

Published in: *Studies in History and Philosophy of Science*
 Part A 38(1), March 2007
 Weyl's 'agens theory' of matter and the Zurich Fichte
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 Pages 84–107
 doi:10.1016/j.shpsa.2006.12.013

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Abstract

This paper investigates Hermann Weyl's reception of philosophical concepts stemming from the German Idealist Johann Gottlieb Fichte. In particular, Weyl's 'agens theory' of matter, which he held around 1925, will be looked at. In the extant literature, the admittedly also important—influence of Husserl on Weyl has mainly been addressed. Thus, apart from investigating some detailed Fichtean inheritances in Weyl's concepts of causality, chance and continuity, the general difference which Weyl saw between the philosophies of Fichte and Husserl will also be discussed. For Weyl this is above all a difference between an active constructivism and a rather passive phenomenological seeing (*Schau*). Further, the paper shows in some detail the way Weyl was drawn into a certain reading of Fichte by his Zurich colleague, the philosopher Fritz Medicus. The methodological frame of the paper is that of *Konstellationsforschung*, a historical and systematic approach which proves to be particularly fruitful when investigating a (broadly speaking) German Idealist context and which allows special attention to be given to the acting subjects within the constellation under investigation. Conversely, Weyl's agens theory suggests amendments to this methodology.

Weyl's 'agens theory' of matter and the Zurich Fichte

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Keywords: Hermann Weyl; Fritz Medicus; Johann Gottlieb Fichte; Theory of matter; Activity vs. passivity; *Konstellationsforschung*.

1. Introduction and methodology

Over the last few years several excellent works have been published on the relationship between the mathematician–philosopher Hermann Weyl and Husserlian phenomenology.¹ In the present paper, however, I would like to draw attention to a further important relationship, which so far has mainly only been remarked upon and

¹ See, for instance, Feist (2004), Marion (2004), van Atten, van Dalen, & Tieszen (2002), and Ryckman (2003, 2005).

treated in passing; namely that to the German Idealist Johann Gottlieb Fichte.² At the same time, I shall put emphasis on *Konstellationsforschung* as a historical and systematic method which emphasises activity and subjectivity, and which seems to be particularly congenial to the philosophical issues involved here.

I will illustrate in some detail the actual reception and elaboration of Fichtean concepts in Weyl's philosophy of science, which deals with notions of acting and suffering, of causality, of chance and of continuity. This will be done through a discussion of Weyl's so-called 'agens theory' of matter from the 1920s. Admittedly, the 'agens theory' was and is of negligible influence in physics, and, as has been shown in the literature, Weyl's concept of matter changed considerably over the years.³ Thus, this paper could be criticised as offering 'only a snap shot' of Weyl's career. However, I would like to suggest that, on the contrary, this approach should sensitise us to the Fichtean inheritances which also crop up in other of Weyl's philosophical writings and that it is of both inner-philosophical and historiographical importance.

Apart from pointing to the Fichtean themes in Weyl's work, the other obvious task will be to address their origin. Prima facie, it is unclear why Weyl, being a mathematician and a political liberal, should have read Fichte. After all, Fichte is presumed to have been the most mathematically ignorant of all famous German Idealists, and throughout the first decades of the twentieth century his work was most prominent in a national conservative practical philosophy. Hence, I suggest that Weyl's intensive consideration of Fichtean philosophy can only be understood by looking at the interaction between Weyl and the philosopher and famous Fichte scholar Fritz Medicus, who was Weyl's colleague at the ETH in Zurich and who read Fichte in a particular and liberal way.

This leads me to a brief methodological comment. The present paper might be understood as a piece of *Konstellationsforschung*, a combination of historical and systematic methods developed by Dieter Henrich in his reconstruction of the origins of German Idealism.⁴ Starting from the fact that certain texts and documents cannot be fully understood on their own (as is here the case with the Fichtean themes in Weyl's writings), these texts or documents are investigated as part of a constellation consisting of additional persons, theories, and documents. In the present case, attention to a wider

2 Papers that include at least some comments on Weyl's reception of Fichtean philosophy are Scholz (2000, 2001), Tieszen (2000), and Bell (2004).

3 See Scholz (2006) and Mancosu & Ryckman (2005), who also mention the relationship to the work of Fritz Medicus (and Fichte) which will be dealt with here in more detail. By claiming that the agens theory was of 'negligible influence' I mean that Weyl's specific notion of agency is not prominent in physics. Of course, as Mancosu & Ryckman (2005) discuss, Wheeler claims that his geometrodynamics stands in the tradition of Weyl (as does Mielke, 1987, with respect to his geometrodynamics). Such a claim, however, is only justified with respect to space-time as being a non-simply connected manifold, but not with respect to the concept of agency. This also distinguishes Weyl's theory from the earlier theory of matter of Mie. I shall briefly come back to Mie at the beginning of Section 3, but will have to leave a more detailed discussion of the physics involved for another occasion.

4 For detailed methodological discussions see Mulrow & Stamm (2005). For a brief English description of *Konstellationsforschung*, see Freundlieb (2003), pp. 16–18.

constellation also including political considerations will obviously be needed to enable a distinction between the reception of Fichte's work by Weyl and Medicus in Switzerland (the 'Zurich Fichte') and the national conservative reception of Fichte's work in most parts of Germany. Here it is clear that a politically indifferent methodological approach like that common in History of Ideas will not be helpful. *Konstellationsforschung* also differs from other methodological approaches such as, for example, Discourse Analysis, by placing special weight on the creativity of the actors in a constellation, a creativity which often reveals itself in intense intellectual exchanges over rather short time-spans (as was the case with Medicus and Weyl reading Fichte together etc.).⁵ Those actors are assumed to have a sphere of possibilities available to them within a specific intellectual and conceptual space (*Denkraum*).⁶

Emphasis on creativity and the delineation of new dimensions of conceptual spaces seems not only appropriate for a general understanding of Weyl's scientific work, that is, his groundbreaking contributions to a variety of mathematical and physical subdisciplines. It is also a reasonable approach to the philosophical concerns of this essay, namely first and foremost the notion of activity as understood against a German Idealist background. It is neither a coincidence that Henrich developed his *Konstellationsforschung* in a study of the origins of German Idealism, nor is it a coincidence that this method shows itself to be especially useful for investigating the interaction between Weyl and Medicus. The underlying reason is that without a method putting special emphasis on the understanding of subjectivity in a certain German Idealist sense, a crucial driving force of Medicus's and Weyl's enterprise would be lost right from the beginning.⁷ And this is also what distinguishes *Konstellationsforschung* from actor-network theory, since the latter is strongly influenced by Whitehead, whose notion of subjectivity differs from Weyl's, as will be briefly discussed below.

Finally, a remark should be made on the relation to studies of Weyl in the context of, for example, the First World War or the Weimar Republic.⁸ Though the present work has a different focus, it is compatible with such work, in particular when the latter talks about freedom and responsibility. This might be seen in the fact that, roughly speaking, the concept of activity, which is of fundamental importance for the present philosophical context, also seems to have played a major role on a more general cultural level at the time.

The paper is organised as follows. First, some general historical evidence is given for Weyl's involvement with Fichte. This will encompass some remarks on Weyl's

5 See Mulsow & Stamm (2005), *passim*. Further differences as compared to, for example, Gadamer's hermeneutics or Popper's 'third' world of ideas are also discussed in Freundlieb (2003), pp. 16–18.

6 The question of whether and to what extent this notion is connected to that of a *Denkstil* and *Denkkollektiv* in the sense of Fleck (1980), is an interesting one and could lead to such provocative questions as whether *Naturphilosophie* is itself a *Denkstil*.

7 If this paper is correct, then it also gives an answer to the notorious debate in *Konstellationsforschung* about whether it is applicable to other periods than the origin of German Idealism around 1800 (see Mulsow & Stamm, 2005, *passim*).

8 Cf., for example, Sigurdsson (1991, 2001).

academic surroundings in Zurich around 1920 (Section 2).⁹ Second, I shall elaborate on Weyl's agens theory, and this will include comments on the role of statistics in physics, on causality and on time (Section 3). Third, some remarks will be made on the reception of Weyl's theory as it was presented in his contemporary and later philosophy (Section 4). Fourth, I shall briefly review the general themes of post-Kantian philosophy and the sense in which Weyl's agens theory might be called something like a *Naturphilosophie* (Section 5). Finally, the major difference which Weyl sees between the philosophies of Husserl and Fichte, and which demonstrates the value of *Konstellationsforschung* for investigating Weyl's reception of Fichte in particular, will be discussed (Section 6). At the same time, this paper will suggest amendments to *Konstellationsforschung*.

