

# NIETZSCHE-STUDIEN

Internationales Jahrbuch  
für die Nietzsche-Forschung

Begründet von

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Band 38 · 2009



Walter de Gruyter · Berlin · New York



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THE USEFULNESS OF SUBSTANCES.  
KNOWLEDGE, SCIENCE AND METAPHYSICS  
IN NIETZSCHE AND MACH

**Abstract:** In this paper I will discuss the role played by Ernst Mach on Nietzsche's thought. Starting from the contents of his *Beiträge zur Analyse der Empfindungen*, I'll show the close similarities between their views on both human knowledge and the scientific world description. In his writing on science Nietzsche shares Mach's critique to the 19<sup>th</sup> century mechanism and its metaphysical ground, as much as his way of defining the substantial notions such as *matter*, *ego* and *free will*. Moreover, my investigation will make it clear that Mach cannot be seen as a direct source of Nietzsche's thought, since the latter wrote many times on the same subjects long before his first reading one of his works. Rather, it is possible to consider the writings of Lange, Spir and Spencer as the first sources of Nietzsche's views on the main themes Mach dealt with in his work from 1886.

**Keywords:** Knowledge, sensualism, psychology, will, metaphysics.

**Zusammenfassung:** Der Beitrag untersucht die Bedeutung von Ernst Mach für das Denken Nietzsches. Ausgehend von Machs *Beiträgen zur Analyse der Empfindungen* werden starke Ähnlichkeiten ihrer Auffassungen hinsichtlich der menschlichen Erkenntnis und der wissenschaftlichen Weltbeschreibung aufgezeigt. Nietzsche teilte sowohl Machs Kritik am Mechanismus des 19. Jahrhunderts und seiner metaphysischen Grundlage als auch seine Weise, substantielle Begriffe wie *Materie*, *Ego* und *freien Willen* zu bestimmen. Dennoch kann Mach nicht als eine direkte Quelle für Nietzsches Denken angesehen werden, da Nietzsche schon vor seiner Lektüre Machs die Themen behandelt hatte, in denen seine Auffassungen mit denen Machs konvergieren. Es dürften vielmehr Werke von Lange, Spir und Spencer als direkte Quelle für Nietzsches Ansichten auch zu den Themen in Frage kommen, die Mach dann in seiner Arbeit von 1886 behandelte.

**Schlagwörter:** Wissen, Sensualismus, Psychologie, Wille, Metaphysik.

## 1. *On perception and lie*

### 1.1 The neo-Kantian background

Among the many scientists that Nietzsche knew all along his life, Ernst Mach is one of the most important for the role he played in 19<sup>th</sup> century physics and psychology. His view on the history of science, as much as his criticism of the mechanistic world picture, were well-known in those years and shared by other

contemporaries; a fact that allows us to think that Nietzsche could easily have been influenced by them, but makes more difficult to evaluate Mach as a source of his philosophy. Indeed, this issue involves several problems, since the name of Mach is almost absent from Nietzsche's writings; despite of it, their working on the same themes and the deep similarities between their ideas on human knowledge suggest us to compare their work, and even suppose a direct influence between them. Moreover, during the last years many scholars of the Nietzsche-Forschung recognised Mach as a main reference for their work, since a study on his thought has been useful to answer some questions on Nietzsche's philosophy and explain specific theoretical assumptions that could otherwise remain without a well-defined ground.<sup>1</sup> Nevertheless, until now there's no critical and complete study on the connection between them; the name of Mach appears only occasionally in the studies concerning Nietzsche's philosophy, and it often fades into more general themes or not much detailed reflections on the features of 19<sup>th</sup> century epistemology.<sup>2</sup>

The main evidence of an interest for Mach's work comes from Nietzsche's private library, in which one finds two volumes of the Austrian scientist. The first of them is the work from 1886 bought by Nietzsche maybe in the same year, titled *Beiträge zur Analyse der Empfindungen*, the first edition of one of Mach's best known works.<sup>3</sup> The other text is an essay on projectile's paths, published by Mach with Peter Salche and sent to Nietzsche with his sign.<sup>4</sup> On the other hand, if one considers Nietzsche's writings, any attempt to refer a single passage

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<sup>1</sup> Mach is one of the many authors one can take as starting point of a research leading outside Nietzsche's texts, to reconstruct the whole picture which they are part of. Mazzino Montinari defined this operation as the setting up of an "*extratext*", that is essentially one of the main aims of the critical edition of Nietzsche's writings (see Montinari's unpublished note quoted by G. Campioni in: Nota to Mazzino Montinari, *Che cosa ha detto Nietzsche*, Milano 1999, p. 202).

<sup>2</sup> In his last works devoted to a reconstruction of Nietzsche's scientific readings, Thomas Brobjer quoted many times Mach, e.g. in: *Nietzsche's Philosophical Context*, Urbana / Chicago 2008, pp. 91–95, and *Nietzsche's Reading and Knowledge of Natural Science: An Overview*, in: Thomas Brobjer / Gregory Moore (ed.), *Nietzsche and Science*, Aldershot 2004, pp. 21–46, pp. 41–46. Some correspondences between Mach's thought and Nietzsche's philosophy have been highlighted also by Hans-Joachim Pieper in his *Musils Philosophie. Essayismus und Dichtung im Spannungsfeld der Theorien Nietzsches und Machs*, Würzburg 2002. Moreover, in the last years Nadeem Hussain dealt more directly with the connection between the two thinkers, looking at Mach's epistemology to carry out an interpretation of Nietzsche's thought. Later in text I will refer to his two essays on this argument.

<sup>3</sup> From the second edition Mach called it *Analyse der Empfindungen und das Verhältnis des Physischen zum Psychischen*.

<sup>4</sup> The short inscription is: "Herrn Prof. Dr. Nietzsche hochachtungsvoll E. M." (see Giuliano Campioni / Paolo D'Iorio / Maria Cristina Fornari / Francesco Fronterotta / Andrea Orsucci, *Nietzsches persönliche Bibliothek*, Berlin 2003, p. 382). It seems likely that this article has been sent to Nietzsche in return for his *Zur Genealogie der Moral*; in fact, the philosopher put Mach into the list of people to whom the publisher Naumann had to send the just printed book (Cfr. Nietzsche an Constantin Georg Naumann, 8. November 1887, KGB III 5, Nr. 946).

of them to one of Mach's works, even if indirectly quoted, seems not to lead us to the attempted results.<sup>5</sup> The only place where one can read the name of Mach is a note from 1882, found for the first time by Alwin Mittasch (with the help of Max Oehler) and published in his text from 1950.<sup>6</sup> In a notebook, among other books that he studied some years before, the philosopher wrote the title of an early essay of Mach, *Die Geschichte und die Wurzel des Satzes von der Erhaltung der Arbeit*, published in Prague in 1872 but presented one year before at a meeting of the Royal Bohemia Society of Science.

Therefore, it seems that the only one element one can start from to compare the two thinkers – and check the similarities between them – is the book found in Nietzsche's private library, the *Beiträge zur Analyse der Empfindungen* the philosopher bought in 1886 and that he probably read, even if there're no relevant proofs of a detailed study.<sup>7</sup> Many questions rise from this book, if one wants to make sense of the presence of it in Nietzsche's library: first of all one should understand how did he know Mach and the main contents of his epistemology and, consequently, why he asked for his last work; moreover, one should study Nietzsche's concerning with the same issues on physics and physiology the Austrian scientist deals with. It's highly probable that Mach represents just a perspective, a peculiar world view that exited Nietzsche's interest and that in many ways he shared; therefore, the study of a similarity between them leads us to a debate they both refer to, and from which they received the main subjects they would handle with their work. Indeed, the value of this book is greater than what is written in the title, since the unusual theory of the *elements* carried out by Mach

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<sup>5</sup> It seems to me exemplary the case detected by Brobjer in 2003, when he suggested a comparison between a page from *Götzen-Dämmerung* and a section of Mach's book from 1886, to testify an influence of this text on Nietzsche (see Nachweis aus Ernst Mach, *Beiträge zur Analyse der Empfindungen*, in: *Nietzsche-Studien* 32 (2003), pp. 450–451). Despite the fact that the two passages reveal many correspondences (they both concern the oneiric activity, and present as example the perception of a gunshot and of an explosion), the main topic of the “*Zeit-Umkehrung*” they both deal with occurs many times in Nietzsche's writings between 1884 and 1885, before Mach publishing his work on sensations (Cfr. Nachlass 1884, KGW VII 2, 26[35] and 26[44]; Nachlass 1885, KGW VII 3, 34[54] and 39[12]; Nachlass 1888, KGW VIII 3, 15[90]). Moreover, one encounters it even before, in a paragraph of *Menschliches, Allzumenschliches* titled *Logik des Traumes* (MAM I 13). In this aphorism one can find all the elements Nietzsche presented in the section on *Irrthum der imaginären Ursachen* of *Götzen-Dämmerung* (GD, Die vier grossen Irrthümer 4), from the general topic of time-inversion to the specific example of the gunshot he uses in his argument.

<sup>6</sup> Alwin Mittasch, *Friedrich Nietzsches Naturbeflissenheit*, Heidelberg 1950, p. 186. In 1986 Montinari published this fragment into the critical apparatus of the complete edition of Nietzsche's works, exactly in the *Ergänzungen im Text der Abteilung VII* (KGW VII 4/2, S. 67).

<sup>7</sup> As Brobjer writes, there're only two annotations in the copy of the book in Nietzsche's library in Weimar: a correction made from “auf” to “auch” on p. 61, and an underlining on p. 85: “Das stärkere selbständige Auftreten der Phantasmen [...] muss seiner biologischen Unzweckmässigkeit wegen als pathologisch angesehen werden” (see Nachweis aus Mach, *Beiträge zur Analyse der Empfindungen*, p. 450).

is more than just an exposition of the main results of his experiments on sensorial activity; rather, it is an attempt to overcome the traditional scientific worldview, and get rid from the Kantian-oriented idealism and materialism. Therefore, in this text Nietzsche could have found an example of how science was updating his views, through a revision of its ground ideas and a refusal of the metaphysical heritage that was still the basis of it describing the natural world.

It is very likely that Nietzsche paid attention to Mach's book from 1886 for he was interested in the main topic it concerns, i.e. the question of sensations, a subject that the philosopher already studied from his first readings on natural science. Furthermore, since he dealt with the main questions of the theory of knowledge and the theoretical grounds of scientific discovery, Nietzsche wrote many times to focus the role of sensations for human knowledge and, most of all, to stress the importance of distinguishing between the misleading of senses and the falsification of our reason. In fact, over the years he was even less persuaded of the truthfulness of the Cartesian view attributing to our perceptions an illusory nature; in his last writings he reversed this idea and detected the brain elaboration of our sense testimony as the crucial moment when external data are modified. Nietzsche presented this idea in *Götzen-Dämmerung* when, referring to Heraclitus' perspective, he wrote that senses *do not lie at all*. According to him, "was wir aus ihrem Zeugnis machen, legt erst die Lüge hinein, zum Beispiel die Lüge der Einheit, die Lüge der Dinglichkeit, der Substanz, der Dauer ... Die "Vernunft" ist die Ursache, dass wir das Zeugnis der Sinne fälschen. Sofern die Sinne das Werden, das Vergehen, den Wechsel zeigen, lügen sie nicht ..." (GD, Die "Vernunft" in der Philosophie 2).

