found the conception of philosophy in those lectures (ibid, Ch. 14) completely alien. Thanks to Sebastian Luft for pointing this out to me.

⁴⁸ “Was Kant ‘Erscheinung’ nennt, das Ding der Erfahrung, das ist ein subjektivistisch (oder anthropologistisch) gedeutetes Ding, während es das eine und einzige Ding ist, von dem zu reden überhaupt Sinn hat.” This passage from a manuscript of late 1909 is quoted by Kern (1964), p. 121.

become an intra-mental semantic dovetailing of noesis and noema, and to even talk as if there were two separate things, a *Zeichen* in consciousness and an “external” process or configuration of which it is a sign, was already to give up the neutrality afforded by the phenomenological reduction.

But Carnap, faced on the one hand with awkward questions about the fit between the two discontinuous parts of his *Aufbau* construction of 1922–1923, and on the other with the Husserl circle’s rejection even of that previous, partly phenomenological solution, found himself forced to choose between its two components: which would have priority? It was in this situation that he had the idea of transferring the Husserlian bracketing approach applied to the phenomenological basis in phase one to the *other* part of his two-part assembly, the constitutional system. And from *this* new viewpoint, Husserl’s scruples about the *Zeichentheorie* came to seem otiose. To insist that Helmholtz’s *Zeichen* are signs of something intra-mental rather than signs of we-know-not-what would have seemed as ontological as the traditional dogmatism of realists and idealists. And actually, in taking this attitude Carnap was in good company. His position here was comparable to Hermann Weyl’s, who (like other followers of Husserl) also made use of phenomenological language to approach problems of the constitution of science, and who also nonetheless saw this as consistent with the Helmholtzian *Zeichentheorie*, rejecting Husserl’s critique.⁴⁹

Carnap’s new approach of bracketing everything beyond the bare constitution system itself combined two key ideas, then—the idea of bracketing what lay outside a clearly delimited neutral domain (Husserl) and the idea of constitution by logical construction rather than Humean or Machean abstraction (Russell).⁵⁰ This synthesis of Husserl and Russell not only solved the logistical problem of how to reconcile the two less-than-harmonious components of the constitution system in the *Aufbau*, it also dovetailed neatly with Carnap’s new disdain for ontology. It enabled him to bracket anything with ontological connotations. It is hardly surprising that the issue of realism vs. idealism—the *Realismusproblem*—was the principal butt of Carnap’s

⁴⁹Weyl actually cites Helmholtz himself in this context, though he puts his argument in modern axiomatic language: “A science can determine its subject matter only up to an isomorphic representation. In particular, it is altogether indifferent toward the ‘essence’ of its objects of study. What distinguishes the real points of space from number triples or other interpretations of geometry can only be *experienced* in immediate, live acquaintance. ... It is mysticism to expect of scientific knowledge that it reveal—to acquaintance—a deeper essence than that openly available to acquaintance. The conception of isomorphism pinpoints the unquestionable and ineluctable limit to knowledge.” (Weyl 1926, p. 22) Weyl goes on, in this passage, also to describe a view of the *Ding an sich* that is very consistent with what Helmholtz had formulated half a century earlier. Although we do not know the “essence” of the *Ding an sich*—whatever is behind the appearances—we know something about its structure, he says, since we know that the experienced world must be isomorphic to it. For (in Helmholtz’s words, which he quotes here) “if different perceptions urge themselves on us, we are justified in concluding that there is a difference in the real conditions.” (Helmholtz 1878, p. 656, quoted by Weyl 1926, p. 22) Weyl concludes, very much in Helmholtz’s spirit, “Though we are not *acquainted* with the things in themselves, we *know* as much about them as about the appearances.”

⁵⁰Carus (2007), pp. 145–8 discusses which specific aspects of *Our Knowledge of the External World* cleared away the obstacles to Carnap’s *Aufbau* project in early 1922.

philosophical disdain, not only in the *Aufbau* itself, at the culmination of its final chapter, but then also in the separate pamphlet on *Pseudoproblems in Philosophy*, of which the problem of realism vs. idealism is the main example.

While this part of the *Aufbau*'s philosophical conclusion could be read as directed mainly at Russell, it is less often noticed that the *first* set of to-be-bracketed philosophical problems addressed in the final chapter of the *Aufbau* is clearly aimed largely at Husserl. In *Der Raum*, as we saw in section I above, the eidetic reduction had played a notable role. The Carnap of 1920 had assimilated the key message of the opening sections of *Ideas* that phenomenology is a *Wesenswissenschaft*, and concerns *Wesenserkenntnisse*, knowledge of essences, rather than knowledge of fact. In the crushing (if low-key) polemic against the cognitive standing of *Wesensprobleme* in the first sections of *Aufbau* part V, it is hard not to see Carnap settling accounts and correcting youthful errors, if not positively burning bridges to his own past. This is especially true of §164 on the essence of the intentional relation, the only place in part V where Husserl is explicitly mentioned. The tone is always measured and *sachlich*, never explicitly polemical, but the argument is very compressed, and is hardly comprehensible without the knowledge of Carnap's earlier immersion in phenomenology—indeed without that knowledge it is hardly comprehensible what this section is even doing here. Carnap focuses on the claim, fundamental to Husserl's strategy of constitution,⁵¹ that it is the essence of the intentional relation that it refers to something beyond itself. No objection, says Carnap, as long as we understand this (in the constitutional rather than metaphysical sense of "essence," cf. §161) as referring to the larger structure to which a given element of it may be said to "refer," as e.g. a particular color "refers" to the entire three-dimensional space of colors—i.e. as long as we understand the "something beyond itself" to refer to something within the constitutional system. This understanding, while in a sense Husserlian (since nothing is predicated of anything "beyond" the residuum of bracketing), would of course fundamentally subvert Husserl's entire approach.

The burden of §158–65 was reiterated in more condensed form a few years later when Carnap commented on a paper of Roman Ingarden's at the Eighth International Congress of Philosophy in Prague, in 1934:

Once we set aside various superficial differences, the fundamental divergence between the phenomenological conception and that of our circle lies, it seems to me, in our view that there there are no scientific sentences of a third kind, between the empirical, synthetic sentences and the analytic sentences, namely the supposed results of phenomenological intuition of essences.⁵²

⁵¹As exemplified especially in *Ideas* II, which I am assuming Carnap heard about at least second-hand in his meetings with Landgrebe and others in Freiburg during late 1923 and early 1924, described in section 1 above. The basis for this constitutional strategy is laid in *Ideas* I, especially section 3, chapter 3 (§§87–96) which in turn relies on the discussion of intentionality in section 2, chapter 2 (esp. §§36–46); Carnap in section §164 of the *Aufbau* refers to the latter. See Rang (1990) on the overall strategy of *Ideas* II.

⁵²"Nach Beseitigung verschiedener Differenzen liegt, wie mir scheint, der Hauptunterschied zwischen der phänomenologischen Auffassung und der unseres Kreises darin, daß wir meinen,

Tolerance and Neutrality

It may be worth adding, in conclusion, a few reflections on this story. First and most importantly, there is the subsequent history of the bracketing strategy Carnap picked up from Husserl. In the *Aufbau* it was used to bracket or exclude anything beyond the constitution system itself. But when Carnap arrived in Vienna, the fundamental parameters of any such constitution system came under scrutiny, especially (1) the question of the “correct” system basis for *erkenntnismäßige Primarität* and (2) the question of the “correct” logic for the constitution system. These discussions forced Carnap to go further back, or further “down” if you like, to apply the bracketing strategy at a more fundamental level. The result was the “principle of tolerance,” which greatly generalized the ontological bracketing of the *Aufbau*. Now everything was bracketed outside the specification of a language, indeed in the original formulation of 1934, everything outside the bare *syntax* of a language, its vocabulary and formation rules, was excluded, even meaning and truth. This overkill was soon reversed, of course, but it is interesting that Carnap should have pushed the bracketing strategy to such extremes. Rather than retreat from the already quite radical anti-ontology stance of the *Aufbau* and *Scheinprobleme*, he pushed it about as far as it could possibly go. There were other considerations involved in Carnap’s arrival at the principle of tolerance in late 1932 (cf. Awodey and Carus 2009), but the bracketing strategy of the *Aufbau*, inspired by that of Husserl, was an important part of the background against which the discussion with Gödel played out.

Second, it may be of interest to reflect on the particular way in which Carnap reconfigured Husserl’s bracketing strategy. It evidently involved a step of “extruding [subjective processes] from the mind into language,” as Dummett liked to put it. For Carnap, the residuum of the bracketing process is not thought, nor anything subjective or internal at all, but language. Now, people have trampled all over poor old Dummett for making this *the* hallmark of analytic philosophy, and using it as yet another way of glorifying Frege. But without wanting to make any pronouncements about analytic philosophy more generally, I note that in Carnap’s case, at least, a form of such “extrusion” (if you want to call it that) really did play a significant role.

Finally, the discussion of Carnap’s response to Husserl raises the question how to characterize the philosophical “neutrality” they both sought, but in very different, perhaps not entirely comparable, ways. Husserl developed his strategy of bracketing in pursuit of this goal, and Carnap followed him, as we have seen, though making language rather than subjectivity the residuum of bracketing. Yet neither of them seem to be very “neutral” regarding the major divide between the two conceptions of subjective consciousness discussed in section 2 above—a divide that both Husserl and Carnap acknowledge and indeed emphasize. Husserl never stopped seeing things that way, as the highly adversarial portrayal of the two sides in *Krisis* makes clear, not to

daß es zwischen den empirischen, synthetischen Sätzen und den analytischen Sätzen nicht noch wissenschaftliche Sätze einer dritten Art, nämlich die vermeintlichen Ergebnisse der phänomenologischen Wesensschau, gibt.” (Carnap 1936, p. 244)

mention “the struggle of these two ideas as the point of modern intellectual history.”⁵³ Husserl put himself unequivocally on the one side of this “struggle,” against the other.

Carnap’s view was, of course, quite different. As we have seen, he no longer recognized the *question* whether subjective consciousness “really is” part of (a product of) nature or “really is” constitutive (or partly constitutive) of nature, taken literally, as a legitimate theoretical question. For him, it became an external, practical question of which form of language to adopt—an important question, to be sure, and one subject to rational considerations,⁵⁴ but not in itself a “cognitive” question, or an *internal* one.⁵⁵ It is not a question that is answerable within a defined system of linguistic devices and computational, statistical, or experimental procedures. Its answer depends, to some degree, on the utility functions of those making the decision, in the context of their own practice and their own work.

Husserl recognized this too, even in *Krisis*, when he acknowledged that for scientists the naturalistic program is indispensable; it is a defining feature of their work and they cannot pretend that there is an alternative to “Galilean” science. He thought, however, that there could and should be another perspective on knowledge from outside science, which could also inform science itself. He thought that science could not in itself tell us what knowledge (or what kind of life) to value. Interestingly, Carnap agreed, though of course the kind of alternative perspective he envisaged was somewhat different from Husserl’s. But it was precisely this idea of the availability of an external perspective that separated Carnap from Quine. While Carnap recognized—with Quine—that any given evaluation of a scientific fact or theory had to begin *in medias res* (Dreben 1994), he also thought an ideal viewpoint was possible that enabled us to imagine other ways of articulating the science emerging from the particular configuration of scientists, intellectual traditions, and social processes that we happen to be living with.⁵⁶ We cannot choose our facts; those are given. But within that constraint, we have complete freedom regarding the choice of

⁵³The subtitle of section §14, which briefly characterizes the two opposed “sides” of “Objektivismus” and “Transzendentalismus,” is “das Ringen dieser beiden Ideen als der Sinn der neuzeitlichen Geistesgeschichte.” For Husserl, this was also a personal “struggle”; he used his influence to block Carnap’s German job prospects. As he remarks to Heidegger in a 1928 letter, in which he says that he wrote Heinrich Scholz that of the three candidates being considered as his successor in Kiel, Oskar Becker was by far the best, as Moritz Geiger’s work was “eigentlich mathematisch” rather than philosophical; “was aber Carnap anbelangt, so stehe er doch gar zu weit zurück. Da sei doch [Gottlob Friedrich] Lipps viel ernster zu nehmen.” (Husserl 1994, vol. IV, pp. 57–8, letter of 9 May 1928) The attitude animating such derogatory remarks is hinted at elsewhere; e.g. in a 1935 letter from Prague to Roman Ingarden, Malwine Husserl says that her husband’s lectures there are being well received, though “Da er Gast des Cercle Philosophique war, so kam es zu keiner Berührung mit Carnap und den Positivisten, denn der Cercle ist ja gerade gegen diese Ungeistigkeit gegründet und statutenmäßig eingestellt.” (Husserl 1994, vol. III, p. 305, letter of 14 January 1936) I am grateful to Thomas Vongehr for pointing out these passages in the Husserl correspondence to me.

⁵⁴This has been widely doubted; some of these doubts are addressed by Carus ([forthcoming](#)).

⁵⁵In the sense of “Empiricism, Semantics, and Ontology” (Carnap 1950).

⁵⁶Unlike Quine, but like Robert Musil, for instance; cf. Mormann 2000, pp. 210–13. Further detail on this conception of an ideal viewpoint and its relation to a naturalistic perspective on actual processes of scientific development in Carus (2004), pp. 342–51, Carus (2007), pp. 275–84, and revisited in Carus ([forthcoming](#)).

frameworks in which to articulate those facts, i.e. to determine *how* they are given, their relevance to the theories we invent, and thus their significance to us. This fundamental distinction between the theoretical and the practical has been traced, very plausibly, to Carnap's early immersion in the Kantian tradition (Richardson 2007).

It is perhaps not so difficult to envisage the availability of such a perspective in specifically (meta-) scientific contexts.⁵⁷ But the same considerations (the same dialectic between the theoretical and practical) also make such a perspective available on "Galilean" science more generally. So in this respect there is less difference between Husserl and Carnap than may appear; Carnap is not bound (as Quine would appear to be) by his conception of rationality to adhere uncritically to *realexistierende Wissenschaft*.

The difference that remains is Husserl's insistence that constraints of a *theoretical* kind could or should be imposed on our conception of science from a transcendental perspective, e.g. it could constrain the methods and theories of psychology. This Carnap rejected; the kind of external perspective on science he upheld, against Quine and others, was of an entirely *practical* (normative) kind, and specifically excluded any theoretical (cognitive) component. This was, after all, the burden of the principle of tolerance. So from that point of view it could be said that Carnap's philosophical "neutrality" was of broader scope than Husserl's.

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⁵⁷An example is Carnap's critique of the entropy concept in the physics of his day; see Carnap (1977) and Carus (forthcoming).

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Carnap's Early Conception of a "System of the Sciences": The Importance of Wilhelm Ostwald

Hans-Joachim Dahms

The aim of this paper is to draw attention to a scientist who played an important role in Carnap's formative years (from the time he was 14 until at least the publication of the *Aufbau*): Wilhelm Ostwald, a Nobel-prize-winning chemist and leader of the Deutscher Monistenbund (as successor of its founder Ernst Haeckel). I will focus on three episodes: (a) Carnap's youth (before the First World War), (b) a meeting in Buchenbach in August 1920, which Carnap organized with some of his Jena friends, and (c) the *Aufbau*.

Whereas in the first section Monism (especially religious doubt and the unity of science), language planning and Esperanto are at the forefront, the second section is focussed on a "system of the sciences", and the third on color and ethics. I will conclude with a suggested answer to the question why Ostwald's importance for Carnap declined between his student years and his Vienna period.

Carnap's Interest in Ostwald Before World War I

On the occasion of his 150th birthday in 2003, Ostwald received some attention; a number of conferences were organized at Leipzig, his former university. In the new millennium he was remembered, it seems, mostly by people outside science and philosophy, such as those interested in problems of color and painting or environmental activism (his energetic imperative was "don't waste energy, utilize it [*Verschwende keine Energie, verwerte sie!*]"). In recent years, his philosophical ideas have also begun to attract renewed attention. He is remembered by analytical

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philosophers only for publishing Wittgenstein's *Tractatus* in the very last issue of his *Annalen der Naturphilosophie*. But he also turns up in Carnap's autobiography and in the *Aufbau*, which is why he is worth a closer look.

At first sight Ostwald seems far removed from Carnap, both in his biography and in his main interests. Ostwald was born on 21 August 1853 in Riga (now Latvia), and died on 4 April 1932 in Leipzig. Carnap was about 40 years younger, and died on 14 September 1970 in Santa Monica.¹

Ostwald was by education and profession a physical chemist, who spent most of his teaching career at Leipzig, and won the Nobel Prize for Chemistry in 1909 for his work on catalysis, chemical equilibrium and reaction speeds, while Carnap studied philosophy, mathematics and physics in Jena and Freiburg, before he entered a career in philosophy, which carried him to Vienna, Prague and then after his emigration to the United States in the mid-1930s to Chicago and Los Angeles. Philosophers do not get Nobel Prizes (except occasionally in literature), but while Paul Schilpp was still alive, the honor of becoming the subject of a volume in the *Library of Living Philosophers* was perhaps the closest equivalent, and Carnap's volume (originally intended as a volume on logical empiricism, with Reichenbach as joint subject) was published in 1963.

But Carnap had also begun his academic career with experimental work in physics (though he later said he was no good at it), and if he developed philosophical interests in the foundations of the sciences at an earlier age than Ostwald, that was partly due to Ostwald himself and his influence on Carnap's entire generation. For Ostwald, though by training and profession a chemist, had found himself involved in much wider-ranging debates when he waded into the long-running controversy over Dubois-Reymond's² famous *ignorabimus* claim regarding the impenetrable limits (within the mechanistic framework) to our knowledge, and the "world-riddles" (Dubois-Reymond)³ to which "we will never know" the answers. Ernst Haeckel, the Jena zoologist who first popularized Darwin's ideas in Germany, claimed, on the contrary, that Dubois-Reymond's "world-riddles" could be solved within the mechanistic framework of Newtonian and mid-nineteenth-century physics. Ostwald, however, took the bull by the horns and sought to refute Dubois-Reymond by rejecting mechanism itself. He did this in the most spectacular and highest-profile way possible, by giving a programmatic talk at a plenary session of the 1895 annual meeting of the German Society of Scientists and Physicians in Lübeck, entitled "Overcoming Scientific Materialism".⁴ The reification of matter and its hypostatization as the sole reality in the mechanical world view, he said, had

¹Interestingly, Ostwald also spent some time in California, as a guest professor at Berkeley in 1903. Indeed, he is credited with a decisive influence on the creation of the physical chemistry science community not only there but throughout the US, mainly via his forty-odd American students at Leipzig, many of whom subsequently became the leaders of the discipline at the major American universities; for details see Servos (1990) esp. 53–70.

²see Dubois-Reymond (1872).

³see Dubois-Reymond (1880).

⁴see Ostwald (1895).

been understandable in the seventeenth century, but was ultimately a metaphysical superstition that was becoming less and less plausible every year. No comprehensive mechanical explanation had been forthcoming for heat, radiation, electricity, magnetism, or chemical reactions (p. 18). In the 23 years since Dubois-Reymond's *ignorabimus*, Ostwald said, none of its critics had questioned its main premise—mechanism. This was why no one had been able to refute him. "But if this foundation collapses, and we have seen that it must, then the *ignorabimus* falls with it, and science once again has free rein." (pp. 19–20) Ostwald's proposed alternative to mechanism, his doctrine of "energeticism," in which energy replaced matter as the single substance of the world, did not ultimately convince the scientific community,⁵ but became the basis for his monism, which became (apart from this offbeat basis) a form of classical positivism in the English and French style—as he himself acknowledged. Indeed, he became so fascinated with Comte that he wrote a biography of him.⁶

In pursuing these ideas, Ostwald became so enamored of a larger cultural role for himself that at age 50 he gave up his Leipzig professorship to devote himself full time to his "project of enlightenment," a huge and many-faceted task. In his lectures on *Naturphilosophie*, considered important enough by Lenin to be refuted in detail, he attempted to revive the idea of a *Naturphilosophie* in an empiricist, positivistic sense, and rescue it from its associations with Schelling and German idealism. In 1902 he founded the *Annalen der Naturphilosophie*, and was able to attract many well-known scientists to contribute, as well as many promising younger thinkers (Philipp Frank's first publication appeared in the *Annalen*, in 1907, for instance). The *Annalen* also included an extensive book review section, nearly all written by Ostwald himself, covering an enormous range of subjects, from scientific monographs to American pragmatism to Marxian economics. He also founded the famous *Ostwalds Klassiker der Naturwissenschaften*, perhaps the best-known series of scientific classics ever published, and again was able to persuade leading scientists from many fields to select important texts, introduce them, and annotate them for non-specialists.

He threw himself with particular energy into the Monist movement founded by Ernst Haeckel in Jena in 1906, and took over from Haeckel as chairman of the *Monistenbund*, the Monist Society, in 1909 (until 1915). On the eve of World War I this movement had grown to astonishing proportions, with several thousand members and over 300 local chapters. Carnap clearly came under the influence of this movement when he was still in school. In the original version of his autobiography, he wrote that when he moved from Ronsdorf⁷ to Jena in 1909, a "much freer atmosphere prevailed in the school and among the pupils." He joined a "Scientific Club,"

⁵Deltete (1999) gives a good overview; for some well-known (negative) reactions at the time, see Boltzmann (1896) and Planck (1896).

⁶Ostwald (1914b).

⁷The small town of Ronsdorf was integrated, together with the major industrial cities of Barmen and Elberfeld, into the newly-created composite town of Wuppertal in 1929.

in which “we pupils gave talks and held discussions,” and here he also first came across the “strange but fascinating heretical views of the iconoclast Ernst Haeckel, who on the basis of the theory of evolution attacked the dogmas of the church.” He was controversial, says Carnap, “admired by some of us, hated by others,” with Carnap in the pro-Haeckel camp.⁸ Indeed, it seems he had already been reading Haeckel and Ostwald even before his move to Jena, since in some of his first diary entries, from 1908, he mentions his discovery of Esperanto (which according to his autobiography was in 1905), and his decision to learn it. It seems likely that he was encouraged in this by his reading of Ostwald, who was one of the organizers of the first international Esperanto Congress in 1905, and its principal German supporter and publicist.⁹ In the following, we restrict our discussion of Ostwald’s influence on Carnap (after briefly reviewing the background of Ostwald’s overall monistic worldview) to two main aspects: Ostwald’s influence on Carnap’s life-long program of “language planning”¹⁰ and Ostwald’s construction of a “system of the sciences.”

Ostwald and Monism

The Monist movement was associated with a propaganda of unified science and a sort of ethical scientism—the belief that all practical questions, including even ethical questions, could be and should be answered by science. The Monists were anti-religious and anti-metaphysical. Haeckel, the founder of the movement, was once, at a meeting of freethinkers in Rome, elected as the “anti-pope.” Ostwald, less given to grand gestures and media events of this kind, was nonetheless a tireless propagandist on a more modest and workaday scale, giving “Monistic Sunday Sermons”¹¹ and devising secular (Monistic) words for traditional Christmas carols. He also, as we have seen, sought to establish a respectable intellectual pedigree for Monism. In his biography of Comte, he wrote:

What Comte had in mind and really achieved to a very considerable degree, is almost the same as that what the present German Monism sets as its central goal. In that Monism acknowledges science as the uppermost authority for all and every mental activity and rejects every other source of knowledge and action, it has placed itself on the same ground, which was called by Comte as the “positive” one. And when nowadays, at least in theory this postulate, namely to acknowledge science as the single and upmost judge for all things, is not dragged into doubt any more...., we have to owe this theoretical acknowledgement of the postulate in a decisive way to the action of Auguste Comte.¹²

⁸ Carus (2007, 50).

⁹ It is unknown whether there was ever any personal contact between Carnap and Ostwald. Carnap went to a number of Esperanto congresses, and may have encountered Ostwald at one of these, but there is no correspondence or other evidence of any communication between them, either in the Carnap papers at Pittsburgh and LA, or in the Ostwald papers.

¹⁰ Carnap (1963, 67).

¹¹ Ostwald (1911/1912).

¹² Ostwald (1913) V (my translation).

One important element of continuity from Comte to Haeckel to Ostwald was the attitude to religion; while all three rejected traditional religious doctrine, they were also concerned to fill the resulting void with some new forms of ritual and community-building—Comte with his positivist religion; Haeckel and Ostwald by the Monist organization and its adaptation of certain Christian forms. This attitude fit surprisingly well with the conception of religion Carnap had been brought up with, and was thus well suited to exercise an influence on the early development of his religious views. In Carnap's autobiography we find these remarks about the influence of Haeckel and Ostwald on his early development:

During my pre-university years I had gradually begun to doubt the religious doctrines about the world, man, and God. As a student I turned away from these beliefs more deliberately and definitely. Under the influence of books and conversations with friends, I recognized that these doctrines, if interpreted literally, were incompatible with the results of modern science, especially with the theory of evolution in biology and determinism in physics. The freethinker movement in Germany was at that time mainly represented by the Monistenbund (Society of Monists). I studied eagerly the works of the leaders of this movement, e.g. the zoologist Ernst Haeckel and the prominent chemist Wilhelm Ostwald. Although most of these books could not be regarded as serious philosophical writings but belonged rather to popular literature, and from the point of view of the theory of knowledge their formulations seemed to me often quite primitive, I was nevertheless in sympathy with their insistence that the scientific method was the only method of obtaining well-founded, systematically coherent knowledge and with their humanist aim of improving the life of mankind by rational means.¹³

The process of shedding his religious convictions was a gradual, step-by-step one for Carnap, as he also recounts in his autobiography. The actual step of leaving the church was delayed some years beyond the point where he had lost his faith, out of respect for his mother. It might appear that the loss of faith would have been deeply traumatic for him, as he was brought up in a severely pietistic family whose ancestors had left the sinful Babylon of the town of Elberfeld in the Wupper valley to erect a new Jerusalem further up in the hills of the Bergisches Land, thus founding the village of Ronsdorf, where Carnap was born two generations later.¹⁴ But actually Carnap's parents conceived of religion more as a matter of ethics and community than as a matter of doctrine and belief. This was his own explanation why his loss of faith did not lead to a crisis of conscience.

It was not, as I had often seen it with others, a matter of a sudden and violent rebellion with vehement emotional upheavals. . . I think this is chiefly due to the influence of my mother's attitude. Since childhood I had learned from her not to regard changes of convictions as moral problems, and to regard the doctrinal side of religion as much less important than the ethical side.¹⁵

The rejection of religion (and metaphysics) remained constant over the course of Carnap's life, but "the abandonment of my religious convictions led at no time to a nihilistic attitude toward moral questions."¹⁶ In these respects, Carnap remained a

¹³Carnap (1963, 7).

¹⁴Carus (2007, 48).

¹⁵From the original version of Carnap's autobiography, quoted by Carus (2007, 49).

¹⁶*ibid.*

good student of the Monists and positivists, even if his parents unintentionally prepared the way.

The Idea of a “World Language”

Around the time he gave up religion, Carnap also developed an interest in another project shared and advanced by Ostwald: the idea of a humanistic internationalism and the idea of creating and using a universal artificial language. Ostwald was a leading figure in this movement too: after he was approached by Louis Couturat, the logician and Leibniz scholar, to join the international committee for the invention and introduction of such a language, he cooperated intensely.¹⁷ He made many public appearances in support of the most popular of these languages, Esperanto, and continued this support for the common cause even after the adherents of the new system Ido broke away from Esperanto in their own splinter group.¹⁸ Ostwald's motives had been once again his abhorrence of the waste of energy which went along with the teaching and learning of the natural languages with their complicated vocabulary and syntax and the need to translate everything in international communication. Another motive was Ostwald's enthusiasm for overcoming European provincialism and nationalism and converging toward a European thought and even political unity (right up to the first world War, when he too was overwhelmed by nationalistic furor and signed the notorious “Appell an die Kulturwelt”).¹⁹

Carnap also became a vocal supporter of Esperanto at the very time when he read Ostwald's monistic publications. Even in his published autobiography Carnap devotes two entire pages to a discussion of artificial languages; this is cut back severely from the original draft, which went into much more detail. In the published version he writes:

With the second kind of language planning, whose aim is an international language, I became acquainted much earlier than with language planning in symbolic logic. At the age of about fourteen I found by chance a little pamphlet called “The world language Esperanto”. I was immediately fascinated by the regularity and ingenious construction of the language, and I learned it eagerly. When a few years later I attended an international Esperanto congress, it seemed like a miracle to see how easy it was for me to follow the talks and the discussions in the large public meetings, and then to talk in private conversations with people from many other countries, while I was unable to hold conversations in those languages which I had studied for many years in school. One of the high points of the congress was the performance of Goethe's *Iphigenie in an Esperanto translation*. It was a stirring and uplifting experience to hear this drama, inspired by the ideal of one humanity, expressed in the new medium which made it possible for thousands of spectators from many countries to understand it, and to become united in spirit.²⁰

¹⁷Ostwald (2004, 440 ff).

¹⁸ibid.

¹⁹See Meyer-Rewerts and Stöckmann (2011).

²⁰Carnap (1963, 69).

From then on Carnap devoted considerable attention to Esperanto and other artificial languages, even Basic English.²¹ He attended numerous Esperanto congresses, corresponded with many of the leading participants, and defended their use even where it was unwelcome.²² He encouraged logicians and others involved with formal systems of all kinds to give their attention to this problem. He admitted that "the two problems, the construction of language systems in symbolic logic and the construction of international languages, are entirely different from a practical point of view,"²³ but also insisted that "working on them is somehow psychologically similar," and concludes,

I think it might lead to fruitful results if some of those logicians who find satisfaction and enjoyment in designing new symbolic systems would follow the example of Leibniz, Descartes, Peano, and Couturat and direct their thought to the problem of planning an international language.²⁴

Even before he went to university, then, we observe in the young Carnap interests and tendencies that were clearly to some degree under the influence of Wilhelm Ostwald.

The System of the Sciences

Another respect in which Carnap followed in Ostwald's (and the positivists') footsteps is his interest in the integration of all knowledge into a single unified system. This was, of course, a goal not only of Bacon and the *Encyclopédistes* but also of the Romantics and, of course, Hegel. For Comte, the creation of such a system was of critical importance in the recovery process from the shock of the French Revolution, and it was to lay out this program of the "organization of knowledge" that he wrote the early essay he later called his *opuscule fondamentale*, the *Plan of the Scientific Work Necessary for the Reorganization of Society* (Comte 1822). Ostwald was evidently so impressed by the importance of this work that he translated it and issued it in a parallel edition to his biography of Comte. Whether or not Carnap was directly influenced by one or other of these routes along which Ostwald channelled Comte, he certainly expressed very similar opinions in his own articulation of the "political" role to be played by the intellectual in the aftermath of the German Revolution of 1918. Intellectuals, he said then, had failed by giving the contemplative life too high a priority over the practical, and thus failed to play their

²¹ His spirit of tolerance is expressed in Carnap (1944), where he writes that while he personally is attracted by the logical simplicity of Esperanto and its offshoots, the logical defects of Basic English should not prevent us from seeing that it may in practice be superior to the alternatives, and both approaches should be tried. On the relations between Ogden and Carnap regarding Basic English, see McElvenny (2013).

²² Notoriously, for instance, in the company of Wittgenstein; cf. Carnap (1963, 26).

²³ *ibid.*, 70.

²⁴ *ibid.*, 71.

necessary social role of coordinating and organizing all the different social functions, as Comte had held to be essential. For (as in Comte and his positivist progeny) while traditional society had held all the different social functions together in a way that benefitted the established hierarchy, once that traditional framework was swept away by the revolution, only reason—i.e. only intellectuals, people who are professional experts in reasons and reasoning—can now fulfill this task of arriving at a “form of community [*Gemeinschaftsgestalt*] that could serve to coordinate all the activities in society “so as “to remove them from the realm of chaotic whim and subordinate them to goal-oriented reason.”²⁵

It is hardly surprising then that Carnap, as we will see in section “[The Buchenbach Meeting of August 1920](#)” below, used Ostwald’s own proposals for a system of the sciences (i.e. Ostwald’s proposed modification of Comte’s system) as his starting point in this quest.

The Buchenbach Meeting of August 1920

Despite his low opinion of Haeckel’s and Ostwald’s philosophical acumen, Carnap’s interest in Ostwald did not come to an end after he entered university. In fact, it seems that Carnap not only read a number of Ostwald’s publications during his undergraduate years at Jena, but that they had considerable impact. These include not only the Comte biography already mentioned (and the accompanying translation of the *Opuscule Fondamentale*) but also his “Philosophie der Werte”²⁶ (Philosophy of Values) and the second edition of his “Modern Philosophy of Nature” (*Moderne Naturphilosophie*).²⁷ In all these works, the construction of a system of the sciences is central.

In August of 1920, Carnap organized a meeting with some Youth Movement friends at his new home in Buchenbach near Freiburg. The subject was the “System of the Sciences,” and—naturally—Ostwald’s ideas on the subject were the starting point. Nowhere in Carnap’s “Intellectual Autobiography” is this gathering mentioned. Carus in his book on Carnap deals extensively with Ostwald’s influence on Carnap, but does not mention this meeting.²⁸ In what follows I address three questions about it: (1) What were the aim, the theme(s) and the program of this meeting? (2) Who were the participants and what was their background? (3) What were the effects of the meeting?

²⁵“der chaotischen Willkür zu entziehen und der zielbewußten Vernunft zu unterwerfen.” Quoted from the Archives of Scientific Philosophy in Pittsburgh by Carus (2007, 63). It is notable that these same words re-appear, though of course in a more circumscribed application, in the concluding paragraph of one of Carnap’s first published papers, Carnap (1923, 107).

²⁶Ostwald (1913).

²⁷Ostwald (1914a).

²⁸But he cites from the beginning of a longer circular letter Carnap sent to his friends, where the conference is mentioned towards the end.

The Buchenbach Meeting: Context

We know that this meeting took place as Carnap mentions it in a circular letter sent to some Youth Movement friends in the autumn of 1920. Carus cites from this letter in his book.²⁹ It marks a decisive turning point in Carnap's life. He deplores the current relationship between science and philosophy, using a metaphor borrowed from the military sphere; empirical science has the role of the troops in the trenches, on the front line, while philosophy is the officers at headquarters. Communication between the two is disturbed or completely interrupted: philosophy (headquarters) hardly knows any more where the front line even is, while the front no longer cares about orders from headquarters or any strategic insight it may contain, as it seems irrelevant to the actual circumstances they deal with daily. Carnap, as someone acquainted with both sides, wants to help by contributing to the reestablishment of proper communication. Towards the end of this letter Carnap adds:

In August and September we had a nice time together with the Flitners, who visited us. In August we did philosophy of science [*Wissenschaftslehre*] for a week. Franz and Hilde Roh and Freyer lived in the village while it went on. We discussed the subjects mentioned above, the system of the sciences, especially the connections between logic, mathematics, physics, and psychology. These discussions provided much support for me, in part clearing up, in part stimulating because opening up new frontiers; small wonder, since I proposed egoistically my main area of interest as the subject for discussion.³⁰

Before giving short characterizations of the participants, and describe the program as well as the actual proceedings of the meeting, I would like to highlight its importance in Carnap's life.

In winter of 1919/1920 he had moved into his father-in-law's house in Buchenbach near Freiburg and went through his state examinations as a high school [*Gymnasium*] teacher in philosophical propaedeutics, mathematics and physics as main subjects in Jena. But then he had to make the decision which career to follow. One possibility was to become a teacher at a reformed secondary school, as Freyer had been for a while. Another was to become a lecturer at one of the newly founded *Volkshochschulen* [community colleges] intended to bring university subjects to a larger public, as Flitner had done; indeed, Carnap had taught mathematics for two semesters with much success at the Volkshochschule in Jena.³¹ But instead he turned his back on these relatively safe choices and opted instead for a life as a theoretician, as we have seen from the above quotations. So he had not only begun to reshape his masters' dissertation on space into a doctoral dissertation, which would become *Der Raum*, but was already engaged in the search for a systematic ordering of the sciences, or, as he put it in the original draft of his autobiography:

²⁹ Carus (2007, 91 f).

³⁰ Carnap circular letter, ASP (081-47-01), 7 November 1920.

³¹ There is information about these activities in the papers of Herman Nohl in the Göttingen university libraries special collection department: Carnap's mathematics courses were among the best attended in the program of the Jena *Volkshochschule*.

I worked on many special problems, always looking for new approaches and improved solutions. But in the background there was always the ultimate aim of the total system of all concepts. I believed it should be possible, in principle to give a logical reconstruction of the total system of the world as we know it.³²

The Buchenbach Meeting: Participants

There were only three participants in the 1920 meeting³³ apart from Carnap: Wilhelm Flitner (1889–1990), Hans Freyer (1887–1969), and Franz Roh (1890–1965). Who were they?

Flitner had studied philosophy with Carnap in Jena (and even went along to a lecture course of Frege’s, to make sure the course wasn’t canceled due to under-enrollment).³⁴ After World War I he was among the founders of the Jena *Volkshochschule* and became its director until 1925. He became a professor of education, first at Kiel, then at Hamburg and finally at Tübingen. He is remembered (together with Eduard Spranger, Herman Nohl, Hans Bollnow and others) as one of the leading figures of the “*geisteswissenschaftliche Pädagogik*” in the tradition of Dilthey, whose merits and deficits are still much debated in Germany.

Freyer studied philosophy in Leipzig and had been a teacher at a progressive school after World War I, became a philosophy professor at Kiel and finally in 1925 got a chair of sociology in Leipzig, the very first one in Germany to be called by that name. During the twenties he moved politically more and more to the right and in 1931 published a book *Revolution von Rechts* [Revolution from the Right].³⁵ After the Nazis’ seizure of power he even wrote a program for a national-socialist university reform³⁶ (which did not become as notorious as Heidegger’s rectorial address “*Die Selbstbehauptung der deutschen Universität*”). Carnap was surely disappointed in Freyer’s political development.³⁷ It also seems that the correspondence with Freyer may later have been removed from his papers.

³² Quoted by Carus (2007, 139).

³³ Prim and Glaser (2002, 171) mention two other summer meetings (in 1919 and 1921) of the same group (which they call “Flitner’s thought-collective”).

³⁴ See his memoirs, Flitner (1986).

³⁵ Freyer (1931).

³⁶ Freyer (1933).

³⁷ See the entry of 6th of June 1933 in Carnap’s diary, where he describes a visit of Freyer’s former co-worker, Ernest Manheim, who told him about Freyer’s newest political allegiances and activities: “at 7 pm Dr. Manheim and wife visit, he is Freyer’s pupil, wanted to habilitate in Leipzig in sociology, is now in Prague (hungarian Jew), an enemy of the Third Reich. He talks about Leipzig. It seems Freyer moved steadily to the right after 1926, voted for the Nazis after 1930, is now very disappointed since the 5th of March 1933. He still hopes for a reconstruction which fulfills his wishes. . . “7 h kommen Dr. Manheim und Frau, er ist Schüler von Freyer, wollte sich in Leipzig für Soziologie habilitieren, jetzt in Prag (ungarischer Jude). Gegner des Dritten Reichs. Er erzählt aus Leipzig. Freyer seit 1926 nach rechts geschwenkt, seit 1930 Nazis gewählt, seit 5.3.33 sehr enttäuscht.

Franz Roh began as a student of philosophy in Jena, but then – under the influence of his friends – turned to art history instead. He finished his studies in Munich with the eminent conservative art historian Heinrich Wölfflin. Shortly afterwards he became the mastermind of the legendary art exhibition “Neue Sachlichkeit” in Mannheim, to which he contributed a sort of overview and program, his book “Nach-Expressionismus.”³⁸ He lost his job after the Nazi seizure of power, because he was considered a propagandist for “degenerate art.” After World War II he was rehabilitated and became one of the leading art critics and promoters of modern art in Germany. He also was the first to publish a book on the infamous “degenerate art” exhibition in the early 60s³⁹ and so paved the way to a renewed interest in the painters of *Neue Sachlichkeit* (“new objectivity”) of the 20s.⁴⁰

What did they have in common other than some training in philosophy? The answer is that all of them belonged to the German Youth Movement (as also, by the way, did many participants in the Erlangen conference in 1923).⁴¹ Although no mention is made of the influence of this movement on Carnap's life and work in his published autobiography, its enormous importance is evident in some of the unpublished pages.⁴² For instance:

For those whose work is of a purely theoretical nature, there is the danger of a too narrow concentration on the intellectual side of life, so that the properly human side may be neglected. I think it was very fortunate for my personal development during these decisive years (i.e.: student years) that I could participate both in Freiburg and in Jena in the common life in such fine and inspired groups of the Youth Movement.⁴³

What attracted him to these groups?

The aim was to find a way of life which was genuine, sincere, and honest, in contrast to the fakes and frauds of traditional bourgeois life, a life, guided by one's own conscience and one's own standards of responsibility and not by the obsolete norms of tradition.⁴⁴

Am 1. Mai hatte er schwarz-weiß-rote Flagge statt Hakenkreuz am Auto gehabt, demonstrativ. Er hofft aber noch immer auf eine Erneuerung, die seinen Wünschen entspricht. Über Verbrennung der Bücher. Durchsuchung aller Bibliotheken, auch privater. Die Universitätsbibliothek und die städtischen Büchereien dürfen die verbotenen Bücher behalten, aber nur gegen besonderen Erlaubnisschein ausgeben.”

³⁸ Roh (1925); cf. the more detailed discussion of Roh and this book in Dahms (2004).

³⁹ Roh (1962).

⁴⁰ For Roh's life and work see Mück (2000).

⁴¹ Carnap and his friends all belonged, pace Muller (1987) 64, to the Sera-Kreis around the Jena publisher Eugen Diederichs and the philosopher and educator Herman Nohl (see Wipf (2004) 18). Carnap and his friends also were members of the related free-student-movement; Wipf (2004) 14 offers a long list of prominent members. Carnap was the only member of these groups who after the first World War participated in founding the Jena socialist student group; cf. Dahms (2003) 740.

⁴² Cf. UCLA Carnap Papers, Box 2, CM3, pp. B29-B36. Carnap cut these pages at the suggestion of Herbert Feigl and Carl Hempel in order to shorten his autobiography when the Schilpp volume turned out to be too large. On the folder in which he kept the excluded page, Carnap wrote: “To be set aside for future use in a separate autobiography.” Unfortunately, these pages include some of the more personal and colorful details of Carnap's early life, as well as the most culturally revealing, so it is highly desirable that the uncut autobiography be published soon.

⁴³ Cf. UCLA Carnap Papers, Box 2, CM3, p. B32.

⁴⁴ Cf. UCLA Carnap Papers, Box 2, CM3, p. B31f.

This voluntaristic attitude⁴⁵ did not by itself make any particular member of the Youth Movement a social democrat (as in Carnap's and Roh's case), a conservative nationalist (like Freyer), or someone with changing preferences (like Flitner). So the small sample of the Buchenbach meeting confirms Jerry Muller's point about the Youth Movement in his biography of Freyer: "All stood in opposition to the social and cultural status quo, but they were not easily pigeonholed as progressive or reactionary, as right and left, or even as nationalistic or cosmopolitan."⁴⁶

The participants of the Buchenbach conference had to be very tolerant towards each other regarding their philosophical and political outlook. But there were limits to this rule: whereas the close friendships with Flitner and Roh lasted through Carnap's whole life, so that he even planned to return to Germany in the 1960s after a meeting of the three in Alpbach (Austria) in 1964,⁴⁷ the ties to Freyer were cut during the Nazi period.

The Starting Point: Ostwald's Pyramid of the Sciences

As starting point for the conference Carnap sent his friends a sketch of Ostwald's system of the sciences, which is preserved in the Roh papers in the Germanisches Nationalmuseum in Nuremberg. This diagram is in Carnap's handwriting, but there is a handwritten note written by someone else on it: "Ostwald: Wissenschaftsbau [construction of the sciences]."⁴⁸ Something similar is handwritten on a typescript containing first this same system of the sciences and then the program of the conference: "after Ostwald (summer 1920)."

So in order to understand the diagram and the program properly, we begin with some remarks about Ostwald's "pyramid of the sciences [*Pyramide der Wissenschaften*]", his "system." Ostwald had, as we have seen, developed an increasing interest in the architectonic of the sciences (and thus in philosophy) from around 1900. But it was his participation in an "International Congress of all arts and sciences" at the occasion of the 1904 St. Louis World Exhibition that prompted his first attempt to put together a full-fledged system of the sciences.⁴⁹ A few years later he discovered that Comte had largely anticipated him. Comte's system, like Ostwald's first proposal, is different from most of the earlier attempts at systematization, in that it does not proceed from different capacities of the mind—from the subjective side, so to speak—but from the objective one: the objects of the world and their description and explanation by the sciences. Comte's aim had not been to

⁴⁵On Carnap's life-long attitude of "voluntarism" see Jeffrey (1992) and Carus (2007).

⁴⁶Muller (1987, 33).

⁴⁷Schorner (2010, 231).

⁴⁸Roh papers (Nürnberg).

⁴⁹Ostwald (2004, 338 ff).

present the content of all the existing theoretical sciences, but to give them a methodical order, and also to cut away all remnants of pre-scientific belief-systems such as religion and metaphysics.

Ostwald follows Comte in these respects; he distinguishes four different layers of sciences:

- logic, mathematics, geometry and kinematics (collectively called “sciences of order”),
- physics and chemistry (natural sciences),
- biology,
- psychology, sociology and cultural sciences.

Sciences of order are the common foundation for every other science (though the sense of “foundation” here remains somewhat vague; Ostwald certainly did not mean “deductive premise” in the sense of the *Aufbau*). The natural sciences proceed from the concept of energy. Biology adds the idea of life, sociology and cultural sciences the concept of society (including the societies of non-human animals), while the cultural sciences that study the processes and histories of art and science pertain only to humans.

