
Ernst Mach and Friedrich Nietzsche: On the Prejudices of Scientists

Pietro Gori

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Abstract: The aim of this paper is to provide a thorough account of the fact that Ernst Mach and Friedrich Nietzsche are often associated with each other in the specialized literature on the history of philosophy and the philosophy of science. As I will argue, the consistency which can be discovered between them is much more substantial than one may imagine. On the basis of their conception of knowledge and truth, it is possible to outline a complete parallelism between their approach to the issue concerning our intellectual relationship with the external world. In fact, Mach and Nietzsche dealt with the very same questions and indeed pursued a common general aim, namely the elimination of worn-out conceptions from the world of modern culture. Furthermore, I will maintain that Mach's and Nietzsche's research interests converge on the classic problem of realism vs. antirealism, and that it is in the light of this particular issue that their own views can be compared.

In the specialized literature on the history of philosophy and the philosophy of science, Ernst Mach and Friedrich Nietzsche are often associated with each other. The reason for this is mainly rhetorical: given that Mach and Nietzsche apparently belong to different domains of our culture, scholars often try to surprise their readers by showing that similarities between these authors' views can in fact be found – and that they are not at all secondary. This happens on both sides. Mach scholars, whose audience has little patience for non-systematic, aphoristic modes of expression such as Nietzsche's and for the philosophical perspectives Nietzsche inspired, refer to Nietzsche in order to argue that Mach participated in a rich and multifaceted cultural movement. On the other hand, Nietzsche scholarship has been especially intrigued by Mach, for his viewpoint may cast light on certain interpretive problems involving questions approached by Nietzsche and inspired by post-Kantianism and modern epistemology – e.g. the

problem of subjectivity, the contradictory concept of the ‘thing in itself’, and the actual value of scientific knowledge.

The aim of this paper is to provide a thorough account of this association. As I will argue, the consistency which can be discovered between Mach and Nietzsche is much more substantial than one may imagine. On the basis of their conception of knowledge and truth, it is possible to outline a complete parallelism between them – and I use this Machian expression intentionally, for I believe that Mach and Nietzsche concerned themselves with the same issues concerning our intellectual relationship with the external world and that it is only their different interests that allow us to interpret these issues as pertaining to ethics (Nietzsche) or to the actual practice of scientific research (Mach). They in fact dealt with the very same questions and indeed pursued a common general aim, namely the elimination of worn-out conceptions from the world of modern culture. But an accurate investigation reveals even more, namely that Mach’s and Nietzsche’s research interests converge on the problem of realism vs. antirealism, a heated topic in contemporary philosophy of science and, more generally, a fundamental philosophical issue. As will be shown, that problem permeates the reflections of both authors, and it is in the light of this particular issue that Mach and Nietzsche can be compared.

1. Phenomenalism

Mach’s unique official pronouncement on Nietzsche is as strong as it is negative. In the revised and extended edition of *The Analysis of Sensations*, at the end of the paragraph in which Mach famously argues that ‘the ego must be given up’ (*Analysis of Sensations*, p.24), he declares that ‘the ethical ideal founded on [...] the freer and more enlightened view of life’ holding that the I is a mere theoretical product, a view ‘which will preclude the disregard of other egos and the overestimation of our own, [...] will be far removed from [...] the ideal of an overweening Nietzschean “superman”, who cannot, and I hope will not be tolerated by his fellow-men’ (ibid., p.25). Mach’s friend and populariser Hans Kleinpeter¹ had a hard time persuading Mach that his observation was biased by a received view which neglected the most interesting aspects of Nietzsche’s thought. The almost exclusive interest that intellectuals had in the highly poetic work *Thus Spoke Zarathustra* at the beginning of the twentieth century meant that they remained stuck on the surface level of what was otherwise profound and multifaceted thought. But a study of Nietzsche’s posthumous writings outlines an image that differs greatly from the one that had been popularized, making it possible to assess the actual philosophical value of

¹ Kleinpeter has been a minor albeit interesting figure in the history of scientific philosophy. He was a strong supporter of Mach, whose thesis Kleinpeter discussed in a series of articles published for example in *The Monist*.

Nietzsche's work (cf. Kleinpeter 1912/13). For Kleinpeter, that value rests on a biologically grounded conception of truth which leads to the sort of epistemological relativism defended by Mach.²

Kleinpeter passed on to Mach the idea that Nietzsche developed some interesting theoretical issues (cf. Gori 2011, pp.294-8), and he worked extensively on this between 1911 and 1912. His 1913 book *Der Phänomenalismus. Eine naturwissenschaftliche Weltanschauung* includes the results of that research, namely the idea that Nietzsche defended the principles of the world-conception outlined by the guiding figures of a *scientific philosophy* (e.g. Mach, Richard Avenarius, John Stallo, and William Clifford). Kleinpeter (1913, p.95) focuses on Nietzsche's reflections on the merely symbolic value of concepts and words that one finds in his posthumous writings. Apparently, Nietzsche maintained that our knowledge is only a collection of intellectual instruments developed in the evolution of mankind, whose fruitfulness for the preservation of the species, the fact that they allow us to manage the world in an operationally efficacious way, has determined our ordinary faith in their ontological consistency. But this is a terrible mistake, for we have no access to 'things in themselves', and therefore we should remain agnostic at least concerning their properties (and perhaps also their actual existence). For Kleinpeter, this biological conception of knowledge lies at the origin of the scientific instrumentalism defended by Mach and by pragmatist thinkers such as William James and F.C.S.Schiller (Kleinpeter 1913, pp.27, 123, 209, 251; cf. also Kleinpeter 1912 and 1912/13).³ According to that view, 'truthfulness' is not related to the actual agreement of our world-description with what lies beyond the phenomena; on the contrary, it only pertains to the result of a process through which we test our expectation over a well-defined experience. Insofar as it is not a property of things, truth depends on the observer, his interests and/or the field of the research he is pursuing. As defended e.g. by Mach, in particular, scientific truth is the momentary resting point of research, a collection of thought-symbols that allows us to save time and effort in future research.⁴