In the years before Nietzsche's view on the same subject didn't completely correspond to this idea, for he criticised many times the mechanistic perspective writing that it was grounded on two *prejudices* (a *psychological* one and another – precisely – *of the senses*<sup>8</sup>). However, as times goes by he changed his opinion, and started thinking that the crucial point should be the *interpretation* of sense data. During his last years of thought he paid attention to the activity of the intellect, and wrote that all the "errors" of knowledge – that he considered useful to the preservation of the species – came only from its working.<sup>9</sup> Everything concerning the existence of substantial entities, the description of a 'real' world consti-

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<sup>8</sup> See Nachlass 1888, KGW VIII 3, 14[79]: "Wir haben also, um den Mechanismus der Welt theoretisch aufrecht zu erhalten, immer die Clausel zu machen, in wie fern wir sie mit zwei Fiktionen durchführen: dem Begriff der Bewegung (aus unserer Sinnensprache genommen) und dem Begriff des Atoms = Einheit (aus unserer psychischen "Erfahrung" herstammend): sie hat ein Sinnen-Vorurtheil und ein psychologisches Vorurtheil zu ihrer Voraussetzung. Die mechanistische Welt ist so imaginirt, wie das Auge und das Getast sich allein eine Welt vorstellen (als "bewegt") / so, daß sie berechnet werden kann".

<sup>9</sup> See FW 110–111.

tuted by material atoms, things and subjects – in other words: the creation of a realm of metaphysical entities –, is closely related to our brain processing sense data, i.e. its schematizing and simplifying them.

On the whole, Nietzsche admits that human knowledge of external world comes from a “Zweifache Fälschung, von den Sinnen her und vom Geiste her, um eine Welt des Seienden zu erhalten, des Verharrenden, Gleichwerthigen usw.” (Nachlass 1886/87, KGW VIII 1, 7[54]). However, in *Götzen-Dämmerung* Nietzsche dismisses this duplicity, and focuses his attention to the main operating of the intellect, which *believes* in the *mere relative* stability that sense organs – that are limited – testify, and on this ground builds a world of abstract entities. The danger seems to be that the intellect, trying keeping away from the sense misleading and, moreover, completely rejecting what they testify, takes refuge in a dimension which is intrinsically different and separate.<sup>10</sup> Nevertheless, in his last year of thought Nietzsche admits that modern philosophy tries to overcome the traditional perspective (most of all he refers to idealism), since it displays a new interest on sense testimony and its value. He seems to assess positively this turn, even if exposed to another error, since an extreme belief in sense data could be illusory as much as an ideal creation. Thus, in the last book of *Die fröhliche Wissenschaft*, Nietzsche warns the readers about the new perspective: “Ehemals hatten die Philosophen Furcht vor den Sinnen: haben wir – diese Furcht vielleicht allzusehr verlernt? Wir sind heute allesammt Sensualisten, wir Gegenwärtigen und Zukünftigen in der Philosophie, nicht der Theorie nach, aber der Praxis, der Praktik ...” (FW 372). This reference to the practical attitude that modern sensualists would adopt is absolutely coherent with Nietzsche’s position in *Götzen-Dämmerung*. According to R. Small, their perspective can be seen as an “intention to achieve a better, more detailed and accurate *description* of natural processes, ‘perfecting the image of becoming’ rather than pretending to grasp its underlying causes. They treat the senses not as an authority for conviction, but as a source of provisional hypotheses. For the senses themselves do not contain the interpretations we impose upon them”.<sup>11</sup> Therefore, Nietzsche looks favourably the sensations, since he considers them as a content we can know only after our brain processed it, but having no truth value at all. Senses working depends on their physiological constitution, thence their reacting to the external world is always conditioned by their inner mechanisms. Any *error* belongs to the intellect, which misinterprets sense data and transforms them into a

<sup>10</sup> The perspective against which Nietzsche warns us is therefore that of idealism, which – he writes – leads to “dem kalten Reiche der “Ideen””, but also thinks to elude the misleading tentacles of senses, which drag the philosophers out of *their* world (FW 372). This attitude will incur into the common error of going round an obstacle and coming up against another of the same weightiness, since “die Ideen schlimmere Verführerinnen seien als die Sinne” (ibid.).

<sup>11</sup> Robin Small, *Nietzsche in Context*, Aldershot 2001, p. 158.

world of fixed entities. In a notebook entry from 1887–1888 concerning some ideas on Nihilism, Nietzsche sums up his view on perception and writes: “Die Ideen sind Täuscherei; die Sensationen sind die letzte Realität” (Nachlass 1887/88, KGW VIII 2, 11[332]).

Nadeem Hussain lately dealt with this subject: in a couple of articles he observed that Nietzsche set off many ideas he concerned with all along his life by his reading the main works of Albert Lange and Afrikan Spir.<sup>12</sup> Indeed, the problem of sensations – seen as part of the broader question of knowledge – seems to be closely related to the topics on sensualism which Lange dealt with in his *Die Geschichte des Materialismus*. The sharp refusal of idealism and, moreover, the idea that external world can be described just as our senses show, are all observations one can directly refer to Lange’s view.<sup>13</sup> Indeed, the ideas of materialism are linked with a perspective which pays attention to sense data, and one can consider this philosophy as the one attributing the greatest value to our senses and finally *believing* in their testimony. On the other hand, this greatest trust allows us to distinguish between sensualism and materialism, as one can read in some of Nietzsche’s writings and most of all in the closing remarks of Lange, who finally finds a view that justifies the Kantian theory of knowledge and his claims on the inner structure of the world of phenomena. Moreover, Nietzsche seems to admit the value of the main ideas of materialism, and emphasizes their relevance for both philosophical and scientific inquiry; nevertheless, he stops himself at the crucial point, i.e. accepting the *existence* of matter.<sup>14</sup> That’s why sensualism can be seen as a way out of this trouble, once one considers it as a mere *temporary hypothesis*.<sup>15</sup> Thus, it is possible to believe in sensory activity as long as we don’t pretend to completely accept the image of nature they describe us, since this disposition would lead us to the creation of a world of absolute entities not related to reality

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<sup>12</sup> The works here referred to are the following: Nadeem Hussain, Reading Nietzsche through Ernst Mach, in: Thomas Brobjer / Gregory Moore (ed.), Nietzsche and Science, Aldershot 2004, pp. 111–129, and Nadeem Hussain, Nietzsche’s Positivism, in: European Journal of Philosophy 12/3 (2004), pp. 326–368.

<sup>13</sup> See Friedrich Albert Lange, *Die Geschichte des Materialismus*, Frankfurt am Main 1974 [1882], vol. 2, p. 621: “Der Materialismus [...] vertraut *den Sinnen*. Auch seine Metaphysik ist nach Analogie der Erfahrungswelt gebildet. Seine Atome sind kleine Körperchen. Man kann sie sich zwar nicht so klein vorstellen, wie sie sind, weil das jede menschliche Vorstellung übersteigt; man kann sie sich aber doch vergleichsweise vorstellen, als sähe und fühlte man sie”.

<sup>14</sup> See Nachlass 1884, KGW VII 2, 26[432]: “Wenn ich an meine philosophische Genealogie denke, so fühle ich mich im Zusammenhang [...] mit der mechanistischen Bewegung (Zurückführung aller moralischen und ästhetischen Fragen auf physiologische, aller physiologischen auf chemische, aller chemischen auf mechanische) doch mit dem Unterschied, daß ich nicht an “Materie” glaube”.

<sup>15</sup> See JGB 15: “Um Physiologie mit gutem Gewissen zu treiben, muss man darauf halten, dass die Sinnesorgane nicht Erscheinungen sind im Sinne der idealistischen Philosophie: als solche könnten sie ja keine Ursachen sein! Sensualismus mindestens somit als regulative Hypothese, um nicht zu sagen als heuristisches Princip”.



at all. According to Nietzsche, sensualism is not a theory asserting the truthfulness of sense data and considering them as the constitutive element of natural world; rather, this perspective simply admits the unavoidable function of our sense organs as the only way to reach external data. Thus, even if – as written by Lange – materialism uses the same terms as sensualism, it can distinguish itself from this latter perspective since it *believes* in sense data, and builds on them a metaphysical world picture that can be directly compared with that of idealism. Instead of it, one can see sensualism as a third way, an hypothesis that is different from both the most extreme perspectives, and which results let us state that the world we see is intrinsically different from his ‘true’ structure.<sup>16</sup>

Nietzsche dealt with the theme of sensations since he was in Basel, when he read the main work of Afrikan Spir. Many notes from 1873 reveal that he implicitly refers to this author’s thoughts, most of all when he writes that it could be possible to describe nature only from sensations and representations.<sup>17</sup> Moreover, Nietzsche found in Spir’s *Denken und Wirklichkeit* some observations on the origin of the notion of *substance* and, more generally, of the idea of existing material entities rising from what sense organs testify.<sup>18</sup> Briefly, the perspective of Spir concerns subjects that later Nietzsche picked up in his thoughts, first of all a way of describing the world of experiences with phenomenological terms, as a flux of sensations gathered together in complexes only relatively permanent. Moreover, among the ground ideas of Spir one finds some interesting statements on the cognitive relationship between human beings and the natural world, which one can compare with some later ideas of Nietzsche. Above all, the former argues that intellect’s processing sense data, although it may be defined false, still complies with the inner world structure. In other words, even though representations are false, they still process data coming from the reality, i.e. the sensations. One cannot have any perception without sensations, even if their elaboration gathers them together or misinterprets their content.<sup>19</sup> Thus, what falsifies our world is just *the way in which* we interpret a group of sensation, and only from this operation come all substantial and material entities. In Nietzsche’s

<sup>16</sup> In Lange’s view it allows us to confirm the Kantian idea for which both perception and knowledge comes by our inner, physiological configuration.

<sup>17</sup> See Nachlass 1873, KGW III, 26[11], but also the observations on Nietzsche’s writings from the same year that Karl Schlechta and Anni Anders made in their *Friedrich Nietzsche. Von den verborgenen Anfängen seines Philosophierens*, Stuttgart-Bad Cannstadt 1962.

<sup>18</sup> One can define Spir’s view, even though builded on a Kantian perspective, as a form of phenomenalist-oriented Kantianism, most of all for he writes that “was wir als Körper erkennen, das sind in der That die wahrgenommenen, unmittelbar gegebenen Objecte, nämlich unsere Empfindungen oder deren Gruppen” (Afrikan Spir, *Denken und Wirklichkeit*, Leipzig 1873, vol. 2, p. 56). For a discussion on Nietzsche’s reading of Spir see Hussain, Nietzsche’s Positivism, and Paolo D’Iorio, *La superstition des philosophes critiques. Nietzsche et Afrikan Spir*, in: *Nietzsche-Studien* 22 (1993), pp. 257–294.