Although Ostwald had discovered that his own system closely resembled that of Comte, he nevertheless stressed the differences⁵⁰:

1. Comte had not included logic and other sciences of order in his lowest layer.⁵¹
2. Ostwald banned astronomy from the (theoretical) physical sciences,⁵² since for him it was an applied science.
3. Ostwald included psychology, which Comte had treated as a department of physiology.⁵³
4. Ostwald added cultural sciences as the highest layer of the pyramid.⁵⁴

Despite these deviations Ostwald's pyramid is very similar to Comte's and especially so if compared to other historical systematization efforts.⁵⁵

Carnap's diagram is identical with Ostwald's system, to which he only added red lines, representing the “cuts” between different layers of sciences; the precise significance of these “cuts” never becomes entirely clear from these documents, but it seems clear that they represent challenges to any form of reductionism.

⁵⁰In Ostwald (1928) he devotes chapter four “Kritik an Comtes System” (54–68) to the treatment of these differences.

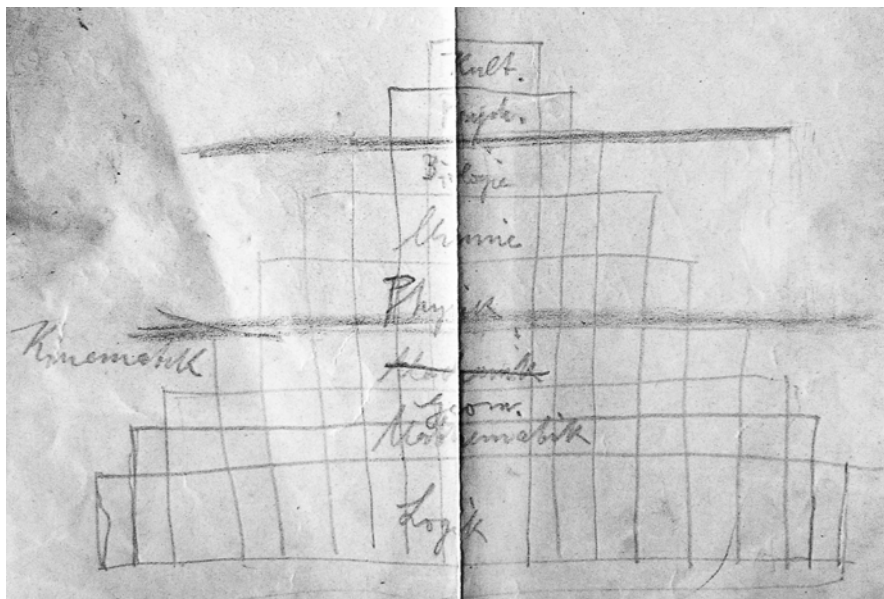
⁵¹Ibidem, 60 ff.

⁵²Ibidem, 62 f.; see also Ostwald (1914b, 62).

⁵³Ostwald (1929) 63. This difference is all the more remarkable, because Ostwald had in mind a psychology that relied on introspection (ibid. and 132).

⁵⁴This addition was motivated apparently by Ostwald's discussions with the German sociologist Ferdinand Tönnies on a ship crossing the Atlantic in 1904; see Ostwald (2004, 341).

⁵⁵Ostwald discussed many of those forerunners in his (1928, 9–43).



This can be seen more clearly from a sheet which accompanied the diagram:

System of the sciences

(handwritten addition:) according to Ostwald, summer 1920

		subjects
	Deductive logic	
	Arithmetic	1. Sciences of order
Cut A	-----	
	Geometry	
	Kinematics	
Cut B	-----	
	Physics	2. Natural sciences
	Chemistry	
Cut C	-----	
	Biology	
Cut D	-----	
	Psychology	3. Psych.
Cut E	-----	
	Cultural sciences	

On the basis of these two sheets a program of the meeting was sketched, as follows:

First discussion	Talk:	
1. The system of the sciences short orientation about some subjects	Short	C
2. Sciences of order (and cut A)	Short	C
3. The cultural sciences (definition, object, aim) (don't anticipate talks 7–9!)	Short	R, Fr
4. Cut B	Very short	C
5. Cut C	"	C
6. Cut D	longer	Fr, (R?)
7. Cut E	"	Fr
8. Ethics as science; its position in the system	"	Fr
9. Aesthetics	"	R
10. Attempt to bridge cuts D and E	"	C
11. Final discussion	"	C
Second discussion		
1. Roh: The value of science for life		
2. Flitner: Which role has the culture of science to play in education [<i>Bildung</i>] alongside the culture of the other areas? ⁵⁶		

(In the right-hand column are the initials of the participants—C for Carnap, Fr for Freyer and R for Roh; Flitner seems to have joined only in the latter part “second discussion”⁵⁷; in the first column are the proposed subjects of the talks and in between some hint at the duration of each, e.g. “short”, “longer.”)

Noteworthy is furthermore the emphasis on the “cuts” and the various attempts to bridge those cuts. It seems that the second discussion-round with talks given by Roh and Flitner was without direct reference to details of the system; perhaps these talks were meant as contribution towards the system taken as a whole. Furthermore it might be interesting to note that the title of Roh's paper (“The value of science for life”) closely resembles the one Carnap himself later on gave in 1929 as first of his papers at the Dessau Bauhaus.⁵⁸

But there are some handwritten notes (on seven small pages) among the Roh papers on the talks and the discussions following the presentations. If one follows the numbering of the pages of these notes and compares is with the program given

⁵⁶ Copy of a typescript (in the Roh-papers), my translation.

⁵⁷ It seems that he was absorbed during these holidays mainly in writing a first draft of his book *Laienbildung*. See Priem and Glaser (2002, 171).

⁵⁸ Dahms (2004, 365, 368f). I could not find a written version of these talks anywhere in the in the Carnap, Roh, or Freyer papers. The Flitner papers are still closed to the general public (with some exceptions such as Priem and Glaser).

above, the order of the talks changed in the beginning: Carnap started his first talk with the distinction between theory of knowledge and logic. Apart from the title of this introduction no information is given in the notes about that section. So it is an open question whether Carnap perhaps used the distinction in order to discard questions of the theory of knowledge altogether from the “system” or whether he insisted on the necessity to present its stages in the ordering that the theory of knowledge demanded (as he later did in the *Aufbau*).⁵⁹ Then he proceeded with a sort of beginner’s course in formal logic, introducing the concepts of object, class, relation, function etc. and illustrated these with some examples.⁶⁰ Only then the conference turned to the theme that – according to the program shown above – should have come first: Ostwalds pyramid of the sciences. There are no notes about the natural sciences. Instead the discussion turned to the “cut” between biology and psychology. Answering a question by Roh, Carnap declared that soon one would be able to combine psychology with chemistry, using organic chemistry as a bridge. Psychology itself loomed large as a subject in the discussions. It seems to have been Carnap’s aim to stick to a physicalistic understanding of psychology, when he started with psychophysics, but later he introduced the concept of “intention.” In the end of this section he spoke about *Ausdrucksverstehen*, which might be rendered as “reading human emotion from the outward behavior of the body, especially the movement of the face.” This section has some similarity to §19 of the *Aufbau*.

Then the discussion turned to the cultural sciences. When compared with Carnap’s later stance toward some problems discussed here it is astonishing how thoroughly the presentations and discussions in this section are under the sway of traditional Neo-Kantian philosophy. That perhaps can be explained by the fact that the presenters in this part of the program were Freyer and Roh. Ethics and aesthetics were both treated as well-respected fields of philosophy, the “normative sciences.” Aesthetics was subordinated to ethics, which was defined as the “discipline of what ought to be [*Lehre vom Seinsollenden*]”. The cultural sciences proper were treated mostly in a discussion of Rickert and the Heidelberg Neo-Kantian tradition. Here Windelband’s well-known distinction between the nomothetic goal of the natural sciences and the supposed ideographic aim of the historical disciplines were brought up.⁶¹ But contrary to this Neo-Kantian view we find here the thesis that the unique and singular are not so important, because everything is individual and unique. That perhaps would make the unique all the more important, one might argue. But I take it that the thesis is meant as a reminder that all the objects of the natural sciences are unique and individual too, with the consequence that natural science should be considered just as idiographic as the historical sciences. In §12 of the *Aufbau* we find a paragraph that sounds like an echo of these discussions:

⁵⁹ Carnap (1928) § 54 f., 64.

⁶⁰ See the parallel to Carnap (1928) § 5 (object), § 33 f. (class and relation).

⁶¹ For the locus classicus of that distinction see Windelband (1894), his university rector’s address in Straßburg 1894; Carnap mentions this address in the bibliography of the *Aufbau*, 280.

Recently (following ideas of Dilthey, Windelband, Rickert) a "logic of individuality" has been much in demand, i.e. a method of conceptual treatment that does justice to the peculiarity of individual circumstances and does not try to grasp them by stepwise restriction into class-concepts. Such a method would have a great importance for individual psychology and for all cultural sciences, especially for history (see for instance Freyer...⁶²)

In the end the discussion turned towards themes that in the program of the conference were reserved for the "second discussion," now formulated as the question of the function of the sciences on the one hand and history on the other for a (comprehensive) world view. The thesis is proposed that if the sciences want to give a picture of the world, they cannot rest content with the purely ideographical approach history offers. But the nomothetical alone is not sufficient either. In the end the contributions of the different cultural fields for a comprehensive world view are given as follows:

1. nomothetic: seeking law,
2. sense: seeking amplitude or fullness (= art),
3. ideographical: giving a world picture (for instance history), which is not contained in the two others.

Whether Carnap got as much out of the meeting as he claimed in his circular letter is hard to tell. In any case there were no further meetings with these participants or range of subjects; instead he would soon turn, after a brief detour via the Husserl circle (see Carus's paper in this volume), to an entirely different group of people, such as those who participated in the 1923 Erlangen conference, especially Reichenbach, Lewin, and others.⁶³ Nevertheless Carnap kept his Jena friends well-informed about his progress in his letters and surely discussed certain less technical aspects of his work with them.

Ostwald in the *Aufbau*

Ostwald's pyramid of the sciences and the discussions about it at the Buchenbach meeting in 1920 resemble the *Aufbau* approach in certain respects, but also differ from it significantly. It is interesting that Carnap in a short paper "Skelett der Erkenntnistheorie"⁶⁴ which was written in August 1920 (i.e. in the same month as the meeting took place) develops ideas which point already very much forward to

⁶²Carnap (1928) § 12; note that the counterargument against the importance of the ideographical given in the 1920 discussion is absent in 1928. The reference to Freyer is Freyer (1923). See for a recent discussion of that work Tuboly (forthcoming).

⁶³For the Erlangen conference see Carnap (1963) 14 and 37. It is noteworthy that leading participants of that conference (such as Carnap himself, Lewin, and Reichenbach) had been also members of the Freistudentenschaft before World War I. See Wipf (2004) as the best overview of that movement.

⁶⁴(RC 081-05-04); I thank Christian Damboeck for a hint to this paper.

the programme of the *Aufbau*. It was probably written immediately after the conference, but cannot be regarded as a short protocol. Its content cannot be discussed here, since this would require another article.

When we now compare the content of *the meeting* with the *Aufbau*, the most important difference is the *Aufbau*'s rejection of both the traditional organization of knowledge by human mental faculties (as in Bacon and the *Encyclopédistes*) and Ostwald's (as well as Comte's) attempts to ground an organization of knowledge on the objective subject matters of the various sciences, with the "theory of order" supposedly at the foundation (though Ostwald was no more successful than Comte at showing how this could actually be carried out). Instead of these traditional approaches, Carnap proposed in the *Aufbau* to make the relations among the various parts of human knowledge purely *deductive*. He did not succeed, of course, but the proposal was quite revolutionary, and it is not surprising that the project has continued to fascinate, and to attract new efforts to improve on it.⁶⁵

But Carnap of course presented his own version of the Comte/Ostwald "pyramid" in his "hierarchy of concepts [*Stammbaum der Begriffe*]" (Carnap 1928, pp. 24–5), and Ostwald is mentioned as a forerunner of the *Aufbau* project in §3, though Carnap makes explicit that, unlike others who attempt in various ways to derive all concepts from a few fundamental concepts by some form of reasoning (such as Mach, Avenarius, Ziehen, Driesch, Dubislav, Husserl, and Meinong), Ostwald gives no such attempted derivations.⁶⁶ What this tells us about the Buchenbach meeting is that at that point, Carnap had not yet had the idea of applying the logic he had learned from Frege (and had just that summer re-discovered in another form in Russell and Whitehead's *Principia*) to the problem of the "total system of all concepts" that evidently already preoccupied him at the meeting.

Ostwald also survives in other aspects of the *Aufbau*. One notable such aspect is that of values. These had been classified as belonging to the cultural sciences in Ostwald's system. In the well known §59, where Carnap also discusses the question of choosing among different forms of system (with a basis in the psychical or the physical), there is a discussion about the philosophy of values. There Carnap mentions Ostwald's theory of values and treats it with surprising respect (considering not only the contempt of most physicists toward energeticism by this time, but also the withering critique Ostwald's theory of values had suffered at the hands of Max Weber, among others):

It could be questionable, whether in a constitutional system with a physical basis also the realm of values finds its place. This doubt is removed by Ostwald's ... derivation of values of different kinds on a energetic basis. We must concede, from a philosophical standpoint, that not only the experiential, "phenomenological" derivations of values is methodologically admissible and fruitful..., but also the energetic one. A total science (Gesamtwissenschaft) needs both.⁶⁷

⁶⁵ Among the better-known attempts are Goodman (1951) and, more recently, Leitgeb (2011).

⁶⁶ Carnap (1928) § 3.

⁶⁷ *ibid.*, § 59.

This casts an interesting sidelight on §152, where Carnap comes back to the sphere of values (without mentioning Ostwald) and focuses solely on the "phenomenological" side—since after all the constitution system he sketches in his book is explicitly an *epistemological* and not a physical one, though he adds to the passage quoted above that in a *Gesamtwissenschaft*, both sides are needed, both an experiential [*erlebnismäßige*] and a materialist derivation of all concepts. Clearly some interesting thoughts about values underlay these passages, and Carnap obviously still thought Ostwald's proposals of some interest, despite all the criticism. So it is not surprising that there has recently been speculation about how and why this emphasis appears to have changed during the 1930s.⁶⁸

Ostwald is also mentioned in §176, where Carnap addresses the concept of reality and criticizes Russell for his explicit realism, while claiming (despite Ostwald's notorious energeticist monism!) that his own conception of reality is more akin to that of positivism, naming Mach and Ostwald as predecessors, with only a vague reference to Ostwald's little pamphlet *Grundriß der Naturphilosophie* to substantiate this claim.⁶⁹

There may also be implicit references to Ostwald buried e.g. in the discussions of color. Ostwald was after all one of the leading experts in this field and from about 1914 worked and published almost exclusively on this subject.⁷⁰ Among his achievements is a new ordering of all the colors and a way of measuring each individual color. In addition to these scientific breakthroughs he made various efforts to get his ideas and theories about colors through not only to scientists, but also to teachers and professors of art and also practicing painters.⁷¹ Carnap had evidently read at least some of these writings, as he refers to Ostwald's major work, his *Farbenlehre*, in *Der Raum* (on which he was at work during the time of the Buchenbach meeting), and elsewhere. It is perhaps interesting to note that in letters from the front during World War I, Carnap had already exchanged ideas about theories of color with

⁶⁸Mormann (2010).

⁶⁹Carnap (1928/74) § 176: "Der metaphysische Wirklichkeitsbegriff"; the reference to Ostwald is Ostwald (1914a, 101 ff).

⁷⁰He wrote about 20 books and articles alone covering that theme. See for a short popularized version of his theories on colour in dialogue-form Ostwald (2002).

⁷¹Ostwald himself painted – albeit in a perhaps more traditional manner than some of his contemporaries – quite well and left in his villa Energie about 1000 paintings, mostly of landscapes, and also about 3000 colour studies. So he accepted with delight both an invitation to the Dessau Bauhaus's inauguration in December 1926 and also for a series of lectures on color there the following year. This episode is not covered in Ostwald's memoirs which appeared that same year. But the reception of his ideas seems to have been mostly critical by the Bauhaus masters, who each (especially Kandinsky, Klee, and Schlemmer, as well as Itten, who had left by then) had their own, very different, theories of color and its psychological meaning and impact. Especially Ostwald's idea that beauty in art followed certain laws of harmony was dismissed by most of them. Not only because the idea of such laws seemed suspicious as such, but also because harmony was not seen as an aim of painting any more.

Flitner, especially concerning Goethe's *Farbenlehre*.⁷² And Carnap also discussed color during his stay at the Bauhaus in 1929.⁷³ So there is no doubt more to be said about the background to the discussion of color in §§88 ff. of the *Aufbau* than commentators have so far managed,⁷⁴ and Ostwald would no doubt be found to have an important role.

In conclusion, what we learn from the Buchenbach meeting is that the influence of Ostwald evident in Carnap's published writings is just the tip of a rather large and mostly unexplored iceberg; this influence has previously been discerned from other unpublished writings and from interpolative guesses,⁷⁵ but the documents of the Buchenbach meeting cited above provide concrete and detailed evidence of a kind not hitherto available.

These documents shed light not only on the background to Carnap's search for a "total system of all concepts" that eventually led to the *Aufbau*, but also enrich our understanding of Carnap's early publications, particularly *Der Raum*—which was actually being written at the time of the meeting. Ostwald's "pyramid of the sciences" does make a significant appearance in *Der Raum*, alongside Husserl, as exemplifying the structure of knowledge as conceived by Carnap at that time.⁷⁶ But while the influence of Husserl on the early Carnap has been beaten to death,⁷⁷ that of Ostwald has hardly begun to be explored, and from the evidence of the Buchenbach meeting it seems it can hardly be overstated.

More generally, it seems that in his overall *Weltanschauung*, the basis of his life-long values, Carnap was far more deeply influenced by the positivist tradition than has been acknowledged. The interpreters who were—rightly—able to discover traces of Kantian and neo-Kantian and phenomenological thought in his early works had an entirely valid point to make, but their priority, at the outset, anyway, was to liberate Carnap from the interpretative encrustations of those who read him in English through the eyes of the British empiricist tradition, as simply an extension of Russell. They were right. What got lost in the shuffle, however, and what these documents remind us of, is that there was a native German (and French) empiricist—positivist—tradition, that Carnap grew up immersed in this tradition, and that it presented itself to him largely in the shape and personality of Wilhelm Ostwald.

⁷² Carus (2007, 94–7).

⁷³ Dahms (2004).

⁷⁴ Vossenkuhl's (1992) critical discussion of color in the *Aufbau* antedates much of the better-informed and more sophisticated scholarship on that theme over the past two decades.

⁷⁵ Carus (2007, 66–8, 91–108).

⁷⁶ Carnap (1922, 85).

⁷⁷ Cf. e.g. Mayer (1992), Roy (2004), Ryckman (2007), Haddock (2008), Stone (2009), and Carus (2015, in this volume), among many others.

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The Context of the Development of Carnap's Views on Logic up to the *Aufbau*

Clinton Tolley

Introduction: The Early Carnap Between Kant and Russell

As Michael Friedman has ably described (cf. Friedman 1999), the reception-history of Carnap's 1928 *Aufbau* during the mid-century after its publication was one in which this work was seen almost exclusively as contributing an updated version of British and Austrian empiricism. In particular, Carnap's logical 'construction of the world' was seen as building off of the early-century work of Russell, especially Russell's own 'logico-constructive' programme in his 1914 *Our Knowledge of the External World*. As Friedman notes, this view of the *Aufbau*'s core sympathies was fostered and encouraged especially by the influential portrayals of Ayer, Quine, and Goodman.

Friedman has also forcefully argued, however, that such Russell-focused readings of the *Aufbau* are deeply misleading as to the true intellectual spirit of the work, since it ignores the significant role played by the Kantian and neo-Kantian problematics that animated Carnap's work and intellectual life from very early on, but especially from the time of his 1922 *Der Raum* through the composition of the *Aufbau* itself (cf. Friedman 2000: ch 5). More recently, Friedman's revisionary

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efforts have been further supported by the careful historico-analytical work of Alan Richardson (cf. Richardson 1992, 1998).¹

For the claim that Kantian and neo-Kantian concerns play a very active role in shaping the early Carnap's views, the textual and historico-contextual evidence marshaled by Friedman and Richardson is quite compelling. It is therefore very easy to have a considerable degree of sympathy with this part of their proposal. It is less clear, though, that this evidence should compel us to *wholly* neglect what surely motivated the more familiar interpretation in the first place – namely, the *prima facie* substantial evidence Carnap is (at least) *also* directly and deeply influenced by Russell. As Christopher Pincock, for one, has emphasized, this counter-evidence includes various testaments from Carnap's own hand at the time concerning the extent of Russell's impact on Carnap's early projects, in both published work and private correspondence (not least correspondence with Russell himself), along with later retrospective portrayals of Russell's decisive influence (cf. Pincock 2002). Pincock has urged in particular that the early Carnap's concerns with presenting the 'constitution' of our 'cognition' of the physical world from an 'autopsychological' basis of elementary phenomenal contents ('*Erlebnisse*'), and the resulting re-conception of the objectivity of such cognition, bears *at least as much* affinities with Russell's own attempts in the 1910s to present the construction of our 'knowledge' of the external physical world out of sense-appearances, as it does with any particularly neo-Kantian attempts to do the same (cf. Pincock 2002: 14f; cf. Pincock 2007).

In what follows, I will sound a note of caution similar to Pincock's, by pointing to a further dimension along which Carnap's early views depart fairly directly from both Kant and the neo-Kantians, and swing much closer to Russell's – namely, in Carnap's conception of the subject-matter of the science of *logic*. For though many recognize the extent to which the *system* of logic ('logistics') that Carnap embraces is surely not Kant's – since it is indebted to advances made possible only by Russell, Frege, and others – there has been very little discussion of the extent to which Carnap's very understanding of the *subject-matter* of logic itself departs from the Kantian perspective.² For example, though Friedman himself acknowledges that, in the *Aufbau*, 'Carnap's conception of logic is that of *Principia Mathematica*' (Friedman 1999: 180), the extent to which this conception could be compatible with a broadly neo-Kantian framework is not directly addressed. This comes at a cost, for, as we will see below, the Kantian (and neo-Kantian) conception of logic is of a science primarily concerned with mental *activity* and its (ideal) *contents* (concepts, Fregean '*Sinne*'), whereas Russell takes logic to be primarily concerned with the *objectivities* which are represented by such contents through such acts – i.e., with the objects, properties, states of affairs, facts (and so on) that together constitute the

¹In this proposal for the re-framing of our engagement with the *Aufbau* through a broadly Kantian perspective, Friedman and Richardson significantly develop and vastly extend earlier sketches in this direction made in Haack (1977), Sauer (1985, 1989), Moulines (1985), and Coffa (1991).

²In fact, there has been very little discussion in general of the early Carnap's conception of the subject-matter of logic. For a very helpful discussion of Carnap's early 'system of logistics', see Reck (2004, 2007).

most general or universal features of the objective world. And while Friedman is right to claim that the early Carnap does, for the most part, embrace the Russellian conception of logic, Carnap also follows Russell in placing logic at the very basis of his own constitution programme, which has the effect of lodging non-Kantian doctrines right at the heart of Carnap's project at the time. Hence, even if we should surely welcome Friedman's and Richardson's recent contributions as a necessary corrective to the traditional one-sidedly Russell-framed interpretation of the early Carnap's views, I will conclude that it nevertheless remains correct to *also* orient our understanding of Carnap in this period, on certain key points, by reference not just to certain not-uniquely-Kantian threads that are at work throughout the *Aufbau* (as Pincock has argued), but, in the case of logic, certain decidedly non-Kantian, and decidedly Russellian, threads as well.

I will proceed as follows. In "[Conceptions of logic in the early Carnap's historical context](#)" I will present three conceptions of logic which can be seen to flow into Carnap's early thought, based on his own reporting of influences at the time and later, as well as his published references concerning logic in *Der Raum* and the *Aufbau*:

- (i) the *mentalist* conception of logic developed by Kant, and taken up in an exemplary fashion by Natorp, according to which logic is concerned first and foremost with mental acts of understanding and their ideal contents (concepts, thoughts);
- (ii) the *referentialist* conception of logic which emerges in the work of Frege and Husserl, according to which the domain of logic includes not just contents (Fregean *Sinn*, Husserlian meanings) but also includes 'formal-ontological' structures (in Husserl's words), i.e., items belonging to the realm of Fregean 'reference [Bedeutung]' – though also still leaving room (however minimal) for a treatment of mental acts (of intending, referring, judging, inferring, etc); and, finally,
- (iii) the more austere *ontological* conception of logic which is developed and defended by Russell during the 1900s–1910s, according to which the subject-matter of logic is simply the most general features of the world itself, rather than anything mental whatsoever (whether act or content/sense).

With this framework in mind, I will then turn in "[The early Carnap's conception of logic](#)" to the three major writings of Carnap's early period which deal with the question of the subject-matter of logic: the 1922 *Der Raum*, the 1928 *Aufbau*, and the 1929 *Abriss der Logistik*. Here I will show, first, that already by the time of *Der Raum*, we find Carnap at least at one remove from the Kantian mentalist conception, insofar as he means to follow Frege and Husserl instead in including ontological concerns within logic. I will then show, secondly, that by the time of the *Aufbau* and the *Abriss* at the latest, the dominant position on logic that Carnap endorses seems to be one that moves almost all way to embracing the Russellian ontological conception, by rejecting the idea that either mental acts or thoughts have distinctively 'logical worth'.

Because Carnap places logic at the very foundation of the *Aufbau*'s constitution project (Carnap 1928: §§106–7), I conclude that the foregoing implies that there is a set of largely Russellian and decidedly non-Kantian doctrinal commitments lying squarely at the very basis of the project itself (“[Resisting idealism: an ‘extensionalist’ conception of logic is not \(neo-\)Kantian](#)”). In the concluding sections, however, I turn to one final distinct thread which can be seen to be present in Carnap’s conception of logic in the *Aufbau*, one which only ever so slightly (and sketchily) begins to emerge there as well as in an essay on concepts Carnap wrote while in the final stages of composing his book (Carnap 1927), and only finally receives considerably further development in Carnap’s subsequent work. More importantly for our purposes, it is a thread which does not seem to fit very well at all with the Russellian conception Carnap otherwise will have been shown to embrace at the time. This is:

- (iv) the conception of logic as dealing with our own (mental acts(?) of) ‘conventions’ and ‘stipulations’, rather than having any straightforwardly ontological import.

After trying to track down some of the roots of this conception in Wittgenstein and others (“[Resisting ‘realismus’: constitution, convention, and stipulation](#)”), I will then ask whether, if fully embraced, this conventionalist conception might be viewed as drawing Carnap closer to the Kantian or neo-Kantian conception of logic after all (“[Kantian roots of the *Aufbau*’s proto-conventionalism?](#)”). I will argue that, though this conception does bear some affinities with the Kantian one, there is still no reason to mark it out as distinctly Kantian (or neo-Kantian).

Conceptions of Logic in the Early Carnap’s Historical Context

Finding an Appropriate Historical Frame

In the Preface to the 2nd (1961) edition of the *Aufbau*, Carnap refers to Frege and Russell as the most salient influences on his conception of logic at the time, and also as providing him with the ‘insights’ about logic that ‘formed the basis of [his] book’ (Carnap 1928 [1961], xi). Frege and Russell’s key role is further confirmed by Carnap’s correspondence with Russell and others during this early period (cf. Pincock 2002), as well as by the more extensive comments Carnap made in his later ‘Intellectual Autobiography’ (cf. Carnap 1963:11–13; see also Reck 2004). It would be natural, therefore, to expect that the early Carnap’s views on logic will share especially much in common with Frege and Russell in particular.

At this point, however, three difficulties arise. The first is that it is not at all evident that Frege and Russell agree on the nature of the subject-matter of logic (cf. MacFarlane 2002; and see below “[Frege and Husserl: logic as the science of objective contents and their objects](#)”). We will need to determine, therefore, which overlapping dimensions of their otherwise divergent views Carnap sees himself as drawing upon. A second is that a good number of these texts represent Carnap’s

perhaps clouded retrospection of his influences at the time, rather than his first-hand reports from the time itself. A third related difficulty is that in other earlier recordings of his influences, including other correspondence from the time and in Carnap's early references to secondary literature, we find other figures arguably taking up a significant amount of the spotlight as well. For example, as Coffa notes (cf. Coffa 1991: 207), when Carnap writes to report to Hugo Dingler in 1920 which authors Carnap is most engaged with at the time – i.e., the time when he is working out the views expressed in *Der Raum* – Carnap's list instead highlights figures such as Helmholtz, Mach, and Weyl, and also includes Kant and the neo-Kantian Paul Natorp. A similarly broad variety of references is found in *Der Raum* itself, in the part of Carnap's literature-survey that focuses on logic. There, besides Russell (and Whitehead) and Frege, we find Carnap singling out also Couturat and Husserl, along with the neo-Kantian thinkers Bauch, Cassirer, and (again) Natorp, and Kant himself (cf. Carnap 1922: 78–79, 85–85). This is in addition to the oft-noted broadly 'Kantian' tenor of the whole of *Der Raum* (it was published in *Kant-Studien* after all!), and the central framing role played by some of Husserl's distinctions in determining Carnap's background conception of both the relationship between the three kinds of space he identifies in the work, as well as the three disciplines which pertain to these spaces respectively (Carnap 1922: 60–61, 65).

Nor does such a breadth of references drop out once we reach the *Aufbau* itself. Though again Russell (and Whitehead) and Frege are surely given pride of place in Carnap's description of who he means to be following with respect to logic (cf. Carnap 1928: §3), Husserl, too, again comes in for positive mention in relation to Carnap's general approach to constitution-theory (ibid.), as do the neo-Kantians – now perhaps especially Cassirer, given his articulation of the philosophical significance of the theory of relations (cf. Carnap 1928: §12).³

All of this strongly suggests that the early Carnap was in fact engaged with a much richer set of perspectives on logic than those of Russell and Frege alone, and in particular was actively engaged with positions importantly distinct from either traditional or Russellian versions of empiricism – with the Kantian, Fregean, and early-phenomenological traditions perhaps standing out in particular. Yet if we were already wondering how best to understand Carnap's later claim to be deeply influenced by two authors (Frege and Russell) who don't themselves obviously agree on the nature of logic, the question returns with even more significance now that we find ourselves tasked with weaving together an even broader set of diverging perspectives.

We can get some bearings by looking briefly at what would seem to be three main perspectives on logic represented in Carnap's references, in order to then see which of these provides the closest fit with Carnap's own views of logic at the time. We will begin with the Kantian, broadly mentalist perspective of Kant and Natorp; then turn to the more sharply de-psychologized, referentialist perspective common

³For a very lively and nuanced presentation of the multi-faceted intellectual context of Carnap's early work, see (Carus 2008).

to Frege and Husserl; and look, finally, to the more straightforwardly ontological perspective of Russell.

Kant and Natorp: Logic as the Science of Mental Activity and Its Contents

Kant

Kant takes the traditional logic to be a ‘science [Wissenschaft]’ whose object is ‘*thinking* [denken]’, considered as a specific sort of mental activity, one that is brought about by our intellect, or in Kant’s terms, our capacity of ‘*understanding* [Verstand]’ (cf. B75–76). Thinking is a species of ‘*representing* [vorstellen]’, or the mental activity by means of which certain mental contents are used to represent further items to the mind. More specifically, thinking is representing objects ‘through *concepts* [Begriffe]’ (cf. B93–94; B376–77). Kant takes the paradigmatic case of representing objects through concepts to be ‘*judging* [urteilen]’ about objects. In fact, sometimes Kant makes it sound as if our understanding cannot use concepts in any other way except in judging, and in any case holds that the capacity for thinking is also adequately understood as the capacity for judging (cf. B93–94). This also allows Kant to characterize concepts in terms of their role in judgments, insofar as they provide the ‘matter’ for judgments by serving as their subject- and predicate-terms, with the copula serving as the (most basic) ‘form’ by means of which concepts are connected into a judgment (cf. B94; B322; B141–42).

Kant’s attitude toward logic is not wholly traditional, however, insofar as he proposes that we should reconceive of logic as having two central parts, in light of the two aspects of our understanding: on the one hand, its basic activity (thinking, judging), and on the other, its basic contents (concepts). Logic itself will thus have (1) a ‘formal’ part, which sets out to identify basic (‘elementary’) ‘forms’ of the *acts* of understanding (forms of judging), in abstraction from the kinds of matter or contents (concepts) that can be involved in such acts (cf. B76–79; Kant 1800: §I, 9:13); and then (2) a part that does not abstract from considerations of these contents, but seeks instead to determine the basic (‘elementary’) contents (*concepts*; what Kant calls ‘categories’) which are involved in all acts of understanding. Kant’s name for the first part is ‘formal logic’ (cf. B169–70), while he calls the second part ‘transcendental’ logic (cf. B79–82).

As Kant sees it (cf. Kant 1783: §39, 4:323), such a reconception is necessary because the concerns of the traditional logic have been largely restricted formal logic – i.e., the tasks of finding the basic ‘forms’ of judging, along with the basic ‘rules’ for interrelating such judgments in inferring (syllogisms). The possibility of an equally apriori inquiry into the basic concepts (or ‘categories’) of understanding, by contrast, is something that Kant thinks had not yet been recognized to belong to logic as the science of *thinking* – though such an inquiry had been pursued instead under the

heading of *metaphysica generalis* or ontology, as the science of *being* and its basic genera (cf. Baumgarten 1779: §4). Kant faults previous attempts at an ontological grounding of category-theory on two fronts. First, he criticizes their failure to show how the knowledge they purport to have achieved could be possible *apriori*, since it would seem to require that we could have all of being itself present to mind somehow prior to actually being 'given' any particular being in an intuition or experience (cf. Kant 1783: §9). Secondly, Kant criticizes previous metaphysics for failing to provide a genuine 'principle' from which the basic categories can be derived systematically, rather than haphazardly ('rhapsodically'; cf. B107; Kant 1783: §39, 4:324).

Kant's own contention that the science of the categories should be seen as a branch of *logic* is meant to overcome both of these limitations. By showing how the relevant *concepts* of kinds of objects can be derived ('deduced') from logical *forms* of acts of understanding in judgment, Kant's account addresses the first issue by demonstrating how we could possess the relevant knowledge in question *apriori*: to find the basis of these basic concepts (contents) we do not need to look beyond the understanding itself, which is itself something that *is* 'given' to the mind *apriori*, as a part of the mind itself (cf. B159). And since the traditional logic has already shown that the forms of judgment themselves compose a system, the possibility of the deduction of the categories from such forms also shows, secondly, that the set of these basic concepts does have a systematic principle (cf. again B107 and Kant 1783: §39).

What is crucial for our purposes in all of this is that Kant conceives of both parts of logic as having a subject-matter which is available *apriori*, since consisting solely in the 'mental' dimensions of understanding, whether its *acts* (as in formal logic), or its representational *contents* (concepts) – *rather than* including whatever individual *things* 'in themselves' might exist or have being, in order to be thought or judged about. For Kant, it is especially important to see that this is true even of transcendental logic, since his revisionary account of the science of categories shows that what traditional ontology claims to be knowledge directly of the predicates (properties) of *things* consists instead solely in knowledge of certain conditions for our '*cognition*' (concepts) of things (cf. B113–14).

Natorp

To many ears, Kant's use of such straightforwardly mental terms made logic sound – for better or for worse – as if it were a discipline that should be subordinated to psychology, when the latter is understood as the study of the powers and states of the soul (the science of 'psychical' phenomena, broadly construed). To be sure, Kant himself tried to head off any such subordination, at least with respect to *empirical* psychology, since (as we noted above) the subject-matter of 'pure' logic is given to the mind *apriori*, and so knowable 'prior' (in some sense) to any experience (cf. B77–82; Kant 1800: §I, 9:12–14). Nevertheless, many later aspiring neo-Kantians took even greater pains to distinguish the manner in which the understanding is treated in logic from how it is approached in psychology, to avoid the charge of 'psychologism' that had been leveled against Kant and post-Kantians by Husserl

and others (cf. Husserl 1900–1: Prolegomena). Not least of these was Paul Natorp, who famously retorted that the neo-Kantian tradition did not have anything to learn from Husserl's anti-psychologistic arguments, since Kant's own concern, especially in his transcendental logic, was already with the determination of which 'basic *concepts* [Grundbegriffe]' form the 'pure' and 'objective' basis or ground for the 'basic principles [Grundsätze]' of 'basic sciences [Grundwissenschaften]' like mathematics and natural science – rather than anything subjective or particular to the psychological make-up of this or that individual (cf. Natorp 1901: especially 281f).

Even so, in his own later treatise on logic, his 1910 *Die logischen Grundlagen der exakten Wissenschaften*, Natorp follows Kant in accepting that logic itself is tasked with uncovering the 'basic *acts* [Grundakte]' of understanding, and the specifically logical (deductive) 'manner of *proceeding* [Verfahren]' in thinking (cf. Natorp 1910: 5; my ital.). What is more, Natorp also means to follow Kant in claiming that the fundamental activity of understanding is something which can be understood as a kind of 'synthesis' that is manifest in 'judgment'.⁴ In fact, Natorp criticizes then-contemporary conceptions of logic which, in their recoil from psychologizing the logical domain, go on to entirely neglect the 'process-character of thinking', a neglect which Natorp himself means to correct (Natorp 1910: 41; cf. 18, 27).

Yet though Natorp retains a version of Kant's characterization of the subject-matter in terms of certain basic intellectual acts, Natorp is equally clear that the activity or process in question is simply not one that could be captured by the methods of psychology: 'This law-governed process of thinking [gesetzmäßigen Gang des Denkens]... is not a process in time, therefore it is certainly not a psychological or historical process' (Natorp 1910: 17; cf. 13–16). Rather, thinking is identified in logic solely as the act-correlate of certain relationships which obtain among 'what is thought [das Gedachte]', which Natorp also unpacks in terms of the 'content [Inhalt]' or 'sense [Sinn]' associated with subject-predicate structures, structures which Natorp calls 'the possible content of an assertion [Aussage]' (cf. Natorp 1910: 37). Like Kant, however, Natorp also maintains that this basic predicative relation within the possible contents of assertions itself obtains *only because* of the nature of the 'basic' intellectual 'act' of 'cognizing' (thinking) – which allows Natorp to keep hold of Kant's thought that the basic structures of such contents ('constituents') for judgment will be 'directly derived from' this basic act – even going so far as to claim to derive the very fact that such content will consist in concepts *at all*, related in judgeable forms (cf. Natorp 1910: 44; cf. 49).⁵

For Natorp as for Kant, therefore, logic is concerned with both forms of activity (thinking) as well as kinds of contents (what is thought, 'sense'; cf. Natorp 1910: 7).

⁴To be sure, Natorp argues for a very particular understanding of the acts of 'synthesis' and 'judgment', insofar as he associates the most 'original' versions of these acts not with a 'combining' of pre-given discrete parts but with a more holistic 'determining' the parts of a whole together with the 'connection' and 'correlation' between the parts all at once (cf. Natorp 1910: 21–39).

⁵This is part and parcel of Natorp's attempt to defend and further develop Kant's proposed expansion and reorientation of logic, from the traditional merely 'formal' logic of acts toward the transcendental logic of basic cognitive contents, yet to do so in a way that satisfies Kant's demand for a single principle provided by an original *activity* of understanding (Natorp 1910: iv).

What about Kant's exclusion of the *things* themselves (the ontological) from the domain of logic? Unlike Kant, Natorp does not appear to countenance any sharp separation of what is thought qua content from the object thought about through such content. Rather, the only 'object' for thinking is the exact 'correlate' to thinking's 'projection' (Natorp 1910: 32–34). As a consequence, Natorp holds the seemingly more radical position that 'there is for thinking no being [Sein] that would not be posited in thinking itself. [...] Logically, at least, nothing *is* before thinking. (Natorp 1910: 48). But then, because there *is* nothing to be thought beyond what is 'posited in thinking', nothing merely 'in itself' in complete detachment from thinking, logic of course cannot then be charged with the task of uncovering anything like the subject-matter of the traditional ontology (i.e., the universal predicates and laws governing things 'in themselves').⁶

Frege and Husserl: Logic as the Science of Objective Contents and Their Objects

Frege

For Husserl at the turn of the century, and before him, for Frege, all such attempts to 'ground' logic in any sort of mental activity looked deeply misguided. Though both accepted that certain mental acts (such as judging, inferring, etc.) are of particular interest in logic, this is not because they contribute to the determination or constitution of the *contents* to which they are related, and it is especially not because they help to 'generate' or 'posit' the *objects* or things to which the mind is related through such contents. Rather, both held that such acts are coordinated with contents and objects whose natures and structures are what they are *independently* of the existence and nature of any such acts.

This is, of course, not to say that there are no parallels with the Kantian tradition. Like Natorp, Frege distinguishes 'what is thought' qua content from the mental act coordinated with it; this content is what Frege calls a 'thought [Gedanke]', something which serves as the 'sense [Sinn]' of an 'assertoric sentence [Behauptungssatz]' (Frege 1967: 148). Yet though Frege, too, takes 'thinking [Denken]' to be one of the most primitive acts of interest to logic, Frege construes thinking not as an active synthesis, but a receptive 'grasping [Erfassen]' of what is already there, complete with whatever constitution it has (cf. Frege 1967: 346). What is more, Frege takes thoughts themselves (and *Sinn* more generally) to be 'modes of being *given*' further 'references [Bedeutungen]' (Frege 1967: 144), rather than modes of 'positing' or 'generating' objects.

⁶For more on the neo-Kantian rejection of the 'in itself' in this sense, and the turn toward the 'generative' conception of the objects of cognition, see (Friedman 2000: Chapter 3) and (Richardson 1998: 116f).

Frege takes the reference or objectivity represented ('given') by a whole thought to be the 'truth-value' of the thought, i.e., 'the true' or 'the false' (Frege 1967: 148f). Each thought, in turn, is composed of component senses which give separate references of their own, such as individuals, properties, relations, and so on. Since we will return to this issue in Carnap, it is worth noting that Frege's terminology is a little confusing here, since he departs from the Kantian tradition (and more recent usage as well) by associating 'concepts [Begriffe]', not with the *content* that composes a thought, or something at the level of sense, or that by means of which e.g., a property ('mark') is 'given', but rather with something at the level of *reference*, or what is 'given' (represented) through the level of sense: the domain of concepts includes not representations of properties but the properties, relations, and (more generally) functions themselves (cf. Frege 1969: 96).

Even so, like Natorp, Frege, too, takes the subject-matter of logic include all three 'realms' (act, content, object) – at least to some degree.⁷ That logic has to deal in some direct way with mental acts can be seen from the fact that Frege insists on including signs for certain specifically logical mental acts within his official logical notation ('concept-script [Begriffsschrift]') – most importantly, signs for the act of 'judging', the act of 'defining', and the act of 'inferring' (cf. Frege 1893: §5, §14, §27).

Despite this, however, Frege seems to think that logic's interest in these acts does not go very far beyond noting the contents (thoughts) they are coordinated with (cf. Frege 1969: 159). What is more, when Frege describes the domain of logical laws, he describes this domain not in terms of activity but rather in terms of items have a certain kind of *being*: 'logic is the science of the most universal laws of *being-true* [Wahrsein]' (Frege 1969: 139, my ital.; cf. Frege 1967: 343). What has this kind of being, for Frege, are not acts of thinking or judging but their contents, i.e., thoughts: 'the predicate 'true' applies to thoughts' (Frege 1969: 142).

Yet, as the reference to truth here also makes evident, Frege also does not take logic to be concerned solely with thoughts per se, in abstraction from the question of their reference (truth-value). Rather, logic is directly concerned with the relation between thoughts and their truth-values, and in particular, with the 'step [Schritt]' from thought to truth-value: 'logic is not concerned with how thoughts proceed from thoughts without reference to the truth-value, for the step from thought to truth-value, and more generally from sense to reference, must be taken' (Frege 1969: 133). In fact, Frege goes so far as to conclude that the realm of reference itself can thus be viewed as 'what is essential [das Wesentliche] for logic', such that 'the logical laws are first laws in the realm of references and relate only mediately to sense' (Frege 1969: 133).

With Frege, then, we see a clear shift of logic's focus from acts and contents (Kantian concepts) to the realm of their references: to those things, properties, relations, etc. represented through contents (senses). To be sure, Frege continues to follow Kant in holding the domain of logic to be something which can be known

⁷For a lengthier defense of the claim that all three realms belong within Frege's conception of 'what is logical [das Logische]', see (Tolley 2011).

apriori, independently of what is known in experience or intuition.⁸ Still, Frege never makes the further transcendental-idealist claim that the domain of logic is knowable apriori *because* it can be 'derived' from (apriori knowable) forms of mental activity. And though he does accept that objects in the domain of logic are 'given' to the mind through thinking and reasoning ('reason [Vernunft]') alone (cf. Frege 1884: §105), Frege does not characterize such 'givenness' as an active generation or positing by thinking itself. Rather, Frege insists that such objects are 'no more an object of psychology or a product of a psychological process [ein Ergebnis psychischer Vorgänge] than the North Sea is' (cf. Frege 1884: §26).⁹

Husserl

Frege's conception of logic is therefore built upon a commitment to the objectivity and mind-independence of both the contents (thoughts) and objects (properties, relations, truth-values) in view within logic. And by making logic directly concerned with the realm of reference as well, Frege would seem to bring more squarely back into logic what had traditionally been thought of, before Kant, as the domain of ontology.