2. Weyl's reception of Fichte

2.1. Biographical evidence

As Weyl once recalled: 'In Zurich around the end of the first World War we [Weyl and his wife] were reading the major works of Fichte together with some friends'.¹⁰ There are stenographical notes by Weyl on several of Fichte's major works at the ETH Archive.¹¹ That Fichte was in fact not only read by Weyl, but also had a philosophical impact on Weyl's own writings, is documented by the following passage written by Weyl after he had left Zurich. It is taken from an address on the occasion of the (presumably seventieth) birthday of the philosopher Fritz Medicus, Weyl's long-time colleague at the ETH in Zurich:¹²

Were I still the same man who was lucky enough to work [wirken] together with our honoured guest in Zurich for 17 years, then it would presumably not be difficult for me to present him on the occasion of his birthday with a philosophical contribution to this festschrift. It was in those years that, not entirely without his influence, I got deeply involved in Fichte and Eckhart, and that later the theory of relativity, the problem of the infinite in mathematics, and finally quantum mechanics became the motivations for my attempts to help clarify the methods of scientific understanding and the theoretical picture of reality as a whole.¹³

9 Further information about the Zurich constellation can be found, for instance, in Frei & Stambach (1992).

10 'In Zürich gegen Ende des ersten Weltkrieges lasen wir in einem Freundeskreis einige Hauptschriften von Fichte' (Weyl, 1996, p. 384). (If not indicated otherwise, translations are mine.)

11 See ETH-Archive, Hs91a: 75. The personal papers (manuscripts, notes, correspondences) of both Hermann Weyl and Fritz Medicus are at the ETH-Archive in Zurich.

12 Admittedly, it might be arguable whether this document still belongs to the Zurich constellation, since it was written by Weyl in retrospect and while he was living in Princeton. On Weyl and emigration experience see Sigurdsson (1996).

13 'Wäre ich noch derselbe, der 17 Jahre lang das Glück hatte mit unserm Jubilar zusammen in Zürich zu wirken, so würde es mir wohl nicht schwer gefallen sein, ihm einen philosophischen Beitrag zu dieser Festschrift auf den Geburtstagstisch zu legen: es war in jenen Jahren, dass, nicht ganz ohne seinen Einfluss, Fichte und Eckhart mich tief beschäftigten, und später Relativitätstheorie, die Problematik des Unendlichen in der Mathematik und schliesslich die Quantenmechanik den Antrieb angaben für meine Versuche, an der Klärung der Methode wissenschaftlicher Erkenntnis und des

Since this quote is taken from a rather short address to Medicus and not from something more like Weyl's memoirs, the explicit mentioning of relativity and quantum theory suggests that Medicus (and Fichte) indeed had some influence on Weyl's interpretation of these theories. In addition, the phrase 'be deeply involved in something' ('sich tief mit etwas beschäftigen') presumably means more than simply 'to read something'. Finally, already back in 1918 Weyl had written about 'taking advice' from Fichte.¹⁴

It is reported that Weyl and his wife attended many of Medicus's lecture courses.¹⁵ Furthermore, Weyl gave the drafts of several of his philosophical writings to Medicus and asked for his comments.¹⁶ And, in his *Philosophie der Mathematik und der Naturwissenschaften*, Weyl mentions Medicus as the only philosopher who had taken up a position on the then recently changed notion of causality in science.¹⁷ So, who was Fritz Medicus and why was he so important for Weyl's reception and elaboration of Fichtean ideas?

2.2. Who was Fritz Medicus?

Fritz Medicus was born in Germany in 1876. His most famous philosophical teachers included Gottlob Frege and the Neokantians Alois Riehl and Wilhelm Windelband. He wrote his doctoral thesis on Kant and non-Euclidean geometry (*Kants transcendente Aesthetik und die nichteuklidische Geometrie*). However, much more than his thesis, it was his 1901 habilitation on Kant's philosophy of history (*Kants Philosophie der Geschichte*) which was widely acknowledged as an important work. Riehl, for instance, emphasised its relevance for contemporary philosophy of history, and Ernst Troeltsch reviewed it twice very positively and thus initiated the reception of Medicus's work within theology.¹⁸ However, arguably most important with respect to theology is the fact that during his time in Halle—where he was a *Privatdozent* before coming to Zurich in 1911—Medicus was the philosophical teacher of Paul Tillich.¹⁹

theoretischen Gesamtbildes der Wirklichkeit mitzuhelfen' (ETH-Archive, Hs91a: 16). Unfortunately I cannot go into details here concerning Medicus and Weyl's reception of Meister Eckhart, for this would lead to a number of rather subtle philosophical debates. Suffice it to say that their reception is a rather particular one which links Eckhart's theory of the intellect to the notion of subjectivity in German Idealism.

14 Cf. Weyl (1918), p. 2.

15 See Marti & Medicus (1982), p. 6; cf. also Weyl (1996), p. 384.

16 Weyl did so, for example, in the case of his paper 'Was ist Materie?' (see ETH-Archive, Hs1377: 741); cf. Also Sigurdsson (1991), pp. 221–223.

17 Weyl (2000), p. 266.

18 Cf. Graf & Christophersen (2004). Medicus's later work on Fichte was also important for theology. Later during his life time, the most important German speaking theological encyclopedia (the RGG) contained an entry on 'Neufichteanismus', where Medicus was explicitly mentioned as the 'discoverer of Fichte's philosophy of religion' ('F. Medicus erneuerte Fichte als dessen Biograph und Herausgeber seiner Werke und entdeckte Fichtes Religionsphilosophie, indem er sie zugleich in die Tradition der deutschen Mystik einstellte', Lübke, 1960, p. 1410). In contrast, today the RGG lacks an entry on 'Neufichteanismus' altogether.

19 Tillich describes Medicus as having been his 'highly esteemed teacher and guide to Fichte and Schelling' ('hochverehrten Lehrer und Führer zu Fichte und Schelling'; quoted in Graf & Christophersen, 2004); see also Tillich (1962), p. 35, for a similar statement.

In 1905, Medicus wrote a still highly readable introduction to Fichte's life and work,²⁰ and later edited Fichte's major works. At first, however, considerable reluctance was expressed by several publishers for whom he offered to edit Fichte,²¹ and this even though Fichte's works had not been published for more than half a century. This was due to the general disrepute into which German Idealism had fallen soon after Hegel's death in 1831. Thus, Medicus became the initiator of what has since been called a 'Renaissance of German Idealism' and this, from today's perspective, must be judged as his highest philosophical achievement.²²

In 1911, Medicus became Professor of Philosophy and Pedagogy at the ETH in Zurich, where he taught until his retirement in 1946. He died in Zurich in 1956. While the University of Zurich had a regular Department for Philosophy, at the ETH there existed only this single chair (for the period I am interested in here). Although, at the ETH, the Swiss Federal Institute of Technology, philosophy could not be taken as a major course, Medicus's lectures had been very popular and his emphasis on freedom and responsibility had considerably influenced many of his students.²³

Medicus was a genuine Fichtean, an 'Überzeugungstäter', that is, someone who acts out of conviction and moral necessity, and who aims to augment the humanity of humankind. He was also a democrat to the core as is nicely illustrated by what his colleagues in Halle said after Medicus received his call to the ETH: 'our Dear Lord sends Medicus to Switzerland to cure him of his democracy mania'.²⁴ Apparently Medicus was not cured, and his convictions compelled him to adopt Swiss nationality in the late 1930s (he spoke of an 'unavoidable' and 'necessary' step). At that time, Medicus gave speeches entreating the Swiss nation not to remain silent about the inhumanities going on in Germany; speeches that Swiss publishers did not at the time dare to print.²⁵

In those days it was rather untypical for a democrat and liberal like Medicus to rely on Fichte.²⁶ Much more common were national conservative adaptations, which emphasised Fichte's concept of nation and later claimed him as the great forerunner of national socialism.²⁷ Even long established figures like Heinrich Rickert, who did not

20 Medicus (1905).

21 Cf. Medicus (1914b), p. 390. In the end the Meiner Verlag only agreed to publish a selection instead of Fichte's complete works, as initially suggested by Medicus.

