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THE FRENCH CONNECTION: CONVENTIONALISM AND THE VIENNA CIRCLE

INTRODUCTION

In 1929 Moritz Schlick and those scholars he had brought together came to realize that they had given rise to something entirely new, so the text of the *Vienna Circle Manifesto* has it. What was novel was the conception of the world, henceforth scientific. Or as we may put it otherwise: a discipline had been established, the philosophy of science, that is a reflection on science no longer subordinate to traditional theory of knowledge and metaphysics. The text goes on to explain why such a conception arose geographically where it did: "That Vienna was specially suitable ground for [the development of the spirit of a scientific conception of the world] is historically understandable"[1]. The *Vienna Circle Manifesto* proceeds to enumerate the multifarious intellectual movements that were brought together at the beginning of the 20th century in the city of Vienna. Is it irrelevant or untimely to emphasize this cosmopolitan spirit? I believe, on the contrary, that cosmopolitanism provides both a lesson about philosophical creativity and a key for understanding the vitality of Viennese philosophy: the achievements of the Vienna Circle were the result of an exceptional open-mindedness on the part of its members.

Of the various attempts to analyze scientific knowledge at the time, the Vienna Circle certainly provided the largest synthesis. Viennese positivism drew on the philosophical traditions of England and France as well as Germany, each in a significant manner. Rather than promote some national tradition, the aim was to develop a new conception. Singling out one source of influence, I wish to study the relationship between the Vienna Circle and the French conventionalist movement. This relationship has not received, in my opinion, sufficient attention. The impact of Russell's logicism has been commented on time and again. The Austrian antecedents of logical positivism have been carefully excavated. Even the unacknowledged Kantianism of several members of the Vienna Circle has been more recently brought to light. Yet the contribution of French philosophy of science is hardly touched on, despite the fact that the logical positivists themselves referred frequently to Henri Poincaré and Pierre Duhem, ascribing to them several important claims. This lack of interest may not be difficult to explain. While logical positivism was flourishing, an anti-positivist reaction had

M. Heidelberger and F. Stadler (eds.), History of Philosophy and Science, 277–286.

begun in France, with Bachelard and Koyré. This reaction accounts for the small audience the Vienna Circle attracted there, giving rise to the misconception of a French tradition altogether unwilling to accept positivism. Yet, this does not square with the fact that positivism made an early appearance in France with Auguste Comte. Positivism was influential there, in one form or another, until the First World War, that is well up to the formative years of several members of the Vienna Circle.

Furthermore, a historical examination of the philosophical context of the turn of the 19th and 20th centuries reveals that the endeavor to reformulate positivism preceded the Vienna Circle considerably. Before taking root in Austria, neo-positivism was a French current of thought. Indeed, as early as 1901, Édouard Le Roy published an article entitled "Un positivisme nouveau"[2]. He claimed in this article to perceive the beginning of an intellectual movement and drew up the program of reorienting positivism. This fact raises several questions: to what extent did this movement anticipate the Vienna Circle? To what degree did this movement make it possible to further the project of renovating positivism? By bringing up these questions, I do not intend to make a priority claim. One may acknowledge, from the outset, that the logical brand of positivism is characteristic of the Vienna Circle. The originality of logical positivism, however, cannot be established, if its forerunners are not taken seriously into account[3].

The comparison with conventionalism will make it possible to complete the picture of the major influences acting on the Vienna Circle. How are we to understand the role the concept of convention comes to play in philosophy of science, if we pass over in silence Poincaré's motives for introducing it? Without recalling Duhem's arguments, it is difficult to follow the discussions pertaining to crucial experiment and the testing of theories. How are we to comprehend the complex relationship between the Vienna Circle and positivism if we omit to mention the new positivism of Le Roy and Abel Rey? Conventionalism thus provides several indispensable links in the development of philosophy of science.

1. POINCARÉ AND THE CONCEPT OF CONVENTION

One may begin by mentioning the very concept of convention, which gave its name to the doctrine of Poincaré and related thinkers. The concept was introduced by Poincaré in association with the thesis that the hypotheses of geometry are conventional. Poincaré's thesis received a good deal of attention from the logical positivists, and the concept of convention was definitively incorporated into the vocabulary of philosophy of science.