The concern for ontology within logic is made even more explicit in the kindred conception of logic developed by Husserl in his 1900–1 *Logische Untersuchungen*. Already in the Foreword, Husserl signals that he, too, will argue for the shift in logic's focus away from a concern with mental acts per se, and toward their contents and the objectivities represented through them, distinguishing 'the psychological connections of thinking [Denken]' from 'the logical unity of the content of thought [Denkinhalt]' (Husserl 1900–1: I.vii; cf. I.12–16). And, as is well-known, one of Husserl's main concerns throughout the *Investigations*' 'Prolegomena' is to combat psychologism about logic, by criticizing any view according to which the subject-matter of logic would consist solely in mental activity, its processes, or its 'products'. To this end, Husserl insists that we must take care 'not to mix up the *psychological* 'presuppositions' and 'foundations' of the *cognition* of a [logical] law with the *logical* presuppositions, grounds, of premisses of the [logical] *law*' itself (Husserl 1900–1: I.75). Similarly, we should not confuse the domain that is governed by logical laws with any domain of '*facts* [Tatsachen]', including psychological ones – with a 'fact' being understood by Husserl to consist in 'some-

⁸Like Kant, Frege distinguishes the kinds of objects we can know on the basis of the division between the different 'sources of cognition [Erkenntnisquellen]' of these objects, with the 'logical' source providing apriori knowledge of what pertains to everything 'thinkable', independently of whether it is also sensible or imaginable (cf. Frege 1884: §14, §§26–27, and §105; and Frege 1969: 286f).

⁹All of this suggests that we should be cautious against grouping Frege too close to Kant or the neo-Kantians, even if – as Gottfried Gabriel and Hans Sluga have argued (cf. Gabriel 1986; Sluga 1980) – there are clearly ways in the Kantian problematic leaves deep marks on Frege's own positions. For further comparison of Kant and Frege on different aspects of their philosophies of logic, see (MacFarlane 2002) and (Linnebo 2003).

thing temporally determinate [ein zeitlich Bestimmtes]' (Husserl 1900–1: I.76–77; my ital.). Logical laws, rather, 'are related in general to *truths*, and therefore have truths as the 'objects' that they govern', and 'no truth is a fact' in the sense just spelled out, since 'a truth is raised above all temporality, i.e., it makes no sense to ascribe to it temporal being, arising, or passing away' (Husserl 1900–1: I.76–77; my ital.).

As this suggests, Husserl, like Frege, takes the items which possess the right kind of 'being' to be true (or false) to be 'objects' which are distinct both from anything psychological and from any other (temporally) existing thing. These items are what Husserl (following Bolzano) calls 'propositions [Sätze]', which, though they can serve as the contents of acts of judging, are not identical with such judgments or any other mental ('psychical') acts. Rather, a proposition is 'an ideal meaning-unity [eine ideale Bedeutungseinheit]' which stands over and against an indefinite number of mental acts as their content (Husserl 1900–1: I.175). Hence, a law of logic (like the principle of contradiction) is 'not a law for the act of judgment [Urteilsact] but rather for the *content* of judgment [Urteilsinhalt]...that we call propositions' (Husserl 1900–1: I.176; cf. I.70).

While this might suggest that Husserl takes logic to focus solely on the realm of Fregean thoughts, Husserl, like Frege, holds instead that 'ideal validity' cannot be 'supplied' to 'acts of thinking' through a self-standing realm of propositions or truths, but only by the 'objective' *relation* that this realm of contents bears to the realm of '*things* [Sache]' that they represent truly (Husserl 1900–1: I.228). In this way, Husserl likewise takes the 'objective connection' to which acts of thinking are related to be 'twofold': on the one hand, there is the 'the objective connection of *things*, to which the phenomena of thought [Denkerlebnisse] (those actual or possible) are intentionally related', and 'on the other side there is the connection of *truths*, in which the unity of things comes to objective validity, as what it is' (Husserl 1900–1: I.228). What is more, Husserl takes these two dimensions (the true contents (propositions) and the things of which they are 'valid') to be 'given with one another apriori and inseparable [unablösbar] from one another' (Husserl 1900–1: I.228–9). Insofar as logic is concerned with the laws which govern truths, then, it is also concerned with the objective connections that constitute the things which such truths allow us to intend 'validly'.

For this reason, Husserl holds that logic itself will have to investigate *both* 'the concepts: concept, proposition, truth, etc.', or what Husserl calls 'the categories of *meaning* [Bedeutungskategorien]' (where '*Bedeutung*' is used in a non-Fregean way, as interchangeable with 'sense'), *as well as* 'other concepts that stand in correlation with these, such as: object, state of affairs...and so on', which Husserl calls 'the pure or formal *objectivity*-categories [gegenständlichen Kategorien]' (Husserl 1900–1: I.244; my ital.). Later Husserl will mark the presence of the second set of categories (something, object, etc.) within logic by claiming that logic itself contains 'formal *ontology*' as one of its branches, the one which presents 'axioms concerning the logical essence of object-in-general', with the science of the 'meaning-categories', by contrast, being assigned to the branch of specifically

'apophantic logic', which treats instead of 'the essence of the proposition' (Husserl 1913: §10, 23).¹⁰

Finally, again like Frege, and against Natorp, Husserl is quite explicit about the fact that we stand in a receptive rather than productive relation to both apophantic-logical contents and formal-ontological objectivities. We are 'given' such ideal contents and 'formal' objectivities in what Husserl initially calls 'universal [allgemeiner] intuitions' (cf. Husserl 1900–1: II.478), and later calls 'eidetic grasping [Wesensschauung]' (cf. Husserl 1913: §3). Husserl admits that these intuitions contrast with sensory intuitions of concrete individuals as to (a) the nature of their objects, since they have 'universal objects' rather than individuals, and (b) which mental acts need to prepare the way for such intuitions, since they must be preceded by an act of abstraction, in order to yield a 'sensibility formed by categorial acts' (Husserl 1900–1: II.477). Nevertheless, universal intuitions are like sensory intuitions in that they, too, immediately and directly present us with their objects, objects whose natures are what they are regardless of our own mental activity – and so, objects which are in no way 'produced' by our mental activity, but are rather 'adequately' and 'originally given' as they are (Husserl 1913: §3).

Russell: Logic as the Science of the Most General Forms of Facts (Things 'in the World')

Implicitly in Frege and explicitly with Husserl, then, we see an incorporation of the traditional concerns in ontology (and for Husserl, the name itself) within logic. To be sure, both keep some degree of faith with the conception of logic held by Kant (especially his transcendental logic) by claiming that logic is also concerned with the domain of ideal contents (concepts or senses, propositions or thoughts, truths, etc.) by means of which objects, properties, states of affairs, etc. are represented ('intended'), and by allowing an at least residual reference to the mental acts which engage with such contents. Nevertheless, both advocate a shift of focus in logic to orient its subject-matter in a way that incorporates a doctrine of the references or objectivities represented through such contents in such acts.

If we now turn to Russell, however, we find a conception of logic that contrasts even more sharply with the Kantian tradition, insofar as Russell effectively restricts logic's concerns *only* to the objectivities represented through mental contents in mental acts – i.e., items at the level of objects, properties, facts, etc. – and relegates concern with either mental acts or their so-called contents entirely to psychology. This emerges directly in Russell's correspondence with Frege, where he distinguishes his own views on the content and object of mental acts as follows:

One does not assert the thought [Gedanke], for this is a private psychological matter; rather, one asserts the object of the thought, and this is, in my opinion, a certain complex (an objective proposition, one could say), in which [e.g.] Mont Blanc itself is a component. If one

¹⁰For more on the relation between logic and ontology in Husserl, see (Smith 2007).

does not concede this, then one would have to conclude that we don't know anything at all about Mont Blanc itself. Because of this, for me the reference of a proposition is not the true [das Wahre], but rather a certain complex that (in the given case) is true. In the case of a simple proper name like 'Socrates' I cannot distinguish between sense and reference; I see only the idea [Idee], which is psychological, and the object. Better put: I do not accept sense at all, but rather only the idea and the reference. (Frege 1969: 250–51)

As we see here, Russell rejects the very notion that senses or thoughts could be objective non-psychological contents. There is only the 'psychological' act or state (the 'idea' as a private psychological matter), on the one side, and then, on the other, items at the level of Fregean reference: e.g., the object (e.g., Mont Blanc) or a 'complex' (state of affairs, fact) in which it is a constituent.

Given this rejection, it is unsurprising that Russell later goes on to describe logic as a science which is concerned with certain kinds of objects, relations, and facts, rather than with anything akin to Fregean sense:

I think one might describe philosophical logic...as an inventory, or if you like a more humble word, a "zoo" containing all the different forms that facts may have. In accordance with the sort of realistic bias that I should put into all study of metaphysics, I should always wish to be engaged in the investigation of some actual fact or set of facts, and it seems to me that that is so in logic just as much as it is in zoology. In logic you are concerned with the forms of facts, with getting hold of the different sorts of facts, different logical sorts of facts, that there are in the world. (Russell 1918: 80)

'Realistic' here is meant to contrast with the subjective-idealistic tendencies that Russell finds enmeshed in the views of many philosophers after Kant – and even, it would seem, in Frege's, insofar as Frege's position is criticized for placing objects and states of affairs beyond the reach of knowledge, by placing something ideal (mental, psychological) and (as Russell sees it) obstructively in the way, as an intermediary. On the 'realistic' picture, rather than focusing on psychological contents, logic will be concerned directly with objectivities ('facts'). For this reason, logic should be seen as a branch of the 'study of metaphysics', and the particular subject-matter that logic treats of is every bit as 'real', as mind-independent, as much a part of what there is 'in the world', as what zoology studies.

This passage also indicates what particular subject-matter Russell takes logic to have – what he here calls 'the *forms* of facts'. Logic first provides an 'inventory' of such forms, and then goes on to state facts about such forms – what Russell later calls '*completely general facts*' – in which 'there is no mention of any constituent whatever of the actual world, no mention of any particular thing or particular quality or particular relation, indeed strictly you may say no mention of anything' (Russell 1918: 42). Logical facts are special in that they do not include as constituents anything 'particular' – neither particular things like Mont Blanc, particular qualities like whiteness, nor particular relations like being to the left of something. Rather, they include only what might be called 'formal' properties and relations – i.e., the form of a particular bearing a property, the form of two particulars being related, etc. (Russell 1918: 105). This formality is something we can see witnessed in the linguistic expressions – what Russell at the time calls 'propositions' – through which we can mean or intend such *logicalia*, i.e., in 'logical propositions' like: 'If one class is part of another, a term which is a member of the one is also a member of the other'

(Russell 1918: 42). Such propositions ‘do not mention anything’ particular but refer only to various generic forms of particularity – what Russell above grouped under the heading of ‘the forms of facts’. What allows them to do so is that such propositions ‘contain only *variables* and nothing else at all’ (Russell 1918: 104; my ital.).

Though ‘it is not a very easy thing to see what *are* the constituents of a logical proposition’, Russell thinks that logical propositions are therefore to be ‘interpreted as being *about* forms’, which are in turn somehow ‘general’ (Russell 1918: 106; my ital.).¹¹ Yet whatever such formal-generic items are, one point that Russell is absolutely firm on (and here he agrees with Frege and Husserl) is that these items are not made by the mind but are there to be given to or ‘seen’ by the mind in acts of ‘acquaintance’. This comes out quite clearly in Russell’s statement in Preface to the *Principles of Mathematics* of the task of philosophy of logic in relation to the ‘indefinables’ of logic:

The discussion of indefinables – which forms the chief part of philosophical logic – is the endeavour to see clearly, and to make others see clearly, the entities concerned, in order that the mind may have that kind of acquaintance with them which it has with redness or the taste of a pineapple. (Russell 1903: v)

The same view is also present in Russell’s unpublished discussion of our relation to logical forms in his 1913 manuscript. Here again Russell insists that the mind must have ‘acquaintance’ with distinctly ‘logical objects’ and ‘logical forms’ in particular – despite these objects being ‘peculiar’ when contrasted with ordinary sensible objects (cf. Russell 1913: 91f). Like Husserl, Russell accepts that such ‘seeing’ might require preparatory mental acts of ‘analysis’ to enable the entities in question to be perceived (Russell 1903: v). Nevertheless, these acts in no way ‘generate’ their objects; rather, like the preparatory acts that enable the perception of planets, they enable their ‘discovery’ (ibid.).

* * *

Simplifying considerably, we can summarize the foregoing by coordinating the three different conceptions of logic we have canvassed here (Kantian, Fregean-Husserlian, and Russellian) in the following manner, with italics marking which domains each thinker takes to be among the primary subject-matter of logic (Table 1).

Table 1 Conceptions of logic among Carnap’s influences

	(i) Kant	Natorp	(ii) Frege	Husserl	(iii) Russell
Act	<i>Thinking, judging</i>	<i>Thinking, synthesis</i>	Grasping, judging, asserting	Thinking, judging	Thinking, asserting
Content	<i>Concepts, judgments</i>	<i>What is thought</i>	<i>Sense (thought, truth)</i>	<i>Ideal meaning (concept, proposition, truth)</i>	Idea
Object	Things	<i>Objects-as-‘posited’-by-thinking</i>	<i>Reference (objects, truth-values)</i>	<i>Objectivity (object, state of affairs)</i>	<i>Object, complex, fact (forms)</i>

¹¹ For more on the interaction between formality and universality in Russell’s conception of logic, see (Proops 2007: 12f).

With this classification-scheme in hand, we can now turn to the task of comparing the conceptions of logic among Carnap's self-identified influences with the one that emerges in Carnap's own writings, to see which if any of these conceptions is the closest to the one Carnap himself would seem to endorse.

The Early Carnap's Conception of Logic

Carnap on Logic in Der Raum

In his 1922 *Der Raum*, Carnap spells out his views on logic most clearly in the course of discussing what he there calls '*formal space*'. This is a space whose axioms 'are derived solely from logical axioms' (Carnap 1922: 63), which gives the space itself a 'logical closedness and rigor' because it is 'free from non-logical (intuitive or experiential) components' – and so, has only distinctively logical components (Carnap 1922: 8). In Carnap's description of what these logical components are, we find clear echoes of Russell's description of 'general facts':

Formal space is a universal order-configuration [Ordnungsgefüge] of a certain kind. By "universal order-configuration" we understand a configuration of relations – not between determinate objects of a sensible or non-sensible domain, but between thoroughly indeterminate relata, about which it is only known that from one kind of connection another kind of connection follows in the same domain. Formal space, therefore, deals not with the figures usually designated as spatial, triangles, circles or the like, but with meaningless relata, in whose place the most unhomogeneous things can occur (numbers, colors, degrees of kinship, circles, judgements, people, etc.). (Carnap 1922: 6)

Formal space is a more generic, less 'determinate' structure ('order-configuration') than either the 'space of intuition' or 'physical space'. Though the structures of intuitive and physical 'spaces' are themselves instantiations of formal-spatial order-configuration, formal space is the kind of structure whose relation-terms can be instantiated by things not traditionally considered to be spatial in the sense relating to sense-perception (e.g., numbers) (cf. Carnap 1922: 60–61). The theory of formal space, therefore, will not 'mention' any of these particular instantiations of this structure, but will remain at the level of the 'general theory of relations' – which Carnap here aligns with 'formal logic' (Carnap 1922: 8) – and 'develop' ('construct') this space from these abstract formal-logical materials alone, by 'deriving' its 'propositions [Sätze]' (axioms, theorems) from 'the basic laws of deductive logic' (Carnap 1922: 62). Since its 'propositions' – by which Carnap, like Russell, means linguistic expressions (cf. Carnap 1922: 9f) – can be deduced from formal-logical laws alone, formal space itself is a purely formal-logical object.

Now, the theory of formal space is, in fact, not the 'most general' branch of logic, because the deduction (derivation, development) of this theory takes the form of singling out certain slightly more determinate kinds of relations (ones, e.g., that determine a continuous ordered series) from among the even more universal domain of relations in general. What is important for our purposes is what this implies about

Carnap's views of the formal logic from which the more specific theory of formal space is derived. For this shows, first, Carnap takes formal logic itself to include the science of the fully universal domain of relations as such. Yet since this part of formal logic will therefore have an even more general or universal domain than the theory of formal space, its axioms and propositions will likewise not make mention of any particular fully determinate individual or relation, but rather – even more so than those of formal space – must refer only to 'indeterminate' relation-constituents. This line of thought also suggests, secondly, that the general theory of relations itself might only be only one part of formal logic, insofar as there may be a still *more* universal domain within which all relations are subsumed as a special case. This would imply that even the theory of relations itself must be 'constructed' (developed, derived) out of still more universal formal-logical propositions.

When we look to Carnap's own explicit discussion of 'the construction [*Aufbau*] of formal logic', what we find is something very much along these lines:

We begin the construction [*Aufbau*] of formal logic with the undefined basic concepts "true" and "false". Anything that is either true or false we call a *judgment* [Urteil]. A concatenation of signs, in particular written signs, that designates [bezeichnet] a judgment is a (complete) *proposition* [Satz]. If we remove a component with independent reference [Bedeutung] from such a concatenation, marking the gap that results, this "incomplete proposition" no longer designates a judgment. [...] We thus see that the incomplete proposition, though not designating a judgment, possibly (or potentially) contains, so to speak, various judgments, depending on what is inserted into the gap, and so is not meaningless [bedeutungslos]. We say it designates a "*concept* [Begriff]". [...] Just as an incomplete proposition with one argument place designates a concept, one with two argument places designates a *relation* [Beziehung]. (Carnap 1922: 9–10)

Here the very concept of a relation as such is defined by way of more primitive logical terms (the concepts: true and false, judgment, proposition, etc.). And while this construction or derivation of the notion of a relation is not explicitly put in terms of a determination or specification of something more general, it is clear that Carnap is implicitly conceiving of relations as members of a more universal domain – namely, the domain of component parts of what he here calls 'judgments'. To avoid terminological confusion, we should note that what Carnap has in mind here by 'judgment' is more properly thought of as what Frege means by the *reference* of the thought grasped and asserted in an act of judging, rather than any activity on the part of the mind – despite the fact that in Kant's, Natorp's, Frege's, and Husserl's lexicons, 'judgment' is used to refer to just such an act.¹² This is indicated by Carnap's identification of the constituents of judgment ('concepts' and 'relations') with what are 'designated' by, or serve as the 'reference [Bedeutung]' of, the parts of incomplete propositions, and his subsequent association (a few pages later) of the names which are 'inserted' into such incomplete expressions as items which 'designate' or 'refer' to 'objects'. All of this, of course, mirrors the terminology used by Frege, who was one of Carnap's teachers, for the relation of language to *reference*,

¹²This is true as well of the use of 'judgment' by Russell and Whitehead in *Principia*.

not its relation to mental acts or to component-senses of thoughts.¹³ This is also indicated, furthermore, by Carnap's claim later in the work that the pure theory of relations, of which the theory of formal space is one branch, is parallel to Husserl's 'formal *ontology*' (cf. Carnap 1922: 60–61) – rather than, say, Husserl's 'apophantic logic' as a pure 'theory of meaning' (or pure 'grammar').

The Russellian Core of Carnap's Picture of Logic in the Aufbau and the Abriss

By the time of the *Aufbau*, Carnap comes to make more explicit use of Fregean distinctions to specify the subject-matter of logic as the realm of reference rather than that of act or sense. Though in this work Carnap gives a fairly sustained presentation of Frege's distinction between *Sinn* and *Bedeutung* (cf. Carnap 1928: §44), Carnap continues to skip over the level of sense in his own exposition of the 'formal-logical' basis of the *Aufbau* itself. Carnap focuses instead only on signs and what they 'designate', i.e., their 'reference' – whether this consists of individuals, properties or relations ('functions'), or whole 'assertions', here understood as what is designated by whole propositions (cf. Carnap 1928: §26 et seq).

We find the same disregard for act and sense in the *Abriss*. Here Carnap claims that what is of fundamental interest for logic 'is something which is either true or false', what Carnap here also calls an 'assertion [Aussage]', a term which Carnap explicitly claims 'do[es] not mean the historical *act* of speaking, thinking, representing, but rather the timeless *content* [zeitlose Inhalt]' (Carnap 1929: §2b; my ital.). Yet though (as we saw above) 'content' was used in previous authors to pick out something on the level of Fregean sense, Carnap here describes what he means by 'content' solely in terms of what signs 'designate', their 'references', e.g., objects, functions, and assertions as well (cf. Carnap 1929: §2a and §2c). Note, then, that an 'assertion [Aussage]', too – like a 'judgment' in *Der Raum* – is here specified as something on the order of objects and functions and not Fregean thoughts (or acts).

In fact, not only does Carnap *not* focus on the level of Fregean *Sinn* in his initial discussions of formal logic in the *Aufbau*, when he does bring up *Sinn* later on in the work, Carnap does so only to claim fairly directly that consideration of sense is of no importance for logic, because the *only* specifically 'logical worth [logische Wert]' of a sign lies in its 'reference', as opposed to its sense, which supplies instead its 'cognitive worth [Erkenntniswert]' (Carnap 1928: §50). Sense only becomes of interest, thinks Carnap, when we are trying to convey more than just the references, e.g., in literary translation (cf. Carnap 1928: §51). The inquiry into sense (and trans-

¹³For evidence that Carnap was at this time intimately familiar firsthand with Frege's distinctions and terminology, compare the transcripts of Frege's lectures on logic that Carnap made while attending Frege's lectures (cf. Reck and Awodey 2004).

lation) will, however, not be logical but '*psychological*' (cf. Carnap 1928: §50). All of this comes together and is telescoped in Carnap's description of the *Aufbau*'s 'method of constitution' as 'extensional' (Carnap 1928: §45).

With such eschewing of sense, we already see Carnap moving past Frege (and Husserl) and toward Russell. Carnap draws even closer to Russell in his account of what distinguishes distinctively logical 'concepts' and 'assertions' from others:

Logic is, in general, not a proper [eigenes] domain, but contains those assertions, which... hold of objects from *any arbitrary* domain. From this it follows that it must directly concern itself with concepts which can be applied to *any arbitrary* domain. (Carnap 1928: §154)

Like Russell, we here find Carnap signaling the distinctive feature of logic as the absolute *generality* of the validity of its assertions (Russellian 'facts') and the extension of its concepts (properties, relations). Furthermore, we also find Carnap following Russell in describing this feature of logic's subject-matter in the language of '*form*' as well (cf. Carnap 1928: §46). For Carnap, too, a logical form is displayed by transforming linguistic expressions of assertions (i.e., transforming sentences or, in Carnap's terms, 'propositions [Sätze]') through the replacement of determinately meaningful terms with undetermined ('variable') signs, to yield the 'logical skeleton' of the sentence, which then 'designates' the logical form itself:

The 'logical skeleton' of a proposition designates its logical construction-form [Aufbauform], in abstraction from the reference of the non-logical concepts which occur in it. The logical skeleton of a determinate proposition can be manifest through the following: in the proposition every non-logical concept is replaced with a variable; so, the proposition, e.g., 'I see you', in logistical language, 'a sees b', would yield the form: xRy. (Carnap 1929: §41)

The 'skeleton' that results consists entirely in 'logical signs', and what is 'expressed' through the resulting skeleton are 'the logical relations between the non-logical concepts' (Carnap 1928: §46). And as with Russell, what the form is a form of is not something in the realm of sense but rather something at the level of reference: a relation between concepts (functions), obtaining within 'assertions [Aussagen]', understood in the manner sketched above (ibid.) – and so, something akin to a Russellian 'form of facts'.

Conclusion: Retaining (Though Complicating) the Early Carnap's Russellian Heritage

Resisting Idealism: An 'Extensionalist' Conception of Logic is not (neo-)Kantian

In light of the foregoing, we can now put Carnap's early conception of the subject-matter of logic into a parallel chart-form as follows (Table 2).

Table 2 Carnap's early conception of logic

		of interest to
Act	Thinking, judging	Psychology
Content	Fregean <i>Sinn</i> , what is of 'cognitive' worth	Psychology, literature (translation)
Object	Fregean <i>Bedeutung</i> , what is of 'logical' worth	Logic

If this is right, then we should conclude that in his early conception of logic, Carnap was clearly much closer to Russell than Kant or the neo-Kantians – or even Frege or Husserl, for that matter (cf. Table 1 above). For Carnap as for Russell, logic is not concerned either with the nature of certain mental activities or with the cognitive contents grasped in such activity, but rather with certain objectivities (properties, relations, functions, facts) which are given or meant through such contents in such acts.

This, in turn, is of consequence for our general picture of the *Aufbau* for the following reason. It is precisely the subject-matter of logic ('the logical objects or objects of pure logic') that, for Carnap, must be in place as the absolutely first ground in the constitution-system of the *Aufbau*, as something in view *before* introducing whatever further non-logical 'basic elements or concepts' and 'basic relations' (cf. Carnap 1928: §107), and it is precisely the 'axioms' that constitute this domain (of logic) that allow for the 'deduction' of further 'theorems' from whatever non-logical elements, concepts, and relations are introduced (cf. Carnap 1928: §106). In other words, it is precisely Carnap's non-Kantianism about logic that underwrites the 'extensional method of constitution' of the *Aufbau as a whole*. The significance of Carnap's non-Kantianism would therefore seem to run quite deep indeed.

Such a conclusion speaks against any aggressive attempt to fully reorient our interpretive approach to Carnap's work of this period by looking more exclusively to the Kantian and neo-Kantian context in which Carnap's thought developed, and away from the influence of Russell in particular. To accept this, of course, is in no way to deny that Friedman and Richardson are right to hold there are *other* Kantian (and Husserlian (cf. Roy 2004)) threads that run through the *Aufbau*. It is, rather, just to insist (with Pincock) that we would lose something of absolutely crucial importance if we let go of the idea that there are genuinely and distinctively Russellian dimensions to Carnap's positions at the time, and that these dimensions flow from core commitments that lie at the very foundations of Carnap's emerging programme to present the *logical* 'construction' or 'constitution' of 'the world'.

Resisting 'Realismus': Constitution, Convention, and Stipulation

Our analysis would end here, with Carnap in the *Aufbau* embracing a broadly 'realist' conception of the subject-matter of logic – save for one last set of very provocative and importantly divergent remarks Carnap makes about the subject-matter of

logic in *Aufbau* §107. For these remarks introduce a *second* strand of thought about logic, one that only just begins to emerge, ever so slightly, by the time of the *Aufbau* and the *Abriss*, and is in fact already hinted at in Carnap's 1927 essay '*Eigentliche und Uneigentliche Begriffe*' ('Proper and Improper Concepts'), but then is only taken up and developed in detail and rigor in *Syntax*.¹⁴ For in §107 Carnap now describes logic as (a) dealing with *tautologies*, or with linguistic expressions whose truth or falsity we can come to know by virtue of *their* form alone, and whose truth or falsity seems to depend in no way on how things are outside of the realm of expressions; and also (more importantly) as (b) dealing with expressions whose meaning does not seem to come from 'designating *objects*' at all, but comes rather from the *conventions* or stipulations we have made about the use of expressions:

Logic (including mathematics) consists only of *conventional stipulations* [konventionellen Festsetzungen] about the use of signs and of tautologies on the basis of these stipulations. Hence the signs of logic (and mathematics) *do not designate objects*, but rather serve only for the symbolic fixing [Festlegung] of these stipulations. (Carnap 1928: §107; my ital.)

As Carnap explains the idea in the *Abriss*, the term 'tautological' applies to propositions captured by logical sentences such as, e.g., 'if *p* and *q*, then *p*', which are, strictly speaking, 'empty of content [inhaltsleer]', because no determinate 'state of affairs [Sachverhalt]' is referred to by its expressions (which are variable-signs); no determinately contentful signs occur in them besides the ones designating the 'logical relations' (Carnap 1929: §4b). In the 1927 essay on concepts, Carnap goes a bit further, explaining that because the 'so-called cognitions of formal concepts' like those in math and logic 'are tautologies' (Carnap 1927: 373), and the logical and mathematical propositions are 'mere tautologies', they fundamentally contrast with propositions that are genuine 'assertions *about actuality* [über die Wirklichkeit]' (Carnap 1927: 362; my ital.). What is more, though Carnap accepts that these formal concepts can '*help* to assert something about actuality', he here insists that they do this only by helping to '*form* [formen] the assertion', since '*nothing* in actuality corresponds to them' (Carnap 1927: 358; my ital.).

In fact, once we return to the *Abriss*, we can see Carnap drawing out this characterization of tautology in his account of the grounds for the *truth* of purely logical propositions. Though they do not refer to anything in reality (actuality), Carnap does not take this to render sentences which contain purely logical or mathematical expressions entirely 'sense-less [sinnlos]', since they do convey or express something that we can see has 'validity [Geltung]' and is 'necessarily true'; it is just that the ground of this validity or truth, however, is something that lies wholly internal to these sentences: they are 'necessarily true on the basis of [the sentences'] mere form' (Carnap 1929: §4b).

What is striking, furthermore, is that Carnap also goes on to signal here that he ultimately views the formal, tautological character of logical assertions as *more* 'essential [wesentlich]' to their logicity than their alleged generality (cf. Carnap 1929: §4d). This prioritization of tautology and truth due to form alone rather

¹⁴ As Friedman aptly notes, in the *Aufbau* Carnap 'does not in any way engage with the issues actually involved' in systematically following through with this conception (Friedman 1999: 180; Friedman 2000: 122n175).

than referentiality would seem to represent an important shift away from his earlier Russellian characterization of logic as having unrestricted universality.¹⁵

This, however, is arguably not as severe a shift as the *second* component of the take on logic presented in *Aufbau* §107, one which (unlike tautologicality) does not seem to have any anticipation in Carnap's earlier writings (e.g., the 1927 'Concepts' essay). This is Carnap's claim in §107 that meaning is conferred on logical sentences not from their designating objects *at all* – not even from designating Russellian 'forms' of objects – but instead from our own 'conventional stipulations about the use of signs'. For with this, Carnap would seem to shift the domain of 'the logical' completely away from that of the formal-structural features present in 'the realm of reference' (away from what is 'in the world') and toward our own mental *activity*. Not only are logical propositions not 'about' any particular states of affairs, they are not 'about' general facts or forms of facts either.

One important consequence of this, for the Carnap of the *Aufbau*, is that logical propositions are ruled out from expressing (or 'presenting [darstellen]') *cognitions*, since conventional stipulations in general are not cognitions (cf. Carnap 1928: §103).¹⁶ More specifically, logical expressions do not even present us with cognition *of our own activity* (a kind of 'self-cognition'), since they do not 'refer to' or 'designate' these or any other objects whatsoever. Rather logical expressions as a whole now are seen to have only a fully 'non-cognitive' significance.

Though the upshot of this thread is not fully developed until later works, having it in focus might give us some clue as to Carnap's equal hesitation to embracing a more Russell-like 'Realismus' concerning the dependence-relations that he means to put on display in the *Aufbau*. For while Carnap is clear that he does not opt for the more idealist neo-Kantian term 'production or generation [Erzeugung]' of objects and relations to describe what is involved in the work,¹⁷ Carnap takes pains to emphasize that he also does not opt for the alternative 'realistic' portrayal of our relation to the relevant subject-matter – namely, that the subject-matter in question is already present and given, to simply be 'cognized [erkannt]' by us (Carnap 1928: §5). Taking exactly this 'realistic' option, however, would be what would keep Carnap closer to Russell's insistence that we bear an essentially receptive acquaintance-relation to the logical primitives and forms. Carnap, by contrast, here chooses what he describes at the time as the more 'neutral' term, 'constitution', for the relation in question – though we can now see that he seems to have deeper motives for rejecting the idea that we are ultimately 'cognizing' something *at all*, even in logic.¹⁸

¹⁵This is so, even if in the *Aufbau* Carnap nevertheless seems to run tautologicality and generality together (cf. Carnap 1928: §154).

¹⁶One might see this hinted at in the 1927 'Concepts' essay, where Carnap speaks of mathematical and logical (tautological) propositions as '*so-called* cognitions from formal concepts' (Carnap 1927: 373; my ital.).

¹⁷This has already been usefully highlighted by Friedman himself (cf. Friedman 2000: 70–80).

¹⁸Note that Carnap claims that even in the case of 'logical objects', we still require a 'construction [*Aufbau*]' (Carnap 1928: §107).

Kantian Roots of the Aufbau's Proto-Conventionalism?

Where does this non-cognitive, tautological-conventionalist account of logic come from? Prima facie, its roots do not trace from any of the three streams of influence discussed above. What is more, further inquiry shows that it actually doesn't seem to have been taken from any of the authors Carnap lists as influences either at the time or in his reminiscences.

Aside from partial 'conventionalist' precedents in physics and geometry,¹⁹ the closest parallel is surely the conception of logic put forward in Wittgenstein's *Tractatus* (cf. Friedman 1999: 180). This is perhaps unsurprising, since, in his later reminiscences of his early influences, Carnap claims that, besides Frege and Russell, Wittgenstein 'perhaps...had the greatest influence on my thinking' (Carnap 1963: 25). More specifically, Carnap recalls that it was Wittgenstein in particular who argued for 'the more radical form' of the view of logic, only partially anticipated in Frege and Russell (and Schlick), 'that all logical truths are *tautological*, that is, that they hold necessarily in every possible case, therefore do not exclude any case, *and do not say anything about the facts of the world*' (Carnap 1963: 46, my ital.; cf. Friedman 1999: Ch 8).

What is more, when we turn to the *Tractatus* itself, we find Wittgenstein making very suggestive remarks which might seem to carve out just such a proto-§107 role for *conventions* in determining logical forms via replacements of constants with variables. For Wittgenstein, too, also claims that the manner in which something like a logical skeleton is carved out, as it were, of a proposition, is something that happens due to our 'stipulation [Festsetzung]' or 'arbitrary agreement', rather than something that is due to the inner nature of what is meant by the relevant complex of signs (cf. Wittgenstein 1922: 3.315–316). And Wittgenstein also claims that the stipulation itself only characterizes the set of signs ('symbols') in terms of their own (syntactical) properties rather than in terms of 'what is designated [das Bezeichnete]' or their 'reference [Bedeutung]' (cf. Wittgenstein 1922: 3.317; 5.501).

Yet while such remarks surely places Wittgenstein much closer to Carnap, and makes good sense of Carnap's reminiscences, the anticipatory parallels eventually run out. This is because Wittgenstein continues on to make the following crucial qualification, concerning what happens when we finally display the purely logical skeleton of a proposition, by 'turning into variables *all* the signs in it whose reference has been arbitrarily determined': we uncover something that 'is *not* dependent on any agreement [Übereinkunft], but solely on the nature [Natur] of the proposition' – namely, something which 'corresponds to a logical form – a logical prototype [Urbild]' (Wittgenstein 1922: 3.315; my ital.). Wittgenstein therefore appears to separate the special case of the *ultimate* carving out of a purely logical skeleton

¹⁹ Especially notable are the conventionalist perspectives about the foundations of science found in Henri Poincaré and Hugo Dingler, whom Carnap singles out in his 'Autobiography' as being especially responsible for the 'conventionalist attitude' he embraced concerning the foundations of physics in particular (cf. Carnap 1963: 14). Neither Poincaré nor Dingler, however, held that *logic* was conventional (cf. Carus 2008: 119; Friedman 1999: 83).

from the initial or *partial* determinations of propositional forms that still include non-logical components. In the purely logical case, when we arrive at the presentation of a ‘logical form’, we are presenting or displaying something that depends *not* on our conventions or agreements, but rather on the ‘nature’ of the proposition itself. Furthermore, exactly this logical form (of the proposition, of the logical ‘picture’) is itself something that Wittgenstein claims is also mirrored or even shared ‘in’ the world itself, something that ‘has in common with actuality [Wirklichkeit]’ and is in fact itself ‘the form of actuality’ (Wittgenstein 1922: 2.18). However this all might work, and however different the *Tractatus*’s ultimate picture of logic is from that of Russell’s own, here it is closer to Russell, and in any case none of these features seem to fit well with the sentiment expressed in *Aufbau* §107.

If we agree that it departs in crucial ways from the Russellian conception put forward in the rest of early Carnap’s writings and the rest of the *Aufbau* itself, we can conclude by asking whether the tautological-conventionalist conception of logic Carnap expresses in this section is properly thought of as *Kantian* in any respects. Concerning tautology, we might note that Kant, too, can be read as holding that certain judgments – i.e., analytic judgments – can be known to be true simply on the basis of the consideration of the *form* of the relations among their contents (concepts), with logical laws (of identity and contradiction) supplying the ‘supreme principle’ for the cognition of the truth of such judgments (cf. B189f; Kant 1800; §VII, 9:52f), and with such truth not appearing to depend on any further reference or relation that such contents might have to objects in the world (e.g., via intuition). Concerning conventionalism, it is at least true that Carnap here does draw closer to Kant’s original conception by now identifying mental *activity* as the central component for supplying logic with its subject-matter.

What does not seem to find any parallel in Kant, however, is the specifically *conventionalist* or stipulationist dimension of this alternative conception. If anything, Kant would seem to be more like Wittgenstein of the *Tractatus*, in holding that logical forms structure whatever they structure *necessarily*, independently of whatever else we might determine about cognitive contents (or their expression in language) conventionally or through stipulation. For Kant, the reason that logical forms are what they are lies not in any decisions we make, but rather in the essential nature of the underlying capacity for thinking, i.e., in the nature of the kinds of activity that our understanding is capable of performing (B95f). In this respect, logical forms and the laws that govern them are ‘given’ to each of us by our understanding, rather than being made or instituted by anything we do or decide.²⁰

Even here, then, in the incipient conventionalist conception of logic gestured at in *Aufbau* §107, I think we must conclude that Carnap’s conception of logic in the *Aufbau* departs in crucial ways from the Kantian tradition – even if we accept that it is equally non-Russellian as well. Hence, whether it emerged as something entirely idiosyncratic to Carnap at the time, as an initial anticipatory sketch of the revolu-

²⁰In fact, though Kant rejects the idea that we have any representations present in our minds ‘innately’, Kant accepts, by contrast, that the nature of the capacity for understanding *is* innate to our minds (cf. Kant 1790: 8:221f).

tionary doctrine of 'tolerance' in logic that he would more famously and influentially elaborate several years later in *Logical Syntax*, or whether it has its roots in other, currently uncharted influences, it too signals another non-Kantian note close to the core of the fabric of the *Aufbau*.

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Assessing Rickert's Influences on Carnap

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Introduction

Baden neo-Kantian philosopher Heinrich Rickert (1863–1936) significantly influenced Carnap's *Aufbau* project—or so I will argue in this paper. A careful examination of the proto-*Aufbau* manuscript “Vom Chaos zur Wirklichkeit” (1922) and *Der Logische Aufbau der Welt* (1928)¹ reveal important Rickertian influences and show that Carnap's early thinking included a quasi-Nietzschean stance about conceptual systems as norm impositions similar to Rickert's in *System der Philosophie* (1921).² My inquiry also shows that Carnap's *Aufbau* project (circa 1922–1930) proposed a Rickertian value-theoretic explanation of logical reconstruction. Both of these features of Carnap's early work can be traced back to Rickert, and the latter can be explicitly shown to have been an integral part of the *Aufbau* project—at least in its early stages, before Carnap moved to Vienna.

I will also suggest that in the theory of “linguistic frameworks” in “Empiricism, Semantics and Ontology” (1950), Carnap re-expressed some of his longstanding philosophical convictions, which are detectable as early as his 1920s works.³ Most importantly for our present inquiry, Carnap explains in ESO that new “linguistic frameworks” derive from a “procedure” of “construction” that consists of imposing “new rules” that are meant to replace the old ones. Carnap writes, “If someone wishes to speak in his language about a new kind of entities, he has to introduce a system of new ways of speaking, subject to new rules; we shall call this procedure

¹ Hereinafter “Vom Chaos” and *Aufbau*.

² Heinrich Rickert: *System der Philosophie: erster Teil: allgemeine Grundlegung der Philosophie*. (1921).

³ Hereinafter ESO.

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the construction of a linguistic *framework* for the new entities in question”.⁴ I suggest that in this explanation, Carnap essentially re-expresses his early view about conceptual systems in science as resulting from imposing norms. This view can be traced to Carnap’s earlier work and specifically, as I will suggest, back to “Vom Chaos”. My inquiry shows that this manuscript includes many Rickertian features. In particular, I suggest that “Vom Chaos” primordial methodological “fiction” and its adoption of a *will* to systematise—its *Wille zur Neuordnung*—are *adaptations* of Rickert’s epistemology that he put forward in *System der Philosophie*.

I will proceed in the following stages. Section “**Introduction**” investigates the proto-*Aufbau* manuscript “Vom Chaos”. I will argue against Carus’ (2007a) observation that textual evidence about Rickert’s influence on Carnap’s *Aufbau* project falls short. I will claim that “Vom Chaos” involves several elaborations and terms that can be traced back to Rickert. In section “**Vaihinger’s and Rickert’s influences in “Vom Chaos”**”, I will overview Rickert’s attempt in *System der Philosophie* to justify a systematic approach in philosophy. Then, I will make a suggestion, which I think Carnap would find worth considering, about why *System der Philosophie* had a special appeal to the young Carnap. I will then propose *direct* and *distinct* textual evidence about Rickert’s influence on “Vom Chaos”. At the end of the section, I will claim that there is a strong case for the view that Carnap’s *Aufbau* project initially followed Rickert’s lead. In section “**Assessing Rickert’s influence in “Vom Chaos”**”, I will explore Rickertian influences on *Aufbau* (1928) and suggest that a part of Rickert’s legacy survived in Carnap’s thinking after *Aufbau*. In section “**Rickert’s influence in and after *Aufbau***”, I will argue that ESO is, in important part, a continuance of Carnap’s early work. I particularly suggest that Carnap’s explanation about the “constructing” of “linguistic frameworks” is essentially a representation of his Rickertian-influenced early position. Section “**“Linguistic frameworks” as impositions of “new rules”**” provides conclusions.

Vaihinger’s and Rickert’s Influences in “Vom Chaos”

“Vom Chaos” is a relevant source for exploring Carnap’s *Aufbau* project.⁵ Although its central influences remain a debated topic, a particularly acute controversy derives from Mormann’s (2007b) claim that the *Aufbau* project has significant influences from Rickert.⁶ Carus (2007a) has opposed Mormann’s point of view and claimed that the *only* textual evidence for Rickert’s direct influence on Carnap lies in Carnap’s application of the term “Chaos”. Carus (2007a) has gone so far as to say that even this term can be traced back to Hans Vaihinger’s (1852–1933) influence and not to Rickert.

⁴Carnap (1950).

⁵Carnap wrote beside the title of “Vom Chaos”: “This is the germ of the constitutional theory of *Aufbau*” – “*Dies ist der Keim zur Konstitutionstheorie des ‘Log. Aufbau’.*”

⁶Cf. also Pincock (2002), Damböck (2012).

Vaihinger's influence on Carnap's *Aufbau* project is readily apparent and can be supported by many textual references.⁷ Rickert's influence, however, remains contentious. To argue in favour of *both* Vaihinger's *and* Rickert's influences on "Vom Chaos", I shall examine its opening chapters. My textual analysis begins by drawing attention to Carnap's locution of the "construction of reality" (*Aufbau der Wirklichkeit*), which he proposed after introducing the "epistemologist's" (*Erkenntnistheoretiker*)⁸ standpoint about "reality" as "constructed" from "original Chaos" (*ursprünglichen Chaos*).

The 'reality' is not given to us as something fixed, but undergoes constant correction. The epistemologist says that it is constructed for a particular purpose from original Chaos. It is formulated according to ordering principles that are at first instinctive and required by the task itself. However, this sentence about Chaos is a fiction. We who now consider these things know nothing of an original Chaos; we have no memory of having undertaken construction of reality (*Aufbau der Wirklichkeit*), from any such Chaos. (Carnap 1922, sentences 1–4)⁹

These opening passages make clear that in "Von Chaos", Carnap surveys "reality" as a "constructed" (*aufgebaut*) realm, as a "construction" (*Aufbau*).¹⁰ It is important to note that the text actually begins by introducing a position that Carnap wants to reject: the "epistemologist's" explanation about "reality" as "constructed" from an "original Chaos". I suggest that although this epistemological setting has a resemblance to both Vaihinger's fictionalist *magnum opus* *Die Philosophie des Als Ob*¹¹ and Rickert's *System der Philosophie*, as found in the first lines of "Vom Chaos", it most likely refers to Vaihinger. In any case, this setting and the use of the term "Chaos" can be traced to both mentioned works and further back to Nietzsche's writings. Vaihinger's and Rickert's cited works are both strongly influenced by

⁷ Carnap's notes "Skelett der Erkenntnistheorie" (1920) and "Analyse des Weltbildes" (1921) and his pre-*Aufbau* synopses "Entwurf eine Konstitutionstheorie der Erkenntnisgegenstände" (1924c) and "Gedanken zum Kategorien Problem. Prolegomena zu einer Konstitutionstheorie" (1925) include various assertions of "fictions" (*Fiktion*). The central documents about Vaihinger's influence are the typed manuscripts "Vom Chaos zur Wirklichkeit" (1922) and "Topologie der Raum-Zeit Welt" (1924b), "Dreidimensionalität des Raumes und Kausalität: Eine Untersuchung über den logischen Zusammenhang zweier Fiktionen" (1924a) and *Aufbau* (1928). Although each work of this quartet reflects various important and explicit Vahingerian fictionalist contents, "Dreidimensionalität" represents the peak of the influence of Vaihinger's fictionalism on Carnap. I will attempt to assess Vaihinger's influence on Carnap in a forthcoming paper.