22 Tillich, for example, writes in 1962: 'His [Medicus's] writings on Fichte have been the initiation for a Fichte- Renaissance in the first decade of this century, which soon widened towards a Renaissance of German Idealism in general'. ('Seine Schriften über Fichte gaben den Anstoß zu der Fichterennaissance im ersten Jahrzehnt dieses Jahrhunderts, die sich bald zu einer Renaissance des deutschen Idealismus überhaupt erweiterte', Tillich, 1962, p. 35).

23 See Marti & Medicus (1982), p. 69, Barth & Rüegg (1946), pp. 5–6, and Medicus (1956), *passim*.

24 'Der liebe Gott schickt den Medicus in die Schweiz, um ihn von seinem Demokratenwahn zu heilen'. Quoted in Medicus (1996), p. 19.

25 See for example his 1937 talk on 'Human education in the misery of the time' ('Menschenbildung in der Not der Zeit'), which has only been published recently as Medicus (1996).

26 A very detailed and careful history of the Fichte reception with respect to the concept of nation is given in Becker (2000).

27 For instance, Faust (1938), p. 79, goes so far as to maintain that Fichte anticipated the aims of the 'Hitler- Jugend', the 'Arbeitsfront' and even organisations like 'Kraft durch Freude'.

need to fear being distressed by the Nazis, started to call Fichte a figure of ‘ancient grandeur’ (‘antike Größe’), who anticipated the ‘movement of our times’ (‘Bewegung unserer Tage’).²⁸ Indeed, Rickert’s involvement can in particular be seen as a reaction to his loss of students to Heidegger and thus, in the sense indicated above, must be investigated in terms of a German constellation as opposed to a Swiss or Zurich constellation.

Medicus’s understanding of Fichte seems to have been an important precondition for Weyl’s becoming, as he put it, ‘deeply involved in Fichte’. First, Medicus’s political stance seems to have been congenial to Weyl’s. Upon his return to Göttingen in 1930, Weyl cautioned students about dangerous tendencies smouldering in Germany and said that his own political attitude was determined by his experience of Swiss democracy.²⁹ Second, Medicus was also an unusual Fichte scholar insofar as he abhorred ‘throwing about quotes’, as he put it.³⁰ Being a philosopher at the ETH, he was used to presenting philosophical problems not in the immanent language of a certain philosophical school, but in a way that engineers and natural scientists could understand. In the case of Fichte, this seems to have been an important strategy for keeping a mathematician like Weyl interested and in helping him to see the, so to say, ‘mathematical inspiration’ behind Fichte’s philosophical programme. Fichte was very fond of mathematics in general and of Euclidean geometry in particular, both because of its axiomatisation and as a tool for training productive imagination (*Einbildungskraft*).³¹ However, it was mainly the overall ideas that interested Fichte. As far as the technical details were concerned, there are several comments by contemporaries of Fichte to the effect that ‘there was never a mathematical construction understood by him [Fichte]’ and that ‘when it comes to mathematics, I absolutely refuse to tolerate any instruction by Mr. Fichte’, and so on.³² Despite the mathematical ignorance lurking in some of Fichte’s writings, Weyl did not, nevertheless, put him aside. This, I suggest, was mainly due to the particular intervention of Medicus.³³ Else, Weyl would perhaps have reacted like his fellow mathematician Whitehead. Although he discussed Hegelian themes with, for example, Haldane and McTaggart, Whitehead put Hegel’s writings aside after reading just one page because of Hegel’s mathematical ignorance.³⁴

Though it is obvious from the above discussion that Medicus’s thought was the primary avenue for Weyl’s path to Fichte, one might speculate whether Husserl also played some role here. For instance, Husserl gave a lecture course on ‘Kant and Post Kantian Philosophy’ in the winter semester 1907/1908. However, it is not known whether Weyl attended these lectures, and furthermore Husserl’s own *strong* interest in

28 Quoted in Fulda (1999), p. 255.

29 ETH-Archive, Hs91a: 16.

30 See Medicus (1929)

31 See Breazeale (1996, 2001) also for references to Fichte; cf. Medicus (1905) as well.

32 These and other quotations can be found in Radbruch (2003), p. 254.

33 Presumably it was also due to Weyl’s wife Hella, who had been a student of Husserl back in Göttingen and then in Zurich also read Fichte and engaged in discussion with Medicus (cf. quote from Weyl given above).

34 See Whitehead’s autobiographical notes in Schilpp (1951), p. 7, and Whitehead (1969), p. 116.

Fichte (in particular in his religious writings) only started about 1914, that is, after Weyl had already left Göttingen.³⁵

3. The agens theory of matter

Now that we have noted the way in which Weyl became involved with Fichte, the question arises of how this involvement might relate to Weyl's concept of matter. Recall that, according to the early modern view, matter is seen as passive and as pure extension (compare, for example, Descartes's *res extensa*, but also think of *motus versus materia* in Hobbes etc.). Matter is the object of geometrical treatment. Within this tradition also falls the famous field-theoretic programme of the physicist Gustav Mie at the beginning of the twentieth century, according to which gravitation and matter should somehow reduce to electromagnetic fields.³⁶ Weyl's attempts to develop a 'purely infinitesimal geometry' around 1918, which sought to unite general relativity and electromagnetism, and from which originated the gauge principle, also belong to this tradition.³⁷ Within such a tradition, matter is obviously something passive and stands in sharp contrast to the acting subject (which creates the geometrical description of matter).

In the early modern period, however, there was one famous exception to this 'received view'. It was Leibniz, who did not view matter as pure extension and as passive. The term 'agens', which Weyl used to describe his theory of matter after 1920, is indeed borrowed from Leibniz. Additionally, Weyl once even claimed that with his agens theory he had discovered the 'communication of the monads'.³⁸

From the perspective of physics, what changed around 1920 and prevented Weyl from continuing to treat matter as purely geometrically, were the results of atomic physics. Matter was turned into a *genuine* statistical 'object' and in this sense became similar to, for example, voting patterns in Switzerland. Note that statistics here is understood as a kind of makeshift for those parts of reality which do not fall under the methods of the exact sciences in a narrow sense. And this is the point where Fichte, with his emphasis on subjectivity and activity, comes in. Weyl and Medicus combined Fichte's idea of activity, as *the* philosophical concept on which the whole world so to speak depends, with the fact that matter could no longer be understood as a passive object treated geometrically by an active human mind; and thus they attributed activity to matter.

In fact Weyl's view partly resembles those of Bergson and Whitehead. Though it is evident that Weyl read Bergson before 1920,³⁹ he does not mention him in relation to

35 See 'Introduction' in Smith & Smith (1995), p. 7.

36 See Vizgin (1994), pp. 26–38; cf. also Weyl (1968e [1921]).

37 Cf., for example, Scholz (1995).

38 Cf. Weyl (1968g [1924]), p. 510. Although Leibniz is known to have had a considerable influence on German Idealism in general, and on Fichte in particular (see Vaysse, 2000), I cannot go into a detailed discussion of Leibniz, but shall restrict my attention to Weyl's direct reception of Fichtean philosophy and its mediation by Medicus.

39 He refers to Bergson in Weyl (1918), p. 68.

the agens theory.⁴⁰ As far as Whitehead is concerned, it seems particularly striking that his process philosophy can also be viewed as, so to speak, ‘opening the windows of Leibniz’s monads’.⁴¹ However, when Weyl developed his agens theory sometime between 1920 and 1924, Whitehead’s process philosophy was not yet known. In Weyl’s work, an explicit reference to Whitehead’s philosophy of organism can be found only much later.⁴² Besides, there is a very important difference between Weyl’s agens theory and Whitehead’s later philosophy of organism. For Weyl matter lacks subjectivity altogether, but it does not for Whitehead. According to him stones have subjectivity, although weakly, whereas Weyl denies this.⁴³ For Weyl, in contrast to the later Whitehead, there is a qualitative, not quantitative, difference between matter and ego which leads Weyl to a certain dualism (cf. below). Thus, although certain concepts seem to be ‘in the air’ around this period, the particular influence one can point to in the case of Weyl’s agens theory is indeed Medicus and (the Zurich) Fichte, as will be shown below.