Kleinpeter's view of a phenomenalist Nietzsche is sustained by the observations on the metaphorical character of truth that are coherently developed throughout Nietzsche's works. As early as 1873, Nietzsche in fact argued that our truths are only illusions and metaphors and that we have forgotten their standing as mere intellectual elaborations of the received sensorial

² Kleinpeter was not the first to notice an affinity between Mach and Nietzsche. Before him, for example, Rudolf Eisler (1902) stressed their similarities.

³ On this, cf. Gori 2019a: Chapter 4.1.

⁴ Cf. Mach's principle of the economy of thought, e.g. in Mach 1897, Chapter 9.

data (Nietzsche 1999, p.146). In 1878, he conceived of the whole world of representation as ‘the outcome of a host of errors and fantasies which have gradually arisen and grown entwined with one another in the course of the overall evolution of the organic being’ (Nietzsche 1996, p.20); accordingly, in 1882, he describes knowledge as a collection of intellectual errors (Nietzsche 2001, p.110). The list of passages of that sort goes on, but what is important is that Kleinpeter found good reason to argue that ‘Nietzsche understood better than any other thinker the philosophical importance of [...] Mach’s, Stallo’s, Clifford’s [...] attempt to rid science of metaphysics’ (Kleinpeter 1913, p.95). In fact, the idea that our knowledge is nothing more than a collection of operationally fruitful labels and that we are stuck within the boundaries of this intellectually constructed world of appearances calls into question the very dichotomy between the ‘apparent’ and the ‘real’ or ‘true’ world, thus leading us to the fundamental problem of realism vs. antirealism.

When Kleinpeter tells Mach that he believes Nietzsche to be ‘much better than his reputation suggests’ (Letter to Mach, 22.12.1911, in Gori 2011, p.295), he therefore means that in Nietzsche Mach could have found an ally in his crusade against the naïve realism one encounters in the ordinary scientific conception. Insofar as Nietzsche stresses the importance of appearances as actual limits of our knowledge and criticizes philosophers’ tendency to ‘call real what in fact is merely *conceptual*,’⁵ he is a true upholder of phenomenalism, as much as Mach is (Kleinpeter 1912/13, p.7; 1913, pp.27, 143). Furthermore, Nietzsche’s epistemological concerns led him to a complete rejection of substance concepts of all kinds, e.g. that of the subject. In his letter to Mach, Kleinpeter especially stresses that Nietzsche conceived of the I as a multiplicity of elements, not at all as a substantial unity (Gori 2011, p.295, Kleinpeter 1913, p.181). But if Nietzsche defended an anti-metaphysical view of the ego consistent with the Machian one, then Mach should have reconsidered his critical remarks on the ethical ideal of the overweening ‘superman’, given that his argument is based on the idea that this figure is an expression of the selfish ‘overestimation of our own’ which follows from the ordinary conception of the ego – which is not, in fact.⁶

⁵ On this, *Human, all too Human* § 11 (Nietzsche 1996, p.16) and the 1888 posthumous fragment 14[153] (Nietzsche 1980, Vol. 13, p.336) are especially interesting. See also Gori 2017.

⁶ Mach’s view of the Nietzschean Superman was popular at his time, as shown by the early reception of Nietzsche’s *Thus spoke Zarathustra* – the one which determined the appreciation of Nietzsche by the worst expression of German twentieth-century politics. In recent times, the Nietzsche scholarship worked hard to correct this and other misinterpretations of Nietzsche’s thought through the reconstruction of his philosophical context, which has been especially revealing.

As far as we know, Kleinpeter's attempt to make Mach change his mind on Nietzsche was destined to fail.⁷ But that was just the first step in a body of work that deserved further exploration, the value of which can be assessed on the broader plane of the history of philosophy. The question that Kleinpeter left to the interpreters is this: Is it viable to compare Mach and Nietzsche? On what basis can we put them in dialogue? And, most importantly, is this inquiry fruitful for Mach studies, or for Nietzsche studies, or perhaps for both? In the following sections, I will try to answer these questions. As I will show, by following the path of the theoretical issues that Mach and Nietzsche both addressed, an intriguing general picture emerges.

2. Enlightenment

A few years later than Kleinpeter, Philipp Frank endorsed his idea of 'the striking agreement of Mach's view with those of a thinker for whom he cannot have had any great sympathy: Friedrich Nietzsche' (Frank 1970 [1917], p.232). For him, Mach and Nietzsche had similar views on the nature and limits of knowledge. They both criticized the contradictory conception of the 'in itself', and, most importantly, they were both 'enlightenment philosopher[s] of the end of the nineteenth century' insofar as they 'protest[ed] against the misused concepts of [their] time' (Frank 1970, pp.231-2). What did Frank mean by this?