⁸ "*Erkenntnistheoretiker*" is Carnap's later handwritten inscription that replaces another word at this spot. There are no further indications in the text regarding to whom "*Erkenntnistheoretiker*" refers.

⁹ All translations from German in this paper are by the author, M. L.

¹⁰ The notion of "construction" in Carnap's works is discussed in section "[Rickert's influence in and after *Aufbau*](#)".

¹¹ Hans Vaihinger: *Die Philosophie des Als Ob. System der theoretischen, praktischen und religiösen Fiktionen der Menschheit auf Grund eines idealistischen Positivismus. Mit einem Anhang über Kant und Nietzsche.* (1911) (7. & 8. Auflage 1922) English translation C. K. Ogden (1924).

Nietzsche, and both make use of this particular type of epistemological setting *and* the term “Chaos”.¹²

I suggest that the first three lines of “Vom Chaos” most likely address Vaihinger’s epistemology. However, as the manuscript continues, it comes to most closely resemble Rickert’s quasi-Nietzschean epistemology in *System der Philosophie*. To illustrate this feature in “Vom Chaos”, it is convenient to first present some basic remarks about Vaihinger’s fictionalism. According to Vaihinger’s *Die Philosophie des Als Ob*, the human mind’s activity upon the original fluctuating “Chaos of sensations” (*Chaos der Empfindungen*) results in the creation of *false* cognitive artefacts as “fictions”.¹³ In particular, categories and concepts are “fictions” because they deviate from the “reality” of the “given” sensory Chaos. Although Vaihinger assumes that “fictions” are false, he suggests that they are an inherent part of scientific practice, and he affirms that in many cases, their employment can be justified on pragmatic grounds. Vaihinger’s fictionalism makes a sharp distinction between scientific hypotheses and fictions in science. In contrast to the former, the latter are not subject to verification. Rather, scientific “fictions” are false creations of the human mind that are subject to justification *only* on pragmatic grounds—that is, to their expediency and utility for scientific practice.¹⁴

In the following lines of “Vom Chaos”, Carnap rejects the “epistemologist’s” position by claiming that “what we experience” (*erleben*) can only be about an “already ordered reality” (*schon geordnete Wirklichkeit*). Thus, Carnap proclaims that the “epistemologist’s” “reality” of a sensory Chaos is itself a “fiction”, not the

¹²Cf. *NietzscheWörterbuch* (2004). Examples of Nietzsche’s use of the notion “Chaos” can be found in many places in his works. One good example is Nietzsche (1887), “Nachgelassene Fragmente” 9–106. Rickert (1921) pp. 6–7: “What we immediately ‘experience’ (*Erleben*) is, after the distraction of all forms of conceptions (*nach Abzug aller Auffassungsformen*) an irregular (*regellos*) “crush” (*Gewühl*) of impressions (*Eindrücken*), which changes constantly. A completely unsystematically thought world (*unsystematisch gedachte Welt*) is for the scientific man (...) a Chaos.” (M. L.) A peculiar writing titled “Das Salto-mortale des Gedankens” (1903) by a certain Eduard Sokal is also worth mentioning here. Carnap’s (1920) early note includes a reference to this article, and it might be considered a source of the opening lines of “Vom Chaos”. It even contains the notions of “Chaos” and “Korrektur”. However, it does not include the notion of “fiction” (*Fiktion*), and its main contents are remote to the opening of “Vom Chaos”. The notion “Chaos” can be traced back to Nietzsche. With regard to the notion (and the method) of “corrections” (*Korrektur*) in Vaihinger’s *Die Philosophie des Als Ob*, cf. pp. 51–52, 127–129, 194 ff. 350 ff.

¹³Vaihinger (1922), pp. 411–412: “The reality (*die Wirklichkeit*) is certainly a Heraclitan flux of events, but our thinking would itself fluctuate (*verfliessen*), if we would not take possession (*bemächtigen*) of this reality-flow (*Wirklichkeitseinfluss, fließende Wirklichkeit*) by fiction of imaginary breaking points (*Haltpunkte*) and borderlines” (M. L.) Cf. Vaihinger (1922, pp. 1–23; 298).

¹⁴Vaihinger (1924), pp 88; 166; 170–171: “All that is given to consciousness is sensations. By adding a Thing to which sensations are supposed to adhere to as attributes, thought commits a very serious error. (...) Understanding is the well-known feeling of pleasure due to the empirical transformation of sensations into categories. (...) Kant proved that the categories were only applicable to experience and this demonstration is another way of expressing what we have been insisting upon. All these transpositions had originally a practical value. The categories are simply convenient aids for bringing the mass of sensations into subjection”.

ultimate metaphysical reality that Vaihinger took it to be (cf. sentences 2–5). However, after this rejection, Carnap's subsequent notion of a "will for a new order" (*Wille zur Neuordnung*) does not correspond to anything in Vaihinger's *Die Philosophie des Als Ob*. Yet, as the quotations below show, it bears a resemblance to Rickert's Nietzschean notion of a "will to a system" (*Wille zum System*) in *System der Philosophie*.

What we experience is only an already ordered reality, whose order and plan is subject nonetheless to constant emendations (*Aenderungen*). These emendations or corrections (*Korrekturen*) are usually occasioned by small inconsistencies. However, there are also huge inconsistencies going right through the entire realm of reality (*Wirklichkeitsbereich*); in opposition, we acknowledge the will to impose a new ordering, which overcomes them (*sie überwindenden Neuordnung*). It is this will for a new order (*Wille zur Neuordnung*), this disposing of huge inconsistencies, that motivates epistemological deliberation and fictions of Chaos, which occur as the point of departure and the ordering principles according to which the building (*Bau*) proceeded, proceeds and ought to proceed. This will to overcome inconsistencies of reality by construction (*Umbau*) is also the irrational starting point of our theory. (Carnap 1922, sentences 5–9).

(...) a will to a philosophical observance of the world (*Wille zur Philosophischen Betrachtung der Welt*) is necessarily bound with the 'will to a system' (*Wille zur System*), which Nietzsche disparaged (*herabzusetzen*) on ethical grounds and others have peculiarly (*sonderbarweise*) also theoretically fought against. However, the theoretical Cosmos is not given (*gegeben*) to us but rather issued as a task (*Aufgegeben*). Scientific philosophy has persistently worked to construct (*Aufbau*) it (i.e., the "theoretical Cosmos"; M. L.) and advances toward reaching this objective are only possible by taking the path of systematic thought. (...) Philosophy has (...) thought the world such that from the Chaos of sensations (*Chaos der Empfindungen*) there arises an ordered and structured Cosmos in accordance with certain principles. (Rickert 1921, pp. 10, 50; M.L.)

In addition to a resemblance in the mentioned notions, it is worth noting that a *will* for systematising has, in both Carnap's and Rickert's works, a notably similar epistemological function: such a *will* is adopted to serve as a foundational epistemological *maxim* for undertaking the "constructing" (*Aufbau*) of a conceptual system. Moreover, the *prospect* of achieving by "constructing" an ordered conceptual realm is apparently, for both works at hand, a central force in *motivating and* (arguably) *justifying* their system-building philosophical path instead of merely remaining in the realm of primary raw experiences. In fact, *System der Philosophie* explicitly argues that "scientific philosophy" (*Wissenschaftliche Philosophie*) has a self-justified task to "construct" a "theoretical Cosmos", notwithstanding Nietzsche's and various other life-philosophers' rejections of systems (I shall return to this issue in the next section). I also suggest that Carnap's embracing of a "will for a new order" and a "will to overcome inconsistencies of reality by construction" in "Vom Chaos" are centrally motivated and (arguably) justified by the *prospect* of attaining a radically renewed or "modernized" system of concepts that is free from inconsistencies (*Unstimmigkeiten*; cf. sentences 8–9).

At this point, it is possible to counter Carus' observation that there is no textual evidence available for Rickert's *direct* influence on the *Aufbau* project. Even if we leave aside the notion of "Chaos", we can note the notions of "living" (*lebende*) and "dead" (*tot*) parts of experience in page 2 of "Vom Chaos". Thus far in Carnap

studies, these have only been traced back to Hume's impressions and ideas (Carus 2007a, 150). In reality, however, the very same notions are repeatedly employed in *System der Philosophie* to describe the differences between the immediate fluctuating realm of "life" (*Leben*) and the conceptual, "constructed" realm of objects.¹⁵

Another decisive point about Rickert's influence in "Vom Chaos" comes to light when we turn our attention to Carnap's assertion of a methodological "fiction" at the beginning of its system. This procedure does not correspond to Vaihinger and his fictionalism. Rather, Carnap's "epistemological fiction of the building that starts from Chaos" basically *copies* a procedure similar to the one Rickert proposes in *System der Philosophie*.

And we, too, believe that the hindering of the barely reconcilable cracks cannot be sorted out with just a few corrections, but a concise new building from the beginning of the foundation has to be undertaken, which yet is likely in many ways to correspond with the previous building. Therefore, we, too, adopt the epistemological fiction of the building that starts from Chaos (*Fiktion des Aufbaus vom Chaos aus an*). The present formulation of this fiction is put forth like this: We experience (*Erleben*) reality and its formation (*Umbildung*); we extrapolate backwards these reconstructions of a largely ordered reality, i.e., we obtain reality as if it had resulted from an ordered construction process emerging from a disordered state. We reconstruct this fictitious original state, and undertake a thorough reconstruction to achieve a more fully unified (*einheitlicheren*) system of reality. (Carnap 1922, sentences 10–13)

(...) we create a fiction (*Fiktion*). First, we act (*tun*) as if we moved from the conceptual thought world, which divides itself into value and reality, into a conceptual, irrational, and, accordingly, nameless experience (*Erlebnis*): that is, back to the condition in which everything still remains a non-separated unity (*ungetrennter Einheit*). And after this, we act as if we made, in reverse, the smallest conceivable step into the world of real and valid objects, along the path upon which we separate value and reality from each other...(...). (Rickert 1921, p. 258; M. L.)

Let us summarise our results so far. Our enquiry abolishes Carus' attempt to refute Mormann's point of view that Carnap's *Aufbau* project exhibits significant influences from Rickert. Carus' observation about the lack of textual evidence (and the *concise* lack of *direct* textual evidence) is simply mistaken. We have seen that in addition to the various textual parallels between "Vom Chaos" and *System der Philosophie*, these two works reveal coinciding notions other than "Chaos". Most importantly, we have noted that "Vom Chaos" procedure of adopting the fiction of a primordial "Chaos" at the very beginning the system basically *copies* *System der Philosophie*'s similar procedure (we will return to this in the next section).

Regarding the assessment of Vaihinger's influence on "Vom Chaos", I suggest that it—like Rickert's influence—is *also* clearly apparent in the manuscript. Vaihinger's influence comes about in "Vom Chaos" (1) opening chapters (p.1), in its (2) "fictions" (*Fiktion*) of the principles of (i) induction or uniformity and (ii)

¹⁵Cf. Rickert (1921), e.g., 312: "Factual being, which can be made to an object, belongs in all its parts to special sciences, which treat with the physical and the psychical, the meaning-lacking nature and the meaning-involving history of culture as reality, while they take these as objects. This whole domain lacks the immediacy, which is called 'living'. The mere world of reality is 'dead' (*Die bloß reale Welt ist 'tot'*)" (M. L.).

continuity (p. 7) and, finally, in its (3) closing passages (p. 13–14). At the beginning of this section, I have proposed a suggestion about how to view Vaihinger's influence on "Vom Chaos" opening chapters. Carus has noted (2007b, p. 27; I concur with this) that the "fictions" that "Vom Chaos" introduces on page 7 correspond roughly with Kant's categories of cause and substance and quite obviously show a Vaihingerian influence. Finally, the closing passages of "Vom Chaos" also reveal the influence of Vaihinger: Carnap ponders there whether perhaps *only* the "realm of reality" (*Wirklichkeitsbereich*), which is "constructed" (*aufgebaut*) upon the "realm of experiences" (*Erlebnisbereich*), corresponds to what is commonly indicated by the word "reality" (*Wirklichkeit, Realität*). This is particularly true, Carnap continues, *if* the "physical realm" (*physikalische Bereich*) is a "fiction" (*Fiktion*) for the sake of calculability (*Berechenbarkeit*). In conclusion, I suggest that "Vom Chaos" is considerably influenced by Vaihinger's fictionalism. Yet, in sharp contrast with the contemporaneous "Dreidimensionalität des Raumes und Kausalität", Carnap's overall standpoint about Vaihinger's fictionalism remains indecisive in "Vom Chaos".¹⁶

Assessing Rickert's Influence in "Vom Chaos"

System der Philosophie is a complicated and subtle work of philosophy. It is an important part of Rickert's reaction to the growing influence of the irrationalist and anti-systematicist tendencies via "life-philosophy" (*Lebensphilosophie*) in the German philosophical landscape at the time.¹⁷ As a "general groundwork to philosophy", the work has a central agenda of providing a *justification* of a systematic approach in philosophy, which was in line with the Kantian academic philosophical tradition. Within this agenda, *System der Philosophie* sketches (among various

¹⁶I find it remarkable that "Vom Chaos" (1922) standpoint on fictionalism is in stark contrast with "Dreidimensionalität des Raumes und Kausalität: Eine Untersuchung über den logischen Zusammenhang zweier Fiktionen" (1924a). In the latter work, Carnap, declares, i.a., that any optional theory of modern physics is an enormous, systematic fiction: "Evidently (*ersichtlich*), the 'usual' formation ('*gewöhnliche*' *Umformung*) applies a great amount of fictions, while the physical formation really signifies an enormous, systematic fiction (*einzig gewaltige, systematische Fiktion*)" (M. L.). This understanding can be compared to Carnap's indecisive standpoint of "Vom Chaos": "The physical realm contains a certain similarity with the realm of reality, which has been constructed (*aufgebaut*) from the basis of the realm of experiences. (...) Perhaps, therefore, the conception, according to which the realm of reality (*Wirklichkeitsbereich*) is only a pre-scientific and inadequate pre-level of the physical realm, is correct (*Recht*). Contrary to this, another conception holds that only the realm of reality approaches a proper truth value (*eigentliche Wahrheitswert*), as is meant by the word "reality", and the physical realm is a fiction for purposes of calculability. We will not touch here upon the decision to be made between these two conceptions" (M.L.).

¹⁷(Rickert 1921, p. 1–14, 311–318) About *Lebensphilosophie* and its practitioners cf. Bollnow 1958; Albert 1995; Mormann 2013. It is worth mentioning that Rickert's book *Die Philosophie des Lebens, Darstellung und Kritik der philosophischen Modeströmungen unserer Zeit* (1920) proposes elaborations and criticisms about life-philosophy similar to *System der Philosophie*.

other elaborations) a value-theoretic “constitutional” system, which makes use—as we have seen—of a primordial “fiction” (Rickert 1921, pp. 6–14; 232–265). Rickert’s decisive attempt in *System der Philosophie* to respond to life-philosophers’ rejections of systems culminates in its elaboration of an “open system” (*das offene System*). This system is designed to “leave a place for further scientific completions and perfections”, and it captures Rickert’s suggested solution of reconciling a systematic approach to philosophy with life-philosophers’ rejections of “dead” (*tot*) systems in contrast to their favoured immediacy of fluctuating “life” (*Leben*; Rickert 1921, pp. 11; 312; 348–385).¹⁸

I shall explore in the following some central lines of arguments that *System der Philosophie* proposes to make a point about life-philosophers’ rejections of systems. I will put forward one *speculative* line of thought, which I wish experts to consider, about *why System der Philosophie* had a special appeal to Carnap in the early 1920s. Then, I will provide a *full demonstration* of Rickert’s *direct* and *distinct* influence on “Vom Chaos”. Finally, I will claim that there is a strong case for the view that Carnap’s *Aufbau* project initially followed Rickert’s lead.

In *System der Philosophie*, Rickert attempts to justify a systematic approach in philosophy with various lines of arguments. These have a uniting feature in their attempt to secure a path for system building in philosophy from life-philosophers’ anti-systematicist propagation. First, *System der Philosophie* launches a counter-radical counterattack against life-philosophers’ rejections of systematic thinking in philosophy. Rickert argues that such rejections should be understood, despite their seemingly emancipating charms, as resulting in a *non-* and *anti-philosophical* position. Rickert’s argumentation falls at this point (or at least very near this point) into a *circulus vitiosus*: Rickert insists on acknowledging that the very idea of *philosophy* has, since the ancient Greeks, rested upon the fundamental conviction that reality is approachable and conceivable by reason *and* by conceptual means as an ordered realm—or, as he puts it, as a “theoretical Cosmos”. Rickert makes use of quasi-Nietzschean terms in his undermining of life-philosophers’ anti-systematicism. He proclaims that a genuine “will to a philosophical observance of the world” (*Wille zur Philosophischen Betrachtung der Welt*) entails observing the world as a realm to which the idea of order can be applied. Rickert concludes that a correct understanding of the fundamental idea of *philosophy* must result in approving the philosopher’s notorious “will to a system” (*Wille zum System*; Rickert 1921, pp. 8–24; 47–50; 246–250).¹⁹

Alongside this radically dismissive counterattack, *System der Philosophie* also puts forward more subtle criticisms about life-philosophy. Rickert particularly criticises life-philosophers’ overemphasis on the notion of “life” (*Leben*) and their

¹⁸ Bast (1999) makes the similar observation that an optimal philosophical program in Rickert (1921) consists of carefully adjusting the world’s “irrational” and “rational” ingredients into an all-embracing “living” system of concepts.

¹⁹ Rickert (1921 p. 21) insists on also acknowledging that *philosophy* will always eventually aim at systems and that even Nietzsche, who so vigorously fought against all systems, was planning, during his last creative period, to propose his own philosophy in a system.

setting of this concept in strict opposition to all systems. Rickert observes that life-philosophers were actually correct to claim that philosophy should give full recognition to the many irrational and “living” aspects of reality without artificially rationalising them. Rickert, however, opposes their argument that systems only have philosophically disastrous, life-mortifying effects compared to the “living” (*lebende*) immediate reality of “life”. Rickert particularly disapproves of Nietzsche's famous observation that all system building in philosophy presupposes mistaken and dogmatic epistemological and metaphysical presumptions and/or dishonesty.²⁰ Rickert argues (apparently directly against Nietzsche) that no one could really obtain the authority to deny the scientifically oriented philosopher's attempt to observe the world as an ordered realm. Rather, as Rickert puts it, such a philosopher “willingly locks himself in the prison of logic” to overcome the primary realm of fleeting sensory impressions and aims at “construction” (*Aufbau*) to attain a well-ordered realm, a “constructed” “theoretical Cosmos” (Rickert 1921, pp. 8–24; 47–50; 63; 152–155; 246–250).

At this point, it is important to note that Rickert's standpoint in *System der Philosophie* about the *object of research* (*Gegenstand*) of *philosophy* is in the totality of the world without truncating any of its various aspects. Moreover, Rickert suggests that the central *task* of philosophy is to produce from this an all-embracing system.²¹ Thus, it is understandable that *System der Philosophie* actually gives credit to life-philosophers' similar viewpoints about the *object* (*Gegenstand*) of philosophy. Nevertheless, life-philosophers had misunderstood that philosophy has a central *task* to propose an all-embracing system. Moreover, Rickert notes that they went astray in giving the world's irrational aspects an overly dominant emphasis without simultaneously being able to provide a satisfactory explanation about “values” (*Werte*) as “valid” (*Geltende*) cultural norms. Rickert acknowledges that “values” are an undeniable part of the reality that philosophy must attend to and integrate in an all-embracing philosophical system (Rickert 1921, pp. 46–49; 315–318).

Let us now return to Carnap's *Aufbau* project. Some Carnap experts emphasise that life-philosophy had deep and long-lasting influences on Carnap.²² I do not intend to add to extant observations about the life-philosophical influences of

²⁰Rickert (1921 pp. 1–10). Many of Nietzsche's works, like *Human all too Human*, *Beyond Good and Evil*, *Genealogy of Morals* and particularly (the later composed) *Will to Power*, include various comments and arguments against thinking systematically and the application of logic. Cf. Hales (1996).

²¹Rickert (1921 pp. 1–36). In fact, Rickert's standpoint about the *object* and the *task* of philosophy was common among contemporaneous German academic philosophers. Cf. Eisler and Müller-Freienfels (1922) on late nineteenth and early twentieth century German philosophers' metaphilosophy. Cassirer (1993) provides a lucid and critical analysis about German life-philosophers' “*Leben/Geist*” metaphysics.

²²Cf. Gabriel (2004, 2007), Mormann (2006a, b, 2007b, 2012, 2013), Damböck (2012). Mormann (2006b, 2012) claims that Carnap was “deeply impressed by the philosophical current characterised vaguely as ‘philosophy of life’ (*Lebensphilosophie*) and particularly influenced by Nietzsche” who “influenced considerably Carnap's thought-style and even the content of philosophizing”. Mormann (2012) even suggests viewing Carnap as, to a considerable extent, an heir of German neo-Romanticism and in a certain continuance with Nietzsche's philosophy.

Nietzsche or the Dilthey school on the *Aufbau* project,²³ nor do I want to comment on scholars' various observations about Carnap's neo-Kantian influences.²⁴ Rather, I would like Carnap scholars to consider my following, admittedly somewhat *speculative*, line of thought. It goes like this: I find it reasonable to view that *System der Philosophie* included some valuable philosophical elaborations for the young Carnap when we take in account that Carnap in the early 1920s was influenced by Neo-Kantianism *and* if we suppose that he was also significantly influenced by life-philosophy, especially by Nietzsche. For Carnap, such valuable elaborations in *System der Philosophie* touched upon the issue of how to *reconcile* a conceptual system "constructing" approach in philosophy (that was in line with an influential Kantian academic establishment) with life-philosophers' (and particularly Nietzsche's) anti-systematicism. I find it worth noting that at the time when Carnap was beginning his *Aufbau* project, *System der Philosophie* was a fresh publication by a renowned representative of a highly influential German academic Kantian establishment. (It is also worth mentioning that Carnap's *Doktorvater*, Bruno Bauch, was both academically and intellectually bound to the Baden school.) Moreover, the early proto-*Aufbau* note "Über die Analyse von Erlebnissen" (dated 11.9. 1921) impressively shows that Carnap was concerned and struggled at the time with the problem of the "experience correspondence" (*Erlebnismässigkeit*) of "constructed" objects.²⁵ Thus, I find it reasonable that *System der Philosophie*'s unique type of cross-fertilisation of Kantian and Nietzschean epistemological elements had a strong appeal to Carnap *and* that this is evidenced by "Vom Chaos" Rickertian contents.²⁶

Let us return from this *speculative* line of thought to demonstrate "Vom Chaos" *factual* Rickertian contents. I claim that Rickert's influence on "Vom Chaos" can actually be given a *full demonstration*.²⁷ I have already suggested that "Vom Chaos" includes several (i) *textual parallels* and some (ii) *coinciding notions* with *System der Philosophie*. These can, of course, be taken as textual evidence (and the latter

²³ Cf. Damböck (2012), Gabriel (2004, 2007), Mormann (2006a, b, 2007b, 2012).

²⁴ Cf. for example (Carus 2007a, b), Friedman (1999, 2000, 2007a, b, c), (Richardson 1998, 2003).

²⁵ Cf. Carus (2007a, p. 140). Carnap wrote at the beginning of this early note: *Anscheinend Vorideen für den späteren "logischen Aufbau der Welt"*.

²⁶ It is remarkable that *System der Philosophie* actually proposes a heavily Nietzschean-influenced interpretation of Kant's transcendental idealism. Rickert interprets as Kant's original position that concepts and their systems resulted from imposing norms. Rickert even suggests that by adopting such a standpoint, Kant had already transformed traditional ontological disputes into questions about "valid values". Rickert (1921) p. 157: "The relation to an object stands following Kant's explicit explication as nothing else 'than making the conjunction (*Vebindung*) of representations of a certain kind made necessary and subordinate this to a rule (*Regel zu unterwerfen*)'. What does this mean? In rule there echoes the concept of norm (*Norm*), an imperative (*Vorschrift*), ought (*Gesollten*), and a rule, which cannot be based on (*Gestützt werden*) on the actual will (*realen Willen*) of a psychical nor a metaphysical subject, must be established (*Gegrundet*) in a valid value (*geltenden Wert*). (...) Thus, the old ontological problem about an object (*alte ontologische Gegenstandsproblem*) is already by Kant transformed into problem of a validity or value (*Geltungs oder Wertproblem*)" (M. L.).

²⁷ I use the notion of *demonstration* in the meaning of conclusive evidence or proof.

even as *direct* textual evidence) of Rickert's influence. However, it can nonetheless be argued that we lack compelling textual evidence about the *direct* and *distinct* influence of Rickert. Namely, "Vom Chaos" rather obscure quasi-Nietzschean formulations and its few terms that coincide with Rickert's work may derive from various unspecified sources, if they cannot be seen as perhaps Nietzsche's direct influences on Carnap.

I admit that "Vom Chaos" contains several passages that leave open questions about their exact—apparently life-philosophy influenced—origins. I nevertheless argue that "Vom Chaos" also includes compelling textual evidence about Rickert's *direct* and *distinct* influence. I claim that the passages below can be seen as a *full demonstration* of the *fact* that "Vom Chaos" has a direct and distinct subtext in Rickert's *System der Philosophie*.

(...) we create a fiction (Fiktion). First we act (tun) as if we moved from the conceptual thought world, which divides itself into value and reality, into a conceptual, irrational, and, accordingly, nameless experience (Erlebnis), that is: back to the condition, in which everything still remains a non-separated unity (ungetrennter Einheit). And after this, we act as if we made, in reverse, the smallest conceivable step into the world of real and valid objects, along the path upon which we separate value and reality from each other...

(...) ...we, too, adopt the epistemological fiction of the building that starts from Chaos (Fiktion des Aufbaus vom Chaos aus an). The present formulation of this fiction is put forth like this: we experience (Erleben) reality and its formation (Umbildung); we extrapolate backwards these reconstructions of a largely ordered reality, i.e. we obtain reality as if it had resulted from an ordered construction process emerging from a disordered state. We reconstruct this fictitious original state, and undertake a thorough reconstruction so as to achieve a more fully unified (einheitlicheren) system of reality.

To the best of my knowledge, this particular type of application of a methodological "fiction" with which to begin a "constitutional system" is a *distinct* procedure by Rickert. Because it is (to the best of my knowledge) also *unique* to *System der Philosophie*, the reasonably similar procedure in "Vom Chaos" can *only* be traced back to this work of Rickert's—if anywhere. One might nonetheless attempt to argue that young Carnap might have invented this procedure by himself or that it shows a primarily *Vaihingerian* influence. I find both these options unconvincing. Of course, it may also be that this "fictionalist" procedure is actually not unique to Rickert, and we shall find in the future some new textual evidence of similar or perhaps even better matching "fictionalist" procedures from some other philosopher(s).²⁸ However, for now, this remains concisely unsubstantiated; we are left here with Rickert.

I will end this section by claiming that there is a strong case for the view that Carnap's reconstruction project was initially designed after Rickert's example in

²⁸ Christian Damböck has (recently in personal correspondence) suggested considering that "Das Salto-mortale des Gedankens" (1903) by Eduard Sokal might be viewed as being of some relevance to the first passages of "Vom Chaos". Be this as it may, this peculiar writing does not have a resemblance to (or, in fact, anything to do with) "Vom Chaos" methodological "fictionalism". Thus, it is evident that Sokal's writing does not qualify as a candidate to be proposed alongside Rickert's *System der Philosophie* as explaining "Vom Chaos" "fictionalist" procedure".

System der Philosophie.²⁹ First, Carnap (1) begins—(too!) as he says—his theory in “Vom Chaos” from an “irrational” starting point.³⁰ Second, Carnap (2) adopts there a “will for a new ordering” as his underlying epistemological maxim for the undertaking of rational reconstruction. Both of these features can be (arguably) traced back to Rickert and *System der Philosophie*. Furthermore, (3) “Vom Chaos” “constructing” proceeds by positing first a methodological “fiction”. This—as I have argued—is a *distinctively* Rickertian feature in “Vom Chaos”.³¹

I cannot note any passages in “Vom Chaos” that would show that its “construction” proceeds within Rickert’s value-theoretic framework. (This would, of course, make my case obvious.) However, even so, I can show as a *hard fact* that (4) Carnap

²⁹This point of view has been put forward by Mormann (2007b): “(...) I want to demonstrate that the constitutional theory of *Aufbau* became first of all designed as a modernized and formalized version of Rickert’s constitutional theory, as he had put it forward in *System der Philosophie* (Rickert 1921). According to my interpretation, Rickert’s approach, which inspired *Aufbau*, became forsaken at the beginning of the 30s; values disappeared from the list of scientific objects to be constituted, and also, the value-theoretical interpretation of quasi-objects became discarded as lacking an object” (M. L.).

³⁰In fact, I would suggest that “Vom Chaos” passage “(...) *the will to overcome inconsistencies of reality by construction (Umbau) is also the irrational starting point of our theory*” also follows the lead of Rickert. This passage strongly parallels Rickert; *System der Philosophie* proposes, for example, that “*Every understandable proposition and especially every scientific philosophy means rescission of the irrational*”. Rickert (1921 p. 249) “*Jede Aussage, der verständlich ist, und vollends jede wissenschaftliche Philosophie bedeutet die Aufhebung des irrationalen.*” Moreover, it is difficult to believe that the young Carnap would have not been familiar with Rickert’s standpoint on the phenomenal “irrationality” of the “reality”. This standpoint may be altogether different from “Vom Chaos”, but it is nevertheless worth considering as relevant and possibly even as bound to “Vom Chaos” “irrational starting point”. Rickert’s philosophical stance about the phenomenal “irrationality” of “reality” is neatly proposed in Guy Oaks’ (1986) introduction to Rickert’s *The Limits of Concept Formation in Natural Sciences – Die Grenzen der naturwissenschaftliche Begriffsbildung*. Oaks 1986, xvii: “(...) every event can be described in term of properties each of which exhibits an indeterminate number of aspects. Rickert calls this the intensive infinity of reality. Thus, reality as a whole is irrational in the sense that there is no criterion that one can specify what would qualify as knowledge of this totality, and every element of reality is irrational in the sense that there is no criterion that can specify what would constitute a complete description of its aspects”. It is also worth noting that Carnap participated in Rickert’s lectures in Freiburg as early as 1911 (cf, Gabriel 2004, 2007).

³¹The editor Christian Damböck was so kind as to call my attention to the fact that Rickert’s *System der Philosophie* does not appear on Carnap’s reading list of the early 1920s (RC 25-03-05). This does not mean, however, that Carnap did not read “System” before 1924, as Damböck has proposed. Rather, in light of available evidence, it is appropriate to presume that he read it without adding it to his list(s) and that he actually did not mark all books he read on the list. For one thing, the list at the case is undoubtedly deficient. One example: Carnap’s markings from 22.8. 1922 contain six books. However, markings about the first book lack information about the author, and the fourth book has been marked incompletely and then cancelled. (This is only one example of similar cases in the list.) Second, Damböck may be said to have committed a logical mistake. Carnap’s reading list at the case may be interpreted as follows: if a book appears on the mentioned reading list as read, this means (with moral certainty) that Carnap read it. Formally: LR => R (1). As we learn from elementary logic, this is not equivalent to R => LR (2). In other words, from (1), it does not follow that if a book is not on the reading list, then it was not read. (Moreover, there is proof about the incompleteness of the list but no proof to the contrary).

integrated a Rickertian value-theoretic interpretation into the *Aufbau* project in its early stages. This is evidenced (in addition to *Aufbau* § 42) in the synoptic manuscripts “Entwurf einer Konstitutionstheorie der Erkenntnisgegenstände” (1924c) and “Gedanken zum Kategorien Problem. Prolegomena zu einer Konstitutionstheorie” (1925). Both of these manuscripts include the Rickertian value-theoretic construction of objects and (1924c) even contain the section “Sein und Gelten” in a chapter titled “Die Logik der Konstitutionsformen” (we shall investigate *Aufbau* § 42 in some detail in the next section).

In conclusion, I remain suspicious that with the textual evidence that is presently available, it can be convincingly *demonstrated* “that the constitutional theory of *Aufbau* became first of all designed as a modernised and formalised version of Rickert’s constitutional theory”, as Mormann (2007b) has proposed.³² I claim that (when putting together our textual evidence in 1–4 above) we can conclude that there is a strong case for stating that Carnap’s *Aufbau* project was first designed after Rickert’s example in *System der Philosophie*. (Obviously, this issue is in need of further research.)

Rickert’s Influence *in and after Aufbau*

Rickert’s presence in *Aufbau* is an undisputable fact. *Aufbau*’s index of references includes, in addition to *System der Philosophie*, three of Rickert’s major works: *Kulturwissenschaft und Naturwissenschaft* (1899), *Der Gegenstand der Erkenntnis* (1904) and *Die Grenzen der naturwissenschaftliche Begriffsbildung* (1913). Moreover, *Aufbau* §§ 12 and 75 clearly connect to Rickert’s lines of thought and mention him by name. Yet, perhaps most importantly, *Aufbau* § 42 integrates the Rickertian *Sein/Gelten* distinction into “constitutional theory” to arrive at a value-theoretic explanation about logically constructed objects. After these remarks, it may be surprising (at least for a non-specialist reader) that Rickert’s influence on Carnap’s rational reconstruction project, which is featured in *Aufbau*, has remained contentious. We shall discuss this matter after a close observation of § 42.

Carnap proposes in *Aufbau* § 42 that a “quasi-object” is to be “distinguished as something, that holds (*Gelten*) of the basic elements, which have ‘being’ (*Sein*)”.³³ Carnap explains that the “constitutional method proceeds beyond the customary

³²Mormann (2006a, 2007b) supports his observation by noting that *Aufbau*’s “constitutional theory” includes “cultural objects” and “values”. Mormann (2007b) sketches an outline of a “South-West neo-Kantian reading” of *Aufbau*, which leans on evidence about Rickert’s influences not only in §§ 12, 42, 75 but also in §§ 106, 152, 158. It is not possible to provide a fair account of Mormann’s elaborations in this paper.

³³Carnap (1928) § 42: “Fundamentally, the difference between being and holding, of which so much has been made in recent philosophy, goes back to the difference between object spheres, more precisely, to the difference between proper objects and quasi-objects” (Translation by R. A. George).

conception of being and holding” in which “this relationship, constantly repeated, leads from level to level”. Thus, Carnap applies in *Aufbau* § 42 the Rickertian value-theoretic explanation of rational reconstruction to a peculiar “perspectivist” type of modification and interpretation. Carnap writes, “The concepts being and holding are relative to and express the relation between each constructional level and the succeeding one”. Thus, Carnap observes the *Sein/Gelten* distinction in § 42 as something that recurs on each level of logical construction.³⁴ Consequently, because all reconstructed objects are supposed to be reducible to the elementary level of the system at issue, this Rickertian distinction recurs all the way down to the fundamental layer of the system.

Scholars have obviously had good reasons for excluding Rickert’s influence from the significant influences of *Aufbau*.³⁵ For one, the large work absorbs many influences, and not all of them are relevant to the same degree; § 42 actually begins with a bracketed notice that says that *Überschlagbar* “can be omitted”.³⁶ One way of making sense of this is to consider that Carnap apparently wanted to mark this section as having minor relevance. It can also be inferred that Carnap considered § 42 optional because it proposes elaborations that are not vital to the presentation of the “constitutional theory”. Whatever the case, these more or less speculative observations do not constitute anything new or decisive in Carnap studies. We will push forward.

Next, I want to focus on two more *facts* about Carnap’s *Aufbau* project. The first is that the Rickertian value-theoretic “construction” of objects was an integral part of the *Aufbau* project at least until the mid-1920s. The second is that (to the best of my knowledge) all markings about this fall out of Carnap’s work after *Aufbau*. We shall not speculate about the possible reasons why the Rickertian value-theoretic framework vanishes from the *Aufbau* project’s “logic of constitution forms” during Carnap’s stay in Vienna. Rather, I wish to suggest a *new thesis* in Carnap studies by proposing that a considerable part of Rickert’s influence survived after Carnap abandoned the *Aufbau* project.

I suggest that although all markings about the Rickertian *Sein/Gelten* framework slip, so to speak, into the back stream of Carnap’s philosophical ship after *Aufbau*, not all of Rickert’s influence has sunk into oblivion. What Carnap retained under the keel of his vessel—if such an expression can be tolerated—was his early absorbed view that “constructing” new conceptual systems attempted to impose “new rules”. As we have shown, such an explanation about “constructing” can be traced to “Vom Chaos”, and it (arguably) reveals a Rickertian influence. Basically, the similar explanation about “constructing” springs to the surface in ESO’s theory of “linguistic frameworks”.

³⁴Carnap (1928), § 42: “Stepwise progress of construction, in which the relationship between being and holding recurs several times: Classes are constructed from things. These classes do not consist of the things. They do not have being in the same sense as the things; rather they hold (*Gelten*) for the things”.

³⁵Mormann’s (2006a, b, 2007a, b) observations about Rickert’s influence are, of course, an exception here.

³⁶*Aufbau* §§ 83, 103–105 and 153–155 include a similar notice.

“Linguistic Frameworks” as Impositions of “New Rules”

The intellectual-historical context of ESO, in which the notion of “linguistic frameworks” is first introduced, is the dispute between Carnap and V. W. O. Quine over the use of abstract objects in semantics. In this paper, Carnap approaches ontological questions, such as “Are there Xs?”, from a preliminary dichotomy between *internal* and *external* questions. Carnap takes internal questions “within the framework” to be unproblematic. If ontological questions are understood as external, about matters of fact, Carnap views these as *pseudoquestions* that have no cognitive content. However, if ontological questions are understood as questions of whether to adopt a “linguistic framework” such that we can talk about Xs in this framework and “there are Xs” is true *in* this framework, these questions are acceptable and pragmatically significant.³⁷

According to a common reading of ESO, controversies about the existence of abstract or physical objects can only be about “linguistic frameworks”. Carnap is often understood to leave no room for genuine or “theoretical” investigations into what entities really have existence. Ontological questions are transformed into questions about choices of a particular linguistic form. Thus, decisions between different competing conceptual systems (i. e., different “linguistic frameworks”) are made only on pragmatic grounds, such as their simplicity, expediency, efficiency and theoretical fruitfulness (Eklund 2009, 2012, 2013).

The acceptance or rejection of abstract linguistic forms, just as the acceptance or rejection of any other linguistic forms in any branch of science, will finally be decided by their efficiency as instruments, the ratio of the results achieved to the amount of complexity of the efforts required. (Carnap 1950)

I suggest that the theory of “linguistic frameworks” in ESO includes important representations of similar elaborations, which are detectable in Carnap’s early works. First, Carnap’s pluralist stance in ESO about various optional “linguistic frameworks”, for which decisions will be made only on pragmatic terms, can be traced to similar elaborations in “Aufgabe der Physik” (1923).³⁸ Carnap observes there that many different theory constructions can be rendered “valid” (*gültig*) by demonstrations of their appropriate “assignment relations” (*Zuordnungsbeziehungen*). Carnap suggests that distinguishing between correct (*richtig*) and false (*falsch*) theory constructions in modern physics is untenable; one can only distinguish between more and less complicated theories. Moreover, in parallel to ESO, “Aufgabe der Physik” can be seen as transforming quests for a “correct” theory into a pluralism of many acceptable “valid” theory constructions and, further, into problems about

³⁷Eklund (2009) calls these two types of external questions in Carnap (1950) *factual-external* and *pragmatic-external* questions.

³⁸“Über die Aufgabe der Physik und die Anwendung des Grundsatzes der Einfachheit” (1923). Eklund (2009, 2012, 2013) provides learned accounts of Carnap’s framework pluralism and his theory of “linguistic frameworks” in ESO. Mormann (2007a) first proposed viewing Carnap’s framework theory in ESO as a continuance of Carnap’s early work, particularly “Aufgabe der Physik”.

how criteria should be used to make choices between different optional theories. Finally, in both mentioned works, Carnap proposes that in science, the lead among various theory “candidates” will be determined by pragmatic factors.³⁹

Most importantly for our present enquiry, ESO proposes that new “linguistic frameworks” derive from a “procedure” of “construction” that consists of imposing a new way of speaking subject to “new rules”. I shall end this investigation by first elucidating the meaning “constructing” in early Carnap’s works. Then, I will present a short analysis about *Aufbau*’s standpoint to *ontology* and claim that ESO is a continuance of this and presents a basically similar metaontological position. Finally, I will claim that Carnap essentially re-expresses in ESO his longstanding view about conceptual systems in science as resulting from imposing norms, which originate from a *will* to organise anew.

The early Carnap believes that conceptual systems of science are “constructions” in the sense that they result from the application of various distinctions and structures upon the “given” (*Gegebene*; Carnap 1923, 1924a, 1928 § 3–5; § 179).⁴⁰ Within the *Aufbau* project, a “rational reconstruction” (*rationale Nachkonstruktion*) has a deliberate *purpose*: it is undertaken with a particular aim to produce a logically ordered conceptual realm (Carnap 1920, 1924a, 1928 § 26, 49, 54, 92 f., 98 f., 143, 179). Early Carnap’s standpoint about the “given” undergoes substantial changes from “Vom Chaos” to *Aufbau* (Carus 2007a, p. 170). In *Aufbau*, Carnap’s preferred “system form” takes the ultimate “given” to be a “stream of experience”, which is *prior* to (often) ontologically burdened distinctions between subject/object, physical/psychical, “real”/dream and “being”/“holding” (*Sein/Gelten*; § 42; §§ 64–66; § 163; § 170). In *Aufbau*, Carnap acknowledges that the undertaking of a “rational reconstruction” involves providing merely a reorganisation of the “given”. Consequently, all of these mentioned distinctions in *Aufbau* are “constructions” as mere reorganisations of the “given”.⁴¹

³⁹Carnap (1923, chapter “Das Prinzip der Einfachtheit”); “(...) Axioms do not have observational contents (*Beobachtungsinhalte*) as their object, but only formal designations (*formale Bestimmungen*), as assigned (*zugeordnet*) to the contents of perceptions, so one can, for every chosen system of axioms, achieve what is called ‘an accordance with reality’. For this, only relations of assignment (*Zuordnungsbeziehungen*) need to be put forward in an appropriate form (as the ‘valid relations of assignment’). In this way, one can establish ‘valid’ relations of assignments” for different axiom systems that can differ vastly in respect of their simplicity. Here we have the core of the logically untenable differentiation between ‘correct’ and ‘false’ systems” (M.L.).

⁴⁰In addition to “Konstruktion”, Carnap’s early works include (famously) the notion “*Aufbau*” and also, occasionally, “*Umbau*”; in early Carnap, these have (arguably) basically the same meaning. Carnap (1920), (1923), (1924a), (1928).

⁴¹In *Aufbau*, Carnap notably states that in the beginning of its system, experiences (*Erlebnisse*) must be taken “simply as they are given”. The “reality” and “non-reality” of its *Elementarerlebnisse* is “bracketed” by applying Husserl’s phenomenological *epoché* (§ 64; § 68). Cirera (1994, pp. 9–11) observes that Carnap follows here a “certain tradition within German philosophy” as represented by, for example, Mach, Avenarius and Dingler, who all posited in the beginning of epistemology an ontologically neutral “given”. My evaluative judgment of this observation must be presented in another paper.

Carnap's standpoint in *Aufbau* about *ontology* becomes (arguably) most precisely articulated in § 59. This standpoint is bound to Carnap's observation about the *limits* of providing a rational reconstruction of objects that sharply distinguishes between the extra-scientific "metaphysical aspect" and the "logico-constructional" aspect of theories.⁴² In stating that the "metaphysical aspect" cannot have any expressions whatsoever in any "constitutional system", Carnap actually subscribes already in *Aufbau* to a position about ontology that is basically similar to ESO, or so I want to argue.⁴³ I propose that Carnap's *metaontological position* is (already) in *Aufbau* a position that holds that (i) a proper scientific approach (on the one hand) and (ii) disputes "on what there is" (on the other hand) do not "overlap" at all. As I view it, ESO proposes a basically similar standpoint about ontology. I will call this Carnap's (longstanding) *exclusive metaontological position*.⁴⁴

Finally, Carnap explains in ESO that new "linguistic frameworks" derive from a "procedure" of "construction" that consists of imposing "new rules" that are meant to replace the old ones. I suggest that this explanation in ESO can be traced to Carnap's earlier work and, importantly, back to "Vom Chaos". I suggest that "Vom Chaos'" adoption of a *will* to systematise—its *Wille zur Neuordnung*—is an *adaptation* of Rickert's quasi-Nietzschean epistemology in *System der Philosophie*. I also propose that ESO's explanation about the "procedure" of "construction" is essentially a re-expression of Carnap's early, Rickertian influenced stance about "constructing" a system of concepts. This stance leads to a "will for a new ordering" and suggests new conceptual systems by establishing *new norms*.

Conclusions

Rickert's influence on Carnap's *Aufbau* project has remained under debate. Our present inquiry suggests that we acknowledge that Rickert had a significant influence on the *Aufbau* project. First, Carnap explicitly integrated into the *Aufbau* project a Rickertian value-theoretic interpretation of the logical reconstruction. Second, Carnap's epistemological stance in the proto-*Aufbau* manuscript

⁴²Carnap notably observes in § 65 that before the formulation of *any* "system-form", the "fundamental elements" are without properties or fall in any object domain. Carnap (1928) § 65: "Before the formulation of the system, the fundamental elements are without properties and do not fall into specific domains; at this point, we cannot even speak of these domains and especially not of a differentiation between different subjects".