Weyl’s agens theory of matter emerged as a highly integrated philosophical approach. As far as science was concerned, it was nourished by the changing role played by statistics in atomic physics and by the problem of describing a spatially extended body in a field theory. On the philosophical side, the agens theory also depended on Weyl’s understanding of the continuum and by his concept of causality. Let me discuss these topics in turn.

3.1. Statistics and chance

Already in his 1920 paper on the relation between causal and statistical descriptions in physics (‘Das Verhältnis der kausalen zur statistischen Betrachtungsweise in der Physik’), that is, long before the establishment of quantum mechanics, Weyl ascribed an independent role to statistics. He argued that statistics should be more than just a shortcut for avoiding the calculation of long and complex causal chains.⁴⁴

There are two main motivations behind this argument. The first is the problem of the lack of temporal directedness in mechanics and electrodynamics. The functional laws of both theories are invariant under time reversal and thus run counter to our intuition that there is a directedness to time. Weyl thought that this problem could be solved by providing statistics with a genuine role in physical descriptions:

This uniqueness of direction enters into physics not through its functional laws, but through our probability judgments; from a state at a given moment we deduce the probable state at a subsequent moment according to

40 He does, however, mention Bergson in connection with the concepts of causality and freedom in 1928 (see Weyl, 2000, p. 268).

41 This phrase occurs in the secondary literature on Whitehead. For his own discussion of Leibniz see for example Whitehead (1979), pp. 19, 80.

42 Here Weyl characterises the talk about events as ‘forlorn hope’ (‘vergebliche Liebesmüh’, Weyl, 1949, p. 313). Weyl’s critique makes it evident that he read Whitehead only very superficially.

43 Compare the difference between Fichtean Konstellationsforschung and Whiteheadian actor–network theory mentioned in Section 1.

44 ‘der Statistik eine selbständige Rolle neben dem “Gesetz” zuweisen’ (Weyl, 1968a [1920], p. 121).

computed probabilities, and not the state at a previous one. Thus probability exposes a part of the causal idea which was quite suppressed in the exact laws.⁴⁵ Second and foremost, it is the structure of a genuine continuum which requires the independent role of statistics in physics. According to Weyl, a continuum must not be understood as a ‘fixed being’ (‘starres Sein’), as something finished, but as evolving in an infinite process both inwards and outwards, as it were.⁴⁶

Weyl explains this by referring to space-time. Let us assume we are at a time t_4 now and space-time consists of the four disjunct subregions R_1, R_2, R_3, R_4 . A moment later, at t_5 , space-time not only consists of R_1 to R_5 from its, as it were, ‘outward development’. There also is an inward process such that $R_{1.5}, R_{2.5}, R_{3.5}$ and $R_{4.5}$ also come into existence. Time and space not only ‘go on’ but also ‘become more finegrained’.

According to Weyl, it is hence an idealisation if mathematical physics takes space-time regions to be fully given as soon as they belong to the past. Not only will there always be new instances of time as a region evolves into the future, but the past also continues to evolve by becoming more fine-grained. At a given moment, we describe certain events as past. A moment later there is not only the additional event which was future before and has now become present, but additional events in the past have also cropped up, as it were. This, of course, has serious consequences for the notion of causality. As Weyl puts it:

Indeed, the future will act on and upon the present and it will determine the present more and more precisely; the past is not finished. Thus, the fixed pressure of natural causality disappears and there remains, irrespective of the validity of the natural laws, a space for autonomous and causally absolutely independent decisions; I consider the elementary quanta of matter to be the place of these decisions.⁴⁷

Thus, what might appear (and in fact is) an absolute coincidence at some present stage, will later have a cause. The connection to quantum physics, indicated in Weyl’s comment at the very end of the above passage, is now obvious. All ‘absolute coincidences’ in quantum physics are only coincidences from certain limited perspectives on nature from within; and this is the case for ontological and not purely epistemological reasons.⁴⁸ Only at ‘the end of all times’ (from a god’s eye view), as it were, could such an infinite process as the becoming of space-time be finished and in

45 Weyl (1932), p. 49. See also, for instance, Weyl (2000), pp. 260–262.

46 See Weyl (1968a [1920]), pp. 121–122.

47 ‘In Wahrheit aber wird die Zukunft noch fort und fort an der Gegenwart schaffen und sie zu einer immer präziser bestimmten machen; die Vergangenheit ist nicht fertig abgeschlossen. Damit weicht der starre Druck der Naturkausalität, und es bleibt, unbeschadet der Gültigkeit der Naturgesetze, Raum für selbständige, kausal voneinander absolut unabhängige Entscheidungen, als deren Ort ich die Elementarquanten der Materie betrachte’ (Weyl, 1968a [1920], pp. 121–122).

48 The outer becoming of the continuum also has its connection to statistics, although the latter is not a genuine type of description, but only a means to describe the ‘overall influence’ of the whole universe upon nearly isolated systems. See Weyl (2000), p. 258.

particular only then would the parts of space-time be fully determined. (There is a certain tension here between ‘free becoming’ and determinacy, which will be addressed in Section 5 when discussing the parallels to Fichte.)

Weyl discusses this new perspective on statistics and its relation to the continuum in several of his writings;⁴⁹ most famously perhaps in his ‘Neue Grundlagenkrise’, where, in the context of Brouwer’s analysis of the continuum, he writes:

any piece of space-time, even the one I am living through now, will be precisely determined only ‘at the end of all times’ as it were. This seems to me to be very important for the assessment of the metaphysical meaning of natural causation.⁵⁰

Thus, there is also a certain relationship between the agens theory of matter and Brouwer’s famous analysis of the continuum as ‘a medium of free becoming’.⁵¹ However, in the agens theory the concept of becoming is no longer applied to a human subject doing mathematics (and perhaps studying matter as pure extension and thus as a part of geometry). Here a free becoming is attributed to nature, and hence matter becomes active (and not the least because it can no longer be studied by geometry alone).

3.2. Matter as extramundane and acting

Allow me to now turn to the problem of extended objects in field physics. Apart from an old discomposure about how to describe an extended charged body in electrodynamics, there was an additional worry after the advance of general relativity which Weyl elaborated on in his 1921 paper ‘Feld und Materie’.⁵² Without going into technical details, the idea is roughly this: as a consequence of general relativity and electrodynamics it makes no sense to describe the inside of a particle.⁵³ Further, it turns out that the relevant properties of the particle can be described by looking at the fields ‘outside of it’ (mathematically speaking: the volume integrals can be turned into surface integrals). That is, not only is it meaningless from a field-theoretic perspective to ask after the inner structure of a particle, but fortunately in field physics one can dispense with such a speculative inside altogether.

Weyl came to view the field as only a forceless transmitter of effects, and he argued that matter stands ‘behind’ the fields and determines them.⁵⁴ Matter is, as Weyl

49 See, for example, Weyl’s letter in Bovet (1922), but also his claims in Weyl (1968a [1920]), which are a little more cautious.

50 ‘erst “am Ende aller Zeiten” sozusagen ist jedes Stück der Weltwirklichkeit, auch das von mir jetzt durchlebte, in sich präzise bestimmt. Dieser Umstand erscheint mir sehr wichtig für die Abschätzung der metaphysischen Bedeutung der Naturkausalität’ (Weyl, 1968f [1921], pp. 172–173).

51 Cf. Weyl (1968f [1921]).

52 Weyl (1968e [1921]).

53 What Weyl basically does in the paper is to calculate the Schwarzschild radius of an electron (more accurately: its Reissner–Nordström solutions).

puts it, an agens (coming from the Latin ‘agere’, meaning to act or move) causing the states of a field.⁵⁵

As already mentioned, this goes against both the common sense notion of matter and the mainstream of modern philosophy since the time of Descartes’s *res extensa*, for in both matter is denied the ability to act or move on its own. Weyl himself, however, claims that his notion of matter as an agens brings physics back into agreement with our ordinary experience in so far as it tells us that matter (things) rather than fields is what acts in the world as well as being that upon which we act.