Poincaré seems to have used the concept of convention for the first time in an article dating from 1891, "Les geométries non euclidiennes", which he later took up in *La science et l'hypothèse*. I shall focus on the early version, in which

the author's motives are easier to grasp. Let us work our way back from the conclusion: "The axioms of geometry are neither synthetic *a priori* judgments nor experimental facts. They are conventions"[4]. If it is obvious that Poincaré is referring here to Kant, one should be no less clear that "experimental facts" is an allusion to Mill. Both philosophers are mentioned earlier in the text, and, I believe, together they furnish the key to Poincaré's position. He is examining here the two major traditional solutions to the problem of the nature of the axioms of geometry.

How to grasp the reference to Kant? At first glance, we have but meager evidence at our disposal. Poincaré seldom gives references. But in a later book, *Science et méthode*, we learn that Poincaré refused the reduction of the whole of mathematics to the analytic *a priori*, proposed by the logicists: "For Couturat, new research, particularly that of Russell and Peano, settled the debate, which had gone on for so long between Leibniz and Kant. They showed that there are no synthetic *a priori* judgments"[5]. As to this conclusion Poincaré, however, was not convinced. He believed that the concept of the synthetic *a priori* is entirely appropriate in the fields of arithmetic and analysis, and Poincaré used it to characterize the principle of complete induction. The question remains of Poincaré's relationship with Kant. Is he salvaging Kantianism or subverting it? One understands how philosophers of different views could find here a source of inspiration: neo-Kantians as well as disciples of Mach. Among the readers of Poincaré number Cassirer, Schlick and Carnap before they joined the Vienna Circle; but also Frank, Hahn and Neurath. Of course, we must add that if Poincaré continues to use the concept of the synthetic *a priori*, the meaning he gives to it is somewhat removed from that of Kant: what is so designated henceforth is a very general principle, reflecting a capacity of the human mind to construct formal systems, not a framework applying to our apprehension of objects.

What does "convention" mean exactly? This becomes clearer when we examine what Poincaré has to say about Mill in his 1891 article:

> Stuart Mill claimed that every definition contains an axiom, since, in defining, one asserts implicitly the existence of the object defined. This claim goes too far; one seldom gives a definition in mathematics without following it up with a proof of the existence of the object defined (...). It should not be forgotten that the word existence does not have the same meaning with respect to a mathematical entity (...). A mathematical entity exists providing that its definition does not imply contradiction (...). But if Stuart Mill's remark cannot apply to all definitions, it remains nevertheless pertinent for some[6].

Poincaré is probably alluding to the following passage of *The System of Logic*: "There is a real distinction, then, between definitions of names, and what are erroneously called definitions of things; but it is, that the latter, along with the meaning of a name, covertly, assert a matter of fact. This covert assertion is not a definition, but a postulate"[7]. Mill applies this theory of definition to geometry. The definitions of geometry contain in fact two propositions: a definition of name and an assumption of existence. The proof rests on the latter, for example:

This proposition 'A circle is a figure bounded by a line which has all its points equally distant from a point within it', is called the definition of a circle; but the proposition from which so many consequences follow, and which is really a first principle in geometry, is, that figures answering to this description exist[8].

We have here an empiricist interpretation of mathematics.

Of course, Poincaré does not follow Mill completely. He adds that existence in mathematics means non-contradiction; it does not mean actual existence. But he retains the idea of mutual dependence between the axioms and the definitions. Definitions may hide axioms, and likewise axioms may conceal definitions. What we have here amounts, nonetheless, to a complete overthrow of Mill's conception of mathematics. Poincaré goes on to declare: "However one turns things, it is impossible to discover any reasonable meaning in geometrical empiricism"[9]. By calling on the notion of convention, Poincaré sets himself apart from Mill's empiricism. For if definitions contain axioms, the mathematician's task is to make them explicit. Once all required axioms have been formulated, it remains to understand that by stating them, one chooses a particular geometry. Thus Poincaré's position is similar to the nominalism that Mill explicitly criticizes, when he evokes the term of convention in a premonitory way:

It had been handed down from Aristotle (...) that the science of geometry is deduced from definitions (...). But Hobbes followed, and rejected utterly the notion that a definition declares the nature of the thing (...); producing the singular paradox, that systems of scientific truth (...) are deduced from the arbitrary *conventions* of mankind concerning the signification of words[10].