<sup>19</sup> See Hussain, Nietzsche’s Positivism, pp. 341–343.

words, the error of knowledge is not our perception of external world, rather *what we make* with the result of this process, when our intellect filters and transforms sense data into concepts. The question – that Spir raises, too – concerns the relationship between us and sense data, since, even though one can say that they're “given” to us, our intellect is the only instrument we have to know the external world. Therefore, any kind of knowledge is just a falsification.

From these brief considerations one can see that Nietzsche's thoughts on sensations come from his reading works of neo-Kantian writers. Both the chronology and the many evidences of his studying these texts allow us to say that his interest on this subject has been roused above all by Lange and Spir, before his finding Mach's writings.<sup>20</sup> Therefore, the *Analyse der Empfindungen* could be a text that Nietzsche used to improve some features of a question he dealt with many years before and that he was still studying in 1886, a fact proved by the sharply machian language of some notes that he wrote after this year. Thus, it was the Kantian background that signed Nietzsche's view, the same ground from which Mach's issues on critical positivism raised. Indeed, many features of his theory of sensations could be seen as a natural development of the phenomenalism of author such as Afrikan Spir and Gustav Teichmüller,<sup>21</sup> most of all if one considers the deep similarities between the world of sense elements and the cluster of sensations they all talk about.

However, one can verify that Nietzsche revises the main subjects of neo-Kantian writers, and that his perspective moves in many ways beyond their view, towards a theory of knowledge that is closer to Mach's thought. The sensualism of this scientist overcomes the tradition, first of all since he doesn't refer to the “thing in itself” anymore, and tries to get rid of the heritage of Kant's philosophy. His aim, in describing the reality as nothing but sensation and represen-

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<sup>20</sup> On a hint of Max Oehler, who worked in Weimar's archive, Alwin Mittasch writes that Nietzsche read texts by Mach in a public reading-room in Zurich in 1884 (see Mittasch, *Friedrich Nietzsches Naturbegrifflichkeit*, p. 21). One finds almost the same information in Hans Kleinpeter, who wrote to Mach that he knew from Elisabeth Förster-Nietzsche that her brother was interested in his research programme (in a letter to Mach from 1912, he wrote: “I received the news from Weimar, that Nietzsche read one of your essays in a scientific journal in 1885 and spoke very favourably about it”). This letter is quoted in John Blackmore, *Ernst Mach: His Work, Life, and Influence*, Berkeley 1972, p. 123). One cannot even know which was the text he read, and there're many possibilities, since they both talk about an essay and it is not possible to consider just the narrow number of books that Mach published before that year. On the other hand, Oehler showed to Mittasch Nietzsche's note from 1882, where one can find the title of Mach's essay from 1872. Even though these news could be reliable, they still date Nietzsche's reading of a text by Mach *after* his studying the main works of Lange and Spir.

<sup>21</sup> Gustav Teichmüller is another reference on the theme of sensations, since Nietzsche read his book *Die wirkliche und die scheinbare Welt* (1882) too. See on this argument, once again, Hussain, *Nietzsche's Positivism*, pp. 343 ff.

tation, is not to save the noumenal dimension, rather to carry out an inquiry that would dissolve any kind of substantialism and, consequently, clear the ground from any metaphysical heritage. In doing so he's in line with Nietzsche, whose philosophy is specifically oriented at an overcoming of the platonic dualism that can still be found in the worldview of post-Kantian positivism.

## 1.2 Antimetaphysical monism

The main issue raised in Mach's book from 1886 concerns the relation of the *Psychical* to the *Physical*. In the introductory remarks to this text he writes that the greatest results achieved by science in modern time, most of all by the physiology of senses, allow us to recognise the direct correspondence between the two planes and dissolve this old distinction. Therefore, Mach carries out this aim, starting from a new definition of the basis of our relation to the external world, those *sensations* from which arise the concepts of *thing*, of *body*, and of any other material entity. As much as human *ego*, they cannot be seen as substantial or permanent as we usually do, rather they're but "räumlich und zeitlich (funktional) verknüpfte *Komplexe* von Farben, Tönen, Drücken u.s.w."<sup>22</sup> Mach talks about sensations, but immediately corrects himself and presents a new definition of this word; indeed, he pays attention to the expressions he uses and takes care not to be misinterpreted because of a less clarity of current usage terms. His way of defining what he means with the word "sensation" is closely related with his epistemology, since only from this ground one can reach his peculiar perspective on scientific thought. The main thesis of his theory of sensations is that anytime one has to define the component parts of the complexes forming the natural world one should not interpret them neither as physical nor as psychical. Indeed, Mach thinks that sensations are already an elaboration, since they show properties relating them with one of the two planes; therefore, they cannot be seen as the primal parts of material entities. That's why he prefers speaking of "elements" (*Elemente*), even if many times there's no distinction between them and the notion of sensation. This is but a *terminological choice* whose value is just methodological; Mach's purpose is to clarify that he calls "sensation" something completely independent from any thinking subject, therefore free from any conceptual modification our brain could process. If one searches beyond our interpreting the world in terms of senses or phenomena one can find these "elements" having no definite properties, i.e. "letzte Bestandteile, die wir *bisher* nicht wei-

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<sup>22</sup> Ernst Mach, *Analyse der Empfindungen und das Verhältnis des Physischen zum Psychischen*, Darmstadt 1987 [1922<sup>o</sup>] (later in text AE), p. 2.

ter zerlegen konnten”.<sup>23</sup> We are unable to subdivide these component parts any further, since they stand on a wider plane than both physic and psychic events, and have no attributes defining them as part of one of these realms.

In his *Analyse der Empfindungen* Mach precisely defines the complexes of elements one could usually consider: he calls A B C ... those complexes of colours, sounds, and so forth, commonly called bodies (*Körper*); K L M ... “den Komplex, der unser Leib heißt, und der rein *durch Besonderheiten ausgezeichneter Teil der ersteren ist*; den Komplex von Willen, Erinnerungsbildern u.s.w. stellen wir durch  $\alpha \beta \gamma \dots$  dar”.<sup>24</sup> What is really important in his defining the complexes of elements is that it is not possible to clearly differentiate between *ego* and *body* (or *soul* and *matter*), since Mach admits that one can see  $\alpha \beta \gamma \dots$  and K L M ... as making up the *ego* (and consider this complex as opposed to A B C ..., that makes up the world of physical objects), but also that, sometimes,  $\alpha \beta \gamma \dots$  alone is viewed as *ego*, and K L M ... together with A B C ... as the world of physical objects.<sup>25</sup> Actually, our body is part of the external world, then, if we’re dealing with the relation of different bodies one another, we can define it as a physical object. However, the same complex of elements can also be seen in a pure psychological way, if one considers its component parts as feelings and volitions. Mach seems not to take really care of this distinction, since from his point of view *body* and *ego* are but supposed unities, i.e. “nur Notbehelfe zur vorläufigen Orientierung und für bestimmte *praktische Zwecke*”.<sup>26</sup> Thence, if one wants to carry out a more advanced scientific investigation, one must leave these concepts as insufficient and inappropriate. Then “*der Gegensatz zwischen Ich und Welt, Empfindung oder Erscheinung und Ding fällt dann weg, und es handelt sich lediglich um den Zusammenhang der Elemente  $\alpha \beta \gamma \dots$  A B C ... K L M ...*”.<sup>27</sup> From this perspective, science has simply to accept this connexion, and to get its bearings in it, without at once wanting to explain its existence.<sup>28</sup>

Therefore, Mach focuses his analysis on the ontological determination of the substantial elements adopted by the mechanistic science as unavoidable ground of its inquiry, and which it looks to for a new definition of both nature and aims of scientific research. Before dealing with the question concerning the *anti-metaphysical* intent of his book, Mach gets down to the basic definition of sensations, whose attributes come from the relation between elements and bodies:

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<sup>23</sup> Ibid. p. 4.

<sup>24</sup> Ibid. p. 7.

<sup>25</sup> Ibid.

<sup>26</sup> Ibid. pp. 10–11.

<sup>27</sup> Ibid. p. 11.

<sup>28</sup> Ibid.

Bei der Häufigkeit analoger Vorkommnisse gewöhnt man sich endlich, alle Eigenschaften der Körper als von bleibenden Kernen ausgehende, durch Vermittlung des Leibes dem Ich beigebrachte “Wirkungen”, die wir *Empfindungen* nennen, anzusehen. Hiermit verlieren aber diese Kerne den ganzen sinnlichen Inhalt, werden zu bloßen Gedankensymbolen. Es ist dann richtig, dass die Welt nur aus unsern Empfindungen besteht. Wir wissen aber dann eben *nur* von den Empfindungen.<sup>29</sup>

Briefly, not any element is a sensation, rather one can call so only those related with our body. Indeed, Mach admits that one can use the two terms as synonyms, but only for in most cases he’s dealing with human perspective, which cannot get rid of the body as *medium* to know the external world; thus, one can say that what is really constituted by sensations is just *our* world, since we cannot relate ourselves with the elements as if they were absolute entities, i.e. ignoring the interaction between them and our body. Together with it, Mach doesn’t want to attribute an ontological value to sensations, thence he doesn’t look at them as the constituent parts of the world – even if he admits that our world representation rose from them. Despite the fact that sensations are the only component parts of reality we can know, they don’t have any value for a description of physical processes *in itself*. The first reference of our worldview are but the *elements*, which can be represented just *as* body sensations; therefore, if one wants to say that our world description is grounded on sensations, one must consider them as something still filtered and modified from our intellect. In other words, Mach’s sensualism has a peculiar quality, since it’s not only based on senses as the ground of our world knowledge. The point is that the constituent parts of reality are just the elements, and we can know them only as sensations because of our looking at the external world from an unavoidable and limited perspective. This is a crucial observation, since it helps us to comprehend Mach’s critique of contemporary epistemology and, most of all, of the Kantian idea of the “thing in itself”. Trying to overcome the dualistic perspective carried on by the scientists still dealing with the great gulf between physical and psychological research, he doesn’t make the inference that could lead him into metaphysics. Indeed, he argues that one must refer to data which are *neutral* about the two realms, i.e. the best starting point for an investigation that would remain out of both their perspectives. Nevertheless, he never admits that a description of these elements is possible. Rather, Mach writes that a knowledge not grounded on our sensations is impossible, since anytime the thinking subject looks at the external world, he modifies its essential data.<sup>30</sup>

<sup>29</sup> Ibid. pp. 9–10.

<sup>30</sup> This theory of sensory experience is Mach’s answer to Kant’s philosophy of the “thing in itself”, rejected by the scientist because of its superfluous role. Indeed, on this basis it is possible to build a dualistic view that would necessarily lead into the realm of metaphysics. If we drop the “thing in itself” from our worldview, we must refer to Mach’s elements, that for us are but sen-

To sum up Mach's analysis, one can define his view as an "*Empfindungsmonismus*",<sup>31</sup> since one does not find any gap between bodies and sensations, between what is without and what is within, between the material world and the spiritual world: "Es gibt keine *Kluft* zwischen Physischem und Psychischem, kein *Drinnen und Draußen*, keine *Empfindung*, der ein äußeres von ihr verschiedenes Ding entspräche. Es gibt nur *einerlei Elemente*, aus welchen sich das vermeintliche Drinnen und Draußen zusammensetzt".<sup>32</sup> All elements, even if connected in many complexes with greater stability and in a more permanent manner than others, constitute "nur *eine* zusammenhängende Masse, welche, an jedem Element angefaßt, *ganz* in Bewegung gerät".<sup>33</sup> The most distinctive trait of this theory is that the elements have no quality at all, a fact that justifies some scholars defining Mach's philosophy as a *neutral monism*.<sup>34</sup> The component parts of reality acquire qualities only in relation with other body complexes; their being physical or psychical objects depends on the perspective from which we look at them, and any element can play different roles in both these areas of investigation. Therefore, all the qualities of the entities one studies depends on the *functional relation* of the elements, and the constituent parts of any complex doesn't have properties in itself.