In Weyl’s treatment, one is only left with surface integrals describing the effects of matter occurring in a certain spatio-temporal neighbourhood, while matter itself is the, as Weyl puts it, ‘extramundane inside’ of this neighbourhood; that is, matter gets, so to speak, ‘thrown out of space-time’.⁵⁶ However, matter is not now turned into something philosophically irrelevant. Although it no longer appears explicitly as matter in a field theoretical description, it *causes* these fields. Matter gains metaphysical import and, together with the ego, becomes the driving force of all fields:

Hence a particle itself is not even a point in field space, it is *nothing spatial (extended)* at all. However, it is confined to a spatial neighbourhood, from which its field effects originate. In this respect, matter is analogous to the ego, the effects of which, despite the ego itself being non-spatial, originate via its body at a given point of the world continuum. Whatever the nature of this agens, which excites the field, might be—perhaps life and will—in physics we only look at the field effects caused by it . . .⁵⁷

3.3. Transcendent reality and acting upon the world

Thus, both matter and consciousness (ego) are called an ‘agens’ and both act in fourdimensional space-time from beyond. With respect to the ego, Weyl had already in a sense made this claim in his 1917 paper ‘Zur Gravitationstheorie’.⁵⁸

54 This move is documented not only in several of Weyl’s philosophical publications, to which I will now turn, but also in letters to Felix Klein and Edmund Husserl around 1920, where he already uses the term ‘agens’ to describe matter. See the letter to Klein from 28 December 1920 (University Library Göttingen, Codex Ms Klein 12, 297) and the one to Husserl from 26 March 1921 (Husserl, 1994, pp. 291–292).

55 ‘ein die Feldzustände verursachenden Agens’ (Weyl, 1968e [1921], p. 254).

56 Weyl states that from a mathematical point of view there is no problem with this idea of ‘throwing out’, which leads to a different topological structure to space-time, now including fringes (‘Säume’). See Weyl (1968e [1921]), p. 253. It must be added, however, that to actually work with such a space-time structure in general relativity would presumably be rather difficult.

57 ‘Danach ist das Materieteilchen selber nicht einmal ein Punkt im Feldraume, sondern überhaupt nichts Räumliches (Extensives), aber es steckt in einer räumlichen Umgebung drin, von welcher seine Feldwirkungen ihren Ausgang nehmen. Es ist darin analog dem Ich, dessen Wirkungen, trotzdem es selber unräumlicher Art ist, durch seinen Leib hindurch jeweils an einer bestimmten Stelle des Weltkontinuums entspringen. Was dieses felderregende Agens aber seinem inneren Wesen nach auch sein mag—vielleicht Leben und Wille—, in der Physik betrachten wir es nur nach den von ihm ausgelösten Feldwirkungen’ (Weyl, 1968g [1924], p. 510).

58 Weyl (1968j [1917]).

There he simplified consciousness to a ‘pointlike eye’ (‘Punktauge’) moving along a worldline. Obviously this was not meant to turn consciousness or the ego into a constitutive part of the space-time continuum. Insofar as a point is a limiting idea, the concept of a pointlike eye was meant rather to bridge the gap between the transcendental ego and space time.⁵⁹ There is, however, a certain dualism of matter and ego. Whereas matter acts in spacetime directly from beyond, the effects of the ego are mediated by matter, notably by a body:

It is very well understandable, that *I* am capable of acting upon the field in no other way than via matter; for I am not field but that which from beyond the field and via the inner border of matter acts in the field.⁶⁰

According to Weyl, my own activity, my ‘acting upon’ (‘Hineinwirken’), is the primal experience of causality: ‘The basic intuition through which we approach the essence of causality is: I do this’.⁶¹ Thus, for Weyl causality means ‘the metaphysical notion of *being the reason for something*’ and has nothing to do with regularity or ‘the mathematical concept of determination by law’.⁶²

The experience of ‘I do this’ not only leads us to the notion of causality, but acting also becomes the primordial philosophical concept. The ego is first and foremost acting:

By experiencing acting and suffering, I become an individual for myself with a mental reality and a link to a body; a body which has its point in space among the corporeal things of the external world and through which I am connected with other individuals like me . . . my will is an activity that encroaches upon the real world via my body . . .⁶³

Note that ‘suffering’ should be understood here as the simple opposite of acting and, as will be shown below, that it is a technical term borrowed from Fichte.

59 Weyl elaborates on this in his talk at the Sixth International Congress for Philosophy at Harvard in 1926 (reprinted as Weyl, 1968i) where he also defends his agens theory. Perhaps the most striking consequence of this aspect of Weyl’s theory is the philosophical grounding of Husserl’s concept of a time halo (‘Zeithof’)—at least in a psychological, if not in a phenomenological sense. The argument roughly goes as follows: the ego, like matter, lacks inner spatio-temporal structure and acts from out of an ‘extramundane inside’ into a certain fringe of spacetime. And since this fringe has no exact inner boundary which would belong to four-dimensional space-time, time as experienced must necessarily have a halo.

60 ‘[Es ist] ganz gut zu verstehen, daß ich nicht anders als durch die Materie hindurch imstande bin, auf das Feld einzuwirken; denn Ich bin nicht Feld, sondern das, was aus einem Jenseits des Feldes über die inneren Feldsäume der Materie hinüber ins Feld hineinwirkt’ (Weyl, 1963, p. 87; taken from Weyl’s 1924 postscript to his paper ‘Massenträgheit und Kosmos. Ein Dialog’).

61 Weyl (1932), p. 31.

62 Ibid.

63 ‘Im Erleben des Tuns und Erleidens werde ich selbst mir zu einem einzelnen Individuum von psychischer Realität, geknüpft an einen Leib, der unter den körperlichen Dingen der Außenwelt seine Stelle im Raum hat und durch den hindurch ich mit andern Individuen meinesgleichen in Verbindung stehe . . . mein Wille [greift] durch meinen Leib hindurch als bewegende Tat in die reale Welt wirkend [hinüber]’ (Weyl, 1923, pp. 5–6).

3.4. Summary

Weyl's agents theory is meant to solve problems from field and atomic physics together with philosophical problems of time and causality. The agents theory leaves room for both functional field laws and the statistical descriptions of atomic physics. According to Weyl, matter has gained its proper 'status as real and causally efficient' ('Wirklichkeitsrecht'). By the same token, the notion of causality is put in what Weyl takes to be its proper place within philosophy, namely as originating from the experience of the ego as acting. This recovery of 'proper causality' also reintroduces the directedness of time, which is in turn closely linked to the role of statistics in physics.⁶⁴

4. Reception of the agents theory

The agents theory appears to be that part of Weyl's writings which was most widely acknowledged among eminent academic philosophers. Ernst Cassirer quotes from it,⁶⁵ Ernst Bloch draws upon it for his own Marxist *Naturphilosophie*, and several enthusiastic letters from others can be found among Weyl's correspondence.⁶⁶

Here I shall focus on the reception of Weyl's agents theory by Fritz Medicus in his 1926 book on the freedom of the will (*Die Freiheit des Willens und ihre Grenzen*). This is the book Weyl referred to, as already mentioned earlier, according to which Medicus was the only philosopher who had developed a position on the recently changed notion of causality. Notably, this statement dates from 1926—a time when quantum mechanics could not yet be called a well established theory—and thus marks again the fast and fertile exchange between Medicus and Weyl.

Already in the preface to his book, Medicus concedes that it could not have been written without the influence of Weyl.⁶⁷ A whole chapter is dedicated to (the then) 'modern physics' and in this chapter Medicus draws directly and heavily upon Weyl's writings. Allow me to give some quotes illustrating how Medicus tried to link field physics, statistics, matter and the ego:

Matter is not in space, it does not fill it passively, but fills it through its *activity*. . . the modern physicist speaks about the 'spontaneity' of the elementary changes of matter, as quantum theory investigates them. And instead of strict causal laws one seeks *statistical regularities* to describe the elementary events of matter. . . If now matter does not follow the *laws by which our understanding reifies the world* . . . the understanding is surely under pressure. However, the understanding does not withdraw from everything. It does not *grasp the meaning* of matter, but it is *concerned with matter*—to be more precise: it turns matter into an *object of statistics*.

64 For a summary see, for instance, Weyl (1968e [1921]), pp. 240–242, 255–256.

65 See Cassirer (1993), p. 346.

66 For instance, from the Heidelberg Professor of Philosophy Erich Frank (1883–1949), and John Scott Haldane (1860–1936), Professor of Physiology and Philosophy in Dublin (see ETH-Archive, Hs91: 567–568, 571–575).