In the 'Age of Enlightenment', Frank (1970, p.229) identifies 'a struggle against the misuse of auxiliary concepts', that is, an attempt to show that concepts have a realm of validity outside of which they cannot be used properly. It is characteristic of the history of science that every period has its auxiliary concepts, and every subsequent period misuses them; therefore, 'in every period a new enlightenment is required in order to abolish this misuse. [...] To this work Mach dedicated himself' (Frank 1970, pp.229, 231). The attempt to enlighten the mind of his fellow scientists rests at the core of Mach's epistemology and in fact defines his own criticism. In the *Preface* to the first edition of *The Science of Mechanics*, Mach declares that the aim of the volume is 'to clear up ideas, expose the real significance of the matter, and get rid of metaphysical obscurities' (Mach 1919, p.ix). This 'enlightening or antimetaphysical intention' (in the original German text, Mach speaks of '*eine aufklärende oder antimetaphysische Tendenz*') clarifies the goal of the entire book, which is to provide a *historico-critical* investigation into the principles of mechanics. From the viewpoint of the history of philosophy, this is of some interest, for the outlined conceptual cluster represents an ideal development of the

⁷ Cf. Kleinpeter's letter to Elisabeth Förster-Nietzsche, 9.11.1912 (*Goethe-Schiller Archiv*, Weimar) and Gori 2011, p.293.

philosophical methodology. The name that Mach gives to his own approach clearly evokes Kantian *criticism*, one of the most important products of philosophical *enlightenment*, but Mach's version claims to be original, especially since it aims to get rid of the metaphysical obscurities that Kant had not been able to abandon. Mach's criticism is in fact a *historical inquiry* which attempts to cast light on the nature of ordinary scientific concepts by tracing their origin through the obscure paths of past cultures and civilizations.

The importance of history as an antimetaphysical tool is stressed in Mach's 1871 lecture on the *Conservation of Energy*. For Mach, 'we are accustomed to call concepts metaphysical, if we have forgotten how we reached them' (Mach 1911, p.17), i.e. if we isolate them from their historical development. For him, concepts are dynamic entities whose actual meaning depends on the cultural framework to which they pertain. Consequently, 'science is unfinished, variable' (ibid.); it is not a discovery of *true* features of reality but rather a creative enterprise. Science creates our conceptual system, constructing the entire intellectual edifice through which we manage the world. Accordingly, in *The Analysis of Sensations*, Mach defends the instrumental view that 'the biological task of science is to provide the fully developed human individual with as perfect a means of orientating himself as possible' (p.37). Furthermore, in *Knowledge and Error*, he observes that the 'laws of nature are a product of our mental need to find our way about in nature, so that we do not stand estranged and baffled in front of natural processes' (Mach 1976, p.34). Instead of being an expression of the actual development of natural events, these laws must be considered only as the most recent 'attempt at orientation' produced by our 'current state of culture.' These are but sketches of a general picture that Mach defended from his early years onwards, stimulated by the urge to contrast the 'naïve realism [...] of the average man' with higher cultural products, such as the scientific world-description, on which that naïve realism casts its shadows (*Analysis of Sensations*, p.37). The 'constant correction of ordinary thought' that determines 'progress in scientific thought' is made possible by the growth of civilization (*Knowledge and Error*, p.2), and history plays an important role in that development, from a philosophical point of view. The historical approach is in fact crucial, for it reveals the inner nature of science as much as the inconsistency of the ordinary metaphysical commitment that rests at its core. Most importantly, this *antimetaphysical criticism* allows us to redefine the boundaries of scientific knowledge, that is, to deal with fundamental epistemological questions such as 'In what sense are scientific concepts meaningful?' or 'To what extent are the general results [of science] 'true'?' (Einstein 1992, p.154).

Is it possible to find a similar approach in Nietzsche? In fact, it is. Firstly, Mach's 1871 definition of 'metaphysical concepts' is consistent with Nietzsche's early observations on truth,

namely the famous idea that ‘truths are illusions of which we have forgotten that they are illusions,’ stated in the 1873 unpublished essay *On Truth and Lying in a Non-Moral Sense* (Nietzsche 1999, p.146).⁸ Nietzsche’s approach to that issue has much in common with Mach’s argument. For Nietzsche, our ‘truths’ are the result of an intellectual activity of schematization and categorization which worked well in terms of human adaptation. Given its great practical value, and considering that we cannot leave it aside, we have ultimately become familiar with that world-description. As a result, we now pretend ‘that with words [we are] expressing the supreme knowledge of things,’ (Nietzsche 1996, p.16), whereas in truth we are only dealing with fruitful designations. Secondly, in the opening section of *Human, all too Human*, Nietzsche introduces ‘historical philosophy’ as the proper methodology to cast light on metaphysical obscurities. For him, ‘lack of historical sense is the family failing of all philosophers’ who embrace a metaphysical viewpoint, ‘assuming for the more highly valued thing a miraculous source in the very kernel and being of the “thing in itself”’⁹ (Nietzsche 1996, pp.12-13). One of the fundamental problems of traditional philosophy thus resides in the illusory belief in a fascinating realm of eternal ‘truth.’ But ‘there are *no eternal facts*, just as there are no absolute truths. Consequently, what is needed from now on is *historical philosophizing*, and with it the virtue of modesty’ (Nietzsche 1996, p.13).