### 1.3 A possible comparison

As we have seen, Nietzsche finds the main topics of his view on sensualism in the works of Lange and Spir. Even though he read these books before the *Analyse der Empfindungen*, his way or arguing, the basic ideas published in *Götzen-Däm-*

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sations, i.e. the reaction of the external world with our sensory apparatus. We can analyse and use as reference points for a complete view on science only these sense data, but we must remember that we're looking at the world from a peculiar and limited perspective, and we cannot perceive the inner qualities of nature. Indeed, in Mach's view there's only one reality, made up with a group of elements connected with each other and forming complexes in a state of nearly stable equilibrium, but that are never isolated from the others. We can know this structure only from our point of view; therefore, we must describe it as *one* coherent mass of sensations ("*eine* zusammenhängende Masse von Empfindungen", AE p. 24 n. 1). Floyd Ratliff wrote that "Mach's anti-metaphysical view of the theory of knowledge was largely conditioned by his very early interest [...] in the analysis of sensory experience". Furthermore, "his contributions to sensory physiology and psychology were [...] almost centred on one aspect or another of this fundamental problem: the role of the observer and his senses in the acquisition and shaping of our knowledge of the external world" (Floyd Ratliff, *On Mach's Contributions to the Analysis of Sensations*, in: Robert S. Cohen / Raymond J. Seeger (ed.), *Ernst Mach – Physicist and Philosopher*, Dordrecht 1970, p. 24).

<sup>31</sup> Manfred Sommer uses this label in his *Husserl und der frühe Positivismus*, Philosophische Abhandlungen, Frankfurt am Main 1985, p. 18.

<sup>32</sup> AE, p. 253.

<sup>33</sup> Ibid. p. 13.

<sup>34</sup> See Erik Banks, *Ernst Mach's World Elements. A Study In Natural Philosophy*, Dordrecht 2003, Cap. 9, pp. 136 ff.

*merung*, and the closing remarks he notes down in his last years of thought highlight a deep similarity with Mach's epistemology. In fact, both Nietzsche and Mach think that our perceptions can be seen as elements corresponding to the external world, as data which our intellect processes, modifying them and gathering together in objects we even define as having an absolute existence. They both admit that our cognitive relation with the external world must start from these elements, that are but component parts of complexes whose qualities and quantities can be described. "Die Farben, Töne, Räume, Zeiten [...] sind für uns vorläufig die letzten Elemente, deren gegebenen Zusammenhang wir zu erforschen haben. Darin besteht eben die Ergründung der *Wirklichkeit*".<sup>35</sup> Thus writes Mach in his book, even paying attention in noting that one must not consider sensations as *absolute* entities, as "first components" of reality. Rather, they are an artificial construct, made buy our brain processing the data resulting from the reaction of our sense organs with the external world. From a pure methodological view we can take them as basic data, but we must be careful not to fall into a perspective claiming their ontological value. That's why Mach defined the elements as parts that *until now* we cannot resolve into its components, waiting for new outcomes from scientific investigation that could improve our image of the world.

Sensations are not *the* reality; they are just *our* reality. And this clarification testifies an awareness that both Mach and Nietzsche have, i.e. their thinking that human beings cannot reject their peculiar perspective. Our looking at the world physiologically depends upon how sense organs react to the external data, and process them; thence, we cannot know any object out of its relation with our body. Mach clearly explains this aspect and makes a distinction between *elements* and *sensations* (even if many times in his work he uses these words as synonymous). In doing so, he tries to overcome the real danger of declaring – even though as mere hypothesis – that a primal basis that could be described as an atomic and *substantial* entity has been found. Any element laying beyond our brain interpreting the world as the ground basis of our concepts – a primal data that would not be resolved into its components – could be seen as constitutive part of reality and, consequently, should be defined as absolute and permanent. Of course, Mach avoids falling into the same errors of the mechanist physics he knows very well, and criticises; thence, he does not declare that sensations are fixed and unchanging aggregate of elements.

The other similarity between Nietzsche's "sensualism" and the epistemology of Mach is the emphatic declaration that *senses do not lie*, i.e. the idea that sense data absolutely have no truth value. This perspective fully corresponds to the *neutral monism* as Mach presented it (of course not using these words to call his

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<sup>35</sup> AE, pp. 24–25.

view) in 1868, in one of his first essays: “die Sinne weder falsch noch richtig zeigen. Das einzig Richtige, was man von den Sinnesorganen sagen kann, ist, dass sie unter *verschiedenen Umständen verschiedene Empfindungen und Wahrnehmungen auslösen*”.<sup>36</sup> Any determination, any attribute one could assign to reality, come from a thought process, since the basic elements which all complexes are constituted of must be seen just as *bricks* of a building or, according to G. Teichmüller’s image, as *mosaic pieces*.<sup>37</sup> Thus, one can describe the different bodies and define their qualities, one can evaluate if a complex of elements is much or less stable, but one cannot say anything about the sensations that have been gathered together. With Nietzsche’s words, one could say that it is only *what we make* of sense testimony that introduces the *lie* of permanence and absoluteness; thence, we can make judgements just after our intellect’s processing the data generated by sense organs. The reality is but a single coherent mass of elements related with our senses and that our intellect selects and processes, connecting them in relatively stable complexes that we later call “things”.

This consideration could be the starting point for an investigation that would connect Nietzsche’s philosophy with the epistemology of Mach. They both deal with sensations, but their attention for this subject must be seen just as part of a more general aim, i.e. their trying to define our worldview with concepts not referring to a metaphysical tradition of thought. Indeed, with his theory of the elements Mach shows that our concepts are not absolute at all, that they must not be seen as substances, as we usually do. In the first pages of his book from 1886 the scientist declares his rejecting any perspective accepting the existence of a permanent substrate that could be defined apart from the set of perceptions out of which it arises, and clearly expresses his view on substantial elements:

Das dunkle Bild des Beständigen, welches sich nicht merklich ändert, wenn ein oder der andere Bestandteil ausfällt, scheint etwas für sich zu sein. Weil man jeden Bestandteil *einzel*n wegnehmen kann, ohne dass dies Bild aufhört, die Gesamtheit zu *repräsentieren* und wieder erkannt zu werden, meint man, man könnte *alle* wegnehmen und es bliebe noch etwas übrig. So entsteht in natürlicher Weise der anfangs imponierende, später aber als ungeheuerlich erkannte philosophische Gedanke eines (von seiner “Erscheinung” verschiedenen unerkennbaren) *Dinges an sich*. Das Ding, der Körper, die Materie ist nichts außer dem *Zusammenhang* der Elemente, der Farben, Töne u.s.w. außer den sogenannten Merkmalen.<sup>38</sup>

Subtracting all the component parts of an object – all its attributes – doesn’t lead us to his *essence*. Even if any single sensation related with it seems not to be

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<sup>36</sup> Ernst Mach, Über die Abhängigkeit der Netzhautstellen von einander, in: Vierteljahrsschrift für Psychiatrie, Leipzig / Neuwied 1868. See also AE, p. 8 n.1.

<sup>37</sup> See Gustav Teichmüller, Die wirkliche und die scheinbare Welt, Breslau 1882, p. 132.

<sup>38</sup> AE, p. 5.



necessary to recognise that object, one cannot take away one or another of its component parts and still find something remaining. This hostility towards the *thing in itself* arises from an evaluation of the mere erroneous nature of our thought, as much as from the idea that sensations are but attributes of complexes of elements not absolute at all. Nietzsche agrees with Mach's claim that the Kantian notion must be rejected, and writes it in 1887–1888 – thence, after his reading the *Analyse der Empfindungen*. In a notebook from these years one can read:

Das “Ding an sich” widersinnig. Wenn ich alle Relationen, alle “Eigenschaften” alle “Thätigkeiten” eines Dinges wegdenke, so bleibt nicht das Ding übrig: weil Dingheit erst von uns hinzufingirt ist, aus logischen Bedürfnissen, also zum Zweck der Bezeichnung, der Verständigung, nicht – – – (zur Bindung jener Vielheit von Relat<ionen> Eigenschaften Thätigkeiten). (Nachlass 1887, KGW VIII 2, 10[202])

The way of arguing and, most of all, the words adopted in this note sharply recalls the excerpts from Mach's book. The basic point of his views, which characterises his defining the question of substances, is the attention he pays to the *functional relations* as the origin of bodies and entities. Nietzsche agrees with the idea that we must refer to the wide range of relations, proprieties and activities, i.e. to the attributes defined by our thought rather than to an imaginary unity that would justify their connection. We can describe just the qualities of a “thing”, which has but a theoretical value and no absolute properties, since it's a logical schematization generated by our intellect processing sense data and arranging them. This question is necessarily related with the peculiar way of defining our knowledge one can find both in Nietzsche and Mach. Precisely, their view on this subject is that our brain activity is but a schematization of the world helping human beings to process sense data better than other animals; therefore, it's useful for their survival, for it helps them to adapt themselves in a better way to the environment.<sup>39</sup> In doing so, our intellect falsifies the world, literally *creating* conceptual entities, i.e. economical unities fixing the most stable complexes of sensations. These substantial unities called “things” are not real at all; rather, they're but *labels* denoting aggregates of elements that cannot be seen as their ground basis. Therefore, there's no reality beyond the sensations, and we've no reason to keep on trying to detect one; we can talk about *bodies* and *atoms* or, broadly, about

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<sup>39</sup> If one compares Nietzsche's theory of knowledge with Mach's “principle of economy of thought”, one can find a deep similarity in their conceiving the cognitive process as based upon the Darwinian selectionist model. That's why I think that both Nietzsche and Mach can be included in the list of those scholars who upheld a natural selection epistemology or, as Donald Campbell wrote in his essay devoted to the philosophy of Karl Popper, an *evolutionary epistemology* (see Donald Campbell, *Evolutionary Epistemology*, in: Paul A. Schlipp (ed.), *The Philosophy of Karl Popper*, La Salle 1974, vol. I, pp. 413–463). I concerned with this subject in Pietro Gori, *Il darwinismo di Ernst Mach. Riflessioni sul principio di economia della scienza*, in: *Annali dell'Istituto Italiano per gli Studi Storici* XXII (2006/2007), pp. 223–252.

a *material* dimension, but only in a pure logical way, i.e. to *describe* the world in a more useful way and share our knowledge with other human beings.<sup>40</sup>

## 2. *The material dimension*

### 2.1 Mental unities and metaphysical beliefs

Mach's observations on sensations are all parts of a more general reflection concerning both the ontological and the epistemological plane. His claiming that the main attributes of reality are but sense data and that we can know the external world only through our brain processing them, obviously involves a new determination of some terms in common use as much as of many basic scientific notions. Once the "reality" of things and objects has been seen as built upon our sense testimony, any attribute of the world shows itself as a mere mental unity. The set of concepts and notions generated by our intellect constitutes the whole world of phenomena, whose main attribute is to be a falsification, a schema helping human beings to preserve themselves. Indeed, Mach argues that our intellect simplifies the external data, and sums up this main topic of his epistemology through the notion of "*economy of thought*" (*Denkökonomie*). The way our intellect works and its being useful for men to win the struggle for life is just the starting point of a study concerning the relation between the subject and the external world; indeed, human beings must adopt mental unities to orientate themselves into a chaotic flux of stimuli not showing any reference point or peculiar attribute.<sup>41</sup> The questions Mach deals with in his *Analyse der Empfindungen* arise from this ground ideas and overcome a mere theory of knowledge to reach a pure metaphysical plane – an attempt that, in the same way, Nietzsche made, too. Indeed, Mach's view on this subject concerns how the notions of *thing*, *atom* and *body* were set up, as much as all other concepts involved in defining the external world as constituted by *material* entities which we attribute an absolute existence to. The basic act of knowing that applies to the world a *logical* scheme must be seen as part of our outlining an external "reality", since any observation declar-

<sup>40</sup> See FW 112 and 354.