67 See Medicus (1926), p. III.

Statistical findings do not hold ‘objectively’, they do not hold for an objective reality, but for an entity made up of mental operations. . . statistics only thinks *about* me, but it does not think *me*. By counting me, statistics only turns me into a quasi-object. Similarly, the [quantum] leap of electrons is a quasi-object for the physics of matter, not an objective event.⁶⁸

Statistics is ‘non-objective’ in the same sense that there is no actual ‘average family’ sitting at the table with its 1.42 children; its ‘objects’ are a special kind of mental construct which cannot be grasped in the same way as can real families with their actual number of children. And statistics, which now becomes the one and only means to describe matter, is also the one and only means to describe what occurs on the level of the ego. Statistics cannot tell us about activity itself, about what it is like to have a religious experience or how to gain a moral conviction, but it might calculate the correlation between certain convictions and deeds.

Thus, according to Medicus, fundamental concepts both in physics and in transcendental philosophy move closer to one another as matter comes to be viewed as spontaneous, as both ego and matter are thought to act upon four-dimensional space-time ‘from beyond’, and as both came to be seen as describable only by statistics.

I now turn to the question of how the agens theory is, after all, related to the work of Fichte.

5. Weyl as a Fichtean philosopher

Weyl claimed that there is a dualism of matter and ego insofar as matter acts in the world ‘directly from beyond’, as it were, whereas the ego does not act in the world directly, but only through the mediation of matter. Although Medicus emphasised that *both* matter and ego are spontaneous, and that they are *both* describable only by means of statistics, he also (implicitly) accepts such a dualism. For him too the ego seems to act in the world via matter.

Insofar as matter and ego both act and are productive, they cause a halo of effects within space-time from their extramundane sphere. Weyl writes:

our conscious ego [is] not only connected to reality as experienced by the silent look of *perception*, but is dragged into the flow of reality as suffering

68 ‘Die Materie ist nicht im Raum, sie erfüllt ihn nicht passiv, sondern sie erfüllt ihn durch ihre Aktivität . . . der moderne Physiker spricht von “Spontaneität” der elementaren Änderungen der Materie, wie sie die Quantentheorie beschäftigen. Und an Stelle strenger Kausalgesetze sucht man statistische Regelmäßigkeiten, um in ihnen das elementare Geschehen in der Materie zu beschreiben . . . Und wenn sich nun die Materie den Verstandesgesetzen der Vergegenständlichung nicht fügen [sic] . . . so ist der Verstand ihr gegenüber freilich in Bedrängnis. Aber er verzichtet nicht auf alles. Er begreift sie nicht, aber er macht sich seine Gedanken über sie . . . genauer: er macht sie zum Objekt der Statistik . . . Statistische Urteile gelten nicht “objektiv”, nicht von einer gegenständlichen Realität, sondern von einem durch gedankliche Operationen geschaffenen Gebilde . . . die Statistik denkt nur an mich, aber sie denkt nicht mich. Indem sie mich mitzählt, macht sie mich nur zum Quasi- Objekt. In ähnlicher Art ist auch das Springen der Elektronen nur Quasi-Objekt für die Physik der Materie, nicht objektiver Vorgang’ (Medicus, 1926, pp. 89–90, 98–99).

and *acting* (—even if one is only an experimenter, who produces the conditions for his experiment). From here originates the deeper meaning of those facts and relations we encounter between the metaphysical concepts of *transcendent reality*, . . . ‘*being-the-reason for something*’ and *necessity*. These concepts cannot be set aside if we really want to understand what causality is.⁶⁹

The notions of acting and suffering (the latter again understood as simply the opposite of acting) are central for Weyl, and from them the concepts of cause and effect originate. Both Weyl and Medicus assume a certain productivity or activity which causes the world of our experience. This allows them to overcome the notorious tension between freedom and nature.⁷⁰ On the one hand, if one fully equates the activity of matter with spontaneity, then nature belongs to the realm of freedom. There might be differences in terms of degree, but in principle an atom, a stone and a human being can all be said to act freely. On the other hand, one might assume a dualism of matter and ego, and that the ego acts (consciously) via matter, whereas the opposite does not hold. I suggest that this latter dualistic view was held by Weyl and Medicus, while the former, which ascribes subjectivity much more widely in nature, seems nearer to Whitehead’s view. It is, however, interesting to note how both mathematicians, Weyl and Whitehead, were deeply bothered by the tension between freedom and nature. By some means or another they both attempted to understand human beings as acting freely and as genuine causal effects in a world of which they are at the same time a part. From their perspective, physics is not a self-contained enterprise that could replace a *Naturphilosophie*.

That this tension between freedom and nature was important for Weyl can be seen also from his *Philosophie der Mathematik und der Naturwissenschaften*. He claims this tension to be the leitmotif of the whole book and writes:

It is all too cheap to explain . . . ‘that it is only we, who read purpose into the life of an organism’ or ‘that purposes in human life are made and not found’ . . . Purpose and freedom appear as two aspects of the same thing. . . Here lies the origin of my free insight and my free way of acting and my responsibility.⁷¹

69 ‘unser bewußtes Ich [ist] nicht nur durch das stille Hinblicken der *Wahrnehmung* mit der zu erkennenden Wirklichkeit verbunden, sondern leidend und *handelnd* in ihren Strom hineingerissen (- und sei es auch nur als Experimentator, der die Bedingungen des Experiments schafft). Es entspringt daraus tiefere Deutung der vorgefundenen Tatsachen und Abhängigkeitsbeziehungen durch die metaphysischen Begriffe der *bewußtseinstranszendenten Wirklichkeit*, des . . . “*Grund-seins von etwas*” und der *Notwendigkeit*. Sie können nicht beiseite gelassen werden, wenn wir wirklich begreifen wollen, was Kausalität ist’ (Weyl, 1968a [1920], pp. 113–114, 116).

70 This is obviously not to say that Weyl thereby solved kindred problems in moral and political philosophy. In particular, Weyl’s emphasis on spontaneity and the absence of determination on action might be overdrawn in this respect.

71 ‘Es ist alles zu billig so zu erklären, . . . daß nur wir es sind “die einen Zweck in das Leben eines Organismus hineinlesen” oder “daß Zwecke im Leben von Menschen gemacht, nicht gefunden werden.” . . . Zweck und Freiheit treten als zwei Aspekte der gleichen Sache auf . . . Hierin liegt der Ursprung meines freien Einblicks und meiner freien Handlungsweise und meiner Verantwortlichkeit’

One way to overcome this tension for Weyl is via his *agens* theory of matter. The parallels with German Idealism should now be obvious, that is, the common elements the *agens* theory shares with the famous philosophical systems of Fichte and Schelling, both of which were also meant to overcome the same tension.

In Fichte's philosophical system, the so-called 'Doctrine of Knowledge' ('*Wissenschaftslehre*'), the ego always and necessarily acts ('*Tathandlung*'), and among the products of its activity is nature:

According to the Doctrine of Knowledge, I assign the notion of myself to nature as far as I can without abolishing the character of nature, i.e., without turning it into something intelligent . . .⁷²

There can be no *Naturphilosophie* . . . one who believes *through speculation* in an autonomous nature is in error.⁷³

The last sentence is, of course, an attack on Schelling, who proposed the existence of a creative activity in nature as well. Thus, coming back to the *agens* theory of matter, Medicus's claim that in atomic physics matter is 'spontaneous' is, *prima facie*, a rather Schellingian one.⁷⁴ And the same would hold for Weyl's pointing to the possibility that something like decision making might occur on the level of matter. At the same time, however, Weyl and Medicus keep the ego as the special conscious *agens*, and refrain from equating matter and ego, that is, from reducing both to the same driving force behind spatio-temporal reality. Although one might argue that any ascription of activity to matter is a non-Fichtean move, I would like to suggest rather that this reluctance to give up the dualism of matter and ego is in fact a Zurich-Fichtean move. Throughout the work of both Medicus and Weyl, Fichte plays a much more prominent role than Schelling. Thus, rather than a *Naturphilosophie* in the sense of Schelling, the *agens* theory might be better called a 'Transcendental Doctrine of Nature'.⁷⁵ However, for practical reasons, I shall stay with the term *Naturphilosophie* here.