Apparently, Nietzsche is as much an antirealist and instrumentalist as Mach. They both consider knowledge a creative intellectual production of signs and labels for the aim of orientation; they both argue that language is imbued with metaphysical commitment; most importantly, both Mach and Nietzsche defend a critical approach to these issues based on the historical method, which they consider the only method that allows us to shed light on ordinary world-description and to overcome its naïve realism. Thus, it is possible to view Mach and Nietzsche as Enlightenment philosophers, as Frank did, and from that viewpoint one can argue that their contribution to the growth of philosophical studies rests especially in the way they dealt with an issue as crucial as the dualism between realism and antirealism.

⁸ I defended this idea in Gori 2014 and Gori 2019a, chapter 5.2.

⁹ These observations are a direct development of Nietzsche’s 1873 reflections. In *On truth and Lying*, he in fact argues that ‘when different languages are set alongside one another it becomes clear that, where words are concerned, what matters is never truth, never the full and adequate expression; otherwise there would not be so many languages. The ‘thing-in-itself’ (which would be, precisely, pure truth, truth without consequences) is impossible for even the creator of language to grasp, and indeed this is not at all desirable. He designates only the relations of things to human beings, and in order to express them he avails himself of the boldest metaphors’ (Nietzsche 1999, p.144).

3. Interpretive Problems

The similarities between Mach's and Nietzsche's epistemological concerns, and the semantic consistency between their reflections on the topic, has intrigued Nietzsche scholarship, especially since work on Nietzsche's private library and his sources has revealed his great interest in the outcomes of modern science.¹⁰ This interest seems to be inconsistent with a critical attitude towards the ordinary scientific world-description reiterated in Nietzsche's writings, e.g. when he argues that 'physics is only an interpretation and exegesis of the world (to suit us, if I may say so!) and *not* a world-explanation' (Nietzsche 2002, p.15), or that scientific concepts are 'conventional fictions for the purposes of designation and communication – *not* explanation' (Nietzsche 2002, p.21). These observations especially conflict with passages where Nietzsche defends an empiricist epistemology and demonstrates his commitment to an ontology based on our sensual experience. In plain language, there seems to be a contradiction within Nietzsche's view that science provides a world-image created only to make the world manageable for us – one that, consequently, does not straightforwardly report the world as it is – and his idea that our 'senses do not lie' (Nietzsche 2005, p.167) and that we can accept 'sensualism at least as a regulative hypothesis, if not as a heuristic principle' (Nietzsche 2002, p.16).¹¹

These interpretive problems have been addressed by Nadeem Hussain in two seminal papers inspired by the presence of Mach's 1886 *Beiträge zur Analyse der Empfindungen* in Nietzsche's private library.¹² Hussain explores in particular the problematic issue of Nietzsche's commitment to a 'falsification thesis' that claims that our language is only about our own representations and that any attempt to grasp the actual features of the world existing beyond them is destined to fail. Consequently, the truth-value of our world-description is put into question, and the fundamental problem of epistemological relativism or scepticism arises. For Hussain, a Machian approach to the matter can shed light on Nietzsche's most difficult passages. In fact, he believes that 'Mach provides for us a basis on which we can interpret much of what Nietzsche says about scientific theories and the role of the senses in a way that would be

¹⁰ Over the past decades, studies on this theme have been published in Babich/Cohen 1999; Brobjer/Moore 2004; Heit/Abel/Brusotti 2012; Heit/Heller 2014.

¹¹ Kleinpeter (1913, p.69) observes that the idea that 'the senses do not deceive' can be found in Goethe as much as in Mach (e.g. 1959, p.10). It is, however, in fact a Kantian observation (Kant 1998, p.384; A 293/B 350).

¹² Apparently, Nietzsche was one of the few who were interested in that book when it first appeared (cf. Baatz 1997, p.85). A thorough account of Nietzsche's personal copy of Mach's 1886 essay is provided in Gori 2018b.

compatible, at least by Mach's own lights, with some kind of falsification thesis' (Hussain 2004a, p.350).¹³

The falsification thesis was originally explored by Maudemarie Clark in her seminal and controversial *Nietzsche on Truth and Philosophy* (Clark 1990). In that book, Clark argued that Nietzsche's use of the notion of 'truth' is problematic given his late view of the role of sense organs and his critical approach to the Kantian 'thing-in-itself,' which Nietzsche ultimately rejects as involving a *contradictio in adjecto* (Nietzsche 2002, p.16). For Clark, the only consistent use of the notion of truth is a matter of correspondence with the actual features of reality; if one has no access to the world as it is independently of us, nothing can be claimed about our actual knowledge – not even that it is a falsification of the original datum. Therefore, together with the thing-in-itself, Nietzsche had to give up his falsification thesis, which Clark claims he did.¹⁴ As Brian Leiter puts it (Leiter 2002, p.14), Clark's interpretation is based on the fact that 'it is impossible to reconcile' the falsification thesis with 'Nietzsche's explicit *empiricism* – his view that 'all evidence of truth comes only from the senses.' But Hussain argues that Nietzsche might have defended the sort of sensualism one finds in Mach and, consequently, that it is possible 'to interpret him as simultaneously rejecting the thing-in-itself, accepting a falsification thesis and defending empiricism.' (Hussain 2004a, p.357).