<sup>41</sup> In 1883 Mach gave a lecture on this subject. The text of his speech, titled *Über Umbildung und Anpassung im naturwissenschaftlichen Denken*, has been published in Ernst Mach, *Populär-wissenschaftliche Vorlesungen*, Leipzig 1923<sup>5</sup> [1896], pp. 245–265 (a revised version of the same speech has been published in Ernst Mach, *Die Principien der Wärmelehre*, Leipzig 1896, pp. 380–390). According to Milič Čapek, in this essay is most concisely stated Mach's *biological* theory of knowledge (See Milič Čapek, *Ernst Mach's Biological Theory of Knowledge*, in: *Synthese* 18/2 (1968), pp. 171–191). Moreover, a comparison between this text and the arguments Nietzsche published in FW 110–111 shows the many similarities between the two thinkers' concerning with this subject.

ing that an entity unrelated to the thinking subject can exist comes directly from our misinterpreting the value of mere thought symbols. What Mach tries to underline is that we usually make a mistake when skipping from the conceptual representation of sense data to an ontological determination of pure mental entities. Briefly, his main idea is that one can find in human beings a constitutional disposition to see the result of their brain activity as a set of *absolute existing objects*, i.e. to admit that it is possible to know how things *really are*. Obviously, Mach argues that we cannot have this kind of knowledge, since any material entity we detect is but a *complex of sensations* gathered together, whose relatively stability let us distinguish and isolate it from the flux of perceptions *just on the logical plane*. Thinking that this pure mental operation can lead us to the *real* substance of things means that we *believe* we could reach the external world and detect the inner structure of reality; most of all, it also means that we *believe* this structure to *exist*. Mach has no hesitation in talking about this *faith*, that corresponds to the *metaphysical need* Nietzsche deals with in *Jenseits von Gut und Böse*, where he directs his harsh attack to mechanistic science.<sup>42</sup> Therefore, sensualism answers to this basic disposition that closely relates the *economic* value of knowledge (and of science) with the claim that a reality unrelated to the subject does exist; then, it plays a main role in Mach's thought as a positive action to get rid of this wrong perspective.

Mach emphasizes many times the close correspondence between our knowledge and the metaphysical claim that is constitutive for human beings, most of all when he deals with the notion of matter. As stated above, he thinks that the world is but a dynamic mass of sensations and cannot be seen as fixed and unchanging; we detect bodies and things just for we gather together many sense data *and* define them as having properties – such as *identity* and *persistence* – we cannot attribute to the natural world, since they're but an aid our intellect generates to help us to organize our perceptions. Some complexes are more strongly cohering groups of sensation, and we can find them in different moments; thence they can be taken as reference points for our world description. Nevertheless, they're just relatively stable, since the sensations gathered in the clusters of elements keep on changing, joining that group or leaving it. The number of the permanent features presented plays the main role in this unceasing dynamics for, if it is great enough, the gradual alterations that would not change the whole structure may be overlooked: “Die Summe des Beständigen bleibt aber den allmählichen Veränderungen gegenüber doch immer so groß, das diese zurücktreten”.<sup>43</sup> Therefore, a body is not absolute and unchanging at all; we can declare its permanence, but only in a relative way, for we see anytime different attributes

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<sup>42</sup> I'm referring to JGB 12, but many aphorisms of this book concern the same topic.

<sup>43</sup> AE, p. 2.

of it. Mach explains this statement with an example: “Mein Tisch ist bald heller, bald dunkler beleuchtet, kann wärmer und kälter sein. Er kann einen Tintenfleck erhalten. Ein Fuß kann brechen. Er kann repariert, poliert, Teil für Teil ersetzt werden. Er bleibt für mich doch der Tisch, an dem ich täglich schreibe”.<sup>44</sup> I can change any part of my table, I can see it with different attributes, nevertheless I will recognise it as the same object ever. The question directly concerns the notion of *identity* and the difficulty of defining it with respect for the unceasing becoming of the external world – a classic problem of the history of thoughts.<sup>45</sup> Philosophy always tried to argue how could one recognise an ever changing and developing entity, whose structure could become totally different (just think to a living being growing). Mach doesn’t stress this question, but he cannot avoid dealing with its main topics. In the opening pages of the *Analyse der Empfindungen*, he confine himself to a few observation on the notion of *body*, arguing that it comes from our representations and putting on our thought the blame for generating entities that could be recognised in different moments. According to his view, our intellect can detect bodies and things for in some complexes the sensations seem to be connected with a greater stability than others; therefore, we denote them with a label, and attribute them a permanence we pretend to be absolute. Obviously, it leads to a metaphysical world view that Mach sharply rejects. That’s why he denies that mental unities have an ontological value: there’s no “thing in itself” which one can refer sense data to, and any claim of existence of a substance must be seen as a mental product. Therefore, Mach argues that these determinations gets value only for our knowledge, since they are but a way of processing sense data. The basic character of the clusters of sensations is to be unstable; they constantly change, but the fact that the number of the permanent features presented is greater then the number of the gradual alterations allows us to recognise them: “die größere Geläufigkeit, das Übergewicht des mir wichtigen Beständigen gegenüber dem Veränderlichen drängt zu der teils instinktiven, teils willkürlichen und bewußten Ökonomie des Vorstellens und der Bezeichnung”.<sup>46</sup>

In a lecture Mach gave in 1882 (published many years later in his *Populär-wissenschaftliche Vorlesungen*) he clearly sums up his thought on material entities, writing that “Körper oder Dinge abkürzende Gedankensymbole für Gruppen von Empfindungen sind, Symbole, die außerhalb unseres Denkens nicht existieren”.<sup>47</sup> In 1886 Mach keeps on dealing with the same subject. In the first section

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<sup>44</sup> Ibid.

<sup>45</sup> Indeed, the idea of replacing part by part the table recalls the well-known paradox of the ship of Theseus.

<sup>46</sup> AE, p. 2.

<sup>47</sup> Mach, *Populär-wissenschaftliche Vorlesungen*, p. 231. The title of this section is: *Über die ökonomische Natur der physikalischen Forschung*.

of his *Analyse der Empfindungen* he states his *introductory anti-metaphysical remarks*, and defines bodies and things as “räumlich und zeitlich (funktional) *Komplexe* von Farben, Tönen, Drücken u.s.w., die deshalb besondere Namen erhalten”.<sup>48</sup> They are not separate from the elements one finds as the ground of our describing the external world, and one can detect them just after a brain activity of selection and grouping. Moreover, the properties of bodies are but temporary qualities, an attribute we assign them and that depends on the way we observe and know them. All the traits with which the common sense defines these complexes must be rejected, starting from the *permanence* that, according to Mach, cannot be attributed to the sensations, since these are not substantial rather becoming elements. The main notions we use to build up our world view come from our intellect; they are an aim for human beings, a useful fiction to assure them a *biological advantage* and allow the species to preserve itself. Since they are but things of thought with a mere *practical usefulness*, any claim of their existence out of the knowing subject is just a misunderstanding; once more, the matter is that it is not possible to give an ontological value to the products of a pure logical process. Mach argues that this error occurs in our knowledge as much as in any scientific image of nature. Indeed, he thinks that science is not separate from the more general thought activity, even if its products are more accurate, therefore better for helping men to orientate into the world. Science has the same “aim” of our intellect, i.e. processing the sense data in a way that could be useful to human beings’ preservation. Therefore, its only task is to detect the connections between the elements and their functional relations; with Nietzsche’s words, one can say that science can only *describe* the external world, and must give up the search of an *explanation* of it.<sup>49</sup> Thus, Mach denies that “ego” and “thing” are primary facts; rather, they are *constituted* by the elements (or sensations). One can see these notions merely as mental unities, resting points for human thought, that must not be confused with the ontological ground of the world.

## 2.2 Genealogy of substantial notions

Going back to Nietzsche’s arguments on this subject, one can find many correspondences with Mach’s view. Even though the former talks about “things” and “matter”, and infrequently uses the word “body” (*Körper*), the essence of his thoughts is the same. As well as Mach, he argues that all substantial notions we usually refer to as the basis of our world picture are but mental unities, later transferred onto another plane. The question Nietzsche deals with fully corre-

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<sup>48</sup> AE, p. 2.

<sup>49</sup> See FW 112, JGB 21 and Nachlass 1884, KGW VII 2, 26[227].

sponds with the ideas stated above, since he shows the limits of defining as absolute entities – i.e. independent from any thinking subject – the falsifications generated by our intellect. Moreover, he admits that these notions play a mere practical role, for they're but theoretical aims enabling men to overcome nature. Indeed, Nietzsche detects as primary need of human beings their organizing the chaotic flux of perceptions, schematizing and simplifying the sense data – in other words, their transforming the external world into something the subject could use and master.<sup>50</sup> The main logical concepts allowing men to preserve their species arises from this process of thought, which *falsifies* a world in which nothing is permanent and self-identical. According to Nietzsche “[d]er Intellekt und die Sinne sind ein vor allem vereinfachender Apparat. Unsere falsche, verkleinerte, logisirte Welt der Ursachen ist aber die Welt, in welcher wir leben können. Wir sind soweit “erkennend”, daß wir unsere Bedürfnisse befriedigen können” (Nachlass 1885, KGW VII 3, 34[46]). Therefore, the *fixed* forms our intellect generated are an unavoidable aim for men's preservation; this “falsificatory apparatus” developed during the evolution of the organism and the natural selection: “Die intellektuellen Thätigkeiten haben sich allein erhalten können, welche den Organismus erhielten; und im Kampfe der Organismen haben sich diese intellektuellen Thätigkeiten immer verstärkt und verfeinert” (Nachlass 1884, KGW VII 2, 25[427]). Thence, Nietzsche thinks that our thought selects sense data and processes them in *conceptual unities*, literary *creating* synthesis that does not exist in itself, as much as any substantial entity having no value out of the logical plane. “Die Synthese “Ding” stammt von uns: alle Eigenschaften des Dinges von uns” (ibid.); and, moreover: “Die Entstehung der “Dinge” ist ganz und gar das Werk der Vorstellenden, Denkenden, Wollenden, Erfindenden. Der Begriff “Ding” selbst ebenso als alle Eigenschaften” (Nachlass 1885/86, KGW VIII 2, 2[152]).