Following this rather general comment, I shall now turn to a more detailed discussion of some of the (Zurich)-Fichtean inheritances evident in the *agens* theory of matter. Medicus claimed that even if matter does not follow the laws of our understanding, the understanding itself must not withdraw from concern for matter. This idea of the human understanding as being at risk of losing its authority over nature is certainly very Fichtean. According to Fichte, nature is something which to a large extent

(Weyl, 2000, pp. 267–268).

72 'Ich trage, laut der Wissenschaftslehre, auf die Natur den Begriff meiner selbst über, so weit ich es kann, ohne die *Natur* selbst in ihrem Charakter aufzuheben, d.i. ohne sie zur Intelligenz . . . zu machen' (Fichte, 1971d, p. 362).

73 'Es gibt keine *Naturphilosophie* . . . wer an eine selbstständige *Natur in der Spekulation* glaubt, der befindet sich im Irrtume' (Letter to Beyme, quoted in Scheier, 1986, p. 389).

74 Medicus (1926), pp. 100–101, acknowledges the parallel with Schelling, although throughout the book his Fichtean inheritance is much more prominent (also as far as the number of citations is concerned).

75 I borrow this term from Lauth (1984), who apparently is the only one who has ever tried to work out the Fichtean counter-approach to Schelling's *Naturphilosophie*.

is placed at our disposal, and nothing admirable (or even ‘holy’) in the sense of Schelling.

As mentioned above, consciousness or the ego was turned by Weyl into a pointlike entity which did nothing but climb up its four-dimensional world-line. Even if Weyl referred to this as a ‘crude simplification’, the pointlike eye on its four dimensional (spatio-temporal) world line can be viewed as a Fichteian spin-off. I quote from Fichte:

The ego that encounters itself as acting, encounters itself as *a line drawing*. This is the primordial scheme of activity . . . The primordial line is the *pure extension*, common to time and space, and out of which time and space follow only by further distinction and determination. The line does not presuppose space, but space presupposes the line; and lines in space . . . are something completely different.⁷⁶

The drawing of lines in Fichte is prior to the separation of space and time in intuition and exhibits the acting of the ego in its purest form.⁷⁷ By drawing a line, however, the ego also suffers. According to Fichte, there is a necessary double structure of acting and suffering without which the world would, so to speak, be ‘empty’. If there was only pure activity, then there would be no objects in the world:

One thinks of an activity as going into infinity the way a straight line goes from *A* through *B* to *C* etc. . . . The direction of the activity of the ego going from *A* to *C* will be reflected from *C* to *A*. . . So we get two directions of the activity of the ego between *A* and *C*, which struggle with each other and where the direction from *C* to *A* can be viewed as suffering and the one from *A* to *C* as pure acting; but both belong to the same state of the ego.⁷⁸

The activity going outwards from *A* to *C*, and then to *D* and *E* etc., is supposed to be an infinite one. Together with it, however, there is a process of reflection going inwards; and both processes are just two sides of the same coin, the necessary double structure of the acting and suffering ego. Only as a consequence of this reflection does the separation of time and space occur. Quoting Medicus:

76 ‘Ferner—das sich selbst als thätig anschauende Ich schaut seine Thätigkeit an, als ein *Linienziehen*. Dieses ist das ursprüngliche Schema der Thätigkeit überhaupt . . . Diese ursprüngliche Linie ist die *reine Ausdehnung*, das Gemeinsame der Zeit und des Raumes, aus welcher die letzteren erst durch Unterscheidung und weitere Bestimmung entstehen. Sie setzt nicht den Raum voraus, sondern der Raum setzt sie voraus; und die Linien im Raume . . . sind etwas ganz anderes’ (Fichte, 1971a, p. 58). The ‘Linienziehen’ is also a central theme in the aforementioned reconstruction of a Fichteian ‘Transcendental Doctrine of Nature’; cf. Lauth (1984), pp. 24–25, 30, 172.

77 It is the ‘reine Selbstdarstellung des Ich’ as Medicus (1914a), p. 13, puts it.

78 ‘Man stelle sich die ins Unendliche hinausgehende Thätigkeit vor unter dem Bilde der geraden Linie, die von *A* aus durch *B* nach *C* usw. geht . . . die von *A* nach *C* gehende Richtung der Thätigkeit des Ich [wird] reflektiert von *C* nach *A* . . . Und so erhalten wir zwischen *A* und *C* eine doppelte mit sich selbst streitende Richtung der Thätigkeit des Ich, in welcher sich die von *C* nach *A* als ein Leiden, und die von *A* nach *C* als bloße Thätigkeit ansehen läßt; welche beide ein und derselbe Zustand des Ich sind’ (Fichte, 1997, p. 147).

In real thought, space and time are one; only in reflection are they separated . . . Only by being filled with causality is time a function of knowledge, and so is space owing to the thing (Gegenstand) in it.⁷⁹

Without going into further detail here, two parallels with Weyl are obvious: (i) Weyl's above mentioned discussion of acting and suffering, and (ii) Weyl's assumption of a twofold mechanism of outward and inward development and determination of spatio-temporal events, in order to account for the role played by statistics as opposed to 'law physics' ('Gesetzesphysik') within the atomic realm.

Next, Weyl's concept of causality, as primarily meaning 'I do this', strongly resembles the Fichtean concept. As a consequence, Weyl's account of our ability to act in the world and of the role played by our body also agrees with Fichte. According to the latter, the body is the sphere of all possible free acts of a person,⁸⁰ and through it one can cause effects in space and time:

*I am supposed to effect matter . . . But it is impossible for me to think of having an effect upon it, except by means of something that is itself matter. . . I, viewed as a principle of effectivity in the corporeal world, am an articulated body, and the representation of my body is itself nothing other than the representation of myself as a cause in the corporeal world . . .*⁸¹

This is in fact similar to what Weyl had said about the human body as the medium of the ego used to cause effects in four-dimensional space-time.

I have already hinted at the tension in Weyl between a 'free becoming', on the one hand, and a full determination from a god's eye view, on the other. There is a similar tension in Fichte. According to him, the main goal of the human ego is to get into full agreement ('vollkommene Übereinstimmung') with itself.⁸² Thus, although its single acts ('Tathandlungen') are understood as free, the ego's main goal in a sense is not. Fichte even adds that this goal can only be achieved if the human ego becomes god.⁸³ This means that only from a god's eye view can everything be experienced as in agreement. Applying this to notions of space and time, one could indeed arrive at the Zurich interpretation of Fichte in the agents theory. For if space and time themselves only develop via the ego's activity,⁸⁴ then the striving for such a full agreement arguably includes space and time becoming more fine-grained. Thus, there admittedly remains a difference between attributing such a development of space-time to the ego versus

79 Marti & Medicus (1982), pp. 52–53.

80 'Umfang aller möglichen freien Handlungen der Person' (Fichte, 1971a, p. 59).

81 'Nun aber soll *ich* auf den . . . Stoff *wirken*. Aber es ist mir unmöglich eine Wirkung auf ihn zu denken, außerdurch das, was selbst Stoff ist . . . Ich, als Princip einer Wirksamkeit in der Körperwelt angeschaut, bin ein articulirter Leib; und die Vorstellung meines Leibes selbst ist nichts anderes, denn die Vorstellung meiner selbst, als Ursache in der Körperwelt' (Fichte, 1971b, p. 11; Introduction, Sec. 8; English translation taken from Martin, Forthcoming).