The core of Hussain's argument rests on his interpretation of Mach's 'sensualism': his neutral monism, or, as Hussain calls it, 'Machian positivism' (Hussain 2004a, p.328). For Hussain, Mach defended an original kind of empiricism, which can be seen as a development of the phenomenalism endorsed by neo-Kantian thinkers such as Friedrich A. Lange, Afrikan Spir and Gustav Teichmüller (three key figures in Nietzsche's philosophical education).¹⁵ Within this framework, it was maintained that sensory evidence does not provide direct access to reality. On the contrary, we are physiologically structured for falsification insofar as both our sense organs and our intellect modify the original datum which we receive from the external world,

¹³ As Robert Cohen points out, Mach insisted on the merely descriptive power of scientific knowledge in a way that can be compared with Nietzsche's critical remarks. For Cohen (1970, p.132), Mach 'seems to conclude [that] science is not an attempt to understand the world as it is but only to describe the world as we experience it; and epistemology, to be scientific, must likewise be not an attempt to understand the phenomenon of science but only a description of it.' Cohen does not emphasize the consistency between Mach and Nietzsche on this point, but he invokes Nietzsche later in his paper (p.135).

¹⁴ Green 2002 and Anderson 1996 disagree with her, for example. Apparently, Clark does not accept that Nietzsche attempted a reevaluation of the notion of truth, as suggested by other scholars (cf. e.g. Clark 1990, p.33). I am inclined to believe that in his late writings, Nietzsche called into question the traditional notion of truth as correspondence and, instead of getting rid of that very notion, argued that it must be reconceived from a new viewpoint. As I tried to show in Gori 2019a, this approach can be compared to William James's pragmatist view of truth – which, incidentally, was inspired by Mach (cf. e.g. Hiebert 1976 and Holton 1992).

¹⁵ Hussain 2004a, p.347. On Nietzsche's engagement with these authors, see e.g. Stack 1983; Green 2002; Emden 2014.

the very existence of which cannot be denied, although one can say nothing about it. For Hussain (2004a, p.334), this conception was ‘part of a standard story about how physiology and the materialistic world view undermine themselves.’ That story was “in the air” early enough to influence Nietzsche’ (Hussain 2004b, p.120), who studied the work of several neo- and post-Kantian authors with great interest. Furthermore, Hussain (2004b, pp.120-121) stresses that Mach’s ‘particular brand of empiricism, and the more specific monistic claim it involves, is at least one natural development of certain shared conceptions of the role of sensory evidence and the nature of scientific theories that were widespread at the time.’ As is well known, Mach’s conception of ‘sensation’ is in fact built upon a rejection of the Kantian thing-in-itself as a non-concept (cf. Mach 1959, p.30) – a notion which is meaningless to us insofar as we ‘know’ only what falls within the boundaries of our bodily experience. That is why Mach suggested that we talk of elements *or* sensations, thus creating the interpretive difficulties we are accustomed to dealing with nowadays.¹⁶ He believed that no proper knowledge is possible without the mediation of our body; therefore, we can only experience the elements as related to that body itself, that is, as sensations (Mach 1959, p.12). But these sensations do not provide access to the actual features of reality; they do not provide us with superior knowledge of things. We can trust them only because they are the very origin of our world-description and the actual limits of meaningful speech, for any discourse which does not deal with sensations and the relation between sensory elements is inconsistent (Mach 1992, p.119). For Mach, in fact, everything that goes beyond the limits of the realm of phenomena is merely a metaphysical assumption which can have no value in high-level cultural products such as science.

Hussain argues that Mach’s untraditional brand of empiricism, which attempts to overcome the metaphysical problems implied by positivism and neo-Kantianism, shows us that ‘one can take science and the senses quite seriously without straightforwardly accepting “the common sense picture of the world of relatively enduring middle-sized objects or the scientific world-view”’ to which Clark (1990, p.108) refers (Hussain 2004a, p.358). Moreover, that view can help Nietzsche scholarship to understand ‘what Nietzsche might mean by sensualism’ in his late writings (ibid., p.336) and ultimately to see that Nietzsche’s commitment to the truthfulness of the sensorial image can be consistent with the anti-metaphysical view he reiterates and even radicalizes in the late period. The only way to make sense of Nietzsche’s observations seems to be to accept that he developed the physiological conception debated at the time in the same way that Mach did, namely by assuming an anti-realist view which is

¹⁶ On the interpretive problems related to Machian elements, see Banks 2003.

moderate insofar as it takes care of the instrumental, i.e. fictional, character of our world-description alone, while the existence of an external world acting upon us is not rejected.¹⁷ In order to affirm that the features of the world of which we have knowledge are human products, the phenomenalist account must admit that there is, in fact, an external world acting on us. But – as noted above – insofar as it lies beyond the boundaries of that knowledge, anything we pretend to say about it is ill-founded and therefore meaningless to us.¹⁸

As Hussain conclusively remarks (2004a, p.358), the crucial point is the way in which Mach and Nietzsche approached ‘the distinctions between appearance and reality and the internal and external world.’ Both of them, in fact, assumed that this distinction is fictitious insofar as it is a product of the ordinary viewpoint, which has faith that our linguistic activity reproduces the external world adequately, thus allowing us to ‘possess knowledge of the world’ (Nietzsche 1996, p.16). But, as Nietzsche famously argued in *Twilight of the Idols* – in a way that, as will be shown, strikingly resembles Mach’s observations on the topic – once the ‘apparent world’ is interpreted as the actual limit of human knowledge, the ‘real’ or ‘true’ world becomes ‘an idea that is of no further use, [...] a superfluous idea, *consequently* a refuted idea’ (Nietzsche 2005, p.171). But along with the true world we also get rid of the apparent one, Nietzsche remarks, for the latter is a pure intellectual notion created in contraposition to the realm of human designations, which common sense mistakes as the criterion of reality.¹⁹ This obliteration is the ‘trademark’ of Mach’s and Nietzsche’s antimetaphysical viewpoint, and,

¹⁷ I defended this interpretation of Mach’s and Nietzsche’s anti-realism in Gori 2018a and Gori 2019a, respectively.