Nietzsche's characterization of substantial entities rises from his detecting the role human intellect plays in our knowledge as a falsification of sense data, since admitting that *bodies* and *things* do exist means to say something that has no match with the properties of the external world. Indeed, if one considers it as an ever-changing flux of elements, any claim of a persistence that would not be relative and temporary must be a misinterpretation. According to Nietzsche, what really happens is our simplifying the wide range of sense data which, processed by our intellect, are organized and gathered together in connections that *we see as* stable and coherent. The value of these connections is first of all pure logic, since they are but mental unities, or concepts. Our brain generated them

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<sup>50</sup> This basic disposition of men will be reinterpreted by Nietzsche in 1888, in the light of his new theory of “Wille zur Macht”. One can read this, for example, in Nachlass 1888, KGW VIII 3, 14[152].

just to enable man to relate himself with the external world, i.e. to know it, thence its working remains on the theoretical plane. One can see that Nietzsche's defining the genealogy of these primitive notions concerns a kind of sensualism, e.g. for his writing that "Begriffe aber sind mehr oder weniger sichere Gruppen wiederkehrender zusammen kommender Empfindungen" (Nachlass 1885, KGW VII 3, 34[86]). His perspective seems to be the same described in the previous section, and it closely relates his thought with Mach's ideas. Nevertheless, in this case the chronology doesn't allow us to compare them directly, at least until the only testified lecture is the *Analyse der Empfindungen* from 1886. In fact, one can date the just quoted observation at 1884–1885, i.e. before Mach's publishing his book. Furthermore, Nietzsche presented the same idea some years before, in a page in which he carried on his argument and showed how the connections of sensations become material instead of pure logical entities:

Die fest verknöteten Empfindungen, die immer wieder kehren ("relativ eine Zeit zusammenhalten") werden von uns als die rohen Dinge und Wirklichkeiten angesehen: zunächst unser Leib. Aber "alle Eigenschaften dieser Dinge bestehn aus unseren Empfindungen und Vorstellungen". (Nachlass 1882/83, KGW VII 1, 5[1] 239)

In these two fragments one finds all the elements to fully define the genealogy of the notion of "thing": it arises out of our intellect processing sense data and connecting them in mental unities whose relative stability will later be misinterpreted and seen as an absolute permanence. Finally, we *believe* that mere thought-symbols, as much as all the other *forms* our organism imposes to the world, do exist inside it; therefore that we *find* – not create – them. As stated above, "die Entstehung der "Dinge" ist ganz und gar das Werk der Vorstellenden, Denkenden, Wollenden, Erfindenden" (Nachlass 1885/86, KGW VIII 1, 2[152]). The concept of "thing" is but a creation of our perceiving and thinking, as much as all the other properties whose meaning can be defined just relating them with a knowing subject, since they come from his reaction with the external world. Moreover, all the qualities are ever-changing, for we have different sensations in different moments, even if we're observing the same object. This is a basic claim for Mach, who argues that the effects of an object on us are never the same and changes together with the background conditions or those of the object itself. Nietzsche agrees with these ideas and carries out his reflection, looking for the real reason of our being unable to detect a substantial and absolute element under the chaotic flux of sensations. According to him, it doesn't depend on the limits of our senses, rather on the fact that a "thing in itself" does not exist at all. From this perspective our intellect is not only the author of the attributes assigned to "things", rather it makes us believing that something like this *could exist* and, therefore, that we could detect and define it. Briefly, we make two different mistakes: first of all we pretend to describe a "thing" having no match with the inner nature of the world; then – and maybe this is the worst error – we declare

that this “thing” does exist: “Fragen, wie die “Dinge an sich” sein mögen, ganz abgesehen von unserer Sinnen-Receptivität und Verstandes-Aktivität, muß man mit der Frage zurückweisen: woher könnten wir wissen, daß es Dinge giebt? Die “Dingheit” ist erst von uns geschaffen” (Nachlass 1887, KGW VIII 2, 9[106]).

Nietzsche’s view on this subject seems to be the same as that of Mach; indeed, he admits that all material entities are but hypostasis of mental unities, a label our intellect assigns to cluster of sensations more connected than others – even if just in a relative way – and that allow us to isolate them from the chaotic, eternal-becoming natural world. However, even in this case one can find some direct sources in which Nietzsche could have found the same perspective, and, once again, the names are that of Lange and Spir. The latter, especially, could be the author of the excerpts Nietzsche quoted in the note stated above; even though the reference to sensations “relativ eine Zeit zusammenhalten” sharply recalls Mach’s view, one cannot compare the fragment with any of his essays Nietzsche read, for it was written in winter 1882–1883. Instead of it, Nietzsche’s concern with the relation between sensations and representations takes us back to his reflections of many years before, in 1873. In the notebooks from this year Nietzsche wrote many times on this topic, and he unequivocally referred to Spir’s *Denken und Wirklichkeit*.<sup>51</sup>

To go back to Lange, in his work on the history of materialism he directly concerns with this subject, most of all in the chapter devoted to the distinction between force and matter. Here, he sums up his view with these words:

*Dinge* nennen wir eine zusammenhängende Gruppe von Erscheinungen, die wir unter Abstraktion von weiteren Zusammenhängen und inneren Veränderungen einheitlich auffassen.

*Kräfte* nennen wir diejenigen Eigenschaften des Dinges, welche wir durch bestimmte Wirkungen auf andre Dinge erkannt haben.

*Stoff* nennen wir dasjenige an einem Ding, was wir nicht weiter in Kräfte auflösen können oder wollen und was wir als Grund und Träger der erkannten Kräfte hypostasieren.<sup>52</sup>

This excerpt clearly shows how close the views of Lange and Nietzsche on this subject are, and, moreover, one can note that they use the same words. I observed above that Nietzsche rarely talks about *bodies*, rather he deals with the belief on existing *things*; this aspect allow us to compare with more certainty his writings on this subject with the ideas of Lange (his book was bought by Nietzsche in fourth edition after 1882<sup>53</sup>) then with Mach’s epistemology. The

<sup>51</sup> Nietzsche read this book in his early years, and in 1877 bought it in second edition. Thus, he kept on studying Spir, as testified by his quoting some pages of this text in many later notes. See for example Nachlass 1885, KGW VII 3, 35[56] and 35[61].

<sup>52</sup> Lange, *Die Geschichte des Materialismus*, p. 662.

<sup>53</sup> See Jörg Salaquarda, *Nietzsche und Lange*, in: *Nietzsche-Studien* 7 (1978), pp. 236–253.



author of *Die Geschichte des Materialismus*, from his Kantian point of view, talks about phenomena rather than sensations, but the essence of the speech is the same. He thinks that all things are but abstract entities, generated by our intellect selecting and processing, as Nietzsche does. Indeed, a few pages before in the same text one reads that

das “Ding” ist in der Tat nur der ersehnte Ruhepunkt für unser Denken. Wir wissen nichts, als die Eigenschaften und ihr Zusammentreffen in einem Unbekannten, dessen Annahme eine *Dichtung unsres Gemütes* ist, aber, wie es scheint, eine notwendige, durch unsre Organisation gebotene.<sup>54</sup>

Lange thinks that there're properties one can know, but he admits that men can manage them when they're organized in conceptual unities. This activity, of course, belongs to our mind and must not be seen as if we could find the ontological ground of these attributes; therefore, the notions our intellect generates and with which it connects some groups of phenomena or sensations do not exist in itself. They are but *fictions of our soul*, set up according to the basic disposition of human thought to detect something permanent. Thus, Lange argues that this disposition leads us to the old notion of *substance*, too; indeed, we detect things in compliance with our need of finding unchanging elements, something that allows our mind to “rest” and orientate itself into the chaotic flux of sense data.

In der Tat ist der Grund, warum wir keine reine Kraft annehmen können, nur in der psychischen Notwendigkeit zu suchen, welche unsre Beobachtungen unter der Kategorie der Substanz erscheinen lässt. Wir nehmen nur Kräfte wahr, aber wir verlangen eine beharrliche Trägerin dieser wechselnden Erscheinungen, eine Substanz.<sup>55</sup>

Lange emphasizes here a basic element, i.e. the fact that we detect material entities for we need to admit something persistent and unchanging – therefore, something that would be separate from natural becoming. Of course, Mach agrees with Lange and, according to him, argues that the genealogy of notions such as “thing”, “matter” and “body” leads us to the basic problem of the existence of *substances*. In his work from 1886 he follows the same perspective: indeed, he thinks that our intellect's basic disposition is to search something of *unconditionally permanent*, which we define as a substance:

Das *bedingungslos Beständige* nennen wir *Substanz*. Ich sehe einen Körper, wenn ich ihm den Blick zuwende. Ich kann ihn sehen, ohne ihn zu tasten. Ich kann ihn tasten, ohne ihn zu sehen. Obgleich also das Hervortreten der Elemente des Komplexes an Bedingungen geknüpft ist, habe ich dieselben doch zu sehr *in der Hand*, um sie besonders zu würdigen und zu beachten. Ich betrachte den Körper oder den Elementenkomplex oder den Kern dieses Komplexes als stets vorhanden, ob er mir augenblicklich in die

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<sup>54</sup> Lange, *Die Geschichte des Materialismus*, p. 659.

<sup>55</sup> *Ibid.* p. 662.

Sinne fällt oder nicht. Indem ich den Gedanken dieses Komplexes, oder das Symbol desselben, den Gedanken des Kerns, mir stets *parat* halte, gewinne ich den Vorteil der Voraussicht, und vermeide den Nachteil der Überraschung. Ebenso halte ich es mit den chemischen Elementen, die mir als bedingungslos beständig erscheinen.<sup>56</sup>

Nevertheless, Mach immediately declares that “eine wirkliche *bedingungslose Beständigkeit gibt es nicht*”.<sup>57</sup> We can imagine it, but only if we ignore or miss out a set of conditions given to us. Indeed, according to his argument, “es bleibt nur *eine Art der Beständigkeit, die alle vorkommenden Fälle von Beständigkeit umfaßt, die Beständigkeit der Verbindung (oder Beziehung)*”.<sup>58</sup> Mach’s claim to focus just to the *functional relation* gathering together the sensations – since it’s the only thing that is unchanging, while the elements forming the *macro-elements* we presume to be materials are never the same – is exactly his attempt to leave the traditional view on nature and, most of all, the mechanistic perspective bound to the presumed *existence* of material particles. If one admits that the material dimension is the realm of substances, then they lose any absolute attribute, too, and cannot be defined as *unconditionally permanent*. Indeed, according to Mach, “was wir Materie nennen, ist ein gewisser gesetzmäßiger Zusammenhang der *Elemente* (Empfindungen)”;<sup>59</sup> the notion of “matter” has but a theoretical value, for it’s designed to organize and manage sense data in a pure *economical* way. Tacking the substance back to the relation between elements, Mach tries to remove it, but not to reject any persistence from our knowledge. He’s just changing his target: what persists, now, is only the *relation*, the *physical law* defining a connection between the elements. Nevertheless, their being permanent must not be seen as a metaphysical attribute of the relations, since it has a pure *methodological* value, and one can accept it as “useful” for a scientific resource that wants to improve its description of external world even more.<sup>60</sup>

### 2.3 The belief in the atomic theory

In the section of the *Analyse der Empfindungen* devoted to the presentation of the main traits of his monism Mach deals with his new definition of the microscopic structure of *matter*, which, as much as bodies, he sees as a cluster of sensations, i.e. nothing but a thing of thought, “ein *Gedankensymbol* für einen relativ stabilen Komplex sinnlicher Elemente”.<sup>61</sup> According to his view, as stated above,

<sup>56</sup> AE, pp. 268–269.