⁴³Carnap states that ontological questions *do not even arise* within the "constitutional theory" and that traditional ontological positions and disputes are devoid of cognitive content (cf. § 27). *Aufbau*'s Viennese-flavoured final sections even suggest that the structural epistemology, as exemplified by the "constitutional theory", is *the* only scientifically proper and *thus* the only acceptable *epistemology* available *in toto* (cf. §175–183). About interpreting and various interpretations of late Carnap's metaontology, cf. Eklund (2009, 2012, 2013).

⁴⁴My interpretation about Carnap's metaontology, which differs considerably from scholars' extant interpretations, is included in my forthcoming "On early Carnap's Metaontology".

“Vom Chaos” (1922) is very likely to follow the lead of Rickert’s *System der Philosophie*. The key evidence for this conclusion is in the textual parallels and coinciding notions between these two works and, in particular, in Carnap’s similar application to the *System der Philosophie* of methodological “fictionalism”.

There are good reasons for the view that some Rickertian influences on early Carnap survived after *Aufbau*. This point of view can be supported by observing that ESO is in important continuance of Carnap’s early work. Most importantly for our inquiry, ESO’s explanation about the “constructing” of a new “linguistic framework” as imposing “new rules” can be viewed as essentially re-expressing Carnap’s much earlier and (arguably) Rickertian-influenced stance about the “construction” (*Aufbau*) of a new system of concepts that follows the lead of a “will for a new ordering” (*Wille zur Neuordnung*).

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Susan Stebbing and the Early Reception of Logical Empiricism in Britain

Michael Beaney

Introduction: Thinking Logically

Are the English illogical? This is the question that Susan Stebbing addresses in the prologue to her most popular book, *Thinking to Some Purpose*, which was published just before the outbreak of the Second World War in 1939. Stebbing here picks up on a theme that Europeans have delighted in debating for centuries: our different national stereotypes. She begins by quoting a remark made in 1924 by Lord Selborne (who had been British High Commissioner to South Africa from 1905 to 1910) about “the glorious incapacity for clear thought which is one of the distinguishing marks of our race” (1939a, p. 11). However, top billing is given to Stanley Baldwin, who – as leader of the Conservative Party – served as British Prime Minister three times between 1923 and 1937. Stebbing writes: “Lord Baldwin is commonly regarded as a typical Englishman, impatient of logic, a little stupid it may be, but indubitably honest, not wasting time upon fine-spun arguments, but guided by common sense and experience” (ibid., p. 13). She then quotes from the last speech he made as Prime Minister (on ‘Empire Day’ in 1937), in which he claims that “one of the reasons why our people are alive and flourishing, and have avoided many of the troubles that have fallen to less happy nations, is because we have never been guided by logic in anything we have done”. What the British have achieved, according to Baldwin, has been aided not by logic but by common sense. (Ibid., p. 17)

What exactly is meant by being ‘guided by logic’ here? In answering this question Stebbing considers the disagreement between the English and the French in a debate at the Assembly of the League of Nations in 1925 over the Geneva Protocol of 1924. Stebbing quotes Paul Painlevé, who was then the French Prime Minister (but who had earlier been a professor of mathematics):

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The Protocol's universality, the severe and unbending logic of its obligations, were framed to please the Latin mentality, which delights in starting from abstract principles and passing from generalities to details. The Anglo-Saxon mentality, on the other hand, prefers to proceed from individual concrete cases to generalizations. (Ibid., p. 19)

In his reply, the British Foreign Secretary at the time, Austen Chamberlain (older half-brother of Neville Chamberlain) endorsed this view of the difference between the two mentalities. Here is how he expresses the 'English' point of view, as also quoted by Stebbing:

We are prone to eschew the general, we are fearful of these logical conclusions pushed to the extreme, because, in fact, human nature being what it is, logic plays but a small part in our everyday life. We are actuated by tradition, by affection, by prejudice, by moments of emotion and sentiment. In the face of any great problem we are seldom really guided by the stern logic of the philosopher or the historian who, removed from all the turmoil of daily life, works in the studious calm of his surroundings. (Ibid.)

The opposition here is clear: 'logical thinking' is understood as rigorously drawing out the implications of general principles and presumably acting on them even if they contradict everyday beliefs. Such 'logical thinking' is seen as characteristic of the 'Latin' mind, while the 'Anglo-Saxon' mind rejects such thinking wherever it conflicts with the deliverances of common sense.

Stebbing does not dispute the correctness of these characterizations of the two mentalities, but she does take issue with the underlying conception of logic that is common to both of them. In criticism of the Latin mentality, she remarks that "it hardly seems logical to start from abstract principles instead of proceeding 'from individual concrete cases to generalizations'"; and in criticism of the Anglo-Saxon mentality (in rejecting logic), she argues that it is not logical to push a conclusion to the point where it no longer applies to everyday life. She writes: "There is something comic in the suggestion that the philosopher or historian is being sternly logical when he 'studies a problem' by ignoring all its conditions." (Ibid., p. 20)

Both Painlevé and Chamberlain, Stebbing claims, confuse logical thinking with simply drawing conclusions a priori from abstract principles (ibid., pp. 19, 21). On Stebbing's view, logical thinking is essentially *purposive*: "To think logically is to think relevantly to the purpose that initiated the thinking; all effective thinking is directed to an end. To neglect relevant considerations would entail failure to achieve that end." (Ibid., p. 14) It is this central idea that is reflected in the title of Stebbing's book: *Thinking to Some Purpose*. Combatting misconceptions about the nature of logic, such as that she finds shared by British and French politicians, is one of the main aims of the book.

This concern with the nature of logical thinking – both correcting misconceptions about its nature and, more positively, promoting the new ideas that were being developed in the first decades of the twentieth century – is central to Susan Stebbing's philosophical work. It is also what made her receptive to logical empiricism when it emerged in the 1930s. At the same time, however, she retained her 'English' common sense and criticized the extreme conclusions that logical empiricists drew. Stebbing played a major role in the reception of logical empiricism in Britain, but – with the notable exception of A. J. Ayer's *Language, Truth and Logic* of 1936 – the

forms it took were ‘very British’, and this was partly due to her moderating influence.

This moderating influence is a natural consequence of her fundamental conception of logical thinking as purposive. To think logically, according to Stebbing, is to draw conclusions that are warranted by the relevant facts; it is not to think within the limits of a system (ibid., pp. 20–21). This idea of ‘thinking within the limits of a system’ is what is wrong with the ‘Latin mentality’. In fact, Stebbing uses this idea to express what she feels is indeed the most fundamental difference between the French and English minds: “the French tend to seek systems at the expense of the facts to be systematized, whilst the English tend to avoid anything approaching to a system” (ibid., p. 21). She goes on to nail her colours to the English mast:

In this untidy world the advantage hardly seems to lie with the French attitude. An Englishman, I suggest, is prone to believe that men have diverse interests, diverse aims, and diverse problems to solve; he recognizes that these diverse aims and diverse interests cannot always be harmoniously solved, nor can these diverse problems admit of neat solutions. (Ibid., p. 21)

Stebbing contrasts the French or ‘Latin’ mind with the English or ‘Anglo-Saxon’ mind. Given that the ‘Anglo-Saxons’ had northern European roots, where would Stebbing stand on the ‘Germanic’ mind? *Thinking to Some Purpose* was written with the threat of a second world war looming, and she clearly had no sympathy whatsoever for Nazism, but, surprisingly, she says virtually nothing about German thinking. I suspect that she would have classified the French and German minds together as ‘Continental’, with ‘thinking within the limits of a system’ the central characteristic. If so, then this would account for her reluctance to embrace logical empiricism as a philosophical system, while endorsing those aspects of it that were relevant for her logical purposes – and in particular, its respect for empirical facts.

Stebbing concludes her prologue to *Thinking to Some Purpose* by conceding that the English cannot be said to be logical. This conclusion is an odd one for her to draw, given that it seems to be based on the *misconception* of logic that she has been at pains to identify. If logical thinking is ‘thinking within the limits of a system’, and this is not something that the English do, then they cannot be said to be logical. But the first premiss of this argument is false, according to Stebbing; so how can they be illogical? Perhaps what she has in mind here are those English statesmen who share the French misconception of logic. If this is right, then both the French and the English are illogical when they fail to recognize what thinking logically actually means.

What Stebbing immediately goes on to say, however, suggests a slightly different reason for holding that the English cannot be said to be logical. She writes:

Is there any nation of which this could be truly said? Such a nation, could it be found, might confer upon this unhappy world the incalculable benefit of pointing out the consequences that must logically follow from the schemes we so unreflectively adopt and the policies we so blunderingly pursue. (Ibid., p. 22)

This suggests that one is thinking illogically whenever one does not think through the consequences of what one believes. However, this seems to reinstate

the conception that Stebbing has been concerned to combat: logical thinking as drawing out the conclusions, however 'extreme' they may be, 'within a system'. So what is her position?

Although Stebbing does not herself do this, I think it is helpful to distinguish a narrower from a broader conception of logical thinking. On the narrower conception, logical thinking is indeed simply thinking through the consequences of something 'within a system'. But in drawing the relevant conclusions, one may well find that these conflict with other beliefs that one has – the deliverances of 'common sense', for example. More rigorous thinking then involves working out which of the beliefs should be rejected in order to maintain consistency. This is the broader conception. In both cases, logical thinking is purposive, in Stebbing's sense. In the first case, our aim is to discover the implications of a set of beliefs; in the second case, our aim is to render our entire set of beliefs consistent.

If this is right, and Stebbing is right about the different mentalities, then the English and the French are illogical in different ways. The French may be good at thinking through the implications of something, 'thinking within the limits of a system', but not very good at responding to the inevitable conflict with our ordinary beliefs. The English may be good at maintaining our ordinary beliefs in the face of the 'extreme' implications of 'thinking within a system', but not very good at thinking through things in the first place. The French may be good at narrower logical thinking but bad at broader logical thinking, in other words, while the English seem to be bad at both, although their feeling for common sense prevents them from accepting 'extreme' views.

Stebbing's claim that the English are 'illogical' and her characterization of the difference between the 'English' and the 'French' mentalities are too crude to be taken seriously. Written as irrationalism was sweeping across Europe, it no doubt served as an effective way to hook a prospective reader of Stebbing's book. But it sits uneasily with her central aim. For if the English (and others) are illogical, then how will they learn from the book? Logical thinking can only be taught to those who are capable of logical thinking. So it might have been better to acknowledge our capacity for logical thinking, while stressing how easily we can be deceived. The rest of the book does indeed explore the multifarious ways in which we can be misled – by analogies and metaphors, by logical fallacies, by propaganda, and by ignoring context, for example. But all this is based on the assumption that we can recognize the deceptions when they are pointed out.

The claim about 'illogicality' aside, however, the prologue to *Thinking to Some Purpose* nevertheless reveals Stebbing's conception of logic and logical thinking. Logic, for her, was not just a formal theory or technical discipline, but had a practical as well as a theoretical – a pedagogical as well as a philosophical – dimension. Her two textbooks on logic show what topics she took as constituting the subject-matter of logic, construed as a discipline, but the examples she gave, and her more popular books, such as *Thinking to Some Purpose*, demonstrate her practical concern with improving people's everyday thinking. As she goes on to say in the second chapter of the book, "thinking is always purposive. To think effectively is to think to some purpose." (Ibid., p. 22) Understanding the purpose of a particular act of

thinking is as important as understanding its logical properties, as traditionally conceived; indeed, understanding the purposes of thinking should be included as part of the domain of logic, properly conceived. As we will see, it was this conception of the purposive nature of thinking that not only informed her philosophical work but also shaped her reception of logical empiricism.

Susan Stebbing: A Brief Biography

L. (Lizzie) Susan Stebbing was born in London on 2 December 1885, the youngest of six children. Her father, Alfred Stebbing, was a merchant, but died when she was only five. Her mother, Elizabeth, died when she was sixteen. In her early years she was educated privately at home, partly for health reasons. She suffered throughout her life from Ménière's disease, a disorder that affects the inner ear, causing attacks of vertigo and nausea, and longer-term hearing loss. It was for this reason that she was advised to study history when she went to Girton College, Cambridge in 1904. This was seen to be easier than either classics or science, which is what – depending on what story one reads – she had wanted to study.¹

In 1907 she came across Bradley's *Appearance and Reality*, which apparently inspired her to stay on at Cambridge after her History degree to complete Part I of the Moral Sciences Tripos. Her philosophy tutor was W. E. Johnson (1858–1931), whose three-volume work on (traditional) logic was to appear between 1921 and 1924. The Mistress of Girton College at the time was also a logician: E. E. Constance Jones (1848–1922). She had already published several books on logic, influenced by the nineteenth-century British logicians as well as by both Lotze and Hegel. Johnson and Constance Jones no doubt stirred Stebbing's interest in logic, although being part of the next generation of Cambridge philosophers, she was to become much more of an advocate for the new logic of Russell and Whitehead.

Stebbing decided not to stay on in Cambridge to do Part II of the Moral Sciences Tripos, however. Despite being able to study and sit the examinations, women were not allowed to actually graduate from Cambridge at the time; indeed, it was not until 1948 that this was allowed. So if a woman wanted an academic career, then she had to gain her qualifications elsewhere. Stebbing went to King's College London instead, from where she graduated with an MA in Moral Science in 1912. Her thesis was titled 'Pragmatism and French Voluntarism' and subtitled 'With special reference to the notion of truth in the development of French Philosophy from Maine de Biran to Bergson'. She argued that American pragmatism and French voluntarism, especially of Bergson's variety, were not as close as many at the time thought, and

¹That she had wanted to study classics is reported in the obituary by John Wisdom that was published in *Mind* in 1943; an obituary in the *Girton Review* gives the alternative story. For the fullest account of Stebbing's life, see Chapman 2013. This corrects some of the details that I gave in Beaney 2006, based on the *Mind* obituary. I am indebted to Chapman's excellent intellectual biography for many of the facts about Stebbing's life reported in the present paper.

criticized both for being insufficiently realist. Here we see the beginnings of her development into an analytic philosopher. Indeed, one reviewer of her thesis, when it was published as a book in 1914, criticized her for being “ultra-analytical, seeking divergences and inconsistencies without having first grasped the spirit and motives of the view she discusses”.²

Stebbing began writing articles and book reviews for philosophical journals: she was to publish more than 40 articles (though some of them were quite short) and over 70 book reviews during the course of a productive life. Many of the articles appeared in either *Mind* or the *Proceedings of the Aristotelian Society*, and the vast majority of the reviews were written for either *Mind* or *Philosophy* (or *Journal of Philosophical Studies* as the latter was called in the first 5 years of its life from 1926 to 1930). We will consider some of her articles (as well as her books) shortly. As far as the book reviews are concerned, she reviewed books by Whitehead, Collingwood, Santayana, C. D. Broad, Roy Wood Sellars, Russell, Lovejoy, Heinrich Scholz, H. H. Price, C. R. Morris, Michael Oakeshott, Carnap, Ayer, and Peirce, to name but the most notable authors. Around 20 of the books reviewed were on logic, and others were on realism, idealism, epistemology, ethics, and philosophy of science. She was very much at the centre of philosophical life at the time, as we shall see.

In the years immediately following her graduation, Stebbing held various part-time jobs teaching philosophy, at Girton, Newnham, and Homerton Colleges in Cambridge, and at King’s College and Westfield College in London. In 1915 she took over the running of the Kingsley Lodge School for Girls in Hampstead with her sister Helen and two friends, Vivian Shepherd and Hilda Gavin, with whom she lived at Kingsley Lodge for the rest of her life. She was Principal of the School until her death and taught history there for a while before her philosophy teaching took up more of her time.

In 1917 an event occurred that had a significant influence on her intellectual development, as she herself reports:

In 1917 I read a paper to the Aristotelian Society [entitled ‘Relation and Coherence’], perhaps one of the most muddled papers that have ever been presented to that assembly. ... At the outset of the discussion ... a man whom I had never seen and took to be quite young, began to ask me questions with a vehement insistence that considerably alarmed me. “What ON EARTH do you mean by that?” he exclaimed again and again, thumping the table as he said “on earth” in a manner that clearly shewed he believed there was no earthly meaning in what I had said. Soon, however, my alarm faded; the vehement philosopher had made me forget not to be a philosopher—nothing mattered except trying to find out what I did mean. In spite of my stumbling replies he managed to elicit the reasons why I had been led to the views I was trying to defend; he shewed me the baselessness of many of my reasons, he unravelled the muddles and enabled me to see more clearly the grain of sense that had been at the back of my inept criticisms. That was my first meeting with Moore, whose name I discovered only towards the end of the discussion. I am inclined to think that this meeting of the Aristotelian Society was somewhat peculiar in the annals of the Society, for the reader of a paper was, before the end of the discussion, convinced that her main contentions were entirely wrong. One does not expect a philosophical society’s meeting to end in a

²Thorne 1915, p. 221; cited by Chapman 2013, p. 31. The criticism reminds one of similar objections made to Bertrand Russell’s 1900 book on Leibniz. See Beaney 2013b, §5.1.

conversion, yet such was the result in my case, owing mainly to the vehement and vigorous clarity of Moore and his patience in pursuing the question to its end ... (1942, p. 530)

This report occurs towards the end of her contribution to the 'Library of Living Philosophers' volume on G. E. Moore, entitled 'Moore's Influence', so there may be an element of exaggeration here. But it clearly shows the enormous effect that Moore had on Stebbing. They remained in close contact for the rest of Stebbing's life, regularly corresponding and meeting up in Cambridge. As well as revealing something of Stebbing's own character – her intellectual honesty and modesty, the report also suggests what it was that impressed Stebbing most about Moore: his determination to discover what might be meant by a philosophical question, proposition or concept. As she put it at the beginning of her contribution, Moore's characteristic merit was "the steady pursuit of methodical questioning" (*ibid.*, p. 520), rooted, we might also add, in a robust feeling for common sense.

In 1920 Stebbing was appointed to an Assistant Lecturership in Philosophy, a two-thirds post, at Bedford College for Women in London. She was promoted to a Lecturership the following year, which was made a full-time post in 1924, and became Reader in 1927. During the course of the 1920s Stebbing wrote numerous book reviews (over 30), contributed to several symposia for the Aristotelian Society, and engaged especially with Whitehead's work, not only reviewing his books but also writing several articles on his ideas. Towards the end of the decade she began work on an introductory textbook on logic, invited to write it by the London publisher Methuen. *A Modern Introduction to Logic* appeared in 1930, with a second edition following in 1933.

Stebbing's introduction to logic may rightly be regarded as the first textbook of analytic philosophy. It was reviewed in the main journals of philosophy and was generally well received, although, predictably, it was criticized by the old guard. I shall say more about this key work in the next section. Here I will simply note that it established Stebbing at the forefront of British philosophy. In 1932 she was invited to give the annual British Academy lecture on philosophy the following year, and she was elected President of the Aristotelian Society for 1933–1934 and President of the Mind Association for 1934–1935. Most importantly of all, she was promoted to Professor in 1933, making her the first woman Professor of Philosophy in Britain, a landmark achievement – especially given that Cambridge was still refusing to allow women to even graduate, let alone be appointed to chairs. 1933 also saw the founding of the journal *Analysis*, established jointly by Stebbing, Gilbert Ryle, C. A. Mace, and A. E. Duncan-Jones (who became its first editor). Publishing short articles on philosophical topics and problems, it is still regarded as a flagship of analytic philosophy today.

Stebbing's book on logic also gave her an international reputation. In the winter semester of 1931–1932 she was Visiting Professor at Columbia University in New York, where she lectured on mathematical logic and contemporary metaphysics. More significantly, she became involved in the activities of the Vienna Circle. She first met Schlick at the Seventh International Congress of Philosophy in Oxford in 1930, when she was on a panel with him. Schlick spoke on the future of philosophy

and Stebbing on logical constructions. Schlick returned to England in 1932 to lecture at King's College London, though illness prevented Stebbing from attending the lectures. Logical positivism formed the topic of her British Academy lecture,³ however, and in 1934 she invited Carnap to give three lectures at Bedford College. These were later published as *Philosophy and Logical Syntax*, which Stebbing reviewed in 1935. It was on the occasion of these lectures that Carnap met both Russell and Ayer for the first time.⁴

In September 1935 Stebbing attended the first International Congress for the Unity of Science in Paris. She was the only British member of its organization committee, and she later wrote a report on the congress, commenting on the participants' shared commitment to "the achievement of a scientific philosophy requiring detailed and piecemeal investigations rather than sweeping generalisations and imposing superstructures" (1936a, p. 29). Ayer was also present, and tells the following story in his autobiography: "One of my most pleasant memories of this congress is that of watching Otto Neurath being gallant to Miss Stebbing, speaking to her in English and saying, 'I have always been for the womans.' It was the only occasion on which I saw her at a loss." (1977, p. 164)

Ayer also reports in his autobiography on the time that Stebbing stayed with him and his wife when she came to read a paper in Oxford, describing her as follows: "Philosophically she was very much a disciple of Moore and she shared his impatience with sloppy or pretentious thinking. She was quite often brusque but she was never mean. She was one of those persons who make you proud if they think well of you." (1977, pp. 157–8) Stebbing was far too independent a thinker to be described as a 'disciple' of Moore, although she was undoubtedly influenced by him (as we have noted), but the rest of Ayer's description rings true. Stebbing wrote a ten-page review for *Mind* of Ayer's *Language, Truth and Logic* when it came out in 1936. She expresses sympathy with his "revolt against deductive metaphysics", but is otherwise critical (1936b, p. 364).

In the meantime Stebbing had written and published *Logic in Practice*, which came out in 1934. Much shorter than her earlier book, it was intended for a more general audience, introducing them to logical thinking by critically examining some examples drawn from actual life, such as the newspaper reporting of the British General Strike of 1926. This was followed, in 1937, by *Philosophy and the Physicists*, also addressed to a more general audience, which offered a critique of the popular scientific works of James Jeans and Arthur Eddington. Both had drawn philosophical conclusions from their scientific work, such as that tables are not really 'solid', that were in conflict with common sense, and this is what Stebbing targeted and criticized.

³Stebbing talks of 'logical positivism' rather than 'logical empiricism'. I use the two terms synonymously in the present paper, though I shall follow her in using the first term in discussing her response to logical positivism.

⁴Ayer had attended meetings of the Vienna Circle from December 1932 to March 1933, but Carnap had not been there at the time, having just moved to Prague. See Ayer 1977, pp. 127–38.

In 1938 the International Congress for the Unity of Science met in Cambridge, and Stebbing gave the inaugural lecture on ‘Language and Misleading Questions’, which was subsequently published in *Erkenntnis* (1939b). This was to be the last talk she gave on such topics. By this time, war was threatening and Stebbing became increasingly concerned with doing what she could, as a philosopher, to help people think clearly about the moral and political issues that were facing them. *Thinking to Some Purpose* appeared in 1939, and this was followed, in 1941, by *Ideals and Illusions*. Stebbing begins the latter by noting the “failure in our national life” that a second world war had revealed. One of the causes, she suggests, is our tendency to think in abstractions, and the answer to this she sums up in the advice: *Be definite*. We should indeed have ideals, but these should be formulated in concrete terms: “What is worth having in such and such specifiable circumstances?” (1941, p. x)

Stebbing’s final book, though, was *A Modern Elementary Logic*, published in 1943. Much shorter than her earlier book on logic, this was intended specifically for teaching logic to first-year university students – written, as she explains in her preface, “from a modern point of view, that is both unencumbered with much dead traditional doctrine and yet meeting the needs of students preparing for an examination” (1943, p. v). The book sold well, being reprinted and used well into the 1960s.

During the war Stebbing continued to teach, but lived in term-time in Cambridge, to where Bedford College was re-located. She was also active in helping refugees from Nazi Europe. One person she helped was Otto Neurath, who had been imprisoned as an enemy alien when he had fled from the Netherlands in May 1940, before Stebbing managed to secure his release and arrange for him to teach and re-establish his Isotype Institute in Oxford. During the war, however, Stebbing’s health declined rapidly, not so much from the Ménière’s disease that had plagued her all her life, although this had indeed become worse, but from cancer. She was diagnosed in December 1941, and although she had both surgery and radiotherapy soon afterwards, by the summer of 1943 the disease had spread to all the organs of her body and she died at Mount Vernon Hospital, just outside London, on 11 September. A memorial service was held in Cambridge on 30 October.

The Development of Stebbing’s Work on Logic

Shortly after her MA thesis on pragmatism and French voluntarism was published, Stebbing wrote a short piece entitled ‘A Reply to Some Charges against Logic’ (1915). This was her first publication on logic, but it developed naturally out of her critique of pragmatism. That critique had led to a dispute in the pages of *Mind* with F. C. S. Schiller (1864–1937), who was the leading British pragmatist, or ‘humanist’ as he preferred to call himself. Schiller was a notable critic of formal logic, arguing that the principles of logic were just human constructions mistakenly believed by deductive logicians to be mind-independent truths. His book, *Formal Logic: A Scientific and Social Problem*, which presents his fullest account of logic, was published in 1912.

Other books on logic joined in the attack, frequently adopting an excessively florid and polemical style. One such book was *A New Logic*, also published in 1912, by Charles Mercier (1851–1919), an English physician and psychologist. In its final chapter, entitled ‘Faults of the Existing Systems of Logic’, Mercier accuses both traditional and modern logic of a whole host of errors and confusions. One fault mentioned is “its failure to refer to the purpose of its argument”. He writes: “No previous writer on Logic known to me, recognises that the purpose of an argument is vital to its validity, or that an argument may be fully and completely valid for one purpose, and utterly false and invalid for another” (1912, p. 405). A few pages later, comparing himself with the little boy in the story of the Emperor’s new clothes, he admits to having no professional expertise in logic but goes on: “The only qualifications I bring to the task are ordinary common sense and a plentiful lack of reverence for authority in general, and for Greek philosophy in particular. The only weapons I am armed with, are the sling of common sense, and a few smooth pebbles of fact from the brook of experience.” (Ibid., p. 414)

It is Mercier’s book that is the main target of Stebbing’s ‘Reply’ of 1915. She stresses the need for reasoning to be based on logical principles, which she argues are just as objective as scientific principles. But in view of her own later emphasis on the purposive nature of logical thinking, what is notable about this piece is its agreement with the basic pragmatist belief in the importance of the practical. Stebbing writes: “Logic will undoubtedly benefit by being brought more into touch with practical life – that is, in being shaped with a view to its *application* to the concrete arguments of science and everyday life” (1915, p. 412). We should also note here the very ‘English’ view expressed by Mercier: a boy armed only with the sling of common sense (and a pebble of fact!) can slay the Goliath of Logic. Stebbing did not share this view, but it no doubt informed her later account of the ‘illogicality’ of the English.

Stebbing began to take more interest in modern logic, especially after her ‘conversion’ to Moorean philosophy in 1917. In her early years teaching in London, she had retained her connections with Cambridge. In particular, she was Director of Moral Science Studies at Girton and Newnham Colleges from 1918 to 1924. Cambridge had been at the heart of the development of mathematical logic in Britain, and although after the First World War, neither Russell nor Whitehead were at Cambridge any longer, the influence of *Principia Mathematica*, published between 1910 and 1913 (with a second edition in 1925), remained strong. Her teaching in both London and Cambridge also convinced her of the need for a textbook that introduced students to the new logic of Russell and Whitehead and its philosophical assumptions and applications. Excluding the publication of her MA thesis, which had appeared in 1914, *A Modern Introduction to Logic*, published in 1930, was her first book, and it is also by far her longest: it adds up to over 500 pages.

Her book did more than just introduce students to the new logic, however. As a former student of W. E. Johnson’s, whose own book on logic had appeared in three volumes between 1921 and 1924, it also contains an account of traditional logic. Indeed, what characterizes Stebbing’s treatment is the way it brings together

traditional and modern logic. The book is called 'A Modern Introduction to Logic' rather than 'An Introduction to Modern Logic'. Stebbing stresses the continuity between traditional (Aristotelian) and modern logic, in that both see logic as essentially formal. Moreover, as she explains in her preface, the syllogism is not only exemplified frequently in our ordinary reasoning but is also "psychologically the simplest form, so that syllogistic arguments provide the easiest means of enabling the student to apprehend form as such and to realize that the validity of reasoning depends upon its form" (1930, pp. ix–x). There is a straightforwardly practical reason, too, for including an account of traditional logic. Logic examinations at the time required understanding of traditional logic, so that a textbook, even while it aimed to broaden the syllabus by promoting modern logic, still had to contain instruction in traditional logic.

Stebbing's book is more, though, even than an account of both traditional and modern logic. The book is divided into three parts, of which only the first and third concern (formal) logic. The second part, amounting to nearly 200 pages in itself, is concerned with scientific methodology, covering topics such as induction and causality. Mill's views are discussed, in particular, so that we can see this part as reflecting Mill's conception of logic, understood as including inductive logic as well as deductive logic. Stebbing's textbook thus provides a comprehensive introduction into a wide range of different aspects of 'logic', as that term has been used over the centuries.

What Stebbing does not do, however, is offer an introduction into the work of what she calls the 'metaphysical Logicians', as represented by Bradley and Bosanquet, in particular. Their ideas, she remarks, end in 'shipwreck', and she distances herself from their views (*ibid.*, p. viii). As well as traditional, mathematical (modern), and metaphysical approaches to logic, she also distinguishes pragmatic approaches. These seek to 'humanize' logic, basing logic on psychology. But while the pragmatists, she writes, "have made valuable contributions to the 'art of thinking', ... they have not advanced the science of logic" (*ibid.*, pp. viii–ix).

There is little in her book specifically on the pragmatists, but it is clear that she was influenced by their underlying motivation. Indeed, one might suggest that her account of traditional and modern logic is embedded in the pragmatic conception that we have already seen exhibited in her work as a whole. Logical thinking is purposive. Her book is framed by a first chapter entitled 'Reflective Thinking in Ordinary Life', a penultimate chapter on 'The Characteristics of Logical Thinking', and a final chapter offering 'A Sketch of the Historical Development of Logic', which opens with a section on 'The Origin of Logic in the Analysis of Reflective Thinking'. The first chapter begins with a very concrete example. An 'idler' on the rocks at the seaside is shaken out of his reverie by someone shouting at him. He realizes that the tide is coming in and that he needs to climb to a ledge above the high tide mark where he will be safe. Such 'reflective thinking', Stebbing argues, illustrates "how thinking essentially consists in solving a problem" (*ibid.*, p. 3). Reflective thinking is 'directed' or 'relevant' thinking, "controlled by the conditions of the problem and ... directed to its solution" (*ibid.*, p. 9). The stages in this process can be regarded as the grounds or *premisses* upon which the solution or *conclusion*

is based, thus revealing the central relation – between premisses and conclusion – with which logic is concerned.

Stebbing's basic conception of logic is elaborated in the penultimate chapter. The purpose of logical thinking, she reiterates, is to reach conclusions through reasoning, reasoning being the proper business of the logician (*ibid.*, pp. 465, 468). Throughout her book, she writes,

we have laid stress upon relevance as an essential characteristic of logical thinking. To know what is relevant to a situation is to apprehend connexions. The discovery of relevance requires judgement for not all relevance is logical. But in connected thinking certain logical principles are implicit, upon which the cogency of the argument depends. (*Ibid.*, p. 468)

The main task of logic, then, is to make explicit the logical principles that govern our logical thinking. These are not psychological laws, which is why logic should not be seen as an 'art of thinking'; rather, they are formal principles, understood as governing all possible – rather than just actual – logical thinking, which is why logic should be seen as a science, the science of possible forms (*ibid.*, pp. 473–4). The aim of logic as a science, then, is to determine and apprehend these logical forms.

In the final chapter Stebbing offers an account of the development of logic from its origin in the analysis of reflective thinking to the modern conception of logic as the science of form, as exemplified in *Principia Mathematica*. She mentions Frege as the person who initiated the project of demonstrating that all arithmetical reasoning is logical, but it is Russell and Whitehead she sees as having brought this project to completion, and hence as having shown, as she puts it, that "all demonstration is purely formal" (*ibid.*, p. 487).⁵

The Method of Metaphysical Analysis

Stebbing's preface to *A Modern Introduction to Logic* was dated July 1930, and the book was published soon after. In September that year she took part in the Seventh International Congress of Philosophy in Oxford, contributing to a panel with Moritz Schlick. Schlick spoke on 'The Future of Philosophy' (1931) and Stebbing on 'Logical Constructions and Knowledge through Description' (1931). As far as we know, this was Stebbing's first acquaintance with any of the members of the Vienna Circle, and the meeting was to influence her work over the next few years.

Stebbing would have found much to approve of in Schlick's writings. In 'The Future of Philosophy' Schlick endorses Wittgenstein's claim in the *Tractatus* that "The aim of philosophy is the logical clarification of thoughts" (4.112), a view that Stebbing also shared. Both Schlick and Stebbing saw in the new logic the means by which to make progress in philosophy, even if Stebbing did not express it with the revolutionary zeal exhibited by Schlick in both 'The Future of Philosophy' and 'The

⁵In the second edition of the book, published in 1933, Stebbing adds two more pages (pp. 487–9) to her account of the development of logic as the science of form, with some further remarks about *Principia Mathematica*.

Turning Point in Philosophy’, which opened the first issue of the newly-established journal *Erkenntnis* later in 1930. This latter paper also articulates that conception of logic that Stebbing was concerned to elucidate in her textbook – the conception of logic as purely formal. This insight into the nature of logic is what Schlick identifies as having made possible the decisive turning point in philosophy to which he refers in his paper (1959 [1930], p. 55).

Two claims that Schlick makes in ‘The Future of Philosophy’, however, would not have met with Stebbing’s agreement. The first is the claim that “The meaning of a proposition has to be known before its truth can be established” (1931, p. 114), which underlies Schlick’s view that philosophy is not a science: the task of philosophy is to clarify the meanings of terms *before* science can do its job properly. The second is the claim that “there is no such thing as metaphysics, the apparent descriptions of it being just nonsensical phrases” (1931, p. 116), which is logical positivism’s most distinctive claim of all. These two claims are criticized in two key papers that Stebbing wrote over the next two years. Indeed, both papers can be seen as motivated by the challenge that Schlick posed to Stebbing’s Moorean philosophy.

The first of these papers is ‘The Method of Analysis in Metaphysics’, which Stebbing read to the Aristotelian Society on 12 December 1932, and the second is ‘Logical Positivism and Analysis’, which was the annual philosophical lecture that Stebbing was invited to deliver to the British Academy on 22 March 1933. As their titles suggest, Stebbing came to see her task as distinguishing her own methodology (and that of Moore and the Cambridge School, more generally) from that of logical positivism and doing what she could to justify it.

The first paper opens with an assertion that must surely be read as Stebbing’s – characteristically direct – response to the challenge posed by logical positivism: “I wish to make clear at the outset that in my opinion metaphysics is a distinctive branch of philosophy” (1932, p. 65). She immediately specifies what she understands by metaphysics: “Metaphysics is a systematic study concerned to show what is the structure of the facts in the world to which reference is made, with varying degrees of indirectness, whenever a true statement is made” (ibid.). In the first part of the paper she distinguishes her conception from a more traditional conception of metaphysics seen as exemplified by Spinoza and McTaggart, in which a deductive method is employed. Quoting Bradley’s famous remark that “metaphysics is the finding of bad reasons for what we believe upon instinct” (1893, p. xiv), Stebbing characterizes this conception as articulating the ultimate principles from which our beliefs can be deduced, thus enabling reasons to be given for our beliefs. On her conception, on the other hand, the method of metaphysics is the method of analysis, aimed not at discovering any new facts but as making clear just what the basic facts are to which we refer in making the statements we do. (1932, pp. 65–70)

Some of these statements, she argues in the second part of the paper, must simply be taken as expressing beliefs that afford the starting-point of analysis, such as the perceptual judgement expressed by ‘I see this pen’. In the third part of the paper she then attempts to clarify the method of analysis characteristic of the Cambridge School (she mentions Moore, Russell, Broad and Wittgenstein by name).

Distinguishing between the ‘immediate reference’ of a proposition, which is what we know when we understand the proposition, and its ‘indirect reference’, which is everything that must be the case for the proposition to be true, she argues that the aim of analysis is to reveal the indirect reference of a proposition. The indirect reference of ‘Every economist is fallible’, for example, is every fact that makes this proposition true, such as that Maynard Keynes is fallible, that Walter Layton is fallible, and so on. Each fact we identify may in turn need further analysis, so that analysis proceeds in stages until we arrive at the simplest facts of all, which Stebbing calls ‘basic facts’. Analysis, then, is *directional*: it seeks to uncover the basic facts; and that there are such facts is therefore a presupposition of metaphysical analysis. (Ibid., pp. 74–82)

In the final section of her paper, she spells out the presuppositions of the method of analysis of the Cambridge School, which, as she rightly points out, had not been adequately done before. She identifies three main assumptions, the first one logical and the other two metaphysical (ibid., p. 85):

1. If p [standing for any proposition] is to be analysed, then p must be understood. It follows that there is at least one expression which unambiguously expresses p .
2. If p is to be analysed, then it is not always the case that p is known to be false, and it is sometimes the case that p is known to be true.
3. Directional analysis is possible.

The first assumption, Stebbing claims, is uncontroversial, although she offers a defence of it by appealing to a distinction drawn by Moore between ‘understanding p ’ and ‘knowing the analysis of p ’, as she puts it in her own terms. One can understand a proposition, she writes, without necessarily knowing what its analysis is: one can know its ‘immediate reference’ without knowing its ‘indirect reference’; and if one can understand a proposition, then there must be some formulation of it that is unambiguous. The assumption is not as obvious as Stebbing thinks, however, and I shall return to it in a moment.

Stebbing herself admits that the metaphysical assumptions are problematic. She spends most time discussing the third, which she breaks down into a series of more specific assumptions, concerning the process of analysis and its culmination in the identification of basic facts conceived as ‘absolutely specific’ (ibid., p. 85). Having formulated these assumptions, however, she admits that they are not only unjustified but not even very plausible, though she nevertheless insists that they must be true if metaphysical analysis is to be possible (ibid., pp. 91–2).

The second assumption expresses her Moorean conviction that one must begin the process of analysis with something *known* to be true. Stebbing merely claims that the assumption is plausible and that she knows of no conclusive reasons against it (ibid., p. 92). It is in obvious conflict with Schlick’s claim, however, that “The meaning of a proposition has to be known before its truth can be established” (as cited above). Stebbing’s second assumption (which seems, in fact, more epistemological than metaphysical) presupposes her first assumption, for it is presumably a condition of knowing that a proposition is true that one understands it. Stebbing suggests that the first assumption is also accepted by the logical positivist, but

logical positivism in fact involves the idea that propositions, which we may think we understand, may well need to be *reformulated* in a logically more precise way. Perhaps the logical positivist would agree that “there is at least one expression which unambiguously expresses p ”, but they would not agree that we must understand p prior to the analysis being given. So both assumptions, it seems, are in conflict with logical positivism.

In this particular paper, Stebbing makes only passing mention of logical positivism. She distinguishes the method of metaphysical analysis from what she calls ‘the method of symbolic analysis’, understood as an abbreviation for ‘the method of analysis used in the construction of postulational systems’ (ibid., p. 76). Stebbing sees the latter method as deductive, in that it begins with postulates (i.e., assumptions) and proceeds to draw out their implications (ibid., p. 83). Such a method “may very well be circular”, she claims, since the choice of postulates is arbitrary and the postulates and theorems are on the same level, whereas in metaphysical analysis the concern is to reach what is ultimately simple, understood as being on a deeper level (ibid., pp. 87–90). She illustrates the difference by considering the system of *Principia Mathematica*, which she argues is a directional rather than postulational system, embodying metaphysical rather than symbolic analysis. Whitehead and Russell, she writes, “did not seek to obtain *one* out of a set of different postulational systems *any* one of which would yield the required demonstrations regarding a specific set of mathematical statements. They sought a *single* system such that its primitive concepts and its primitive propositions should yield the whole of mathematics” (ibid., pp. 90–1).

Stebbing’s Critique of Logical Positivism

Stebbing elaborates a little bit on the difference between a postulational and a directional system in an appendix she wrote for the second edition of *A Modern Introduction to Logic*, which appeared in 1933 (pp. 506–9). But it is in her paper ‘Logical Positivism and Analysis’ that she gives her fullest critique of logical positivism. By ‘logical positivism’ Stebbing means the views not just of the Vienna Circle, and she mentions Schlick, Carnap, Waismann and Neurath, in particular, but also of Wittgenstein, who she regards as the inspiration behind logical positivism. The paper compares logical positivism with the Cambridge School, and Moore’s philosophy, in particular, focusing on their conceptions of analysis, and defends and uses the ideas of the latter in criticizing the former.

The paper begins with a remark made in 1931 by John Wisdom, one of then leading figures in the Cambridge School: “Philosophy is concerned with the analysis of facts—a doctrine which Wittgenstein has lately preached and Moore long practised” (1931–1933, I, p. 195). While Stebbing agrees that this is a doctrine ‘long practised’ by Moore, and as we have just seen, endorses it herself, she expresses doubt as to whether this applies to Wittgenstein, especially with regard to the new

ideas that he was developing on his return to philosophy in 1929, as they were filtering through in the work of the logical positivists. (1933a, pp. 53–6)

Stebbing first clarifies the conception of analysis that she takes to characterize Moore's – or Moorean – philosophy, elaborating on her account of the first two assumptions of metaphysical analysis in her earlier (1932) paper. One of Moore's great contributions to philosophy, she writes, “is his insistence that philosophers must begin by accepting as *true* certain commonsense statements which we should all—when we are not supposed to be engaged in philosophy—*unhesitatingly* admit to be true” (1933a, p. 56). This requires that we understand such statements, unambiguously expressed by an appropriate sentence, but does not require that we know their correct analysis, which it is the task of philosophy to discover. The aim, though, is not to justify our beliefs but to make them *clear*. (Ibid., pp. 56–60)

This might suggest agreement with Wittgenstein's remark in the *Tractatus*, already cited, that “the aim of philosophy is the logical clarification of thought” (4.112). A central aspect of this is distinguishing between sense and nonsense, and Stebbing writes that “Wittgenstein has rendered a great service to philosophy in explicitly calling attention to the ease with which we mistake a nonsensical set of words for the formulation of a profound philosophical problem” (1933a, p. 63), a view that she also finds expressed by Schlick. But what is it for a proposition to have sense? It is here that Stebbing brings in the principle of verifiability, as she calls it, attributed to Wittgenstein through reports of his views by Waismann and Schlick. A proposition has sense if and only if it is verifiable, that is, if and only if we can know the circumstances that would make it true and the circumstances that would make it false, where ‘circumstances’ means facts of experience, as Stebbing interprets Schlick (ibid., pp. 61, 64–5).

Stated like this, Stebbing suggests, the principle of verifiability might seem innocuous (ibid., p. 65). But it is in saying more about ‘experience’ that Stebbing moves towards her criticism of logical positivism. She focuses here on Schlick's views as they were presented in lectures he gave in London in November 1932,⁶ and on Carnap's views as they were expounded in an article published in the second volume of *Erkenntnis*, ‘Die physikalische Sprache als Universalsprache der Wissenschaft’ (1932). Stressing the distinction between form and content, Schlick had argued that it is only form and not content that can be communicated through language. But if verification depends on empirical content, then this suggests that verification can only be provided by each person themselves, within their own experience. It is in answering this problem that Carnap distinguished between a ‘protocol language’ and a ‘physicalistic language’. Each of us has our own protocol language, which reports our own direct experience. What we say, however, can be translated into a physicalistic language, which provides the intersubjectivity and universality required for science. In summarizing Carnap's views here, Stebbing also refers to *Der logische Aufbau der Welt* of 1928, where Carnap had sought to

⁶Stebbing was not able to attend the lectures, presumably due to illness (cf. Chapman 2013, p. 82), but she received a report on the lectures from Margaret MacDonald (Stebbing 1933a, p. 67, n. 1). The lectures (Schlick 1932) were published in 1938.

construct scientific concepts on the basis of the sole fundamental relation of ‘remembrance of similarity’.

In response to these ideas, Stebbing makes two interconnected criticisms. The first, as she puts it, is that “such logically constructed systems remain essentially *abstract*” (1933a, p. 76). It may be useful to see what one can do with the fewest possible assumptions and undefined terms, but this does not show that the world really is such a system. The second is that Carnap’s underlying ‘methodological solipsism’ is false. “I have the best of grounds for denying solipsism”, Stebbing writes, “namely, that I *know* it to be false” (ibid., p. 77). Aside from this Moorean thump on the table, however, she also accuses Wittgenstein and the logical positivists of confusing ‘direct experience’ and ‘content’. In saying ‘I perceive this table’, she argues, one is not saying ‘I perceive an experience of mine’; the table – which is presumably part of the ‘content’ of what is said – is *indirectly given* (ibid., p. 78). Stebbing does not spell out her view, but it is clear that revealing ‘content’, understood as the elements of the facts to which sentences immediately or indirectly refer, is the aim of analysis.

In the rest of the paper Stebbing elaborates on the differences between her Moorean and the logical positivist’s conception of analysis (as she interprets it). In doing so, she distinguishes four kinds of analysis:

1. analytic definition of a symbolic expression;
2. analytic clarification of a concept;
3. postulational analysis;
4. directional analysis.

The first two need not detain us here. Stebbing gives Russell’s theory of definite descriptions as an example of the first, in the case of sentences, and the concepts of mass, force, and simultaneity as examples of concepts that have required ‘analytic clarification’ to make clear what we have really meant when using those concepts.