¹⁸ This only apparently means to fall back to the Kantian picture Mach and Nietzsche claimed to disavow, for the question of the ‘thing in itself’ has to be addressed on the pure theoretical level. The existence of an external realm acting on our sensorial apparatus is mandatory, if one wants to be a phenomenalist and not an idealist. But this does not mean that one must be also a realist about the properties *we* attribute to things. These are a pure human product, whereas the world remains completely unknowable – therefore of no use – to us. As Nietzsche argues, ‘thing in itself’ is a *contradiction in adjecto* (Nietzsche 2002: 16) precisely because it is not possible to even conceive a world-feature independently from our knowing activity (that is: to know *is* to create world-properties, properties which only make sense for us observers and world-interpreters). Thus, the intellectual path that Nietzsche famously draws in the section *How the ‘True World’ Finally Become a Fable* of *Twilight of the Idols* (Nietzsche 2005: 171) can be seen as an invitation to assume the sort of ‘critical standpoint’ Hans Vaihinger outlines in his *The Philosophy of As-if* (1911), which admits the instrumental value of our concepts conceived as intellectual aids for orientation, rather than the form of metaphysical anti-realism which is ordinarily attributed to Nietzsche, with all the problems it raises (for more on this, see Gori 2019b). I think the same goes for Mach. For him, too, it would be inconsistent to argue against the very existence of an external world. As I will try to argue in the next section, a possible solution to this riddle is to uphold a sort of epistemological agnosticism or moderate realism which limits the realm of the ‘knowable’ i.e. meaningful to our intellectual products.

¹⁹ As Hussain aptly observes (2004b, p.117), Mach and Nietzsche agree that ‘language, and conscious reasoning that must occur in language, misleads.’ They both insist on the instrumental value of concepts, on their mere symbolic nature and economical fruitfulness (cf. e.g. Mach 1897, p.192; Nietzsche 1996, p.16; Nietzsche 2003, p.9; Nietzsche 1980, Vol. 13, p.336). Furthermore, for Hussain (2004b, p.117), ‘within a Machian reading an interpretation of the world, and thus a perspective on the world, is a theory of the world that sets up names for particular clusters of sensory elements and the relations they stand in. Such interpretations in general will involve falsification, since grammar misleads us, perhaps necessarily, to think that our theory refers to objects and picks out explanatory causal relations.’

consequently, that on which one must focus if one is to develop a productive comparison between the two authors.

4. A Broader Viewpoint

Further studies on Nietzsche's engagement with modern science have been carried out since Hussain presented his initial case, and the Machian issues one encounters in Nietzsche have been thoroughly explored. On the one hand, these studies reveal that Nietzsche and Mach could not have influenced each other directly (Gori 2018b). On the other hand, however, Hussain's observations have for the most part been confirmed. Namely, it is nowadays widely accepted that Nietzsche's view of truth and knowledge is indebted to neo-Kantianism and that he also developed and ultimately overcame that tradition in an original way. Furthermore, the framework that Mach shares with Nietzsche has been defined as a debate on the physiological limitation of human knowledge and the apparent impossibility of solving certain fundamental 'world riddles.'²⁰ Against the early attempt to make either a positivist or an anti-positivist out of Nietzsche (he apparently endorses both views at different stages of his philosophical activity), a new image of Nietzsche as a post-Kantian and post-positivist has been defended, and it can be argued that Nietzsche was an important representative of a post-empiricist philosophy of science which claims that 'in natural science data is not detachable from theory; [...] facts have to be reconstructed in the light of interpretation; [...] theories are not models externally compared to nature in a hypothetico-deductive schema; [...] what counts as facts are constituted by what the theory says about their interrelations with one another; [...] the language of natural science is irreducibly metaphorical and inexact; [...] [and that] meanings in natural science are determined by theory; they are understood by theoretical coherence rather than by correspondence with facts' (Hesse 1972, p.280). Broadly speaking, it is possible to say that, like Mach, Nietzsche dealt with the outcomes of the Kantian legacy from a non-sceptical point of view, thus developing a view which is comparable to other approaches still debated within the current philosophy of science, such as the pragmatist, fictionalist, constructivist and coherence theories of truth.²¹ That is, both Mach and Nietzsche embraced the account of an active and creative mind which modern research reported, without interest in finding any realm of fixed truths or meanings beyond the phenomena. As shown above, this view implies

²⁰ Emile Du Bois-Reymond's 'Ignorabimus!' makes the case for the nineteenth-century problematization of the scientific world-explanation and shows us that epistemological relativism was the fundamental problem of that time (cf. Bayertz *et alia* 2007). As I tried to argue in Gori 2019a, Nietzsche's 'death of God' can be profitably interpreted in the light of that issue.