<sup>57</sup> Ibid. p. 270.

<sup>58</sup> Ibid.

<sup>59</sup> Ibid.

<sup>60</sup> See Giovanni Boniolo, Mach e Einstein. Spazio e massa gravitazionale, Roma 1988, p. 64, and AE, pp. 285–286.

<sup>61</sup> AE, p. 296.

any entity commonly seen as having an absolute existence now loses the attributes assigned by our intellect, since any property is traced back to the relations between the elements forming the complex. When Mach turns to the notion of matter he starts dealing with the problem of physical science and its operating on the natural world. Most of all, he concerns with the main concepts science uses to describe nature, and emphasizes that in his view the notions of *atom* and *molecule*, as much as that of matter, become meaningless:

Als einen weitem Gewinn müssen wir ansehen, dass der Physiker von den herkömmlichen intellektuellen Mitteln der Physik sich nicht mehr imponieren lässt. Kann schon die gewöhnliche "Materie" nur als ein sich unbewusst ergebendes, sehr natürliches Gedankensymbol für einen relativ stabilen Komplex sinnlicher Elemente betrachtet werden, so muß dies um so mehr von den künstlichen hypothetischen Atomen und Molekülen der Physik und Chemie gelten. Diesen Mitteln *verbleibt* ihre Wertschätzung für ihren besondern beschränkten Zweck. Sie bleiben ökonomische Symbolisierungen der *physikalisch-chemischen* Erfahrung.<sup>62</sup>

The concept of material atom is the ground notion of mechanism, the scientific world view that prevailed in Mach's years. That's why defining it as an entity having no absolute value at all, i.e. that doesn't exist in itself, means to undermine the whole scientific world picture of 19<sup>th</sup> century. The claim of the Austrian physicist is clear: he thinks that the atom is nothing but a mental unity, generated with a pure theoretical purpose, according to the economic way of working of our intellect. As much as things and bodies, one can distinguish it from the sensations which it's composed of only in a logical way. Moreover, the atoms are not reference points to define sensations and give them an ontological ground; rather, any property one can attribute them comes from their being gathered together in complexes. Furthermore, since Mach admits that our brain activity has an unavoidable disposition to find something that could be defined as *absolutely persistent*, one can say that in the atom he recognises the same *substantial* qualities the intellect assigns to the entities fixed in symbols and schemes.

According to Mach, science is closely related with human thought, a fact he emphasizes in his writings on the principle of economy of thought.<sup>63</sup> Even though science is an elaborate and complex kind of knowledge, it does not correct the *errors* of the intellect, rather it carries them on, in compliance with the same inner disposition to simplify external data. Moreover, its using substantial notions reveals science to be spurred on by an essential *metaphysical need*, an aspect that Nietzsche detects as the main accusation against mechanism. Mach deals with the problem of the *substance* in the chapter devoted to the influence of his investigation on physical research, and he observes that his monism could

<sup>62</sup> Ibid. p. 254.

<sup>63</sup> See the two sections of Mach, *Populär-wissenschaftliche Vorlesungen*, titled: *Über Umbildung und Anpassung im naturwissenschaftlichen Denken* and *Die ökonomische Natur der physikalischen Forschung*.

leave the traditional way of treating sense data and – what is most important for him – finally get rid of the metaphysical content reducing their value. Mach's way of thinking, his taking back all substantial entities to mere relatively stable complexes of sensation, corresponds to Nietzsche criticising scientific thought in *Jenseits von Gut und Böse*. Indeed, in this book he focuses his attacks to the concept of atom and to the metaphysics laying behind it; he especially relates mechanism to the Western philosophic-religious tradition of thought and its claim to detect substantial entities as ground of the external world.

Nietzsche develops his argument on this subject in the first section of *Jenseits von Gut und Böse*, in the aphorism where he quoted the names of Copernicus and Boscovich,<sup>64</sup> pointing out that both these thinkers showed us how to get rid of appearances. Above all, the former taught us to renounce the belief in substances, “dem Glauben an das Letzte, was von der Erde “feststand”, abschwören, dem Glauben an den “Stoff”, an die “Materie”, an das Erdenrest- und Klümpchen-Atom” (JGB 12). The main issue raised in this page concerns Nietzsche's refusal of the material nature of atoms, an idea presented by Descartes, carried on by many scientists in 18<sup>th</sup> century, and finally taken as ground of the Newtonian-mechanistic theory. According to Nietzsche, one must reject the absoluteness assigned to the notion of atom, that has a mere practical value, since there's no need to retreat into the realm of *lies* and any investigation on nature can be planed in a better way. His taking the concept of atom back to our brain processing sense data to help human beings describing external world, is obviously in compliance with Mach's ideas: “Um die Welt zu begreifen, müssen wir sie berechnen können; um sie berechnen zu können, müssen wir constante Ursachen haben; weil wir in der Wirklichkeit keine solchen constanten Ursachen finden, erdichten wir uns welche – die Atome. Dies ist die Herkunft der Atomistik” (Nachlass 1886/87, KGW VIII 1, 7[56]). Nature is not stable and permanent in itself; thence, there're no fixed elements one can take as reference points to build a certain description of it. Nevertheless, science needs a ground from which elaborate its laws and, since it cannot find a firm basis, adopts as reference what senses present as (relatively) most stable. The way science works is closely related with our brain activity, most of all with its believing in the testimony of senses (here seen in a negative way) and accepting the permanence of some natural elements whose becoming cannot be detected by our limited sense organs. Thus, according to Nietzsche, the main problem is our being unable to leave the

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<sup>64</sup> On the influence of the mathematician Ruggero Boscovich on Nietzsche's thought see above all: Schlechta / Anders, Friedrich Nietzsche. Von den verborgenen Anfängen seines Philosophierens; George Stack, Nietzsche and Boscovich's Natural Philosophy, in: *Pacific Philosophical Quarterly* 62 (1981), pp. 69–87; Greg Whitlock, Roger Boscovich, Benedict de Spinoza and Friedrich Nietzsche: The Untold Story, in: *Nietzsche-Studien* 25 (1996), pp. 200–220; Pietro Gori, *La visione dinamica del mondo. Nietzsche e la filosofia naturale di Boscovich*, Napoli 2007.

realm of appearances, where we see as stable some elements that, if observed more accurately, could reveal their ever lasting becoming. Out of this ground arises our defining atoms as little spheres, as corpuscular and extended masses of matter we assume as not composed by other particles. If we could carry on a more detailed observation, maybe with a technology that would increase our perceptions (e.g. our eyesight), then the mere apparent continuity of matter would dissolve into interrupted lines made up by discrete elements. Nietzsche stresses this point with his referring to Boscovich: indeed, the natural philosophy of this scientist is a challenge to our believing in appearances and, most of all, thwarts the corpuscular theory of the mechanistic materialism. Boscovich dissolves the atom, denying its (presumed) material and extended nature that is but the outward appearance of the dynamic relation between elementary particles; thence, the dualistic contrast between force and matter is replaced with a view according to which nothing in the world is stable and permanent, and one can refer just to the *energy* permeating the universe. Thus, mechanism must be abandoned for a *dynamical world view* closer to a heraclitean philosophical perspective claiming the eternal becoming of everything.<sup>65</sup> That's why Nietzsche set Boscovich beside Robert Mayer, who, even if elaborated the theory of the conservation of force, defended a Cartesian dualism and admitted the absolute permanence of matter.<sup>66</sup> In a letter written to Peter Gast on 20<sup>th</sup> March 1882, where Mayer is defined as “ein grosser Spezialist – und nicht mehr”,<sup>67</sup> Nietzsche presented the same idea he published in *Jenseits von Gut und Böse*, detecting Copernicus and Boscovich as two thinkers we must refer to if we want to enlighten our thoughts and get rid of the idea of a material nature.<sup>68</sup> Nietzsche's critique to

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<sup>65</sup> See Nachlass 1884, KGW VII 2, 26[410]: “Der Glaube an Ursache und Wirkung, und die Strenge darin ist das Auszeichnende für die wissenschaftlichen Naturen, welche darauf aus sind, die Menschen-Welt zu formuliren, das Berechenbare festzustellen. Aber die mechanistisch-atomistische Welt-Betrachtung will Zahlen. Sie hat noch nicht ihren letzten Schritt gethan: der Raum als Maschine, der Raum endlich. – Damit ist aber Bewegung unmöglich: Boscovich – die dynamische Welt-Betrachtung”.

<sup>66</sup> For a reconstruction of Mayer's life and thought see Robert B. Lindsay, *Julius Robert Mayer: Prophet of Energy*, Oxford 1973.

<sup>67</sup> Nietzsche an Heinrich Köselitz, 20. März 1882, KGB III 1, Nr. 213. On the connection between Nietzsche and Mayer see the two essays by Alwin Mittasch, *Friedrich Nietzsches Verhältnis zu Robert Mayer*, in: *Blätter für Deutsche Philosophie* 16 (1942), pp. 139–161, and Alwin Mittasch, *Der Kraftbegriff bei Leibniz, Robert Mayer, Nietzsche*, in: *Proteus* 3 (1942), pp. 69–76. See also the studies of Günter Abel, *Nietzsche. Die Dynamik der Willen zur Macht und die ewige Wiederkehr*, Berlin 1984, and Robin Small, *Nietzsche in Context*, Aldershot 2001.

<sup>68</sup> The new defining the notion of matter, out of which arises a dynamic world view, is a main subject which many scientists contemporaneous with Nietzsche dealt with, most of all in their discussions on the connection between force and matter. During 19<sup>th</sup> century many authors wrote on this question, from Emil Du Bois-Reymond to the unavoidable Albert Lange. The former, in his conference titled *Die Sieben Welträthsel* (1872), argued that it's impossible to define the inner nature of matter and force, while Lange devoted a chapter of his main work to *Kraft und Stoff*.