‘Postulational analysis’ is the term that she now gives to what she had called ‘symbolic analysis’ in her 1932 paper: this is “the kind of analysis used in the construction of a deductive system” (1933a, p. 80). ‘Directional analysis’ is what she had earlier called ‘metaphysical analysis’, but in working through the presuppositions of that kind of analysis, had also started to call ‘directional analysis’ because its aim was to get to ‘basic facts’. She adds little to her earlier account of the latter, however. What she does do is argue that logical positivism “fails in its treatment of analysis”. Not only do the logical positivists fail to distinguish the four kinds of analysis, but they also fail to accord a role to directional analysis, i.e., to the analysis of facts, thereby departing from the practice of Moore. She goes on:

Not only is their conception of analysis defective, but, further, their conception of the *kinds* of facts to be analysed is inadequate. They treat all facts as *linguistic facts*. Hence, they suppose that the first problem of philosophy is to determine the principles of symbolism, and *from these principles* to draw limits with regard to what we *can* think. This assumption has two important consequences. First, it leads to the view that philosophy is ‘the activity of finding meaning’, to quote Schlick’s statement. The second consequence is that they are

apt to place too much reliance upon the construction of postulational systems. (Ibid., pp. 82–3)

We have already noted Stebbing's Moorean objection to Schlick's claim that "The meaning of a proposition has to be known before its truth can be established". According to Stebbing, this gets things precisely the wrong way round:

Understanding more or less unclearly what we say, we nevertheless may know that what we say is true. We then inquire what must be the case if what we have said is true. In this way we may come to see more clearly what it is we were knowing. It is correct to assert that scientific concepts must be clarified, but it is a muddle to suppose that this clarification is a pursuit of meaning. The word 'meaning' is too ambiguous, unclear, and vague, to be helpful in this connexion. (Ibid., pp. 83–4)

This shows that Stebbing was not a 'linguistic philosopher' in the way that Wittgenstein and the logical positivists (at least in the early 1930s) might be regarded as being. The point of analysis, on Stebbing's Moorean conception, is to get clear about the facts that make what we say true.

Stebbing's second objection concerns the role of postulational analysis. Here she accuses the logical positivists of relying too much on Russell's 'supreme maxim in scientific philosophizing', which he had first formulated in 1914: "Wherever possible, logical constructions are to be substituted for inferred entities" (1917 [1914], p. 115). The maxim had also served as the motto of Carnap's *Aufbau* of 1928, and can be seen as exemplified in Carnap's method of quasi-analysis.⁷ Stebbing had discussed logical constructions in her earlier work, suggesting that the term was misleading, and arguing that there were several different motivations for talk of 'logical constructions' and several different types of logical constructions.⁸ While it may make sense to talk of the action of a committee, for example, as a logical construction out of facts about the actions of individual members of that committee, that is quite different from treating physical objects as logical constructions out of sense-data. On Stebbing's (Moorean) realist view, physical objects such as tables exist independently of our apprehension of sense-data, in a way that committees do not exist independently of their members. While tables are 'logical constructions' in the sense that Russell's theory of descriptions applies to such sentences as 'The table is brown', tables are not themselves 'constructs'. To the extent that postulational analysis seeks to 'construct' physical objects, then, it is misguided.

Stebbing summarizes her objection to logical positivism at the end of her lecture, in explaining how she thinks philosophy is concerned with language:

What we ordinarily say, we say unclearly. We speak unclearly because we think unclearly. It is the task of philosophy to render our thoughts clear. Hence, it is not incorrect to say that the 'object of philosophy is the logical clarification of thoughts'. But, though not incorrect, this statement is not itself a *clear* statement. We cannot clarify our thoughts by thinking

⁷For discussion of this, see Beaney 2004.

⁸See Stebbing 1930, ch. 9; 1931. In the second edition of *A Modern Introduction to Logic* (Stebbing 1933b), ch. 9 was revised slightly and an appendix on 'Logical Constructions' added (App. B). What follows draws on the latter, in particular. For an account of the different conceptions of 'logical construction', see Linsky 2013.

about thinking, nor by thinking about logic. We have to think *about* what we *were* thinking about. The philosopher considers a *given expression*, and analyses it in order to find *another expression* which says *more* clearly what the original expression said *less* clearly. This investigation is not linguistic. We must first *know* what facts are the case before we can fruitfully employ analysis for the purpose of clarifying our thoughts about the world. Accordingly, Logical Positivism fails, I think, in so far as it attempts to start from *a priori* assumptions with regard to the nature of language and the principles of symbolism, and, by means of these, to draw limits with regard to what we *can* think. Their mistake is that they seek to make *everything* clear at once. But it is not in this way that philosophy can develop. We must proceed step by step, beginning with propositions which we *know* to be true, not ruling out initially what does not fit in. (1933a, p. 86)

On Stebbing's view, analysis is metaphysical, not linguistic. As in logical positivism, its aim is to clarify our thoughts, but its method is rather different. It begins with what we (supposedly) *know* is true, and then seeks to progressively uncover the more basic facts that make what we know true. This can only be done by taking particular propositions and analysing them one by one. We misunderstand philosophical analysis if we think we can develop a system that provides the necessary analyses once and for all.

Subsequent Debate About Analysis

Prompted by the challenge posed by logical positivism, Stebbing's two papers on analysis helped initiate a debate about the nature of analysis that lasted the rest of the 1930s (until the outbreak of the Second World War). Most of this debate was pursued in meetings of the Aristotelian Society (including in its annual joint session with the Mind Association) and in the pages of the recently founded journal *Analysis*. There was a symposium on 'Is Analysis a Useful Method in Philosophy?' in 1934, for example, and one on 'Does Philosophy Analyse Common Sense?' in 1937. Stebbing was not the only initiator; the other leading figure was John Wisdom, whose *Interpretation and Analysis in Relation to Bentham's Theory of Definition*, exploring the relationship between Bentham's use of 'paraphrasis' and Russell's theory of descriptions, had appeared in 1931. A member of the Cambridge School as well, Wisdom also wrote a series of articles on 'Logical Constructions', which was published in *Mind* between 1931 and 1933.

There is space here for mention of just two of the highlights in this debate that relate directly to Stebbing's work.⁹ The first is Max Black's paper on 'Philosophical Analysis', which was read to the Aristotelian Society on 24 April 1933, just a month after Stebbing's British Academy lecture, but responding, in particular, to her earlier paper, which had been read to the Aristotelian Society the previous December. Taking the example of 'Every economist is fallible', Stebbing had argued that the metaphysical analysis of what is said here would yield such more specific facts as

⁹For more on this debate, see Urmson 1956; Beaney 2003, and Baldwin 2013; and on analysis, more generally, see Beaney 2009.

that Maynard Keynes is fallible, Walter Layton is fallible, and so on. But Black argued that even if we identified all these specific facts, a statement listing them would not *mean* the same as ‘Every economist is fallible’, since understanding the fuller statement would require knowing the names of every economist. Instead, Black suggested, what ‘Every economist is fallible’ means is simply ‘(x) (x is an economist) entails (x is fallible)’. This is “a logical analysis of structure”, which does not involve the metaphysical presuppositions that Stebbing found so hard to justify (1933, pp. 257–8).

There is an obvious response to this, however, and that is to distinguish two kinds of analysis, logical analysis and metaphysical analysis. While logical analysis exhibits logical form, metaphysical analysis identifies the basic facts that make the statement analysed true. The two are not necessarily incompatible; indeed, the second arguably presupposes the first: it is only when we have revealed the logical form of a statement that we can make progress in identifying the appropriate facts. Such a distinction did indeed come to be drawn in the 1930s, by Stebbing, among others. Logical analysis was also called ‘same-level’ analysis, and metaphysical analysis ‘reductive’ or ‘directional’ or ‘new-level’ analysis, the latter term, in particular, indicating that the aim was to uncover whatever it was that lay at the most basic level.

This distinction is invoked by Stebbing in responding to a second paper that had criticized her earlier (1932) account. This was a short paper published in *Analysis* in 1934 called ‘Miss Stebbing’s Directional Analysis and Basic Facts’, in which Eugene D. Bronstein rejected her distinction between analytic definition and directional analysis on the ground that whether an analysis has a ‘direction’ is independent of whether it ends in basic facts, the existence of which he was sceptical. Analytic definition, too, can therefore be ‘directional’. In her reply, published in *Analysis* later that year, Stebbing argued that analytic definition is merely ‘same-level’ analysis while directional analysis is ‘new-level’. ‘Every economist is fallible’ may indeed be ‘analytically defined’ or ‘logically analysed’ along the lines that Black had suggested, for example, but that is quite different from seeking to identify the facts that make the statement true. Even if there are no ultimately basic facts, there may be still be legitimate new-level analyses, such as in reducing talk about committees to talk about their members. (1934b, pp. 34–6)

As to whether analysis terminates in basic facts, Stebbing points out that she had only claimed in her 1932 paper that this was a presupposition of metaphysical analysis, not that it could be justified (1934b, pp. 33–4). In her 1933 paper, however, she had said that she did believe that there are final facts (1933a, p. 86), so there was certainly some vacillation in her views. With the distinction between logical and metaphysical analysis in place, however, it becomes possible to reject the latter without rejecting the former, which we might well want to do if the latter does presuppose the existence of basic facts. Indeed, during the course of the 1930s, philosophers became increasingly sceptical of ‘basic facts’ and with it the corresponding conception of metaphysical analysis. Part of this scepticism can be attributed to the growing influence of logical positivism. Whether or not Wittgenstein is included among the logical positivists, his new thinking when he returned to Cambridge in

1929 also had an influence on the repudiation of metaphysical analysis, especially of the kind that had (arguably) characterized the logical atomism of his and Russell's earlier work.

Logical positivism, then, was something of a Trojan horse. In allowing it to enter Britain, Stebbing sowed the seeds of the downfall of that conception of philosophy that was distinctive of the Cambridge School in the late 1920s and early 1930s. Stebbing herself came to reject that conception, as is made clear in a paper she published in 1939, 'Some Puzzles about Analysis'. But she does not abandon analysis altogether: it is especially required, she writes, "when we ask misleading questions. A question is misleading when the logical form of the question misleads us with regard to the logical form of the answer we expect to satisfy us." (1939b, p. 78) An example she gives is a question that the physicist James Jeans had asked: 'What is the essential nature of a centimetre?' Jeans had argued that this was too difficult for us to know, but such a question lacks sense, according to Stebbing.¹⁰ There is no need here for metaphysical (new-level) analysis: logical (same-level) analysis is all that is required.

Stebbing returns to the topic in one of her last papers, her contribution to a collection on Moore's philosophy. Distancing herself again from directional analysis, she suggests that Moore's lasting influence on philosophy will prove to have been in offering same-level analyses, involving analytic definition or analytic clarification, to use her earlier terms (1942, p. 528). She may still have rejected the system-building of postulational analysis in favour of a piecemeal approach, but her earlier criticism of logical positivism for not recognizing directional analysis has clearly been dropped. In her own later work, from *Philosophy and the Physicists* (1937) onwards, same-level analysis is what she herself offers, diagnosing and clarifying the misleading things we say and the confused thinking to which we are frequently prey. *Thinking to Some Purpose* (1939a), with which we began, is perhaps the best example of this.

Conclusion: Stebbing's Place in the History of Analytic Philosophy

As we have seen, Susan Stebbing was at the centre of philosophical life in Britain in the late 1920s and 1930s. She published the first textbook of analytic philosophy in 1930, establishing the new logic of Frege and Russell in the university curriculum, and also wrote more popular works bringing logic and critical thinking to a wider audience. Her conversion to Moorean philosophy in 1917 illustrated the influence that Moore had on British philosophy, and her co-founding of the journal *Analysis* in 1933 gave an institutional voice to the Cambridge School of Analysis. In seeking to defend the Cambridge School in response to the emergence of logical empiricism

¹⁰ Stebbing 1939b, p. 78. She discusses this and other examples from Jeans' writings in Stebbing 1937, ch. 2.

in the early 1930s, she helped to usher in the next phase of analytic philosophy in Britain.

Even before her conversion to Moorean philosophy, Stebbing had been sympathetic to the pragmatists' stress on the practicality of logic. If there is one fundamental idea that governed her work, it is that logical thinking, in the broader sense identified in §1 above, is *purposive*. This idea is reflected not only in her popular books but also in her conception of 'directional' analysis. The belief in basic facts may have been abandoned as a presupposition of metaphysical analysis, but logical analysis was still seen as purposive, the aim being to clear up confused thinking. The idea also accorded with her 'English' common sense and informed her response to logical empiricism. Commitment to the objectivity and value of logic, as well as respect for science and empirical facts, was what she most shared with the logical empiricists, but she was resistant to their more radical ideas and their 'linguistic' philosophy, although she also became more cautious about making metaphysical claims. In this critical but nevertheless open-minded and concessive response to logical empiricism, she also reflected the attitude that was characteristic of many British analytic philosophers at the time.¹¹

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¹¹ A talk based on a first draft of this paper was given as the 22nd Vienna Circle Lecture on 12 December 2014. I am grateful to Friedrich Stadler for the invitation, and to members of the audience for their helpful comments and questions, which have informed the final version of this paper.

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Purity in Concepts: Defending the Social Sciences

Hans Kelsen, *Secular Religion: a Polemic against the Misinterpretation of Modern Social Philosophy, Science, and Politics as “New Religions”*, Robert Walter, Clemens Jabloner and Klaus Zeleny (eds.), Springer, Wien, 2012, 307 p., 106.95 €, ISBN 978-3-7091-0765-2.

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Introduction

Hans Kelsen's book, *Secular Religion*, published posthumously by Springer in 2012, has a fascinating history. It was supposed to come out in 1964, but Kelsen withdrew the manuscript from printing *in extremis*. Theories abound as to why he did so. I will consider two such theories, explicitly referred to by the editors in their informative editorial remarks.¹ One such theory, defended by his biographer, Rudolf A. Métall, claims that Kelsen did so because he changed his mind about the analysis of the concept of religion he relied on throughout the volume.² More precisely, many of Kelsen's attacks target misleading ways in which the concept of religion has been used, and thus assumes a very narrow literal understanding of what qualifies as a religion. In the book, the concept of religion necessarily involves a belief in a transcendent being or god. Rudolf A. Métall claims thus that, because of a change of heart, Kelsen later came to adopt a broader definition of the concept (which didn't refer to a personal god), very similar to the one defended by Bertrand Russell and Julian Huxley.³

The second theory about the mysterious withdrawal of the manuscript is that the book could be understood as a defense of Marx. Kelsen was indeed already suspected

¹ See the editorial remarks by Clemens Jabloner, Klaus Zeleny and Gerhard Donhauser, in Hans Kelsen, Robert Walter, Clemens Jabloner and Klaus Zeleny (eds), *Secular Religion: a Polemic against the Misinterpretation of Modern Social Philosophy, Science and Politics as “New Religions”*, Wien: Springer, 2012, p. xi–xv

² Rudolf A. Métall, *Hans Kelsen*, Wien: Deuticke Verlag, 1969, p. 91.

³ Bertrand Russell, *Religion and Science*, Oxford: Oxford University Press, 1935. Julian Huxley, *Religion without Revelation*, Connecticut: Greenwood Publishing Group Incorporated, 1979.

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of sympathizing with Marxism.⁴ Despite McCarthyism having somewhat faded away in the second part of the 50s, being accused of communist sympathy would still have been problematic in the United States at the time. And it is indubitable that the book could be understood as such, as Kelsen, throughout the book, defends the scientific character of Marxism against those who points out its resemblance with religion. Moreover, in the conclusion, Kelsen argues that those he opposes in the book use a religious terminology to provide a divine justification of capitalism.

As stated by Kelsen himself in the preface, the main aim of the book is to fight against a way of describing theories that Kelsen took to be a genuine threat to the existence and development of an objective and independent social science. This threat was constituted by the various allegations that the prevalent social and political theories were somehow religious, or even – according to Eric Voegelin, Kelsen’s central target in this book – gnostic. It might be judicious to note that Eric Voegelin was no stranger to Kelsen as Kelsen was Voegelin’s *Doktorvater*, that is, the supervisor of his doctoral thesis. But Voegelin and Kelsen had grown intellectually apart and Kelsen was affected by this divergence. For Kelsen, Voegelin was a student who had “erred, and strayed... like lost sheep”.⁵ This might partly explain the disproportionate attention given to the writings of Eric Voegelin in the book.

Kelsen started working on this book as he was writing a review of Eric Voegelin’s book, *The New Science of Politics*.⁶ In this book, Voegelin accused the most influential political and social theories of the time (such as the theories of Comte, Marx and Nietzsche) of being forms of disguised religions. The review written by Kelsen grew longer and broader, addressing not only Eric Voegelin’s allegations but various others, and ultimately became *Secular religion*. The broadening of the scope of *Secular Religion* is entirely justified: Eric Voegelin was far from being the only one to depict modernity as contaminated by religious thought. In the first half of the twentieth century, many indulged in denouncing the religious character of the growing field of social sciences. In fact, the title of the book not only echoes Voegelin’s first pamphlet on the issue, named *The Political Religions*, but corresponds exactly to the expression used by Raymond Aron to describe the political ideologies of that time (secular religions). Throughout the book, Kelsen discusses allegations to that effect made by Carl Schmitt, Fritz Gerlich, Ernst Cassirer, Carl L. Becker, Charles Frankel, Karl Löwith, Reinhold Niebuhr, Arnold J. Toynbee, Karl Jaspers, Raymond Aron, and many others. However, Kelsen certainly presents Voegelin as making some of the most extravagant claims in this direction. Kelsen claims that Voegelin designates as the aim of science in general and of social science in particular “the understanding that above the hierarchy of the universe a

⁴ See Oliver Rathkolb, „Hans Kelsen und das FBI während des McCarthyismus in den USA“, in: Robert Walter/Werner Ogris/Thomas Olechowski (eds.), *Hans Kelsen: Leben-Werk-Wirksamkeit*, Wien: Verlag Manz, 2009, p. 339–348.

⁵ Barry Cooper, *Beginning the Quest: Law and Politics in the Early Work of Eric Voegelin*, Columbia (MO): University of Missouri Press, 2009, p. 220.

⁶ Eric Voegelin, *The New Science of Politics*, Chicago: The University of Chicago Press, 1952.

transcendent source of being and its order exists.”⁷ Kelsen quotes him as further claiming that this “understanding has its root in the real movement of the human soul toward the transcendently experienced divine being.”⁸ These are indeed extravagant claims which might even lead us to wonder why Kelsen thought that they warranted the attention he devotes to them.⁹ The reason Kelsen devotes so much attention to these views has to do with what he took the aim of their defenders to be, so let me say a bit more about what, on Kelsen’s view, really is at stake.

In this book, Kelsen provides a conceptual rebuttal of the use of religious terminology by various intellectuals of the twentieth century to describe the most influential sociological and political theories of the time. But this book is far from being an impartial intellectual history of the use of religious terminology. Kelsen was seriously concerned that these analogies would discredit and undermine scientific theories. Therefore, in Kelsen’s eyes, this is not a mere terminological dispute but a locus of confrontation where an important battle between scientific and religious worldviews will be fought. This was particularly urgent for Kelsen, given that his most important work, *The Pure Theory of Law*, was an attempt to build a legal theory on purely scientific grounds.¹⁰ Throughout the book, Kelsen assumes that this terminological debate will have momentous implications for the survival of the scientific worldview. This is where I believe that Kelsen was mistaken: the scientific worldview has by and large become an uncontested powerful worldview and it has, more recently, even grown into fields that were so far reserved to the humanities.¹¹ Consider psychology, philosophy and even music: there have been many recent attempts to at least partly elucidate some fundamental questions in these fields by appealing to science. The scientific worldview was just not so frail as to be undermined by such rhetorical strategies.

However, the care and analytical attention Kelsen brings to the topic makes the book a worthwhile read. The most appropriate audience for this book would thus be found among historians of ideas and political theorists interested in ideology. Those who have a particular interest in the works of Hans Kelsen might also find such a book rewarding for the different insight it gives into Kelsen’s intellectual formation. This being said, the reader should not expect to find much legal theory.

⁷Eric Voegelin, *Wissenschaft, Politik und Gnosis*, in Eric Voegelin, *The Collected Works*, Columbia (Missouri): University of Missouri Press 2000, pp. 26–27, quoted in Hans Kelsen, *Secular Religion*, p. 50.

⁸Eric Voegelin, *ibid.*

⁹Eric Voegelin, *Collected Works*, Baton Rouge: Louisiana State University Press, 1995.

¹⁰Hans Kelsen, *Pure Theory of Law*, Berkeley: University of California Press, 1967.

¹¹And this has led to many debates. See for instance the recent debate that has opposed Steven Pinker to Leon Wieseltier in the pages of the *New Republic*. Steven Pinker, “Science is not your enemy: an impassioned plea to neglected novelists, embattled professors, and tenure-less historians”, *The New Republic*, 6 August 2013. Leon Wieseltier, “Crimes against Humanities: Science wants to invade the liberal arts, don’t let it happen”, *the New Republic*, 3 September 2013.

Summary of the Book

Let me now provide a brief description of the book content before moving to a critical discussion along with remarks about its relevance for the readers of today.

In the first chapter, Kelsen denies that the expression “secular religion” can even make sense as “secularizing a doctrine” is precisely to expunge religious elements from it. He proceeds with a rebuttal of some of the conceptual misuses of the concept of religion. He starts by describing Bertrand Russell’s analysis of the term, according to which religions have three aspects: (1) a church (2) a creed and (3) a code of personal morals. He then rebuts Russell’s claim that a religious creed differed from a scientific theory because a religious creed claimed to embody eternal and absolute truth. Kelsen argues indeed that the primary characteristic of a religious creed is the belief in the existence of a transcendent being, not a belief in an absolute truth. Russell also claimed that another characterization of religion was the kind of feeling that it was associated with. This allowed Russell to speak of fascism and communism as “new religions”. Similarly Aron had argued: “a man is religious not only when he worships a divinity, but also when he puts all resources of his mind, all devotions of his will, all the ardor of fanaticism in the service of a cause or of something which has become the purpose and the end of his sentiments and actions.”¹² Kelsen once again rebuts both theses. He justly claims that it is a fallacy to conclude from the intensity of the feelings that human beings have towards some ideas to the nature of these ideas. Another insight of this chapter is given by Kelsen at the very beginning, as he points out that the search for similarity might lead to overestimating resemblance and overlooking differences. This is a now well-known psychological phenomenon: there is a risk, when we test a hypothesis, that we will be influenced by what is now called “the confirmation bias”: the seeking or interpretation of evidence in a way that is partial to existing beliefs.¹³

In the second chapter, Kelsen rejects the way Crane Brinton and others collapse the secular notion of progress with the religious notion of an eschatological progress.¹⁴ He defends in particular Marx, by pointing out the distinction between the prediction of a better state of mankind and the definitely religious notion of the realization of the ultimate meaning of history (which could be provided only by a God). On Kelsen’s view, the scientific (as opposed to religious) prediction of Marx is of the same type as the prediction of a physicist. Kelsen discusses allegations made by Niebuhr and Toynbee, who both use the religious analogy to conclude that Marxism ought to be abandoned.¹⁵ The reason for this being, in the words of

¹² Raymond Aron, *L’avenir des religions séculières*, in Raymond Aron, 1905–1983: *Histoire et politique: Textes et témoignages*, Paris: Julliard, 1927, quoted in Kelsen H., *Secular Religion*, p. 23–24.

¹³ Raymond Nickerson, “Confirmation Bias: a Ubiquitous Phenomenon in Many Guises”, in *Review of General Psychology*, 2 (2), June 1998, p. 175–220.

¹⁴ Crane Brinton, *A History of Western Morals*, San Diego: Harcourt, Brace and Company, 1959.

¹⁵ Reynhold Niebuhr, *Faith and History: a comparison of Christian and Modern Views of History*, London: Nisbet, 1949, p. 210–213. Arnold J. Toynbee, *A study of History*, IX, p. 583, both quoted in Kelsen H., *Secular religion*, chapter 3.

Toynbee, that it “might prove an unsatisfying substitute for religion”.¹⁶ Kelsen goes on to discuss the writings of Rosenstock-Huessy, Brinton, Gilson, Löwith and, of course, Voegelin.¹⁷

In chapter 3, Kelsen focuses on Voegelin’s claim that the nature of modern civilization is Gnosticism. On Voegelin’s view, the influence of Gnosticism on modern civilization can be traced to the eschatological theology of history of Joachim of Flora, a theologian from the twelfth century. In order to support this claim, Voegelin argues that (1) Augustin had de-divinised society and that (2) Joachim of Flora helped re-divinize it. Kelsen rejects both (1) and (2). In order to reject (1), he argues that Augustine’s division of temporal and spiritual order didn’t lead him to de-divinize society, as Augustine thought that both orders were ultimately guided by the same divine principles of justice. If Augustine didn’t de-divinize society, then Joachim could not have re-divinized it. Finally, on Kelsen’s view, both Joachim and Augustine agreed on the eschatological character of history.

In chapter 4, Kelsen provides further arguments to reject the claim that Joachim’s theory was gnostic. After all, even if Joachim’s theory does not constitute a re-divinization of society, it still remains to be shown that Joachim’s theology of history is not a divinization of society. Kelsen argues that Joachim’s theory can still not count as gnostic. Voegelin’s problematic characterization is due to his mistaken belief that the gnosis is a speculation about the meaning of history. Kelsen also reject Voegelin’s claims that the theories of Marx, Comte and Nietzsche were also gnostic.

In chapter 5, Kelsen attacks Voegelin’s claim that Hobbes was a gnostic. Kelsen claims that Voegelin made the mistake of taking the law of nature in Hobbes to be identical as the one discussed within the Christian religion. Kelsen argues that Hobbes did not believe in the law of nature in the sense of a normative order of justice valid independently of positive law. Finally, Kelsen adds that Voegelin misunderstood the role religion plays in Hobbes’s theory: religion in Hobbes is not an expression of Gnosticism, but rather used as an instrument of politics, so as to ensure that individuals remain obedient to the civil authority.

In chapter 6, Kelsen looks at allegations that philosophers of the Enlightenment were in some way religious. Kelsen addresses such allegations made by Cassirer, Becker, Frankel, Brinton, Spengler and Taubes. Cassirer and Brinton claimed that the Enlightenment constituted a new form of religion, whereas Taubes claims that Lessing’s *Erziehung des Menschengeschlechts* is the first manifestation of eschatological chiliasm in modern philosophy of history. Kelsen defends the Enlightenment from such allegations but he also holds surprising views, such as the claim that

¹⁶Arnold J. Toynbee, *A study of History*, IX, p. 583.

¹⁷Karl Löwith, *Meaning in History: the theological implications of the Philosophy of History*, Chicago: University of Chicago Press, 1957. Eugen Rosenstock-Huessy, *The Christian Future: or the Modern Mind Outrun*, London: S.C.M. Press, 1947. Etienne Gilson, *Les Métamorphoses de la cité de Dieu*, Paris: Vrin, 2005. Eric Voegelin, *The New Science of Politics*, Chicago: The University of Chicago Press, 1952.

absolute truths can be consistently maintained only under the presupposition of a supernatural authority establishing them.

The next few chapters are each focused on particular philosophers. In chapter 7, Kelsen shields Hume and Kant from the attacks of Antonin Sertillanges. Chapter 8 defends the secularism of the theories of Proudhon and Saint-Simon against the claims made by Karl Löwith and Henri de Lubac. Chapter 9 goes to the rescue of Auguste Comte's positive philosophy. Chapter 10 defends Marxism from the accusation that it is a secular religion. It starts by examining the claims of Raymond Aron. In particular, Aron claimed that Marxism was a secular religion not because of its content which he judged to be rational, but because of the kind of influence it had on its followers. Kelsen takes Aron to make a false inference from the fact that it has found a strong emotional echo in the public to its content but nothing suggests that in the texts from Aron he quotes. Kelsen then deals with the accusations of Crane Brinton that Marxism is religious, with those of Karl Löwith that it is eschatological in form, and with Eric Voegelin's denunciations of Marxism as gnostic.

Chapters 11 and 12 focus on similar accusations made against Nietzsche. The last fairly brief two chapters however return to the broad topics of modern science and modern politics. The very brief chapter 13 rejects various allegations against modern science made mostly by Eric Voegelin and Crane Brinton, but discusses also some comments made by Hans Jonas.¹⁸ Jonas defended the thesis that the gnosis allowed for the conception of the world as an impersonal thing. In other words, Jonas argued that the gnosis had allowed for modern science, but, as Kelsen justly points out, this doesn't amount to the much more radical claim made by Voegelin that scientism *was* a gnostic movement in western society.

Kelsen then addresses the claims made by Brinton against modern science. Brinton claims that scientism is only one among a set of heresies including "materialism, rationalism, humanism, scientism, naturalism, secularism, evolutionism, positivism, ethical culture".¹⁹ Moreover, Brinton takes empirical science to be merely a form of revelation. Kelsen legitimately denies the validity of using the word revelation in this sense by using conceptual analysis. Kelsen ends the chapter by formulating the judgment that these attempts to undermine the credibility of science are "perhaps the most disastrous consequence of the attempt to find theological implications in the characteristic manifestations of modern civilization".²⁰

Chapter 14 returns to a detailed analysis of Voegelin's allegations of the gnostic character of modern politics. Finally, the conclusion re-states the danger in blurring the distinction between social sciences and religion and argues that the social function of such a lack of discernment is to justify the capitalistic democratic social order. Recall that a substantial amount of Kelsen's book focuses on rejecting the accusation made by Aron, Voegelin, Löwith and Brinton that Marxism is just a new

¹⁸ Crane Brinton, *A History of Western Morals*, New York: Harcourt, Brace & co., 1959. Hans Jonas, *Gnosis und spätantiker Geist*, Göttingen: Vandenhoeck & Ruprecht, 1934. Eric Voegelin, *The New Science of Politics*, Chicago: University of Chicago Press, 1952.

¹⁹ Crane Brinton, *op. cit.*, p. 275. Quoted in Hans Kelsen, *op. cit.*, p. 252.

²⁰ *Ibid.*, p. 255.

kind of religion. This is why Kelsen asserts that the analogy drawn between religions and social sciences has for function the justification of the capitalistic democratic social order.

Relevance of the Book for Today's Readers

The question that one might ask is whether such a book, written in the 1960s, might still be relevant for us today. The editors postulate that this book might be relevant because religion seems to be making a come-back on the political scene. They mention in particular Gilles Kepel's *La Revanche de Dieu*, which highlights a certain return to religious influence in the public sphere via two processes (a bottom-up popular process and a top-down political influence).²¹ They also mention Samuel Huntington's *Clash of Civilization*, which took the primary and enduring factor in explaining conflicts to be cultural instead of ideological or economic.²²

But recall that Kelsen's *Secular Religion* is not directed against religious movements as such but mainly against the interpretations of certain theories in the social sciences as religious. The relevance of Kelsen's book in this context might only be verified if we assume that the causal empirical relationship between the use of a certain terminology and the popularity of religions holds. But the assumption that rhetorical stratagems used in intellectual history books might have a huge influence on the popularity of a religion seems indeed rather unconvincing. The fear that motivates the book is that, if it is accepted that ideologies are disguised religions, then this might lead people to want to return to the so-called "true religions". I think that it is implausible to argue that the mere drawing of such analogies would drive people back to religions.

To begin with, it has to be noted that comparing religion with the sciences might not necessarily lead to a return to religion. The analogy with religion could be used politically to do the opposite, that is, to encourage the sociological or political doctrine in question to get rid of whatever properties is deemed religious. If a Marxist faith in the ineluctable coming of socialism is denounced as religious, this could be used for the purpose of making Marxism more scientific rather than less. Some aspects of Marxism could legitimately be described as less rigorous but this description could be justified and used to identify and eliminate these less rigorous aspects within the theory.²³

²¹ Gilles Kepel, *La Revanche de Dieu: Chrétiens, Juifs et Musulmans à la reconquête du monde*, Paris: Seuil, 2003.

²² Samuel Huntington, *The Clash of Civilization and the Remaking of World Order*, New York City: Simon & Schuster, 2011.

²³ The movement of analytical Marxism, which originated in the 1980s, claimed to do just that: to present a more rigorous defence of Marx's theory. Among this movement's famous members were G. A. Cohen, J. Roemer, J. Elster, H. Steiner, P. van Parijs, A. Przeworski and E.O.Wright. See Gerald Allan Cohen, *Karl Marx's Theory of History: a Defence*, Oxford: Oxford University Press, 1978.

For this reason, I think Kelsen is himself guilty of a fallacy when he claims that “the conscious or unconscious purpose of the various attempts to define religion without referring to the supernatural or supersensuous is: to save religion, to defend it against the attack by science.”²⁴ There are two ways of understanding this claim and I take both to be false. If it is implied that any attempt to define religion without referring to the supernatural element is necessarily done in order to save religion from the attack by science, it is obviously false. In fact, one might describe some aspects of science as religious, so as to encourage a more thoroughly scientific approach. Moreover, if this claim is an empirical claim, that is, claiming that this is what people happen to do, it is still mistaken. It is highly implausible to argue that everyone who has ever used religion in this looser sense does so for the sake of defending religion. If I believe a colleague is so enthralled by a certain theory that he loses the impartiality required to assess its merits, I might well label his attachment to the theory religious, so as to emphasize that his faith in it doesn’t rely on evidence. This is why I believe that Kelsen’s assertion is so surprising; it goes against the whole methodology he uses to defeat his opponents in much of the book.

The use of a term to undermine the credibility of another term is a rhetorical strategy, which relies implicitly on the positive or, in this case, negative association of a term to undermine what is being described. However, there is no *necessary* connection between claiming that some aspect of a theory has been influenced by religious thought (or even originated in religious thought) and the value of this theory. This could be described as a version of a genetic fallacy. The genetic fallacy is an error of reasoning whereby someone attempts to discredit a claim by pointing to its origin. However, the origin of a belief can’t *in itself* prove anything as to the validity of the belief. Even if it were proven, that Marx was influenced by religious ideas in his postulation of the ineluctability of the socialist state, such an origin doesn’t in itself prove anything as to the validity of the thought in question.

Someone could object to this argument that the book ought not to be assessed in analytical terms. After all, if Kelsen took it to be a battle for the survival of science, why couldn’t he also use some rhetorical devices for that purpose? The problem with such an objection is the following: Kelsen himself uses mainly analytical devices to rebut the hypothesis that science is analogous to religion. It seems thus particularly strange that he makes no mention of the different possible purposes of the analogy and that he doesn’t consider the possibility that, as such, such analogy proves nothing. I believe that Kelsen must have known that, but refrained from making such an argument because he didn’t believe in the capacity of philosophical arguments to prevent the discredit brought to science by the use of a religious terminology. This book is thus not aimed at philosophers but is really to be considered as part of a political battle of influence. Voegelin’s extravagant claims might have had (and still seem to have) considerable appeal and philosophical arguments on their own might have appeared too weak to counter that appeal.

But the book could be said to have the relevance that the editors attribute to it, if we consider that the book discusses Voegelin’s conviction that the religious drive

²⁴Hans Kelsen, *op. cit.*, p. 38.

was there to stay, forced to take new secular forms, now that it couldn't be released directly in its unadulterated divine form. To the extent that the resurgence of religious movements could be taken to be a further evidence of this psychological drive to the supernatural, then Voegelin's claim might be said to be relevant to this wider debate. But once again, I think it would be implausible to claim that the resurgence of religious movements could be simply explained by such a drive. Moreover, Kelsen doesn't do anything in this book to reject *this* psychological claim. This specific claim would be best repudiated by psychology, whereas the question of the resurgence of religious movements would be best investigated by an interdisciplinary approach combining political science, sociology, economics and history. I doubt that a conceptual analysis of the terms used by intellectuals who described the theories of Marx, Comte or Nietzsche as being somehow religious might be enlightening in this regard. Kelsen's exclusive reliance on conceptual analysis to restore the credibility of the social sciences is thus wrong-headed.

Moreover, Kelsen's greatest fear, that the social sciences would cease to exist in an objective and independent capacity, has thankfully not been realized. Social sciences today are more independent than they ever were from religious influence. If religion continues to have an important role in politics, it doesn't seem to have so far endangered the existence of an objective and independent science.²⁵

However, it is true that religions, on one hand, and social and political ideologies, on the other, continue to be compared and vehemently opposed in the public debate. The most recent formulation of this antagonistic discourse has been put forward by the *New Atheists* (Richard Dawkins, Daniel Dennett and Christopher Hitchens). Representative books of this movement include Dawkins' *The God Delusion* (2006), Dennett's *Breaking the Spell: Religion as Natural Phenomenon* (2006); *God is Not Great: How Religion Poisons Everything* by Christopher Hitchens (2007); *Atheist Manifesto: The Case Against Christianity, Judaism and Islam* by Michel Onfray (2005).²⁶ Dawkins and Dennett refute religion as a scientific thesis, whereas Hitchens and Onfray focus mostly on the historical, political and social harms that religions have brought up. Opponents on the other side have been many.²⁷ Some of this antagonism can be explained by the very thorny issue of the influence of religion on the university curricula in the United States.²⁸ But the most relevant recently

²⁵This being said, religion might have a big influence in the use and application of scientific advances (think of stem cell research for instance).

²⁶Richard Dawkins, *The God Delusion*, New York City: Bantam Books, 2006, Daniel Dennett, *Breaking the Spell: Religion as Natural Phenomenon*, New York City: Viking, 2006, Christopher Hitchens, *God is Not Great: How Religion Poisons Everything*, New York City: Twelve Books, 2007. Michel Onfray, *Atheist Manifesto: The Case Against Christianity, Judaism and Islam*, New York: Arcade Publishing Inc., 2007.

²⁷Alvin Plantinga, "The Dawkins Confusion- Naturalism ad absurdum", in *Books & Culture: a Christian Review*, 2007, <http://www.booksandculture.com/articles/2007/marapr/1.21.html>. Thomas Nagel, "The Fear of Religion", in *New Republic*, 2006. Michael Ruse, "Richard Dawkins: The God Delusion", in *Isis*, vol. 98, n. 4, 2007.

²⁸Stephen Jay Gould had defended the view that there should be two non-overlapping magisterial: the empirical and the moral. Whereas the empirical domain could be appropriately taught by sci-

published book to consider for the claims examined in *Secular Religion* is probably *BlackMass: Apocalyptic Religion and the Death of Utopia* by John Gray.²⁹ In this book, Gray argues that it is the influence of religious movements which created the secular belief in progress in the Enlightenment, a thesis fairly close to the thesis made by Voegelin that Kelsen seeks to refute.

The relevance and interest of the book might also lay in its instantiating a clash of conflicting methodologies. On one hand, we have Kelsen, painstakingly pointing out how the concepts of religion, eschaton or gnosis are misused by a careful scholarly reading of the texts and a challenging conceptual analysis. On the other hand, there is Voegelin, famous for making sweeping claims using the terminology he saw fit, sometimes his own terminology, with no regard for how the word was actually used by others. Examples of such verbal fantasy include the following expressions: “metastatic faith”, “metaleptic consciousness” and “egophanic history”. Moreover, defending the claim that the character of modernity is gnostic, Voegelin might be justly accused of overlooking evidence for the sake of a grandiose and scandalous thesis. Not to mention that this kind of thesis might always be accused of being self-defeating, as it is not clear to me how Voegelin himself escapes the gnostic character of modern thought. If the theories of others are so infected by religious thought, and if the credibility of their theories is undermined by it, I am not sure how his own views could be said to have any standing in the face of such a general religious epidemic. But, as Mark Lilla commented at the beginning of an article on Voegelin:

Historians who offer ‘multicausal explanations’ – and use phrases like that- do not last, while those who discover the hidden wellspring of absolutely everything are imitated and attacked but never forgotten.³⁰

Voegelin, whose scope of scholarship embraced Greek Philosophy, Chinese imperial history and Gestalt Psychology (among many others), proposed to understand the fundamental nature of modernity as gnostic. Such a reductive thesis might be controversial but it was bound to receive much attention. And, as this book testifies, it did.

ence, the moral domain ought to be taught by religion. This triggered a strong reaction among the New Atheists. Stephen Jay Gould, *Rocks of ages: Science and Religion in the Fullness of Life*, New York: Ballantine Books, 2002.

²⁹ John Gray, *BlackMass: Apocalyptic Religion and the Death of Utopia*, New York: Farrar, Straus & Giroux, 2007.

³⁰ Mark Lilla, “Mr. Casaubon in America”, in *The New York Review of Books*, June 28, 2007.

***The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain from 1900 to the Present.* By Eric B. Kandel**

New York: Random House, 2012. Pp. xviii + 636. \$40.00. ISBN 978-1-4000-6871-5

Allan Janik

The “rock star of neuroscience,” as Nobel Prize winner Eric Kandel has aptly been termed, has produced a provocative multi-disciplinary blockbuster whose many facets can scarcely be adequately summarized, let alone analysed, in a brief review such as this. His immensely learned effort to reconcile the “two cultures” encapsulates a lifetime devoted at once into research into the biological basis of memory and refined appreciation of art. *The Age of Insight* consists of a mammoth argument, based on the premise that the sciences and the arts can learn from one another and constituted by seven elaborately interconnected elements. Thus Kandel links

1. the development of *medicine and bio-science at the University of Vienna c. 1900* to the discovery of the unconscious
2. *theoretically* in Freudian psychoanalysis and
3. *practically* in the portraiture of Gustav Klimt, Egon Schiele and Oskar Kokoschka as well as
4. in Arthur Schnitzler’s *innovative narrative technique*, the inner monologue.

He goes on

5. to connect their pioneering explorations to the work of Ernst Kris in *Gestalt Psychology* especially in connection with the human face (brilliantly described here) as linked to
6. Ernst Gombrich’s discovery of the importance of “*figural primitives*” in appreciating art as well as his path-breaking studies of the *beholder’s role in perceiving* something as a work of art.
7. All that forms the prelude to the discussion of an elaborate, well-documented account of the monumental project to which Kandel has devoted his scholarly career: *a new science of the mind in the making, i.e., an account of the biology of*

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seeing and feeling, that links cognitive psychology, neuroscience and molecular biology into a single discipline. In the end, that science should explain explicitly on the basis of brain functions what artists have always known implicitly about perception and its relationship to feelings.

Replete with beautiful artistic and scientific illustrations, composed in relatively short, digestible chapters that are vastly informative both with respect to historical developments and the state of contemporary biological research but never in and of themselves taxing and that in a sparkingly lucid style, *The Age of Insight* is bound to stimulate – indeed, to dazzle – any reader persistent enough to cope with the vertigo, which can accompany the twists and turns of its highly ramified argument. Since these bold forays venturing for the most part sure-footedly far beyond the bounds of Kandel’s own discipline, precisely because they are the efforts of a distinguished scientist with a deep, subtle appreciation of art, they are sure to provoke vigorous discussions pro and contra on the part of artists, scientists and historians as well as policymakers, both university administrators and legislators, so wide are their implications for our understanding of culture, creativity and scholarship. For that reason it is imperative to scrutinize Professor Kandel’s main claims carefully with a view to facilitating critical discussion of his multi-faceted thesis. At every aspect of his intricate argument there are important issues to be discussed, insights to be high-lighted, allegations to be analysed. So it should be clear from the start that any critical essay short of a monograph will have to be highly selective. Very few people, including this reviewer, will be capable of doing the book full justice. What is proposed here is (1) an historical critique of his views about Viennese modernism and (2) a philosophical critique of the limitations of his view of knowledge. The latter is particularly important because philosophy, including the philosophy of science, plays a lamentably negligible role in his account of the origins and achievements of “the science of the mind”. So his presentation of the rich and complex relationship between the psychology and the biology of visual perception will not be treated except in certain crucial aspects bearing upon the two aforementioned points. Doubtless he is clever enough to accommodate many of the objections raised here but, nevertheless, if the position taken here is at all right with respect to the philosophical difficulties in his project, he would at least have to revise, if not reform, certain aspects of it. What, then, does he claim?

Briefly, he maintains that Viennese modernism, concentrated first and foremost in the figures mentioned above, played the decisive role in pin-pointing and exploring unconscious thought processes, i.e., the cognitive and emotional mental phenomena that twenty-first century biological science strives to explain definitively. Moreover, he considers that little or nothing is accidental about this. For example, Gustav Klimt was capable of producing powerfully moving portraits such as that of Adele Bloch-Bauer that could continue to fascinate an art buff like Ronald Lauder for over 50 years from his first glance at it until he was finally in a position to acquire it. Klimt’s power to move spectators 50 or 100 years after completing the portrait is rooted in his “implicit” awareness of fundamental features of the cognitive and emotional psychology of facial perception and ultimately their basis in the

biology of the visual and emotional response to art. Explicitly, Klimt learned about developments in medicine and biology at the University of Vienna's Medical School from his encounters at Berta Zuckerkandl's salon from none other than the husband of his hostess, Emil Zuckerkandl, who invited the painter to observe the dissection of cadavers and even gave lectures on biology to artists at Klimt's behest so that they would be better acquainted with the human anatomy in all its biological detail. These salons were organized by the wives of upper-middle class patrons of the arts as private cultural centers as it were, where the wealthy, cultured elite could encounter creative figures from Viennese intellectual and artistic circles. Their importance in the development of Viennese high culture c. 1900 can hardly be overemphasized, as Ilse Barea¹ and more recently Deborah Coen² have stressed. So Kandel is spot on in underscoring its importance. In any case, Kandel insists illuminatingly that the biological knowledge that Klimt gleaned from those conversations in the Zuckerkandl salon is directly reflected in the ornamentation of many of Klimt's portraits, including, for instance, "Golden Adele", which is inspired *inter alia* by pictures of sperm, ova and embryos photographed through a microscope. This is the most exciting aspect of the book for historians of Viennese culture; for it extends our understanding of Klimt in interesting and important ways. For Kandel it is but the point of departure.