²¹ On this see, e.g., Remhof 2015.

that we cannot surpass the boundaries of our humanly-categorized world and, therefore, that nothing meaningful can be said of what lies beyond it.²²

This is what a thorough investigation of Nietzsche's concept of 'perspectivism' reveals. In *The Gay Science* § 354, Nietzsche intertwines that notion with 'phenomenalism' defined as the view that 'due to the nature of *animal consciousness*, the world of which we became conscious is merely a surface- and sign-world,'²³ and ultimately declares his agnosticism about 'the opposition between subject and object,' a distinction that Nietzsche leaves 'to those epistemologists who have got tangled up in the snares of grammar (of folk metaphysics)' (Nietzsche 2001, pp.213-4). As Nietzsche continues: 'Even less am I concerned with the opposition between 'thing in itself' and appearance: for we 'know' far too little to even be entitled to *make* that distinction. We simply have no organ for *knowledge*, for 'truth'.' This observation is the final step of a long yet consistent reflection on human knowledge that Nietzsche developed from 1873 onwards, a reflection which led him to the idea that the popular notion of 'knowledge' must be reconceived, for we erroneously believe it to provide proper access to reality.²⁴ On this, Nietzsche seems to agree with Mach, who in *Knowledge and Error* attempts to correct the ordinary conception that puts too much trust in imagination, due to its fruitfulness as a means of conceptual completion (*Knowledge and Error*, p.1). For Mach, 'the imagination rounds off incomplete findings in the way that is most familiar to it, thus occasionally falsifying them,' leading ordinary thought 'to the opposition between illusion and reality, between appearance and object' (ibid., p.7). This is of course problematic, for we misconceive the only fact to which we have access – the testimony of our sense organs – and create an illusory realm of non-existing entities. More precisely, Mach argues that 'once this opposition has emerged, it tends to invade philosophy as well, and is not easily dislodged. The weird and unknowable 'thing-in-itself' behind appearances is the ordinary object's unmistakable twin, having lost all other significance' (Mach 1976: 7; cf. also Mach 1959, p.6).

Insofar as they are expressed by an expert in the field of experimental psychology, Mach's remarks are more concrete and precise than Nietzsche's, and the same can be said of his epistemological agnosticism, which coherently follows from the monistic conception endorsed

²² This conception is explored, e.g., in Pihlström 2008.

²³ It can be argued that '*Phänomenalismus*' in Nietzsche identifies precisely the post-Kantian world picture outlined in works such as Friedrich Lange's *History of Materialism* (1866¹, 1875²), which Nietzsche carefully studied. See on this e.g. Stegmaier 2012, p.280 ff.

²⁴ Quite significantly, in the 1886-87 posthumous fragment 7[60], where Nietzsche contrasts positivism with perspectivism, we read that 'inasmuch as the word 'knowledge' has any meaning at all, the world is knowable' (Nietzsche 2003, p.139). For a discussion of that note in the light of the phenomenalist framework, see Gori 2019a: Chapter 2.

in the *Analysis of Sensations*. In that book, too, Mach criticized the ‘common and popular way of thinking and speaking [which] contrasts ‘appearance’ with ‘reality,’ arguing that ‘to speak of ‘appearance’ may have a practical meaning, but cannot have a scientific meaning. Similarly, the question which is often asked, whether the world is real or whether we merely dream it, is devoid of all scientific meaning’ (p.11). Accordingly, in *Knowledge and Error*, Mach argues that once we get rid of the illusory dualism between appearance and reality, the more economic conclusion (i.e. the inference to the best explanation) is to avoid any metaphysical commitment that cannot be demonstrated; therefore, agnosticism seems to be preferable to anti-realism.²⁵ Mach indeed believes that, ‘after misconstruing the boundary between the internal and external and thereby imposing the stamp of illusion on the ego’s entire content,’ we have no ‘further need for an unknowable something outside the confines that the ego can never transcend’ (ibid., p.7). Thus, the anti-metaphysical and monistic view which Mach advocates allows us to abandon the very distinction between appearance and reality, as Nietzsche argues. That is, if explored from the point of view of the ‘complete parallelism of the psychical and physical’ (*Analysis of Sensations*, p.60), and if, consequently, we take care of the *functional relations* between the elements only, ‘the question as to illusion and reality loses its sense’ (*Knowledge and Error*, p.7).

As noted above, this obliteration is crucial for both Mach and Nietzsche. Their criticism of common-sense realism and its faith in the existence of substance concepts such as the I, the body, etc. is in fact based on the assumption that the distinction between two separate realms of reality is artificial and illusory. Nietzsche is quite clear on this in *Twilight of the Idols*, for example, where he blames language for having induced us to believe in the existence of a causal agent called ‘I.’ In doing this, language proved to be a product of ‘psychology in its most rudimentary form,’ for it introduced a ‘fetishistic mindset’ which is essentially metaphysical and of which we can rid ourselves only insofar as we give up our ‘faith in grammar.’ (Nietzsche 2005, pp.169-70. Cf. the passage from *The Gay Science* 354 quoted above) The same critical attitude towards the notion of subjectivity can be found in *Beyond Good and Evil*.²⁶ There, Nietzsche reflects on the ‘atomistic’, i.e. ‘metaphysical’, need which spurs on philosophers as much as scientists (Nietzsche 2002, p.14). For him, it is because of this need that we ordinarily believe in the existence of both spiritual and material atoms, that is, in substance entities

²⁵ On Mach’s commitment to or against metaphysical realism, I disagree with Banks 2004. I tried to make my case for this in Gori 2018a.