How are we now to construe Poincaré's position? I believe that he is drawing a parallel between Kant and Mill; they serve as thesis and antithesis in his argumentation. It would be false to think that Poincaré rejects any less Kant's view than Mill's. It is perhaps worth remarking, as the trend has changed today, that Mill was probably more seriously read than Kant in 19th century France, especially among scientists. We should pay attention to what Poincaré is doing: he is borrowing elements from both the rationalist and the empiricist conceptions. Thus it appears that he is aiming at a new synthesis, more in accordance with the state of knowledge at his time.

The logical positivists probably sensed this tension in Poincaré, although they were not primarily interested in giving a coherent interpretation of his philosophy. However that may be, they put his concepts to use. Let us consider the following passage of Carnap's *Aufbau*:

Each constructional step can be envisaged as the application of a general formal rule to the empirical situation of the level in question (...). These general rules could be called a priori rules, since the construction and cognition of the object is logically dependent upon them (...). However, the rules are not to be designated as 'a priori' knowledge, for they do not represent knowledge, but postulations[11].

Several themes are reminiscent of Poincaré: one must redefine the nature and scope of *a priori* knowledge; science contains many implicit conventions, that is unconscious presuppositions, disguised definitions. To be sure, conventions are extended beyond the sphere defined by the French mathematician. Poincaré was criticizing Kant's conception of geometry; Carnap rejected the latter's philosophy of mathematics altogether. But logical positivists were still concerned with a similar set of problems. It is often argued that logical positivists developed an antifoundationalist philosophy. This is all the more plausible as conventionalism had already represented a break with traditional foundationalist theory of knowledge.

There are other aspects of Poincaré's thought which the logical positivists seized upon, in particular his so-called structural realism. But it is important to realize that the latter is not unrelated to the concept of convention. Because Poincaré sought to avoid a radical conventionalism, of which he accused – rather unfairly – Le Roy, he was led to introduce a second-order realism. This doctrine certainly had an influence on the Vienna Circle. But Poincaré's proposal needed to be considerably improved on, and the logical positivists, I believe, could find in the conventionalist movement more precisely fashioned analytical tools.

2. DUHEM'S HOLISM

If the concept of convention makes it possible to avoid some of the difficulties facing traditional philosophy of science, it raises new problems. One must mark out the limits of conventionality, lest one lapse into skepticism. Perhaps the author who noticed this most clearly was Duhem. What has come to be known as the Duhem-Quine thesis is precisely a response to radical conventionalism: speaking of such general principles as the law of inertia, Duhem wrote:

> Hypotheses which by themselves have no physical meaning undergo experimental testing in exactly the same manner as other hypotheses (...). There thus disappears what might have seemed paradoxical in the following assertion: Certain physical theories rest on hypotheses that do not by themselves have any physical meaning[12].

Now, this thesis gave rise to several interpretations. Neurath was alone in giving it full force and drawing all its consequences. Carnap accepted it only in a restricted sense, otherwise favoring an inductivism somewhat similar to that of Poincaré. Popper, in turn, exploited Duhem's deductivism, while rejecting his critique of crucial experiments. Yet, Duhem's thesis directed attention to the problem of experimental testing, and this problem was to remain central until postpositivists replaced it with the competition between paradigms.

Furthermore, this thesis is connected with Duhem's conception of physical theory, which logical positivists took up. Let us return to the *Vienna Circle Manifesto*: concerning their sources of influence, the authors of the text assert: "Above all there were epistemological and methodological problems of physics,

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History of Philosophy of Science
New Trends and Perspectives
Heidelberger, M.; Stadler, F. (Eds.)
2002, X, 442 p., Hardcover
ISBN: 978-1-4020-0509-1