82 See Fichte (1971c), p. 14.

83 See *ibid.*, pp. 26–27.

84 Cf. above; for more details on how space and time arise and relate to intuition ('Anschauung') see Fichte (1975), §4.

attributing it to nature itself. However, Weyl's claim about the emergence of new physical events, which then cause what was earlier chaotic or indeterminate, means that nature comes into better and better agreement (coherence) with itself. This resembles Fichte's account of the ego coming into a full agreement with itself, after which none of its experiences appear chaotic or incoherent.⁸⁵

6. Activity and becoming

From a general philosophical perspective, Weyl's agens theory is an attempt to answer the notorious post Kantian problem of reconciling nature and freedom (matter and ego). The agens theory is also very post Kantian in employing activity as its central philosophical notion and in particular by applying it to nature. This marks a divergence from Weyl's other important philosophical centre of reference, Husserl. According to phenomenology, matter lacks intentionality, and phenomenological concepts like the intuition of pure essences ('Wesensschau') denote something rather passive. Since a lot has been written on passivity in Husserl, I will be brief here.⁸⁶ According to Husserl, there is always a whole net or structure of experiences ('Erfahrungsstruktur des Ich') which one contemplates:

The absolute and indubitable part of transcendental self-experience is not the empty identity of the 'I am', but rather something spanning all particular ways in which real and possible self-experience is given . . .⁸⁷

In comparison, Fichte's Doctrine of Knowledge is phenomenological insofar as it seeks to articulate the fundamental structure of our consciousness. The *discovery* of myself as active can be called a phenomenological fact. According to Fichte, however, such a discovery is a reflective fact and must be further explained. For Fichte there must be a pre-reflective self-relation that provides the ultimate source of unity in my experience. Fichte calls this prereflective self-relation 'self-positing' ('sich setzen'), and for him it marks a point of unity between theory and practice, insofar as the knower is also an agent. Thus, the primordial activity, called 'self-positing', is not a fact of consciousness but lies beyond the limits of any strictly phenomenological description.⁸⁸ As Fichte puts it: 'This absolute identity . . . can only be derived, it is not somehow immediately given as a fact of actual consciousness.'⁸⁹

85 It would be interesting to compare this to the view of C. S. Peirce. This, however, would take a larger study than this paper. In addition, within the work of Weyl references to Peirce only seem to appear in the context of mathematics. Cf. Weyl (2000), p. 85.

86 An important monograph is Holenstein (1972); Delhom & Schües (2002) review some recent literature.

87 'Nicht die leere Identität des "Ich bin" ist der absolut zweifellose Bestand der transzendentalen Selbsterfahrung, sondern es erstreckt sich durch alle besonderen Gegebenheiten der wirklichen und möglichen Selbsterfahrung hindurch' (Husserl, 1995, p. 30; II. Med., Sec. 12).

88 Cf. Martin (Forthcoming).

89 'Diese absolute Identität . . . läßt sich nur schließen, nicht etwa unmittelbar als Tatsache des wirklichen Bewußtseyns nachweisen' (Fichte, 1971b, p. 1; Introduction, Sec. 1; English translation taken from Martin, Forthcoming).

Weyl describes the opposition between Husserlian phenomenology and Fichte's Doctrine of Knowledge as that between 'seeing' ('das Sehen') and 'creative activity' ('das Schöpferische').⁹⁰ Here 'seeing' cannot be everything, since—as Weyl puts it in one of the quotes above—we are not just connected to the world by a 'silent look of perception'. Activity is the major ingredient in our encounter with the world and it is intimately linked to the notion of causality, the analysis of the continuum, and so on. Similarly, also in his later writings, Weyl claims that 'it is not enough to have one's eyes opened widely; [truth] must be gained by acting',⁹¹ and that Fichte 'is anything but a phenomenologist, he is a constructivist of the purest sort'.⁹²

Thus, I suggest that Weyl's agens theory of matter inherited a great deal from Fichte's philosophy, and that it was the rather particular and liberal reading of Fichte as mediated by Medicus that enabled Weyl to attribute—at least some—activity to matter.

Without being able to go into detail, it should be mentioned that it is on this basis that Weyl's comments on the controversy between intuitionism and formalism in mathematics can be more fully understood. Only by emphasising activity and the constructive elements in Fichte as compared to Husserl, who has more of a representationalist element in his phenomenology, does Weyl's strong association of phenomenology with intuitionism become plausible. It is in this way that one might understand such comments as that a victory of Hilbert over Brouwer would be a 'decisive defeat ('entscheidende Niederlage') for pure phenomenology'.⁹³ For those who read Husserl in a more constructivist way, these comments have been more or less pushed aside by claiming that Weyl failed to read Husserl carefully.⁹⁴ While this seems to be true, and also holds for Weyl's reading of Fichte, I hope to have shown that at least some of Weyl's comments on Husserl make more sense when read against his (Zurich) understanding of Fichte.

From this also follows some methodological reflections. As perhaps opposed to the influence of Husserl on Weyl, Weyl's Fichte reception can most adequately be investigated by a method which puts particular emphasis on the acting subject. Thus, I hope that this study of Weyl's agens theory of matter has shown the adequacy and fruitfulness of *Konstellationsforschung* as compared to, for example, traditional History of Ideas, all the more since Weyl's basic aim was not to become an accurate Fichte scholar but to appropriate some terminological and conceptual elements which he could then freely build into his *Denkraum* of a 'Transcendental Doctrine of Nature', or distinctive *Naturphilosophie*. Second, and here I introduce a new dimension into the conceptual space of *Konstellationsforschung*, the inward becoming Weyl attributed to space-time is reflected in the ongoing constellational reception of philosophical concepts. Just as in the agens theory physical events become more and more fine

90 See Weyl (1968b [1925]), p. 541.

91 'es genügt nicht, große Augen zu machen, [die Wahrheit] will durch Handeln gewonnen sein' (Weyl, 1968h [1949], p. 334).

92 'Er [Fichte] ist alles andere als ein Phänomenologe, er ist ein Konstruktivist reinsten Wassers' (Weyl, 1968d [1954], p. 641).

93 Weyl (1968c [1928]), p. 148.

94 See for example Tieszen (2000).

grained as time passes, so too do philosophical ideas and constellations. Fichte's 'line drawing' acquires a more detailed meaning in Weyl's *agens* theory, which then relates it to the theory of relativity; and this paper has hopefully offered both (i) an even more fine grained view of why it is that Weyl made use of these Fichtean ideas in his *agens* theory of matter and (ii) a possible reading of Fichte himself, who claimed that 'the Doctrine of Knowledge should be a pragmatic history of the human mind'.⁹⁵ Fichte writes:

If our Doctrine of Knowledge is an appropriate account . . . then it is absolutely certain and infallible . . . however, the question is exactly this, whether and to what extent our account might be appropriate; and thereupon we can never give a rigorous proof, but only one in terms of probabilities. . . We are not the legislators of the human mind, but its historiographers; we are not, of course, journalists, but rather writers of pragmatic history.⁹⁶

This suggests an anti-foundationalist reading of Fichtean philosophy, emphasising that it starts from the real conditions of the human subject in the world and then works itself towards a philosophical anthropology. Such a reading arguably depends on whether one is particularly interested in Fichte's early writings or whether one tends to read the different versions of the Doctrine of Knowledge as successive (and successful) amendments.⁹⁷ Admittedly, the anti-foundationalist reading is not the 'received view' within Fichte scholarship, though it can be found in the contemporary literature.⁹⁸ The present paper thus suggests that *Konstellationsforschung* as a method will in fact only be consistent with the actual historical content it treats if one also adopts an anti-foundationalist reading of Fichte. It has hopefully been shown how this reading allows for the writing of a finegrained history of the Zurich reception of Fichte by Medicus and Weyl. And insofar as I might have here offered a rather peculiar reading of Fichte, this paper itself (rather than being a Husserlian 'Wesensschau') stands in just this tradition of Zurich Fichteanism.

Acknowledgements

I would like to thank Timon Boehm, Jeff Kochan, Michael Hampe, Sku' li Sigurdsson and two anonymous referees for their helpful comments on earlier versions of this

95 'Die Wissenschaftslehre soll sein eine pragmatische Geschichte des menschlichen Geistes' (Fichte, 1997, p. 141).

96 'Ist unsre Wissenschaftslehre eine getroffene Darstellung . . . so ist sie schlechthin gewiß und infallibel . . . aber die Frage ist eben davon, ob und in wie fern unsre Darstellung getroffen sei; und darüber können wir nie einen strengen, sondern nur einen Wahrscheinlichkeiten begründenden Beweis führen . . . Wir sind nicht Gesetzgeber des menschlichen Geistes, sondern seine Historiographen; freilich nicht Zeitungsschreiber, sondern pragmatische Geschichtsschreiber' (Fichte, 1991, p. 69).

97 Compare the anti-foundationalist reading in Rockmore (1995, 2001) with, for example, what is claimed in Henrich (1993), p. 60.

98 See the work of Rockmore already referred to.

paper. Additionally, I would like to thank Tom Rockmore, Erhard Scholz and Richard Tieszen for valuable discussions on topics central to this paper.

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This postprint was prepared by Hannah Mahé Crüsemann.