²⁶ On Nietzsche’s criticism of subjectivity in the light of Lange’s and Mach’s approaches to scientific psychology, cf. Gori 2015.

imagined as a psychical unity or ‘residual earth [i.e. a particle of matter...] out of which the effects are produced’ (Nietzsche 2002, p.18). With his remarks, Nietzsche aims to dismantle an old article of faith and, consequently, to rid philosophy of its inherited fundamental prejudices.²⁷

Therefore, Nietzsche aimed to enlighten the minds of his fellow philosophers just as Mach attempted to clear up the scientific ideas of his time. In the *Analysis of Sensations*, Mach argues against ‘a very widespread prejudice’, based on the monistic conception that the illusory substance concepts I and body, matter and soul, ‘disintegrate into elements’ (pp.310 and 5).²⁸ This prejudice is precisely the idea that ‘there is [a] rift between the psychical and the physical, inside and outside’ – that there are “‘sensation[s]” to which an external “thing”, different from sensation, correspond[s]’ (ibid., p.310). But there is nothing of that sort for Mach, for whom the world we experience is constituted by ‘one kind of elements, out of which this supposed inside and outside are formed – elements which are themselves inside or outside, according to the aspect in which, for the time being, they are viewed’ (Mach 1959, p. 310). In claiming this, Mach contrasts the traditional view uncritically accepted by his colleagues and defends a sort of pragmatically-oriented sensualism without metaphysics, according to which ‘the boundary-line between the physical and the psychical is solely practical and conventional’ (ibid., p.311) and theories and concepts have a mere instrumental value. Within this picture, Mach stresses the purely logical value of complex symbols such as atoms and molecules, arguing that ‘if ordinary ‘matter’ must be regarded merely as a highly natural, unconsciously constructed mental symbol for a relatively stable complex of sensation elements, much more must this be the case with the artificial hypothetical atoms and molecules of physics and chemistry’ (ibid.). On this, too, Mach’s viewpoint is strikingly similar to Nietzsche’s, for they both defend a pragmatic antirealism which aims to reevaluate the value of traditional concepts, once their truth value – their value as an adequate reproduction of reality – is put into question.²⁹ Indeed, the passage from *The Analysis of Sensations* continues as follows: ‘The value of these implements [i.e. atoms and molecules] for their special, limited purposes is not one whit destroyed. As before, they remain economical ways of symbolizing experience. But we have as little right to expect from them, as from the symbols of algebra, more than we have put into them, and certainly not more

²⁷ The first chapter of *Beyond Good and Evil* is in fact titled ‘On the Prejudices of Philosophers,’ and the whole book is conceived as a ‘Prelude to the Philosophy of Future.’

²⁸ Richard von Mises (1970, p.256) argued that ‘Mach’s analysis of knowledge provides an approach to’ the ‘dilemma of the world of appearances of our senses and the ‘true’ world of science,’ to the problem of the thing in itself and the general issue of realism. The effect of that analysis ‘is liberating because it clears away accumulated debris and it provides release by opening our eyes to an unprejudiced view.’

²⁹ This thesis is advocated in Gori 2019a.

enlightenment and revelation than from experience itself. We are on our guard now, even in the province of physics, against overestimating the value of our symbols' (p.311).

Within this picture, it is necessary to redefine the very function of both philosophy and science. The task of the latter ceases to be merely representative and descriptive for Nietzsche and Mach, who instead focus on the role it plays as a means of orientation. Mach is especially clear on this in the *Analysis of Sensations*, where he argues that science aims to provide us 'with as perfect means of orientating himself as possible' (p.37), and in *Knowledge and Error*, where the laws of nature are described as 'a product of our *psychological* need to find our way about in nature,' the most recent 'attempt at orientation' produced by our 'current state of culture' (p.354).³⁰ In Nietzsche, the question of orientation is subtler but also more substantial, for it is related to the fundamental problem of relativism (the 'death of God') with which he is so deeply concerned and which in *The Gay Science* (§125) he in fact presents as a lack of reference points for mankind. Future philosophy as a critical enterprise which undermines the value of the old 'truths' is expected to deal with that relativism and to outline the path towards a valuational system of a different kind.

It is precisely in the light of this that we can compare Mach and Nietzsche and conclude that they belong to the same movement in the history of Western thought. Relativism is a fundamental issue of modernity, an issue that involves the 'hard sciences' as much as any other expression of philosophical thought. It is 'a stream in the philosophy of the past two hundred years that began as a trickle' and has ultimately 'swelled into a roaring torrent' (Bernstein 1983, p.13). Relativism imbues heated topics of contemporary philosophy of science such as the realism vs. antirealism debate and the problem of the objectivity of our world-description, two issues that Mach and Nietzsche wrestled with in an original way. As I have tried to show, their contributions to cultural studies can be evaluated on the basis of their attempt to protect us from the destructive power of that torrent, but at the same time to take advantage of that power itself, in order to allow the highest manifestations of European civilization to rid themselves of metaphysical obscurities.³¹

³⁰ Cf. also *Knowledge and Error*, pp.2-4 and, for more on this, Gori 2019c.

³¹ I would like to thank John Preston for his careful reading and valuable remarks which helped in improving my paper.

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