What the "Viennese Expressionist" artists, as Kandel idiosyncratically terms his trio, knew intuitively as artists about the relationship between perception and emotion provided the Viennese art historians Ernst Kris (who also practiced psychoanalysis) and Ernst Gombrich with material for creating a revolution in art history based upon a number of psychological notions crucial to appreciating art, especially portraiture. One is the idea that ambiguity is essential both for creating and appreciating art; another is the notion that facial recognition is a matter of the perception of a Gestalt (with a fascinating account of the role of exaggerated facial expressions in the heads of busts created by the eccentric Viennese eighteenth century artist Franz Xaver Messerschmidt); a third is the idea that art appreciation is not merely a matter of passive surrender to the sublime forms that are the results of artistic creativity but an active feat of understanding, i.e., informed beholders contribute actively to the meaning of a work of art. Thus Kandel's own work (as well as that of a host of other contemporary scientists who are explicitly mentioned) on the way the brain acts creatively in forming memories is an effort to produce a biological foundation for a set of ideas about what artists do unconsciously that have always been crucial to their art (and *a-fortiori* art history and psychology) without those artists being explicitly conscious of them. The idea that there is a reciprocal relationship between art and science, and in particular that art has long known what science should be explaining, is the most exciting notion in Kandel's book, which does, indeed, on that account have sweeping implications for our understanding of the two cultures – even if Kandel's work is not the last word on the subject.

¹ Ilse Barea, *Vienna: Legend and Reality*, New York: Basic Books 1966.

² Deborah Coen, *Vienna in the Age of Uncertainty*, Chicago: The University of Chicago Press, 2007.

Kandel's extraordinary facility for making detailed descriptions of painting is only surpassed by his ability to explain the basis of perception and feelings in neurophysiology. His account of the discovery and significance of the brain's center of emotion, the amygdala, is as limpid as it is illuminating. His ability to weave both into a suspenseful narrative awe-inspiring. However, that is a two-edged sword. Readers can be easily dazzled by the mass of diverse information sorts presented here as well as Kandel's remarkable cleverness and fail to realize how much speculation is involved ("may," "perhaps," "should," "surely" are words that abound in Kandel). Surely, conjecture is an essential element in scientific discovery but it is, clearly enough, not knowledge as Sir Karl Popper adamantly insisted. Scientists know that, the wider reading-public scarcely does. Similar oversimplifications involved in his stunning but highly selective portrait of the relationship between science and art in *fin de siècle* Vienna will provoke criticism on the part of historians concerned with Austrian culture: science in Vienna was not all of a piece as the deep-seated (and pluri-dimensional) conflicts between Ludwig Boltzmann and the followers of Ernst Mach demonstrate and interest in science on the part of humanists and artists was not always scientific as the (non)encounter between Ernst Mach and Hermann Bahr, the motor of Viennese Modernism, clearly indicates. In addition, there is a sense in which Kandel's narrative, chuck-full of history as it is, is scarcely history at all. Klimt and Schiele, Freud and Schnitzler, Kris and Gombrich are less part of the past than they are his contemporaries inasmuch as their discovery and exploration of the unconscious forms a prelude to his new science of the mind. His past is a "Whiggish" scientist's past rather than that of an acerbic humanist scholar. Further, only Promethean discoverers in the past count in his narrative (his view of the present seems very different at least in terms of the huge number of biological studies cited and discussed in the book). It is not that Kandel lacks a sense of the embeddedness of their insights in the practices of research communities, whose "minor" members provided shoulders for those giants to stand and intellectual controversies (often bitter) in which they were partisan, but that his sense of context is blemished by a residual sense of the development of knowledge as a set of heroic discoveries characteristic of "paradigms lost" as it were (i.e., the classical modern linear, progressive view of scientific development). This lack of sensitivity to the nuances of contexts allows him continually to praise all of his heroes as good Darwinians without paying much attention, say, to the fact that there was a good deal of chaos in the intellectual community in Vienna (and elsewhere, as Loren Eiseley pointed out in his classic study *Darwin's Century*³) c. 1900 concerning just what Darwinism was all about. One identified Darwin with "evolution" but it was even possible to endorse Lamarckian ideas in Darwin's name at the time. Moreover, Darwinism was *à la mode* in *fin de siècle* Vienna: everybody who was anybody was a Darwinian because everybody was an evolutionist, and that because it was "modern" to be Monist, i.e., a committed foe of authoritarianism and superstition (in effect political Catholicism which claimed a monopoly on education and marital

³Loren Eiseley, *Darwin's Century*, Garden City: Doubleday, 1961.

mores in the Danube Monarchy). So it is necessary to look behind labels. Ludwig Boltzmann's Darwinism was different from Ernst Mach's and Mach's was different from Klimt's.

Moreover, Kandel's narrative is selective to an extreme. In connection with Klimt, for example, Kandel's emphasis upon symbolism drawn from reproductive biology in Klimt's portraits, enlightening as it is, obscures, for example, the well-documented fact that these figures in his ornamentation also have to be interpreted against the background of traditional Japanese art, which *pace* Kandel is also at least as important as Darwin and Byzantine art as a background to his conception of portraiture⁴ although they are certainly not mutually exclusive. To be sure, Kandel mentions Klimt's "Japonismus" but it does not really figure in his account of Klimt's painting – a point that could be made about several other elements in his argumentation: often the brute facts are there but improperly weighted from the cultural historian's point of view.

Be that as it may, Kandel rejects Friedrich Jodl's aesthetic objections to Klimt's university paintings out of hand. That rejection obscures the link between Klimt and the irrationalism of the Viennese avant-garde, the irrational, subjectivist "romanticism of nerves" that the *Wiener Moderne* represented but was repulsive to academic Darwinists like Jodl. This is important because it anticipates the profound subsequent moral and aesthetic (not personal) rift between Klimt and Schiele emphasized by many commentators involved in the current Schiele Renaissance.⁵ Kandel's many astute observations about the continuities between Klimt and Schiele do not suffice to bridge the gulf that came to separate them. In fact, in his very way of painting Schiele became increasingly critical of Klimt and *die Moderne* in his pictures. The critical stance that his pictures incorporate links him to an "ethical" conception of art analogous to the one that the aesthete Klimt rejected in painting the university murals.⁶ In fact, Klimt and Schiele came to embody two distinct forms of Viennese Modernism: the "Romanticism of nerves", which took subjective experience – ultimately dreams – to be elemental reality and the unconscious basis of artistic creation on the one hand and a second form of Viennese modernism whose very essence was to be polemic against the first.

Hermann Broch, perhaps better than any of his contemporaries, captured the aesthetic credo of an emerging "critical" modernism (typified in the works of Adolf Loos, Karl Kraus, Arnold Schoenberg, Georg Trakl among others⁷). He character-

⁴ See the exhibition catalogue by Peter Pantzer and Johannes Wieninger, *Verborgene Impressionen/ Hidden Impressions, Japonismus in Wien, 1870–1930/Japonisme in Vienna, 1870–1930*, Vienna, Publications of the Museum für angewandte Kunst, 1990.

⁵ See the contributions of Johann Thomas Ambrózy, Carla Carmona Escalera and Helena Pereña in the newly founded *Egon Schiele Jahrbuch I*, Vienna: Rema-Print Druck-und Verlagsgesellschaft, 2011.

⁶ See Carl Schorske, *Fin de Siècle Vienna: Politics and Culture*, New York, Knopf, 1980.

⁷ See Allan Janik, *Wittgenstein's Vienna Revisited*, New Brunswick: Transaction Publishers, 2000.

ized what is essential to this attitude to culture in an essay of 1913, which was only published after his death, “Notes Towards a Systematic Aesthetics”, as follows:

All art ... strives for the extension of its medium. That end must also be its fulfillment; it must give art *all* its methods... The work of art can only follow ‘the law of its own inner necessity’ ... in that law lies [its] unity ... balance ... universality... Style ... will [thus] be vanquished and with it ornament. The crystal evaporates. Color and tone ascend out of their own laws and become liberated... Aesthetic prescriptions dissolve into ethereal spirituality and sail away.

For Broch the critical modernists’ reduction of art to its medium, i.e., deliberately structured self-reference of words, colors and tones, entails nothing more than a radical re-consideration of the limits of expression rooted in concern for both the integrity of the artifact and that of the artist (particularly perceptible in the work of the later Schiele and, of course, Karl Kraus). It moves away from monumentality and theatricality in the direction of the miniature, the meaningful nuance and the everyday. Critical modernism challenges the spectator, the listener, the audience to seek the beauty of poetry in the details of its very linguistic structuring, the order and sounds of words, that of painting in the structure immanent in the very juxtaposition of colors (or lines), rather than in what words or colors (or lines) represent. In fact they made art out of posing problems for their public rather than solving them and in doing so educed a moral message from a new “grammar” (both literally and figuratively) of their very aesthetic structures. This was their way of rejecting aestheticism and sentimentalism absolutely. In fact, Klimt and Schiele ended up with completely different conceptions of art.

It has been the service of the above-mentioned Johann Thomas Ambrózy to demonstrate that point graphically on the basis of a rigorous iconographical analysis of Schiele’s painting “Hermits”. Kandel, following the conventional interpretation of the picture as representing Schiele the pupil with his blind master leaning on his back, takes it to be a representation of his relation to Gustav Klimt as a kind of burdensome father figure, whom he would like to eliminate. It is a case where there “may” be an unconscious, Oedipal dimension to the double portrait. In fact, according to Ambrózy the picture is not of Klimt at all but of Schiele’s own recently deceased father and in fact replete with Lutheran symbolism. Moreover, the designation “hermits” alludes to Kierkegaard’s pseudonym Victor Eremita, pseudonymous author of *Either/Or*, the work in which the Dane presents his readers with a choice between the aesthetic and the ethical as ways of living.

Grasping such a difference involves *interpreting* Schiele, i.e., posing a question that can only be answered on the basis of examining the aesthetic elements that are constitutive of the picture. On the basis of these immanent structures it is possible to establish the *meaning* of pictures and thus grasp why we react to them as strongly as we do. Doubtless aesthetic appreciation begins in reacting to a work of art but it does not end there. Kandel’s fascinating discussion of *sfumato*, the technique that Leonardo Da Vinci employed to paint Mona Lisa’s celebrated smile is more than enough to indicate that he well understands the point in practice. However, the crux of his argument is to pass from the structure of the picture to the psychological reaction(s) it triggers in order to get to a point where he is able to establish what his

brave new science of the mind should explain. Hermeneutics is there in practice from the start (as it must be) but it is equally excluded in theory as well. “Probably” there is no discussion of the *hermeneutics* of understanding pictures in Kandel’s account of art, because it would complicate his stated goal of reducing mind to brain functions beyond anything that any current claimant to the title “science of the mind” might cope with. In fact the act of interpretation extends far beyond the mere fact of being deeply “struck” by perceiving, say, a picture of a human face.

This is an important point. In fact, collaboration between art historians and philosophers at Bergen University in Norway has produced a clever model for explanation in art history, i.e., understanding pictures both formally and contextually by reconciling “bottom-up” technical analysis of their formal structures with “top-down” hermeneutics of their historico-cultural significance.⁸ Both aspects of the Bergen mode of explanation are profoundly influenced by both Gombrich’s notion of “figural primitives” as well as his idea that beholders bring something essential to the meaning of a picture in the form of their knowledge of normal practices within their culture. It is precisely the notion that pictures can be systematically interpreted along these lines that is missing in Kandel’s account of art generally and specifically what he terms “Viennese expressionism”.

In any case, just as it is possible to be charmed by the beauty of Ms. Bloch-Bauer, it is also possible that one takes her for a coldly vain, rich mannequin. And that judgment would not be entirely wrong. Not everyone is as overwhelmed by her beauty as Ronald Lauder and some people are simply put off by her sang-froid. It all depends upon which elements within the picture are taken to have pride of place and how you are prepared to see them. That determines how we see what we see. Now you might say that the person who is struck by the picture one way or the other is not informed about painting but it is certainly possible to imagine that there are people with a sophisticated understanding of painting who take each view, who can be convinced that their own opinion is incorrect, i.e., that they have let themselves be struck by the wrong elements in the picture and thus can change their opinion of it on the basis of persuasion or even that there are people who can see Ms. Bloch-Bauer now as strikingly beautiful, now as vainly distant. Such ambiguity of perspective is the basis of interpretation and mighty difficult to explain scientifically. In order to do so we would have to demonstrate how our “hard wiring”, as our nervous system is sometimes referred to, could explain being struck by the painting positively or negatively or being indifferent to it. A big order indeed!

In any case, there are a number of problems about “the unconscious” that merit discussion but can merely be identified here. The most egregious bear upon (1) Freud’s “discovery” of the concept itself, (2) Schnitzler’s critique of Freud’s view of it and (3) the confusion between “tacit” or implicit knowing and the unconscious. For starters, as Alasdair MacIntyre has pointed out in his trenchant methodological critique of Freudian theory,⁹ Freud acknowledged that “poets and philosophers”

⁸ See e.g. the contributions of Tore Nordenstam, Kjell S. Johannessen and Gunnar Danbolt in *Contemporary Aesthetics in Scandinavia*, ed. Lars Aagaard-Mogensen, Lund: Doxa, 1980.

⁹ Alasdair MacIntyre, *The Unconscious*, London: Routledge & Kegan Paul, 1958.

have been aware of the role of unconscious motivation from time immemorial with the German Romantics playing a particularly significant role; in philosophy thinkers as different as Herbart and James had already called attention to the phenomena of what William James called “fringe consciousness”,¹⁰ i.e., something momentarily forgotten that could be brought back to consciousness. So Freud did not consider himself a discoverer as much as an inventor of a new technique for making this side of mental life accessible to scientific study.

The link between Freud and Arthur Schnitzler is rather more tenuous than Prof. Kandel thinks. With respect to Schnitzler’s view of Freud, it is clear from Schnitzler’s notes on Freud¹¹ that, despite a certain recognition of the importance of psychoanalysis, Schnitzler harboured definite reservations about Freud and his work not least on the basis of a critical estimate of the latter’s way of understanding the unconscious. Schnitzler’s criticisms of Freud can be summarized in the following five points. First, he takes Freud to be precipitous in moving from the conscious to the unconscious in the way he does but also with respect to his generalization of the Oedipus Complex. Second, he considers many of the “scientific” pronouncements of psychoanalysis to be merely sanctimonious restatements of banalities such as the idea that our first sexual impressions are tied to our first relations with a person of the opposite sex. Third, he criticizes Freud’s understanding of the Oedipus myth and its inappropriateness as a scenario or paradigm for the sort of father-mother-son relationship he wants to articulate. Fourth, Freud oversimplifies distinctions such as that between sexuality and eroticism, *Seelenkrankheit* and *Geisteskrankheit* as well as the notion of libido inasmuch as he restricts it to the experience of pleasure without allowing for the way that inflicting pain can be a source thereof. Finally, he sees psychoanalysis as pervaded with arbitrariness with respect to the interpretation of dreams, folklore, myths and pre-history but especially concerning the way that it projects metaphors such as *das Es*, *das Ich* and *das Über-Ich* in the course of mapping our psychic terrain, which are in turn referred to as if they were clearly and distinctly identifiable components of the psyche. All in all, on Schnitzler’s view Freud distorts the fluidity of the relationship between the conscious and the unconscious. Schnitzler conceived a less sharp distinction between consciousness and the sub-conscious as separated by a vast nebulous mid-conscious (*Mittelbewußtsein*). He considered that this way of distinguishing between the two takes the suppleness of the distinction into account in a way that Freud’s does not. Schnitzler’s unpublished private view of Freudian theory is fragmentary but hardly uninteresting for all that. In fact, it is sufficiently similar to MacIntyre’s systematic analysis to be taken seriously. That in turn warns us about making facile generalizations about the relationship between Freud’s ideas and those of the playwright. For Freud’s part, despite his respect for Schnitzler he always kept him at an arm’s distance to protect his claims to priority about which he was always proprietary.

¹⁰William James, *The Principles of Psychology*, New York: Henry Holt, 1890.

¹¹Arthur Schnitzler, “Über Psychanalyse,” ed. Reinhard Urbach, in: *Protokolle*, 2 (1976), pp. 277–284.

In any case, it will be worthwhile to explore the advantages of mapping the mind as Schnitzler has suggested, i.e., with a vast “Mittelbewußtsein” separating consciousness and the unconscious. At the less conscious end to the spectrum we would have the sort of behavior typical of the character in Henrik Ibsen’s plays or Schnitzler’s characters; at the more conscious end, what Michael Polanyi would later term “tacit knowing”. That refers to a form of feeling-laden knowledge based upon doing or experience that cannot be articulated directly by means of propositions but is nevertheless capable of being taught and learned – the technical skills involved in practicing the arts (think of what Klimt is alleged to have known about perception) or sports being prime examples. Tacit knowing is therefore neither conscious nor unconscious in the strict sense: you can’t say what it is but with luck you can show somebody how to do it. Knowing in this sense is also typical of scientists working in laboratories and nurses in hospitals. All of these people, confronted with the question, “What do you know?” react perplexedly and typically remark “It’s hard for me to say but, look, I’ll show you.” And thus convey what is “known” on the basis of *showing* the questioner how something is *done*. In principle (i.e., lacking physical impediments), the questioner can follow the example of the agent in question and learn to perform the practice that is the subject of inquiry. Such activity merits the name of knowledge because it can be transmitted from one person to another and improved upon in the course of mastering a practice. It is significant that knowledge implicit in action (i.e., skill) was completely disregarded by philosophers and scientists when Polanyi first published his *Personal Knowledge* in 1958 and Polanyi remained a pariah in the scholarly world on that account until well after his death in 1978. Paradoxically, it was only with the emergence of information technology and the debates surrounding the inflated claims of “strong” AI in the 1980s that people began to realize that formal knowledge, i.e., what we learn from books on the basis of definitions, is only one aspect of knowing¹². Professional knowledge is much more the result of learning to “apply” knowledge than it is of merely attending a professional school. Put differently, there is a difference between being a doctor and being recognized as a good doctor that is not a matter of different education or different intellectual capacities but a matter of how a doctor has learned from his/her experience about how to assess the differences between individual cases. This can be learned but not codified. Applying knowledge is essentially different from applying a bandage to a wound; rather, it involves *making judgments* on the basis of *understanding individual differences in specific contexts* that only an experienced person can perceive.

As in the case of medicine, understanding these differences practically is less a matter of biological science than it is of understanding natural history, i.e. patiently learning to describe the development of an individual in its environment on the basis of nuances (as opposed to necessary and sufficient conditions), something that has

¹² See Bo Göransson and Ingela Josefson (eds.) *Knowledge, Skill and Artificial Intelligence*, London: Springer, 1988.

as much to do with art as it does with science (as theory, not practice¹³). Is this not, in the end, what we want to say about the portraitist's knowledge of her/his subject? Of Klimt's practical knowledge of Adele Bloch-Bauer as expressed in the "Goldene Adele"? If so, how does neurobiology explain it? Or better, can neurobiology explain it? Or better yet, how can a science of the mind contribute to a deeper understanding of that activity?

Whatever the answers be, tacit knowledge, knowing implicit in acting deliberately and successfully, clearly plays a huge role both in the creation of works of art and in our understanding of art (our understanding of art is much more clearly expressed in the role that it plays in our lives than in anything we might say about it). Implicitly this point is crucial to Kandel's position but it is almost completely ignored in his explicit exposition in the *Age of Insight*. There are several reasons for thinking that this is a grievous error even from Kandel's own point of view.

Polanyi (whom Kandel only mentions once in passing) speaks to Kandel's view at a number of crucial points. To begin with, Polanyi, as Kandel notes, developed his epistemology of practical knowledge on the basis of Gestalt psychology (something that he shared with such path-breaking twentieth century practice-oriented philosophers of science as Ludwik Fleck, Stephen Toulmin, Norwood Russell Hanson, Thomas Kuhn and others). So there is no question that they have a common concern. As personal knowledge tacit knowing is irreducibly emotional: it is impossible to separate the emotional from the cognitive dimension. This squares both with Kandel's scientific account of perception and his own way of presenting the results of his research, i.e., as a personal statement as much as a scientific document (see below). Tacit knowing is no less "aesthetic" in nature: one of its essential elements is the capacity to form discerning judgments on the basis of ostensibly trivial nuances. Tacit knowing is refined. The crucial difference between Kandel and Polanyi is Polanyi's stress upon the multi-sensory and motoric skills involved in experiential or practical knowing. An experienced mechanic "thinks" with his ears and nose as well as his eyes. That will also apply to someone working in a chemistry lab. Similarly, riding a bicycle involves paying attention to what you see before you, what you hear behind you and keeping your balance at the same time. Etc. In most cases the visual element is the *easiest* to master. The mediocre mechanic only sees the catastrophe when the machine has broken down; she smells it in the act of breaking down but the experienced mechanic hears it malfunctioning and prevents the breakdown. Perhaps most interestingly with reference to Kandel's scientific concerns about memory, experienced soldiers in Iraq relied on their "muscle memory"¹⁴ to react to situations that they perceived as potentially lethal. These reactions in turn more closely resemble what actors have to do on the stage when they respond to cues than they do looking at pictures in a museum. Briefly, brains without hands are radically restricted in their ability to think practically. Indeed, we do well to remember the admonition of the great Dutch cellist Anner Bylsma who

¹³ See Allan Janik, Monika Seekircher and Jörg Markowitsch, *Die Praxis der Physik*, Vienna: Springer, 1999.

¹⁴ Evan Wright, *Generation Kill*, New York: Putnam, 2005.

insists that the brain is a poor instrument in comparison with the fingers. Alternative Noble Prize winner Mike Cooley explained why when he asserts that the hand is the outer edge of the brain. The perspective of Polanyi's variation upon Gestalt psychology as illuminating human knowing-in-practice is a far country for any candidates to be a science of the mind, at least up to now. To respond that aesthetic reactions to art and facial recognition and the like are essential components of the human activities is to invoke just the atomistic, i.e., strong reductionistic, standpoint that Gestaltism rejects. There is a challenge here. How it will be met remains to be seen.

Kandel should be interested in the metaphor "muscle memory" for other reasons as well. First off it is a way of describing a particular form of human action: a way of reacting to immanent danger without "thinking" about what we are doing but simply doing it. Moreover, we forget at our peril that action does not explain itself. It can always be described in alternative and even legitimately conflicting ways. Furthermore, describing action, as opposed to mere perception, entails evaluating it: an act's meaning both in the cognitive and the moral sense is established in the very act of classifying it.¹⁵ One and the same act can be described as patriotism and as terror. My freedom fighter is your terrorist and we have no (empirical or scientific) way of "getting behind" that disagreement to the "fact of the matter". A "science of the mind" would have to do that and none of the candidates are even remotely capable of rising to that challenge. Secondly, it is a metaphor and as such the most fundamental form of human creativity: what Arthur Koestler termed an "Aha-Experience" resulting from seeing things together for the first time in an illuminating and constructive manner. This is ultimately what any real "science of the mind" has to explain. We are clearly far from that. However, this by no means implies that Kandel and his colleagues should throw in the towel and take up gardening instead. It would be unspeakably arrogant to suggest that philosophy can do science better than scientists can, precisely the kind of arrogance that has given philosophy a bad name over the last couple of centuries and rendered it at worst the status of academia's "curiosity shop". The kind of work that merited a Nobel for Professor Kandel represents extraordinary intellectual achievement as does the courage and boldness involved in producing *The Age of Insight*. If there is ever to be a science of the mind he has certainly contributed to it. However, the exact nature of that contribution remains to be seen and that because mind itself is considered too narrowly. But that is certainly no reason for despair, let alone ridicule. Thanks to the meticulous researches by Kandel and his colleagues we have become increasingly aware that the brain develops reciprocally with its environment, i.e., the meaningful activities that its outer edge, the hand (and the rest of the body), performs. To make a long story short, there is no such things as a "philosophical" or any other theory of mind except a scientific one but we are still a long way from it (the speculations implicit in his continual recourse to words like "may," "perhaps," "should," "surely" indicate that this science of the mind consists largely of "bold conjectures" as Sir Karl

¹⁵William Connelly, *The Terms of Political Discourse*, Princeton: Princeton University Press, 1993.

Popper would have called them, i.e., promissory notes to be cashed in at some later date). This critique is a reminder that those notes may be inflationary.

Beyond that, *The Age of Insight* remains important to historians of Vienna 1900 for a number of reasons. First, it helps bring science, long missing, centrally into our picture of Viennese culture. As such the book is a welcome companion to Coen's *Vienna in the Age of Uncertainty*. Vienna 1900 was a center of scientific research and interest in science was as much part of being educated as interest in culture was. One need only consider Ernst Mach's wide impact upon Viennese culture extending from physics to politics to see that. Moreover, Viennese scientists were frequently profound humanists: Ludwig Boltzmann, for example, could dedicate his *Populäre Schriften* to the Shade of Schiller and allude to the limits of theorizing (something that he highly cherished) and therefore scientific knowledge in his farewell lecture in Graz (1890) simply by obliquely, but poignantly alluding to half a line from *Faust*, Part I.

It is important for humanists to note the way that Kandel boldly crosses disciplinary lines. For all the dangers that accompany its boldness, the book has a way of refreshing, stimulating and provoking both the layman and the scholar to second thoughts about what is sometimes all too familiar not least due to conventional academic compartmentalization. Furthermore, it is a sobering thought that humanists would be hard put to write about science as well as this neuroscientist has written about art. In addition Kandel's presentation of *reciprocally enlightening perspectives* on perception and feelings from art and science (which seem to lend his staunchly affirmed and re-affirmed "reductionism" a Pickwickian sense), however robust they ultimately turn out to be, form a genuine contribution to the "two cultures" debate. Finally, *The Age of Insight* is distinguished for its deeply *personal* dimension: the story that Kandel narrates is the story of his own life, a story of how memories (in various senses of the word) of his native city drew back to thematize intellectual debts that he accrued in the course of coming into a position to help create a new science of the mind and creativity, i.e. to explaining how he himself stands on the shoulders of those Viennese giants who are the heroes of this book. Bringing all this vividly and enthusiastically to life on an intellectual tightrope walk through academia at vertiginous heights is certainly no small feat.

A final point has to be made about the Random House's curious production of this fascinating book: if the short chapters facilitate reading the book (relatively) easily, there are three annoying aspects of the physical object that have to bother readers. It is (1) too tightly bound, i.e., too stiff and, as a weighty tome, is less than wieldy, which is particularly problematic because (2) the pages have not been cut evenly and thus have a tendency to slip out of the readers fingers necessitating frequent re-paging to find one's place. That is simply annoying. All this makes things aggravatingly complicated especially for scholarly readers who want to take advantage of the book's superb 130 page documentation (notes, bibliography, index), since the pages continually slip through their fingers. Moreover, the laudable 47 page index frequently has so many sub-headings per entry that the reader gets lost in its very fullness. For example, the entry for Freud runs for some two full pages;

when you are on the second verso page it is no longer immediately clear that, say, the reference to “theory of mind” bears upon Freud’s theory of same. This may sound somewhat churlish but it is by no means intended to be so. In an age when books are at once expensive and an endangered species these are not trivial concerns.

Erratum to: Influences on the *Aufbau*

Christian Damböck

Erratum to:

**C. Damböck (ed.), *Influences on the Aufbau*,
Vienna Circle Institute Yearbook 18,
<https://doi.org/10.1007/978-3-319-21876-2>**

In the Book back matter, in “Reviews” in the section “Obituary” under “In Memory of Pat Suppes”, the author name was missed in the print version (pg 298). Author name “Maria Carla Galavotti” has been included at the end of this Obituary.

The updated online version of this book can be found at
<https://doi.org/10.1007/978-3-319-21876-2>

Reviews

Ilkka Niiniluoto, Sami Pihlström (eds.), *Reappraisals of Eino Kaila's Philosophy*. Acta Philosophica Fennica vol. 89, Societas Philosophica Fennica, Helsinki, 232 pp., 30 €, ISBN 978–951–9264–75–2, ISSN 0355–1792

Eino Kaila (1890–1958) was the leading Finnish philosopher in the decades between 1930 and 1960. Nevertheless, for several decades he was internationally not very well-known since he published only in Finnish and German. This situation is changing. Meanwhile a considerable part of his work has been translated into English. Moreover, in the last 20 years or so, a considerable amount of secondary literature on Kaila (often in English) has been produced. I would just like to mention the following sources:

1. *Eino Kaila and Logical Empiricism* (1992)¹;
2. *Analytic Philosophy in Finland* (2003)²;
3. *The Vienna Circle in the Nordic Countries* (2010).³

For every reader who is seriously interested in twentieth century Finnish philosophy these books are obligatory reading. Most of the publications collected in these volumes conceive of Kaila as an analytical philosopher – although already in 1992 Hintikka pointed out that this holds only with some important qualifications. In con-

The original version of this chapter was revised. An erratum to this chapter can be found at https://doi.org/10.1007/978-3-319-21876-2_15

¹ Ilkka Niiniluoto, Matti Sintonen, Georg H. von Wright (eds.), *Eino Kaila and Logical Empiricism*, Acta Philosophica Fennica 52, Helsinki, Hakapaino Oy, 1992.

² Leila Haaparanta, Ilkka Niiniluoto (eds.), *Analytic Philosophy in Finland*, Poznan Studies in the Philosophy of the Sciences and Humanities vol. 80, Amsterdam and New York, Rodopi, 2003.

³ Juha Manninen, Friedrich Stadler (eds.), *The Vienna Circle in the Nordic Countries. Networks and Transformations of Logical Empiricism*, Vienna Circle Yearbook vol. 14, Springer, 2010.

trast, many papers in *Reappraisals of Eino Kaila's Philosophy* (henceforth *Reappraisals*) take also into account aspects of Kaila's thought that are related to other philosophical traditions, in particular to German Neo-Kantianism and American pragmatism. From *Reappraisals* a richer picture of Kaila's philosophy emerges from which it transpires that he certainly cannot be considered as an analytical philosopher in the usual Anglo-American sense. Kaila's thought was not only influenced by the different currents of „scientific philosophy“ of his time such as logical empiricism, neo-Kantianism, and phenomenology, but also by *Lebensphilosophie*, „existentialism“ or how to call it. In this sense, one may say that Kaila was a truly European philosopher, even if this was hardly noticed outside Finland.

Reappraisals is a collection of ten essays, eight written by Finnish authors and two by philosophers from abroad. By far the longest contribution is Juha Manninen's *Eino Kaila in Carnap's Circle* (9–52) that deals mainly with discussions that Kaila had with members of the Vienna Circle, in particular Carnap, around 1928 and 1929. Manninen heavily draws on unpublished sources (letters and diary entries, mainly in German).

Matthias Neuber's ambitious paper *From Carnap to Kaila – A neglected Transition in the History of "wissenschaftliche Philosophie"* (53–70) puts forward the thesis that Kaila may be regarded as one of the "most up-to-date representatives of the early twentieth century project of a scientific world-conception". According to Neuber, Kaila was engaged in the project of finding a way between (Carnap's version of) logical empiricism and *Naturphilosophie*. For this purpose the concept of "invariance" played an essential role. Neuber even claims that Kaila's "invarianism" may have some affinity with Nozick's structuralist objectivism put forward in his last book *Invariances. The Structure of the Objective World*.⁴ Somewhat surprisingly, he does not treat the interesting problem of how Kaila's and Cassirer's accounts of the role of invariances are related. As we shall see in a moment, this is done by Matti Sintonen's contribution.

Ilkka Niiniluoto in *Eino Kaila's Critique of Metaphysics* (71–90) also investigates the role of invariances in Kaila's philosophy of science. He points out that Kaila's conception of reality was based on the concept of invariances that distinguished several distinct levels of reality according to their different degrees of invariance.

Anssi Korhonen's *Eino Kaila's Scientific Philosophy* (91–116) pursues the issue of what Kaila understood by "scientific philosophy" or "wissenschaftliche Philosophie" in more detail. Korhonen characterizes Kaila's philosophy as "robustly scientific" since he regarded philosophy as being in line with the other sciences. This meant to acknowledge that philosophy had no proper method of its own, moreover Kaila subscribed to a basically realistic outlook to the world thereby maintaining a close relation with a kind of scientific realism.

Jaakko Hintikka's brief *Kaila and the Problem of Identification* (117–122) is another piece of *Reappraisals* that aims to show that the concept of "invariances" was a key concept of Kaila's thought. Hintikka argues that Kaila used this concept

⁴Robert Nozick, *Invariances: The Structure of the Objective World*, Cambridge/Massachusetts, Cambridge University Press, 2001.

in line with Leibniz and that Kaila's insights concerning this notion may be useful to overcome some problems in modal logic that arise from the question of what makes an object the same in different "possible worlds". According to Hintikka, we should learn from Kaila in matters modal and conceptualize objects as concretizations of invariances. Before we go on to deal with the other contributions to *Reappraisals* just a short remark: Not less than four contributions of *Reappraisals* deal with the issue of invariances. This is evidence that Kaila's account of invariances may be a useful source even for contemporary discussions of this topic.

Matti Sintonen, in his contribution *Kaila on the Aristotelian and Galilean Traditions* (123–145), aims to correct the widely accepted picture of Kaila as an obedient follower of logical empiricism or positivism. He wants to show that Cassirer's "critical idealism" strongly influenced Kaila's mature philosophy of science. More precisely, Sintonen contends that Kaila took over the concept of invariance (which was of crucial importance for him) essentially from Cassirer. According to Sintonen, evidence for Cassirer's influence is Kaila's basic distinction between the "Aristotelian" and the "Galilean" scientific tradition which allegedly has its origin in Cassirer's distinction between the substance-oriented thought of Aristotle and the function-oriented thought of Galileo – possibly mediated through the influence of Kurt Lewin's paper *Der Übergang von der aristotelischen zur galileischen Denkweise in der Biologie und Psychologie* (Lewin 1930).⁵ There are, however, also important differences between Cassirer's and Kaila's concepts of invariances. While Cassirer's concept essentially relied on mathematical considerations (Felix Klein's *Erlanger Programm*) Kaila's was strongly influenced by biological and psychological considerations.

In *Kaila's Reception of Hume* (147–162) Jani Hakkarainen argues that Kaila was a competent interpreter of Hume (although not a professional Hume scholar). Hakkarainen asserts that Kaila's introduction to his Finnish translation of Hume's *An Enquiry concerning Human Understanding* still has some philosophical and scholarly value for the contemporary Finnish reader.

From a contemporary point of view a quite peculiar piece of Kaila's *Naturphilosophie* is his concept of terminal causality (*Terminalkausalität*) which is the main topic of Michael Stöltzner's *Terminal Causality, Atomic Dynamics and the Tradition of Formal Teleology* (163–193). Stöltzner's paper is – perhaps somewhat surprisingly – the only contribution to *Reappraisals* that deals with a genuine topic of philosophy of physics. Kaila understood the expression "terminal causality" as a "general designation for such a (non-statistical) regularity of the events, for which not so much the initial conditions but the limit conditions, the boundary conditions, the final conditions are decisive". In his favorable reading of Kaila's approach Stöltzner comes to the conclusion that in modern terms terminal causality should be interpreted not so much as an expression for nature's parsimony (which would have a strong taste for metaphysics) but rather as a criterion for modal selection.

⁵ Kurt Lewin, "Der Übergang von der aristotelischen zur galileischen Denkweise in Biologie und Psychologie", *Erkenntnis* 1(1), 1930, 421–466.

For some years Sami Pihlström has been pursuing the task of investigating the reception of American pragmatism in the Scandinavian countries, in particular in Finland. Already in his contribution to *Analytic Philosophy in Finland* (2003) (mentioned in the beginning), Pihlström pointed out that Kaila played a leading role in this endeavor. In his contribution *Eino Kaila on Pragmatism and Religion* (195–211) Pihlström investigates the not unproblematic relation between Kaila and William James, who certainly was the best known and most influential American pragmatist in Europe during the early decades of the twentieth century. As Pihlström emphasizes, Kaila's early sympathies with pragmatism à la James later clashed with his empiricist conscience, so to speak. It was difficult for him to find a balance between these two often antagonistic influences. In a sense, then, Kaila – as an individual philosopher – had to come to terms with similar difficulties as the logical empiricists as a collective in the 1930s when they were forced to leave Europe and to adapt to a new philosophical and cultural environment deeply marked by pragmatist currents. According to Pihlström, there were interesting parallels between Kaila and James, for instance, both started their careers as psychologists rather than philosophers, and both had a certain inclination to a kind of “romanticism”, as Pihlström and other authors of *Reappraisals* rightly emphasize. It may be expedient to mention here that 20 years ago Hintikka (in his contribution *Eino Kaila's “Blue Fire”* to the already mentioned collection *Eino Kaila and Logical Empiricism* (1992)) had gone even so far to characterize Kaila as a “*Naturphilosoph* in the same sense as the great romantic philosophers of nature”.

The favorite and most important notion of Kaila's “synthetic” *Naturphilosophie* was the concept of the “deep mental” or “spirituality” to be interpreted as a kind of free-floating religiosity that embraced Man and universe as a unified whole. It seems to me that this attitude brings Kaila close to what may be subsumed under a specific version of philosophical romanticism that flourished in the first decades of twentieth century particularly in Germany, to wit, *Lebensphilosophie*. On the other hand, this romanticist “world vision” was hardly compatible with a *wissenschaftliche Weltauffassung* favored by his philosophical colleagues of the Vienna Circle. Kaila considered this apparent conflict between the scientific world view and the “higher” pursuits of humanity, including morality and religion, as the “disease of the age”. In this diagnosis he again meets with Cassirer who put this aporetic dichotomy as follows:

Here romanticism – there positivism; here ‘reason and scientific rationality’—there the opposition, even the disdain of both, here mysticism, there ‘physicalism’, this is the whole theme of philosophy in the last 150 years. Do we necessarily subscribe to one of these alternatives – or is there a kind of ‘reconciliation’ that is more than an eclectic mixture?⁶

Mikko Salmela's contribution *Eino Kaila on Ethics* (213–232) also deals with this issue concentrating on Kaila's stance with respect to ethical matters. According to Salmela, Kaila as a “scientific” philosopher felt obliged to restrict philosophy to

⁶Ernst Cassirer, *Zur Metaphysik der symbolischen Formen*, in: *Nachgelassene Manuskripte und Texte*, Band 1, Hamburg; Felix Meiner Verlag, p. 131.

the epistemological and logical analysis of science, on the other hand, he aimed at a “synthetic” *Naturphilosophie* that comprised non-scientific issues of culture, spirituality, and values. Thereby, Salmela suggests, Kaila comes close to a kind of Hegelian evolutionary humanism for which “spirituality” occupied the highest possibility for human existence. It goes without saying that these speculative ideas fit badly the standards of scientific philosophy. They testify that Kaila was, at least partially, a genuinely “Continental” philosopher.

Reappraisals will certainly help facilitate the recognition of Kaila as an important mid-twentieth century philosopher for the non-Finnish reader. Whether Kaila will become posthumously a “first rank European philosopher” as the editors of *Reappraisals* contend in the introduction of this book – time will show.

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Moritz Schlick, *Kritische Gesamtausgabe, Section I: Veröffentlichte Schriften, vol. 5, Rostock, Kiel, Wien. Aufsätze, Beiträge, Rezensionen 1919–1925.* Ed. by Edwin Glassner, Heidi König-Porstner and Karsten Börger, Wien-New York, Springer, 2012, X + 840, ISBN 978-3-211-32769-2

This volume of the Moritz Schlick’s critical edition directed by Friedrich Stadler and Hans Jürgen Wendel is the last achievement of the project started in 2002 and which is now close to conclusion of Section I, thanks to the admirable competence and surprising speed of the editors. Between 2006 and 2009 the following impressive list of volumes has appeared: the *Allgemeine Erkenntnislehre* (vol. 1); Schlick’s famous little book on the theory of relativity together with his dissertation on the reflection of light, i.e. his doctoral thesis written under the supervision of Max Planck (vol. 2); then the juvenile *Lebensweisheit* and the late *Fragen der Ethik* (vol. 3) as well as Schlick’s papers, lectures and reviews published during the Vienna period, from 1926 to 1936 (vol. 6). With the forthcoming publication of volume 4 *Zürich, Berlin, Rostock* including Schlick’s essays and reviews from 1907 to 1916, the complete edition of Schlick’s published works will be available to scholars of Logical Empiricism, thus opening new perspectives to the historical and philosophical inquiry on the leading figure of the Vienna Circle. In the meantime the team editing the *Kritische Gesamtausgabe* is already at work in order to publish Section II (five volumes containing the great amount of Schlick’s unpublished writings). Finally, Section III and IV will include letters and other documents concerning Schlick’s intellectual biography: for the Schlick’s scholarship a further indispensable source, whose importance would be useless to stress once again.

The volume we are dealing with offers an excellent overview of Schlick’s intellectual activity in a crucial period of his life. In 1919 Schlick was still Professor in

Rostock, but in the following years he became Professor in Kiel and, what is more important, from 1922 on he was finally in Vienna, where his philosophical enterprise, and the future of scientific philosophy in general, entered a new era. In this age of transition, Schlick appears deeply engaged in different yet very similar philosophical and scientific fields. This activity is documented through various kinds of contributions ranging from brief reviews to popular essays, from academic lectures to polemic articles, not to mention the great edition of Hermann von Helmholtz's epistemological writings as well as the admirable, but hitherto little known exposition of *Naturphilosophie* published in 1925. In this context, the core of Schlick's endless intellectual work remains the elaboration of a new empiricism, breaking at the same time with both the legacy of Neo-Kantianism and Positivism *à la* Mach: Einstein, Planck, Poincaré, Reichenbach, Cassirer, Helmholtz (to quote only the most famous) are the prominent colleagues, scientists and antagonists of Schlick's agenda while moving not only in geographical sense from Rostock to Vienna, from German philosophy to the Austrian cultural *milieu*.

First of all, Schlick is the outstanding spokesman of Einstein's theory of relativity. His work in this field deals not only with the physical and epistemological significance of the conceptual revolution Einstein has accomplished, but also with its explanation elaborated by eminent scholars such as Hermann Weyl, Ernst Cassirer, Hans Reichenbach. At the same time, he is committed in criticizing both the misleading interpretation and the polemical reception of the theory, which were widespread in Germany at the very beginning of the 1920s. Schlick continues therefore his divulgation of Einstein's theory, which he had already masterfully begun with the little book *Raum und Zeit in der gegenwärtigen Physik* (first edition 1917): this book had been much appreciated by physicians, philosophers, and cultivate readers. Among a lot of minor contributions on this issue, particularly remarkable is the article Schlick wrote for the *Mosse Almanach 1921*, where a very clear exposition of the theory of relativity is nourished by the conviction that Einstein's physical image of the world (*Weltbild*) rests on philosophical presuppositions, and therefore Einstein has to be considered first and foremost as an original *philosopher* (p. 163). Schlick stresses again and again this insight, according to which the theory of relativity has not only a great philosophical relevance, but is itself a philosophical enterprise (pp. 167, 170, 172–175). So, for instance, Schlick points out in his lecture delivered at the Congress of the Physical-Medical German Society (September 1923) that the theory of relativity shows how the physical and the philosophical perspectives are strictly connected, since the fundamental principles of physics are, and to some extent need to be, explicable from a philosophical point of view (p. 529).

Moreover, Schlick is deeply engaged in the debate about the theory of relativity. This intense activity, first of all documented by many reviews along with some papers, has two aspects. To begin with, Schlick discusses the interpretation of Einstein's theory offered by Weyl, Cassirer, Reichenbach, and Winternitz, in order to examine and to recast the philosophical consequences that these skilled authors draw from a *correct* view of the theory of relativity as physical theory, although their epistemological interpretation seems to be disputable. So Schlick doesn't

agree with Weyl's phenomenological language and perspective (pp. 431–432) and, as well known, he refuses in 1921 Cassirer's sophisticated interpretation aiming to show that Einstein's theory is compatible with a kind of 'liberalized' Kantianism. The arguments Schlick brings into discussion with Cassirer represent a decisive step for the development of his own epistemological view. He points out indeed that the theory of relativity has opened in the body of Kantian philosophy a wound which cannot be healed and, in particular, that the function of synthetic judgements a priori within physical knowledge has for ever lost any place. But it is still possible, according to Schlick, to go beyond Kant and Cassirer himself without endorsing a kind of empiricism *à la* Mach. Accordingly, a third way is conceivable, namely a *new* empiricism based both on constitutive principles formulated as «*hypothesis* or *conventions*» and on empirical, a posteriori given facts of experience (p. 227). This is the core of other critical assessments Schlick expresses in some reviews of this period. So Schlick criticizes for instance Winternitz's book *Relativitätstheorie und Erkenntnistheorie* as a failed attempt to propose a Neo-Kantian view similar to the Cassirer's one (pp. 423–424). Even more important is that Schlick stands up against Reichenbach's formulation of a relativized, constitutive a priori enabling physical knowledge and, in particular, the new frame of Einstein's theory of relativity, arguing for his part that these principles are no longer synthetic a priori, but only conventions in the sense of Poincaré (p. 507).

The second aspect of Schlick's engagement in the debate about these topics is represented by his struggle against the numerous 'enemies' of the theory of relativity. The grounds of similar hostility were of different kind: philosophical, scientific, and also ideological, or even racial (Einstein was some time judged as the founder of a 'Jewish physics'). Schlick was in this sense too an "eminent defender" of Einstein (see the illuminating *Introduction* to this volume, p. 20) and his strategy consisted in denouncing both arbitrary or groundless misinterpretations of the theory of relativity (see e.g. the review of Ernst Gercke's *Physik und Erkenntnistheorie* [pp. 457–458]) and the philosophical attempts to demolish Einstein's physics made for instance by Oskar Kraus (p. 99) or by Hugo Dingler, whose interpretation proposed in *Physik und Hypothese* seems to Schlick nothing more than "grotesque" (p. 449).

Beside Einstein's relativity theory, the second important topic of Schlick's writings published in the early 1920s is the work of Hermann von Helmholtz, whose centenary of birth was celebrated in 1921. On this occasion Schlick edited, together with Paul Hertz, an excellent collection of his epistemological essays provided with extensive comments (*Schriften zur Erkenntnistheorie*, Berlin, Springer, 1921). Helmholtz was in Schlick's eyes a veritable hero, both because of his philosophical understanding of the principles of mathematics and natural science and because of his pioneering view of geometry as branch of physics, an insight the theory of relativity had definitively confirmed (pp. 256–257). As clearly shown by some comments Schlick writes on Helmholtz's *Über den Ursprung und die Bedeutung der geometrischen Axiome* as well as on *Die Tatsachen in der Wahrnehmung*, a central point of Schlick's interpretation is the refusal of a supposed 'Kantianism' endorsed by Helmholtz (see for instance pp. 296, 338–339). In the lecture delivered in Berlin

on November 25, 1921, on the occasion of the Helmholtz's jubilee co-organized by the Physical, the Physiological and the Philosophical Society, Schlick argues therefore that Helmholtz was a genuine empiricist influenced by Hume (pp. 478, 483). According to Schlick, Helmholtz had furthermore totally misunderstood Kant inasmuch his view of the pure forms of intuition was a psychological one, whereas for Kant these forms exhibited in no way a content belonging to the domain of perceivable qualities (*Sinnesqualitäten*: see p. 480).

The last very interesting contribution the reader can find in this extremely precious volume of the Schlick's edition is the extensive *Naturphilosophie*, which Schlick published in 1925 for the *Handbook of Philosophy* edited by Max Dessoir. What is first of all remarkable here is the overview offered by Schlick of the recent achievements in physical science through the theory of relativity and the quantum mechanics ("the most amazing theory of modern science [...] created by Max Planck" [p. 691]), which by the way is mentioned for the first time within the *corpus* of Schlick's writings. Moreover, the second section of the *Naturphilosophie* is focused on life sciences, a topic that Schlick had already faced in his lectures in Rostock at the very beginnings of his academic career, and to which he devotes now an extensive examination having as central aspect a strongly polemical attitude towards Neo-vitalism. Biological laws – Schlick states – have to be reduced to physical laws, according to an epistemological project aiming to conceive science as unified science dealing with a unique concept of nature, beyond the distinction between natural and human sciences or between physical and biological sciences (pp. 738–739).

Thus, this admirable new volume of Schlick's *Kritische Gesamtausgabe* offers a vivid portrait of the leading figure of the Vienna Circle in a crucial period of his life and work. Nearly at the end of his academic activity in Rostock and at the very beginnings of his new position in Vienna, Schlick undertakes the project of a 'new empiricism' resting on the results of more recent physical science, but aiming at the same time at outlining the essential features of a 'scientific philosophy'. To be sure, during the following period (1926–1936), which is well documented by the volume 6 of the *Kritische Gesamtausgabe*, Schlick's linguistic turn influenced by Wittgenstein had already marked the beginning of a new era of his work. The main question remains therefore whether Schlick really becomes a 'new' philosopher along the course of such further development, thus breaking with his early work. On the base of unpublished writings, letters, and other documents the scholars of Schlick and Logical Empiricism will answer to this question in different ways, but it seems undeniable by reading his essays until 1925 that Schlick's philosophical work was already destined, to some extent, to represent a turning point in contemporary philosophy.

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Mary Jo Nye, *Michael Polanyi and His Generation. Origins of the Social Construction of Science*. Chicago and London: The University of Chicago Press, 2011, 428 pp., \$ 50.00, ISBN 9780226610634

Michael Polanyi is known as a footnote in Thomas Khun's influential *Structures of Scientific Revolutions*. In *Michael Polanyi and His Generation*, Mary Jo Nye sets out to track down this footnote.

Nye collected an astonishing amount of information in order to depict an impressive number of aspects of a life and career full of events and turnarounds. The most important stations in Polanyi's life were Budapest, where he was born 1891 and spent his childhood and youth, Berlin, where he worked as a physical chemist between 1920 and 1933, and Manchester, where he lived from his migration until his death in 1976. All three periods are shaped by numerous factors belonging not only to the history of science but also to politics, history and culture. And especially the shifts between these periods, the migrations, coincide with key events in the intellectual history of Europe.

The intellectual environment in which Polanyi had to find his place during the first two decades of the twentieth century was shaped by accelerated and hence conflictual modernization. His generation witnessed in Hungary the rise of the modern formal and physical sciences, the formation of progressive political ideas and the hopes of social utopias against the backdrop of a conservative and backward world, and went through the vast historical cataclysm of the First World War and the subsequent political radicalizations.

Polanyi's scientific activities in Berlin included work in the fields of surface chemistry, x-ray diffraction, chemical kinetics and reaction dynamics. For all these fields, Nye provides the reader with the prerequisite background information for evaluation of the state of research as well as Polanyi's achievements. The emphasis lies here especially on Polanyi's organizational work as the head of a chemical laboratory, which was one of the reasons he was invited to Britain in the early 1930s. Nye also focuses on the intellectual milieu in which Polanyi kept company, on his colleagues and competitors. This is true especially for the period after 1933, but also here the reader can already form a vivid picture of the scientific community associated with the diverse institutes of the Kaiser Wilhelm Society. It was his experiences in these circles – including Max von Laue, Max Planck, Fritz Haber, Walther Nernst and Albert Einstein, to mention only the Nobel laureates – that shaped his increasing interest in the social construction of science.

Nye doesn't back off from difficult and problematic aspects either, such as the fact that Polanyi worked as the head of a department of the Kaiser Wilhelm Society for the German war industry, just like his colleagues, especially Fritz Haber, who participated in the development of chemical weapons (and in 1918 was at once both a Nobel laureate and a wanted war criminal).

The reason for Polanyi renown today and indeed for Nye's primary interest in him is his activities in the field of the theory of science. These activities unfolded

after 1933, during his time in Manchester, and therefore must be seen in the context of the British discussions of the 1930s up to the 1960s. Nye examines his best-known work, *Personal Knowledge*, published in 1958, alongside Karl Popper's *Logic of Scientific Discovery* (the English version being published in 1959) and Kuhn's *Structures of Scientific Revolutions* (1962). What these works have in common is that all three "had parted company with the scientific philosophies of empiricism, inductivism, and logical positivism." In her presentation of this development, the formation of Polanyi's theory of the social construction of science, Nye certainly does justice to the problem. Especially because she doesn't ignore the political aspects of culture and of the sciences. The discussions leading to Polanyi's *Personal Knowledge*, the thematic complexes of liberalism, economic foundations, scientific freedom and of the social functions of science would be unintelligible without the political setting of the Cold War.

As Polanyi's own work makes clear, his argumentation regarding the social construction of science at the same time rests upon his experiences in Hungary and Germany, and is informed by the biographical and scientific turns of his career. These shifts, turns and migrations have to be considered the driving force behind his writings.

During the twentieth century, the mobility of scientists took on different forms, impacted on a considerable number of people and caused fundamental shifts in the domain of the sciences. The most significant of these was the forced emigration from Germany 1933. Polanyi's first migration was nevertheless not from Germany in 1933 but to Germany 14 years previously. At the time Polanyi left Hungary, mass migration was taking place. After the First World War had ended disastrously for Hungary (a series of political shifts, the successive seizures of power by extreme left and right-wing political forces, the loss of two thirds of the state territory – not to mention losing the war) Polanyi saw, like many of his colleagues, better opportunities for himself abroad. He also found himself in an increasingly anti-Semitic world. Anti-Semitism was not the decisive factor behind his migration in 1919 however, since he moved from one country to another with comparable anti-Semitic ideologies.

The preeminent position of the research in the field of the natural sciences in Germany during the first three decades of the twentieth century – Polanyi resided there 1912 and then from 1919 until 1933 – was the direct consequence of the efforts of the German state, German science and German society for modernization, which meant here, just as it did everywhere else, the establishment of an international position of power by peaceful as well as by military means. Polanyi's scientific colleagues were involved in all aspects of these developments, irrespective of their personal views on war or militarism. Their income and the cost of their laboratories were paid on the basis of their involvement. A row of mansions was built in Berlin-Dahlem, where this elite could live sheltered from the vagaries of inflation.

Cold War means not only the confrontation of two ideological blocs after the Second World War, but, as the name suggests, a war without the firing of weapons. The battlefields of the war were armament and the economy as well as the sciences. Polanyi participated in the related discussions with the presentation of an ideologi-

cally informed theory – and repelled those who he intended to address. His ultimate argument – “We may envisage a cosmic field which called forth all the tiny fragments of the universe embodied in man by offering them a short-lived, limited, hazardous opportunity for making some progress of their own toward an unthinkable consummation. And that is also, I believe, how a Christian is placed when worshipping God” – was enough to mesmerize a small esoteric community, but the greater part of his audience subsequently considered him to have disqualified himself.

With her *Michael Polanyi and His Generation*, Nye presents a thoroughly argued and convincing book. She follows a path appropriate for the subject. She discusses the social foundations of the sciences using the example of the life and work of the man who first brought attention to this subject matter. She states the relevant facts. She convinces the reader after only a few pages that the questions and problems of the natural sciences are manifold and specific. She goes into detail and mentions numerous names. The reader thus receives a varied picture – albeit at the cost of missing the wood for the trees.

Nye delivers sufficient information to be able to evaluate Polanyi’s achievements critically, but she backs off from criticism. She leaves open the question of what caused the turn in Polanyi’s thinking. Was it Polanyi’s wide range of interest in historical and cultural issues, or his experiences in the diverse discussion groups in Berlin, or his triumphs and failures as a scientist? The crucial point seems to be that it was not the sciences that passed him by but the world itself. It was this point he was forced to recognize in 1933. First he rejected a position in Britain in January, when Hitler came to power, because he was convinced he could continue his activities in Germany. It was only the dramatical developments of the following months that made him see reason and cancel his contract in Berlin in April.

Polanyi migrated between countries. He migrated between sciences. His migration between the worlds of the natural sciences and the political sciences led to his most important contribution: To the insight that the natural sciences are fundamentally determined by the social circumstances of the scientific communities of the natural scientists. As Nye demonstrates in overwhelming detail, Polanyi learned this lesson the hard way. Surviving two world wars and the economic and political catastrophes of the period between these wars in Central Europe, he established his views in the middle of the Cold War. Even then he was not free of distortions by obscure convictions. For the reader of today Polanyi’s story makes it more than obvious how difficult it is even for the brightest minds to overcome irrationalities.

Tracing the path back to the darkest parts of the history of the twentieth century, to Fritz Haber’s gases (chlorine gas during First World War and Zyklon B patented in 1922), Mary Jo Nye’s carefully balanced, thoroughly researched and absolutely readable book leaves us with the slow but steady growing suspicion that perhaps it would be better to continue to consider Polanyi just as a footnote in Kuhn’s foreword.

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Steffen Kluck, *Gestaltpsychologie und Wiener Kreis. Stationen einer bedeutsamen Beziehung*. Verlag Karl Alber, Freiburg/München, 2008, 224 pp., € 36, ISBN 978-3-495-48325-1

Research on the Vienna Circle has a strong focus on the philosophy of logic, mathematics and physics. The Circle's relation to psychology has received much less attention; articles and monographs on this subject are rare. Laurence Smith published some 30 years ago a book on the relation of Behaviorism to Logical Empiricism⁷ and the Institute Vienna Circle published a volume on Egon Brunswik, a psychologist close to the Vienna Circle and the Unity-of-Science movement.⁸ The rest of the scholarly literature on the topic consists of some occasional papers. The present book by Steffen Kluck is therefore particularly welcome among the sparse literature on the topic. It offers a thorough and detailed analysis of the reception of Gestalt psychology by the Vienna Circle. It shows convincingly that psychology, and especially Gestalt psychology, had a major impact on central philosophical positions of Schlick and Carnap, at least before the linguistic turn of the Circle and Carnap's strict separation of the logic of science from any empirical and especially psychological questions in epistemology. And it offers ample details against the myth that Logical Empiricism was mainly influenced by and allied with behaviorism. At least in the early part of the 1920s, the relation of logical empiricists to the Berlin School of Gestalt psychology (Wolfgang Köhler, Max Wertheimer, Kurt Koffka) was much more important. And that was also the period when psychological questions were particularly important for Schlick's and Carnap's epistemologies (respectively the *Allgemeine Erkenntnislehre* and the *Aufbau*).

Kluck's book is divided into four parts. An excellent and very informative introduction on the different currents of Gestalt psychology (the original idea of a "Gestalt" by Christian von Ehrenfels, the Graz school of Gestalt Psychology and the Berlin school) are presented with a clear analysis of their central concepts. That introductory part is followed by three sections which analyze the reception of Gestalt psychology by the three main philosophers of the Circle, Schlick, Carnap and Neurath respectively. This division by philosophers has, on the one hand, the advantage that one can pick out the philosopher of interest and see separately his connection to the Gestalt movement. On the other hand, by focusing on the three major philosophers of the Circle, less central figures of the Circle are left aside, although some of them had a stronger involvement with Gestalt psychology than the mentioned three. This is especially true for "the" psychologist of the Circle, Egon Brunswik, who wrote extensively on Gestalt psychology in his Viennese years and who is only mentioned briefly in the chapter on Schlick.

⁷Lawrence D. Smith, *Behaviorism and Logical Positivism*, Stanford: Stanford University Press, 1986.

⁸Kurt R. Fischer and Friedrich Stadler 'Wahrnehmungswelt und Gegenstandswelt'. *Zum Lebenswerk von Egon Brunswik (1903–1955)*, Wien: Springer, 1997.

The book gives a good picture of the interaction between the Vienna Circle and the Berlin school. It describes the early intellectual climate in Berlin, where Schlick and the Gestaltists were intellectually formed. It shows how the first direct encounters between Gestalt psychologists and the mentioned philosophers happened at the end of WWI. And it describes more substantial communication, on the one hand, in the correspondence of Köhler with Schlick and on the other between Carnap and Gestalt psychologists at the early Erlangen conference (1923). It also reconstructs the psychological research done at the universities where Schlick and Carnap worked: the psychologists close to Gestalt psychology in Rostock (David Katz) and in Vienna (Karl Bühler, Egon Brunswik). So, the book gives a well-researched historical account of the multiple contacts between the Gestaltists and particularly Schlick and Carnap. But the most substantive part of the book is dedicated to show the importance of Gestalt psychology for some specific philosophical positions of the Logical Empiricists, here particularly of Schlick and Carnap.

Kluck argues convincingly that both Carnap and Schlick accepted the central thesis of Gestalt psychology, namely that phenomenal experience is not given in the form of elements or separate sensational units but that experience consists of more holistic units. Both philosophers accepted that the atomistic units or elements of associationist psychology have to be abandoned. But for Kluck, neither Schlick nor Carnap wanted to go as far as the Berlin school of Gestalt psychology in the acceptance of a psychological holism. Schlick accepted still some basic units of experience which are foundational for the production of psychological holistic structures and Carnap accepted some distinctive features into which experience can be analyzed in his theory of quasi-analysis in the *Aufbau*.

Both Schlick and Carnap are closer to a moderate version of Gestalt psychology. This divergence of the logical empiricists from the holism of the Berlin school is accurately pointed out and analyzed. Less convincing is the author's tendency to generally favor without much argument the position of the Berlin school. Their view is generally taken for granted, because it is taken to be experimentally well founded or closer to some 'psychological reality'. For example, Kluck rejects Schlick's argument that a "whole" ("Ganzheit") is reducible to the properties of its components and their relations. It is claimed that the "experimental results of Gestalt psychology" contradict such a reduction (p. 138). It is not clear how one could experimentally decide between invariant structures of relations between components (Schlick) and an ontology of wholes (Berlin school). And Kluck does not mention any Gestalt experiment which does so. Here, it is exaggerated to imply, as it is done in several parts of the text, that Schlick did not "consider the phenomenal data" (p. 143) while the Gestaltists "followed alone the phenomenal reality" (p. 142).

Schlick's relation to Gestalt psychology is given the most attention in this book and the chapter on Schlick covers almost half of the book. Kluck describes in detail the possible reception of Gestalt ideas by Schlick since the 1910s. He emphasizes particularly Schlick's affinities to the Graz school of psychology, which still accepted sensational units as basis for the production, by the epistemic subject, of holistic psychological structures. This early influence may explain why Schlick kept

reservations towards the more radical holism of the Berlin school. Despite this, the main part of the chapter on Schlick is dedicated to Schlick's relation to the Berlin school, particularly to Wolfgang Köhler. Two topics are particularly important for Schlick: the relation of Gestalt psychology to processes of thought and the psychophysiological reductionism of Wolfgang Köhler. Köhler wanted to extend Gestalt laws beyond perception to processes of thought. For him, thoughts are also submitted to the constraints of Gestalt principles. But this is in conflict with Schlick's idea that concepts are a purely conventional system of signs. The other topic, Köhler's idea that phenomenal structures are isomorphic to physiological "Gestalten", is central for the reductive program of the Vienna Circle concerning mental properties, i.e. the reduction of mental to physical properties and of qualitative to quantitative properties. The chapter on Schlick shows how this reductive program was strongly connected to the ideas of Gestalt psychology, and was not only a consequence of the Circle's interest in behaviorism, as is generally believed.

The shorter part on Carnap focuses centrally on the impact of Gestalt psychology on the *Aufbau*, and especially on Carnap's rejection of Machian elements in favor of a holist conception of experience as an unanalyzable "instantaneous total experience". But Kluck criticizes that Carnap did not go far enough, given the results of the Berlin school. Carnap still believed that quasi-analysis could give some marks ("Merkmale") or components of total experience, although such a view would have been rejected by the Berlin Gestaltists. The abandonment of the *Aufbau* program did not bring Carnap closer to Gestalt psychology, mainly due to the increasing influence of behaviorism. But here again, Kluck emphasizes quite convincingly that Carnap's physicalism would have been compatible with Gestalt psychology, especially in Köhler's version of an isomorphy between phenomenal and physiological "Gestalten". The careful analysis of Carnap's (and Schlick's) interaction with psychologists in the 1920s is less detailed concerning the later development of the Vienna Circle (in the 1930s). Here, the relation of Carnap and Schlick to Gestalt ideas in the Bühler school will certainly need further investigation. For example, Kluck thinks inaccurately that there are no sources about an intellectual exchange between Carnap and Egon Brunswik, although he notes a possible role of Brunswik's psychology for Carnap's adoption of a think-language in the protocol-sentence debate. Further research on the complex relation between the Berlin school, the Bühler school and the Circle is certainly needed.

In the description of Neurath's relation to Gestalt psychology the metaphysical and political implications of that psychological theory are at the forefront. Neurath's interest in the scientific aspects of Gestalt psychology seems effectively to have been quite limited. But these metaphysical and political aspects already played a role in Schlick's view about central concepts of the Gestaltists, so in his analysis of the whole-part relation. Here Kluck does not sufficiently distinguish between Gestalt psychology and the general social and political use of holistic notions in the 1930s (of which the Berlin school can certainly not be blamed). Schlick and Neurath had a very negative reaction to this holism in politics, sociology (and also biology) which was propagated, among others, by such fascist theorists as Othmar Spann. The rejection of a realist conception of wholes ("Ganzheit") by the Vienna Circle

was strongly motivated by an opposition to political holism and, contrary to Kluck's opinion, much less by an incapacity to recognize the experimental results of the Berlin school. This aspect has not been captured by the book although it evidently plays an important role in Schlick's and Neurath's later reaction (in the 1930s) to some central notions of Gestalt psychology. The failure to distinguish between the Berlin school and political holism is especially problematic in Kluck's discussion of Schlick's paper "On the Concept of the Wholeness". Here, Kluck cites approvingly the "sociologist" and follower of Othmar Spann, Johann Sauter,⁹ who captured in his quote the "essential difference between Gestalt psychology and Schlick" (p. 142), namely an interest in mathematical structures (Schlick) vs. an interest in "reality" (Gestaltists). It needs to be emphasized that Sauter was mainly motivated in his somewhat crude and simplistic criticism of Schlick by a defense of political holism and not by a defense of the results of the Berlin Gestaltists. Kluck does not sufficiently consider these political motives behind the increasing rejection of holism by the logical empiricists in the 1930s.

Besides this minor weakness concerning the political background of holism, the book captures in an enlightening and detailed way the interaction of the Vienna Circle with the Gestaltists. It gives us new historical insights into essential topics of logical empiricism (the nature of experience, the empirical basis of knowledge, and mind-body reductionism). It gives a rich picture of the role of psychology for the Vienna Circle and opens new perspectives concerning topics which will need further research, e.g. the relation of the Vienna Circle to the Bühler school or the psychological background of physicalism. For anyone interested in the relation of logical empiricism to psychology, the book will be an essential reading.

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Obituary

In Memory of Pat Suppes

Patrick Suppes – Pat to all who knew him – died in Stanford on November 17, 2014. At Stanford he had been Lucie Stern Professor of Philosophy, Emeritus since 1992, a member of the Department of Philosophy and honorary member of the Departments of Psychology and Statistics, and of the School of Education.

Born in Tulsa, Oklahoma in 1922, Suppes obtained a B.S. in Meteorology and during the second world war served in the army as a meteorologist. In 1947 he

⁹Johann Sauter is mainly remembered in the history of philosophy as the most probable author („Austriacus“) of an article published after the assassination of Schlick, where the deed is defended as an act of self-defense of a misled student against a materialistic and nihilistic professor, who corrupted Austrian youth, see Friedrich Stadler (1997) *Studien zum Wiener Kreis*, Frankfurt am Main: Suhrkamp, pp. 924–30.

enrolled as a Ph.D. Philosophy student at Columbia University, to graduate in 1950 under the supervision of Ernest Nagel. In the same year he moved to Stanford as a post-doc, to embark on a remarkable career not only as a philosopher, but also as a scientist and entrepreneur. Suppes was not only able to make an invaluable contribution to the philosophy of science, but did also extensive work in education and psychology focussing on learning theory and computer-assisted education, whose potential he was one of the first to grasp and put into practice, creating a firm called Computer Curriculum Corporation that he ran very successfully for a number of years. At the age of 70 he started a new research programme in neuroscience and founded the Suppes Brain Lab, where EEG techniques are used to study reactions to linguistic, visual and musical stimuli. Other important institutions created by Suppes are the Stanford Institute for Mathematical Research in the Social Sciences, the Stanford Education program for Gifted Youth, and the Patrick Suppes Center for the History and Philosophy of Science, currently directed by Michael Friedman. The endowment of the Patrick Suppes Family Professorship in the School of Humanities and Sciences and the building of the Nora Suppes Hall annex to the Center for the Study of Language and Information should also be mentioned.

During his long career Suppes received many honours, including the National Medal for Science in the field of 'Behavioral and Social Science', he was awarded in 1990 with the following motivation: "For his broad efforts to deepen the theoretical and empirical understanding of four major areas: the measurement of subjective probability and utility in uncertain situations; the development and testing of general learning theory; the semantics and syntax of natural language; and the use of interactive computer programs for instruction." Among the many awards he was granted from institutions around the world, I am pleased to mention the honorary degree in Philosophy he received from the University of Bologna in 1999, for his deeply innovative contribution to the field.

Suppes liked to describe himself as the most scientific of philosophers of science. His strong aversion to all sorts of philosophical 'isms' was flanked by a deep concern for all aspects of science, from experimentation to theory formation. This attitude, rooted in Suppes' dual militancy as philosopher and experimental scientist, inspired his uniquely original perspective, whose impact on the received view of philosophy of science has been no less revolutionary than that of the so-called 'Kuhnian revolution'. Suppes influence on philosophy of science can be traced back to the Fifties when he pioneered the semantic view of theories. This marked a shift of interest from theories to models, together with the adoption of a formalization within general set theory in place of the traditional formalization in first-order logic. The pivotal idea is that set-theoretical predicates specify classes of structures, and a theory consists of a set of assertions that refer to a given class of structures and specify under what transformations such a class is invariant.

Suppes' perspective supersedes both the separation between theoretical and observational language and the distinction between a context of discovery and a context of justification, traced by logical empiricists. By contrast, he adopted a 'bottom up' approach to philosophy of science meant to analyse all aspects of knowledge in a genuinely pluralistic spirit, with relentless attention to the details

characterizing research and knowledge produced within single disciplines. Central to such an approach is the conviction that scientific knowledge has an irreducibly local character, and is to be analysed within a specific context. Moreover, Suppes insisted that probability enters all stages of a comprehensive analysis of science and knowledge in general, and in this spirit he labelled his own approach ‘probabilistic empiricism’. This is a unique blend of empiricism and pragmatism, that rejects dogmatism and foundationalism in favour of a view of science as a complex enterprise resulting from a multiplicity of factors, a problem-solving activity whose goal is not to produce a truthful description of reality, but to find connections among observed facts and to “furnish material principles of inference that may be used in inferring one set of facts from another”, as stated in a paper entitled “What is a Scientific Theory?” published in 1967.

The list of Suppes’ publications includes more than 30 books and several 100 articles on an impressively broad spectrum of topics including philosophy of science, physics, probability, logic, mathematics, psychology, economics, neuropsychology, education, computer science, and philosophy of language. Suppes’ approach to philosophy of science is summarized in the monumental book *Representations and Invariance of Scientific Structures* (2002), which was awarded the Lakatos Prize in 2003. Another excellent source is the volume *Models and Methods in the Philosophy of Science: Selected Essays* (1993) which collects 30 articles divided into five sections devoted to ‘General Methodology’, ‘Causality and Explanation’, ‘Probability an Measurement’, ‘Physics’ and ‘Psychology’. A number of Suppes’ publications have opened new research fields and have become classics, like *Foundations of Measurement* (1971) co-authored with David Krantz, Duncan Luce and Amos Tversky, still the most extensive treatise on measurement, and *A Probabilistic Theory of Causality* (1970), pioneering the notion of probabilistic causality.

A lot more could be said about Suppes’ extraordinary accomplishments in research, scholarship, and innovation, but I wish to add something on the personal side. I had the good fortune to meet Pat in the late Seventies during a workshop on the foundations of the social sciences, where he gave a paper on causality, arguing that some examples from learning theory speak against the assumption of the Markov property – a subject to which he returned many times in subsequent work. After the end of the session I timidly approached him with some questions, and to my surprise I found that the famous philosopher was ready to patiently answer the naive questions of a neophyte as I was at the time. To my even greater surprise, a month or so later I received a heavy package from Stanford containing a number of reprints of his papers. That was the beginning of a relationship that has been most precious to me, a source of deep philosophical and human inspiration. I am indebted to Pat not only for having learned from him more than I could tell, but also for encouraging my research on some many occasions. A number of my papers, and especially my book *Philosophical Introduction to Probability* would not exist without Pat’s support, advice and encouragement. Pat visited Bologna many times and agreed to take part in a number of projects, always ready to share and discuss his own ideas as well as listen to the opinions of others. In 2012, at the age of 90, he

accepted my invitation to a conference held in Bertinoro at a conference centre of the University of Bologna. There he gave an evening talk on “The future role of computation in science and society”, that was followed by a long discussion that Pat seemed to enjoy immensely, for he loved engaging in debate, a passion he continued until the very end of his life.

Time spent with Pat was always rewarding and enriching. He was very hospitable and generous to his friends, whom he liked to invite to his magnificent Stanford home: after being welcomed with a glass of champagne guests were treated to excellent food and could enjoy the rare pleasure of Pat’s company and conversation. He had a unique ability to probe deeply into a huge range of topics, a prodigious memory and an indefatigable enthusiasm for engaging in arguments about literally everything, from philosophy to science, art, architecture, literature, history, politics and music to sport, cinema, gardening, cuisine and travel. Pat will be sorely missed by the scientific community at large, and by his many friends all over the world.

Maria Carla Galavotti

Index

A

Aagaard-Mogensen, L., 273
Albert, K., 219
Ambrózy, J.T., 271, 272
Arendt, H., 116
Aristotle, 37
Aron, R., 258, 260, 262
Atiyah, M. van, 16
Augustine, 261
Avenarius, R., 78, 89, 99, 124, 128, 145, 146,
149, 180, 228
Awodey, St., 79, 157, 204
Ayer, A.J., 187, 234, 238, 240

B

Bahr, H., 270
Baldwin, St., 233, 251
Barea, I., 269
Bast, R.A., 220
Bauch, B., 1, 2, 120, 191, 222
Bauer-Mengelberg, S., 26
Baumgarten, A., 193
Bavink, B., 20, 102
Beaney, M., 237, 238, 250, 251
Becher, E., 102
Becker, C.L., 158, 258, 261
Beller, M., 20
Benary, W., 101
Benson, A., 56
Bentham, J., 251
Bergson, H., 47, 90, 110, 117, 237
Berkeley, G., 44, 164, 259
Beth, E.W., 85
Binswanger, O., 124
Black, M., 251, 252, 266

Bloch-Bauer, A., 268, 273, 276
Bohr, N., 20
Bollnow, O.F., 172, 219
Boltzmann, L., 55, 103, 140, 165, 270, 278
Bolzano, B., 198
Brading, K., 17
Bradley, F.H., 40, 44, 45, 237, 243, 245
Brinton, C., 260–262
Broad, C.D., 238, 245
Broch, H., 271, 272
Bronstein, E.D., 252
Brouwer, L.E.J., 16, 22, 25, 26
Brunswick, E., 271
Bylsma, 276

C

Cantor, G., 17
Carnap, R., 1–22, 27, 32–36, 39–47, 51–74,
77–81, 83–94, 99–101, 105–111,
115–134, 137–159, 163–175, 177–182,
187–211, 213–230, 238, 240, 247–250
Carus, A.W., 53, 56, 69, 70, 74, 79, 83, 105,
128, 137–139, 141, 145, 148, 154, 155,
157–159, 166, 167, 170–172, 174, 179,
182, 191, 209, 214, 217–219, 222, 228
Cassirer, E., 1, 4, 13, 80, 84, 85, 87, 102, 106,
116, 118–120, 122, 139, 141, 191, 221,
258, 261
Chamberlain, A., 234
Chamberlain, N., 234
Chapman, S., 237, 238, 248
Christiansen, B., 144
Cirera, R., 228
Clauberg, C.W., 78, 91
Coen, D., 269, 278

Coffa, J.A., 15, 79, 188, 191
 Cohen, G.A., 102, 263
 Cohen, H., 102
 Collingwood, R.G., 238
 Comte, A., 101, 165–167, 169, 170, 174, 175,
 180, 258, 261, 262, 265
 Connelly, W., 277
 Constance Jones, E.E., 237
 Cooley, M., 277
 Cooper, B., 258
 Couto, A., 257–266

D

Dahms, H.-J., 53, 163–182
 Damböck, C., 53, 74, 159, 214, 221–224
 Danbolt, G., 273
 Darwin, C., 164, 270, 271
 Dawkins, R., 265
 Dedekind, R., 45
 Dennett, D., 265
 Descartes, R., 19, 145, 152, 169
 Dilthey, W., 85, 117, 131, 172, 179, 222
 Dingler, H., 15, 139, 191, 209, 228
 Donhauser, G., 257
 Dreben, B., 158
 Driesch, H., 78–81, 83, 87–93, 128, 138, 139,
 147, 180
 Dubislav, W., 56, 78, 79, 83, 88–92, 180
 Dubois-Reymond, P., 164
 Duhem, P., 25, 52
 Dummett, M., 157
 Duncan-Jones, A.E., 239

E

Eckhard, M., 27
 Eddington, A., 240
 Einstein, A., 12, 15, 26, 103, 104, 107, 110
 Eisler, R., 221
 Eisley, L., 270
 Eklund, M., 227, 229
 Elster, J., 263
 Escalera, C.C., 271
 Ewald, W., 23, 24

F

Fechner, G., 37–39, 44, 48
 Feigl, H., 53, 99, 101, 111, 173
 Ferrari, M., 102
 Fichte, J.G., 27, 87
 Fishburn, P., 34, 35, 39
 Fleck, K., 53, 276
 Fleck, L., 276

Flitner, W., 141, 171, 172, 174, 177, 178, 182
 Føllesdal, D., 26
 Frank, P., 117, 165
 Frankel, C., 258, 261
 Frege, G., 10, 43, 93, 94, 120, 126, 153, 157,
 172, 180, 188–192, 195–201, 203–206,
 209, 244, 253
 Freud, S., 270, 273, 274, 278
 Freyer, H., 131, 171, 172, 174, 177–179
 Freytag, W., 102
 Friedman, M., 17, 42, 46, 47, 68, 72, 79, 84,
 94, 101–104, 106, 108, 109, 119, 187,
 188, 195, 206–209, 222
 Fries, J.F., 85
 Frischeisen-Köhler, M., 102

G

Gabriel, G., 53, 120, 197, 221, 222, 224
 Galileo, 143
 Galison, P., 120
 Gandon, S., 38, 45, 84
 Gätschenberger, R., 13
 Gavin, H., 238
 Geiger, M., 142, 150, 158
 George, R.A., 66, 225
 Gerhards, K., 3, 8–13, 144
 Gerlach, M.W., 39
 Gerlich, F., 258
 Gilson, E., 261
 Goethe, J.W., 85, 168, 182
 Gombrich, E., 267, 269, 270, 273
 Goodman, N., 39, 85, 128, 133, 134, 181, 187
 Göranzon, B., 275
 Gordon, P.E., 116, 119
 Görs, B., 83
 Gould, S.J., 265
 Grassmann, H., 89
 Grattan-Guinness, I., 31
 Gray, J., 266
 Gregory, R.L., 154
 Gründer, K., 119
 Guyau, J.-M., 87

H

Haack, S., 188
 Haddock, G.E.R., 79, 123, 128, 139, 182
 Haddock, R., 123, 128
 Haeckel, E., 163–167, 170
 Hahn, H., 53, 54, 74
 Hanson, N.R., 276
 Hartmann, N., 90
 Hatfield, G., 154
 Heath, P., 72

- Hegel, G.W.F., 169, 237
 Heidegger, M., 115–117, 119, 121, 143, 158, 172
 Heidelberger, M., 37, 66
 Heinze, M., 78
 Heis, J., 84
 Helmholtz, H.V., 8–13, 15, 152–155, 191
 Hempel, C.G., 83, 173
 Herbart, J.F., 274
 Herbst, A., 78, 124
 Hering, E., 154
 Hertz, P., 127
 Heverly, J., 59
 Hilbert, D., 15–17, 23–27, 36, 42, 43, 46, 93, 105, 140
 Hitchens, C., 265
 Hobbes, T., 261
 Hönigswald, R., 85
 Howard, D., 17, 105, 106
 Hume, D., 44, 85, 218, 262
 Huntington, E., 43, 263
 Husserl, E., 13, 17, 22, 26, 27, 78, 79, 85, 87, 94, 116, 119, 123, 129, 138–140, 142–147, 149–159, 179, 180, 182, 189–193, 195–199, 201, 203, 205, 206, 228
 Huxley, J., 257
- I**
 Ibsen, H., 275
 Ingarden, R., 156, 158
- J**
 Jabloner, C., 257
 Jacobi, F.H., 85, 87, 89
 Jacoby, G., 107
 James, W., 40, 45, 105, 240, 253, 274
 Janik, A., 271, 276
 Jaspers, K., 258
 Jeans, J., 240, 253
 Joachim of Flora, 261
 Jodl, F., 271
 Johannessen, K.E., 273
 Johnson, W.E., 237, 242
 Jonas, H., 262
 Josefson, I., 275
- K**
 Kaila, E., 138
 Kandel, E., 267–274, 276–278
 Kant, I., 12, 15, 24, 52, 78, 89, 99, 102–104, 139, 153, 154, 187–197, 199–201, 203, 206, 210, 215, 216, 219, 222, 262
 Kaplan, A., 130, 132
 Kaufmann, F., 53, 56
 Kelsen, H., 257–266
 Kepel, G., 263
 Kern, I., 3, 8, 154
 Keynes, J.M., 246, 252
 Kierkegaard, S., 272
 Kirchhoff, G.R., 140
 Klages, L., 119, 122
 Klein, C., 79
 Klimt, G., 267, 268, 270–272, 275, 276
 Koestler, A., 277
 Koffka, K., 81, 82
 Kokoschka, O., 267
 Kraft, V., 101, 102
 Kraus, K., 271, 272
 Kris, E., 267, 269, 270
 Kuhn, T., 276
 Külpe, O., 78, 79, 84, 85, 87, 90, 91, 102, 104, 128
 Kusch, M., 93, 117
- L**
 Ladyman, J., 105
 Landgrebe, L., 143, 154, 156
 Lauder, R., 268, 273
 Layton, W., 246, 252
 Leibniz, G.W., 27, 168, 169, 238
 Leitgeb, H., 34, 35, 128, 134, 181
 Lenin, 56, 58, 165
 Leonardo Da Vinci, 272
 Lessing, G.E., 261
 Lewin, K., 127, 179, 180
 Lilla, M., 266
 Linnebo, O., 197
 Lipps, G.F., 158
 Loos, A., 271
 Lord Selborne, 233
 Lotze, H., 237
 Lovejoy, A.O., 238
 Löwith, K., 258, 261, 262
 Luce, D., 39
 Luft, S., 154, 159
- M**
 MacDonald, M., 248
 Mace, C.A., 239
 MacFarlane, J., 190, 197
 Mach, E., 8–10, 12, 13, 15, 20, 44, 54, 55, 78, 92, 99, 103, 109, 124, 128, 132, 140, 145, 146, 149, 180, 181, 191, 228, 270, 278
 MacIntyre, A., 273, 274

Maine de Biran, F.-P.-G., 237
 Mancosu, P., 16
 Manninen, J., 60, 67
 Markowitsch, J., 276
 Marx, K., 257, 258, 260, 261, 263–265
 Maxwell, J.C., 17
 Mayer, V., 123, 182
 McNicol, D., 48
 McTaggart, J., 245
 Meinong, A., 78, 90, 180
 Menger, K., 53
 Mercier, C., 242
 Merten, B., 142, 144, 154
 Messer, A., 102
 Messerschmidt, F.X., 269
 Métall, R.A., 257
 Mie, G., 17
 Milkov, N., 78
 Mill, J. St., 44, 101, 243
 Minkowski, H., 65
 Möckel, C., 85
 Mohanty, J.N., 140, 154
 Monjardet, B., 34, 35, 39
 Moore, E.H., 43, 238–240, 245–249, 253
 Moore, G. E., 239
 Mormann, T., 36, 39, 53, 56, 77–81, 84, 89,
 93, 100, 117, 128, 132, 134, 159, 181,
 214, 218, 219, 221, 222, 224–227
 Morris, C., 130, 238
 Moulines, C., 188
 Müller, T., 84, 221
 Müller-Freienfels, R., 221
 Musil, R., 159

N

Nagel, E., 81, 265
 Nagel, T., 265
 Nasim, O., 47
 Natorp, P., 1, 2, 15, 85, 102, 139, 140, 189,
 191–196, 199, 201, 203
 Nelson, L., 85, 128
 Neuber, M., 102–104, 106
 Neumann, J.V., 53
 Neurath, O., 51–61, 65–68, 70–74, 94, 111,
 120, 240, 241, 247
 Newton, I., 103
 Nicod, J., 47
 Niebuhr, R., 258, 260
 Nietzsche, F., 117, 118, 121, 124, 133,
 215–217, 220–223, 258, 261, 262, 265
 Nohl, H., 171–173
 Nordenstam, T., 273

O

Oakeshott, M., 238
 Oesterreich, T.K., 78
 Onfray, M., 265
 Oppenheim, P., 83
 Ostwald, W., 15, 20, 78, 79, 83, 84, 129, 132,
 163–170, 174–182
 Ottoline (Morrell, O.), 31

P

Painlevé, P., 233, 234
 Paracelsus, 87
 Parakenings, B., 72, 74
 Parijs, P. van, 263
 Pasch, M., 81, 82
 Peckhaus, V., 78
 Peirce, C.S., 238
 Pereña, H., 271
 Pieri, M., 82
 Pincock, C., 47, 188, 190, 206, 214
 Pinker, S., 259
 Planck, M., 165
 Plantinga, A., 265
 Poincaré, H., 12, 15, 47, 52, 107, 128, 139,
 140, 209
 Polanyi, M., 275, 276
 Popper, K., 270, 278
 Price, H.H., 238
 Proops, I., 201
 Proudhon, P.-J., 262
 Proust, J., 128, 134
 Przeworski, A., 263
 Pulte, H., 106
 Putnam, H., 83, 276

Q

Quine, W.V.O., 3, 5–7, 12, 44, 60, 71, 94, 115,
 158, 159, 187, 227

R

Rang, B., 140, 153, 154, 156
 Rathkolb, O., 258
 Reck, E., 188, 190, 204
 Rehmke, J., 90
 Reichenbach, H., 8, 13, 55, 56, 110, 127, 142,
 164, 179, 180
 Reisch, G., 58
 Richardson, A., 1, 7, 46, 47, 71, 84,
 102, 105, 159, 188, 189, 195,
 206, 222

Rickert, H., 56, 116–118, 120–123, 128–130,
178, 179, 213–226, 229
Riehl, A., 102
Riemann, B., 15, 17
Roemer, J., 263
Roh, F., 52, 53, 171–174, 177, 178
Romizi, D., 133
Rosenstock-Huussy, E., 261
Ross, D., 105
Roy, J.-M., 182, 206, 238
Royce, J., 31, 40, 44–46
Ruse, M., 265
Russell, B., 3, 4, 10, 13, 14, 18, 20–22, 31–36,
38–40, 42–48, 54, 71, 72, 78, 80, 82,
83, 85, 90, 93, 99, 110, 115, 118, 128,
129, 138, 145, 154–156, 180–182,
187–192, 199–203, 205, 206, 208–210,
237, 238, 240, 242, 244, 245, 247,
249–251, 253, 257, 260, 276
Ryckman, T., 17, 18, 102, 104, 106, 182
Ryle, G., 239

S

Saint-Simon, L., 262
Santayana, G., 238
Sauer, W., 84, 188
Scheler, M., 117
Schiele, E., 267, 270–272
Schiller, F.C.S., 241, 278
Schilpp, P., 164, 173
Schlick, M., 10, 42, 43, 51, 53–56, 60, 68, 70,
74, 85, 99–111, 209, 239, 244–250
Schlimm, D., 81
Schmidt, F., 86
Schmitt, C., 258
Schnädelbach, H., 115
Schnitzler, A., 270, 273–275
Schoenberg, A., 271
Scholz, H., 158, 238
Schorske, C., 271
Schuppe, W., 78
Seck, C., 106
Seekircher, M., 276
Sellars, R.W., 238
Sertillanges, A., 262
Servos, J.W., 164
Shepherd, V., 238
Simmel, G., 117
Skidelsky, E., 119
Sluga, H., 197
Smith, D.W., 149, 151, 152, 199

Sokal, E., 216, 223
Sokolowski, R., 140
Solère, J.-L., 37
Sommer, M., 146, 149, 154
Spengler, O., 117, 261
Spinoza, B., 245
Stadler, F., 20, 27, 254
Staudt, G.K., 81, 82
Stebbing, A., 233–254
Stebbing, S., 233–254
Stein, H., 17
Steiner, H., 263
Stevens, S.S., 37, 39
Stone, A., 90, 139, 182
Störing, G., 102
Stumpf, C., 85
Suppes, P., 39

T

Taubes, J., 261
Tennant, N., 123
Thiel, C., 13
Thorne, A.R., 238
Tillich, P., 78, 79
Tolley, C., 109, 159, 196
Toulmin, St., 276
Toynbee, A.J., 258, 260, 261
Trakl, G., 271

U

Uebel, T., 10, 20, 53, 57, 58, 60,
63–65, 111

V

Vaihinger, H., 82, 89, 116, 123, 133, 139, 144,
214–219
Veblen, O., 43
Voegelin, E., 258, 259, 261, 262, 264, 266
Volkelt, J., 87
Vongehr, T., 142, 143, 158, 159

W

Waismann, F., 55, 111, 247, 248
Weber, M., 37–39, 41, 132, 180
Welton, D., 143, 154
Wenzl, A., 102
Weyl, A., 15–18, 20–27, 150, 154,
155, 191

- Whitehead, A.N., 18, 32, 33, 38, 47,
80, 84, 118, 126, 180, 191, 203,
237–239, 242, 244, 247
- Wiener, N., 31–48, 55, 271
- Wieseltier, L., 259
- Williamson, T., 37
- Wisdom, J., 237, 247, 251
- Wittgenstein, L., 31, 60, 99, 111, 153, 164,
169, 190, 209, 210, 244, 245, 247–250,
252, 271
- Wolters, G., 79
- Wright, E., 263, 276
- Wundt, W., 78, 79, 102
- Z**
- Zeleny, K., 257
- Ziche, P., 78, 82–84, 87, 124
- Ziehen, T., 78–80, 83, 85, 88–92, 116, 118,
122, 124–128, 180
- Zinnes, J., 39
- Zuckerlandl, E., 269