Mayer concerns above all his being unable to admit that the force could be the only reference point for a coherent world picture, with no need to search something permanent and unchanging next to it. This view necessarily leads to a theology that justifies the origin of matter, but that needs a *primum mobile* distinct from the movement itself.<sup>69</sup> The main mistake Nietzsche detects in Mayer's thought comes from the idea that it is possible to find fixed entities as ground of natural becoming. According to this view, the elementary particles are material corpuscles, extended and stable, whose existence is absolute and not reliant on the force they emanate, so that we could consider them as the source of this force itself.<sup>70</sup>

Nietzsche's way of arguing in reconstructing the origin of the notion of atom corresponds to Lange's view. Indeed, in the chapter of *Die Geschichte des Materialismus* titled *Kraft und Stoff* he writes that in his years many physicists try to take back the matter to forces and, therefore, to leave the materialistic theory defining it as an absolute and inert ground of them. Basically, any research starts from what can be registered, i.e. the effects of the relation between things; we move from this data to look for the origin of this dynamics, but this investigation cannot lead us to a conclusive determination. "Indem wir das Ding Schritt für Schritt auflösen" – writes Lange – "bleibt uns immer der noch nicht aufgelöste Rest, der Stoff, der wahre Repräsentant des Dinges. Ihm schreiben wir daher die entdeckten Eigenschaften zu. So enthüllt sich die große Wahrheit 'kein Stoff ohne Kraft, keine Kraft ohne Stoff'".<sup>71</sup> We choose to stop at the level of elementary material particles, that are for us nothing but a reference point to start describing external world. The research on nature shows that we can observe and register just the relations between the elements, while it's not possible to isolate any permanent entity. Thus, any determination of a substance, i.e. of something unchanging and absolute, has but a methodological value, since it's a mental abstraction, a creation of our intellect helping us to direct our investigations.

Lange's view is the same as Mach's, who will later argue that our idea of a "thing in itself" comes from a gradual removal of the attributes of an "object". Moreover, as well as Lange, the Austrian scientist specifies that we can define the elements we "isolate" as constituent parts of bodies and things just for we could (or would) not carry on our analysis; therefore, they are mere relatively stable.

<sup>69</sup> See Nietzsche an Heinrich Köselitz, 20. März 1882, KGB III 1, Nr. 213.

<sup>70</sup> See JGB 17: "Ungefähr nach dem gleichen Schema suchte die ältere Atomistik zu der 'Kraft', die wirkt, noch jenes Klümpchen Materie, worin sie sitzt, aus der heraus sie wirkt, das Atom; strengere Köpfe lernten endlich ohne diesen 'Erdenrest' auskommen, und vielleicht gewöhnt man sich eines Tages noch daran, auch seitens der Logiker ohne jenes kleine 'es' (zu dem sich das ehrliche alte Ich verflüchtigt hat) auszukommen".

<sup>71</sup> Lange, *Die Geschichte des Materialismus*, p. 651.

This argument brings us to the definition of the “thing” as “resting point” of our thought stated above, and arises from Lange’s defining force and matter as inseparable. Rather, he gives priority to the force, since we can register and study it directly, while the matter is beyond our grasp: “Die Sache ist die, daß in unsren gegenwärtigen Naturwissenschaften überall die Materie das Unbekannte, die Kraft das Bekannte ist. Will man statt Kraft lieber ‘Eigenschaft der Materie’ sagen, so möge man sich vor einem logischen Zirkel hüten!”<sup>72</sup>

Even though the many advances in science make it possible to overcome the old theory of an absolute substance, physicists’ claiming that an *acting subject* under the natural dynamics could be detected still remains: “Unsre Materialisten halten am sinnlichen Stoffteilchen fest, eben *weil* sie der unsinnlichen Kraft noch ein sinnliches Substrat lassen *wollen*”.<sup>73</sup> That’s why they keep on asserting the existence of atoms they define as corpuscles, infinitesimal aggregates of matter still extended and not becoming. According to them, the elementary particles cannot dissolve in the relation between forces; rather, they must be seen as the basis of this dynamics itself. As Nietzsche writes, they keep on searching behind the acting force, for they think they could find an indifferent substrate, a “being”, causing these actions.<sup>74</sup> Thus, the scientists seem not to be able to get rid of the testimony of senses which, since they’re limited, presents a nature of objects, things and bodies, even if small and hardly perceptible. Moreover, they are above all obstinate, for they admit that material things do exist even if an improved and more accurate research revealed the discontinuity of the macroscopic objects; they don’t accept the conclusions of a rational analysis, and go back into what must be defined properly as a *belief*. In his critical account of the substantial basis of physics, Mach follows the same perspective. Indeed, after detecting that we usually look for something to be *unconditionally permanent* – i.e. a *substance* –, Mach argues that this claim belongs also to all *who believe in atoms* (“wer an Atome glaubt”<sup>75</sup>), and, therefore, don’t understand that a research achieving the real ground of natural dynamics is not possible.

Thus, both Nietzsche and Mach share the same attitude towards the scientific thought, which is involved in a metaphysics of substances one could easily get rid of. Even though there were alternative perspectives, the main view during the whole 19<sup>th</sup> century shows nature as composed by forces emanated from an absolute material substrate. The two thinkers find the reason of the difficult of leaving this description in human inability to get rid of his own perspective: atomism is a necessary reference point, a real *need* of our knowledge. Men, since they can

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<sup>72</sup> Ibid. p. 659.

<sup>73</sup> Ibid. p. 639.

<sup>74</sup> See GM, “Gut und Böse”, “Gut und Schlecht” 13.

<sup>75</sup> AE, p. 269.

relate to the external world only through the falsifications generated by their intellect, are unable to reject them, even when they appear in science as elementary particles. Both atom and concepts serve the same function: they're both *thought symbols* generated in compliance with an *economic* disposition that characterizes at any level our knowledge of nature, from perception up to logic and science.

### 3. *Subject and will*

#### 3.1 The ego as mental unity

The explicit purpose of the *Analyse der Empfindungen* is to define in a new way the basic notions of science, and show that the two (outwardly) distinct areas of physic and psychological inquiry could be connected. As stated above, Mach wants to get rid of an incomplete view, and chooses a perspective that could be neutral with respect for both this planes; thence, he works with elements defined as “component parts” of material and substantial objects just in a methodological way, not claiming any absolute existence for them. The “*Prinzip des vollständigen Parallelismus des Psychischen und Physischen*”<sup>76</sup> Mach follows in his investigation has no reference to an absolute entity, rather it detects a substrate whose attributes change together with the observer’s point of view. Indeed, the sensations defined by his *neutral monism* have no properties, since any quality comes from the relation with the perceiving bodies; that’s why Mach insists not to admit an essential difference between the Physical and the Psychical, thinking this idea to be obvious, for it follows from the preliminary remark that any psychical phenomenon corresponds to a physical one, and vice versa. Briefly: “Die in der Erfahrung vorgefundenen Elemente, deren Verbindung wir untersuchen, sind immer *dieselben*, nur von *einerlei* Art und treten nur je nach der Art ihres Zusammenhanges bald als physische, bald als psychische Elemente auf”.<sup>77</sup> In the light of this way of defining the relation between these areas of investigation, it is natural that Mach applies the conclusions of his analysis of the material entities to the pure psychological question of the *ego*. Indeed, he explains right from the beginning that both the different bodies he concerns with – the physical body (*Körper*) and the human body (*Leib*) – are set of elements mere relatively stable and that could be recognised at different times for the sum-total permanency, and the preponderance of its importance for us as contrasted with the changeable element. This preponderance makes possible “der teils instinktiven, teils willkürlichen und bewussten Ökonomie des Vorstellens und der Bezeichnung,

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<sup>76</sup> AE, p. 50.

<sup>77</sup> Ibid. p. 51.



welche sich in dem gewöhnlichen Denken und Sprechen äußert”.<sup>78</sup> Thus, what Mach calls *ego* is, like bodies and things, “der an einen besonderen Körper (den Leib) gebundene Komplex von Erinnerungen, Stimmungen, Gefühlen”,<sup>79</sup> of course described as relatively permanent:

Ich kann mit diesem oder jenem Ding beschäftigt, ruhig und heiter oder aufgebracht und verstimmt sein. Doch bleibt (pathologische Fälle abgerechnet) genug Beständiges übrig, um das Ich als dasselbe anzuerkennen. Allerdings ist auch das Ich nur von *relativer* Beständigkeit. Die scheinbare Beständigkeit des Ich besteht vorzüglich nur in der *Kontinuität*, in der langsamen Aenderung. [...] Wenn ich mich heute meiner frühen Jugend erinnere, so müsste ich den Knaben (einzelne wenige Punkte abgerechnet) für einen Andern halten, wenn nicht die Kette der Erinnerungen vorläge.<sup>80</sup>

The “I” is defined as a set of sensations joined to a particular human body and, above all, it has no determination out of that complex of moods and feelings. Therefore, the *ego* is nothing but the wide range of elements related to our body, and it has a pure logical value, since it comes from a mental disposition to recognise things in the external world and make any kind of knowledge possible. Indeed, by detecting a *soul* one can define a subject and follow his changes, and still recognise him as the same. Our intellect is driven by a real *need* to orientate itself; then, it creates a pure mental unity and assigns a label to the most permanent content of a complex of elements. So, both the views on the “I” and that on the substantial notion of *body* are the same: *matter* and *soul* are mere things of thought we take on as reference point for our describing the external world; they’re but fictions we *temporary* adopt to orientate our investigations, thence their usefulness is strictly *practical*.

Mach’s way of reasoning, as stated in the section on material entities, leads him to dissolve the *ego* and reject any metaphysical value it usually has. Thus, the main object of any psychological inquiry is not different from any other thing of the “real” world, since it arises from the same substrate forming the bodies. Moreover, the fact that the elements Mach chooses as basis of his describing the world are absolutely *neutral* get us rid of any kind of ontological determination that could distinguish between physical and psychological data. Bodies and *ego* are but thought-symbols, generated by our intellect categorizing the different relations between elements as physical or psychical, without any reference to an inner quality. They’re mental unities of the same sort, and one can look at them from the same perspective. That’s why Mach analyses the notion of “I” in compliance with his investigation on things and bodies, pointing out that the elements (or sensations) have an ontological priority over the mere nominal complexes la-

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<sup>78</sup> Ibid. p. 2.

<sup>79</sup> Ibid.

<sup>80</sup> Ibid. pp. 2–3.

belled by our intellect. The main psychological concept is defined as an “ideal mental-economical unity” collecting “die mit Schmerz und Lust am nächsten zusammenhängenden Elemente”, which plays a basic role for human beings. “Die Abgrenzung des Ich stellt sich daher *instinktiv* her, wird geläufig und befestigt sich vielleicht sogar durch Vererbung”.<sup>81</sup>

What most of all concurs to get the *ego* rid of its metaphysical value is that it completely depends upon elements we see as moods, feelings and, more generally, sensations, since we look at them only in connection with our body. Indeed, these elements are the “bricks” forming the soul, once gathered together, and without which we would have nothing to detect:

Nicht das Ich ist das Primäre, sondern die Elemente (Empfindungen). [...] Die Elemente *bilden* das Ich. Ich empfinde Grün, will sagen, dass das Element Grün in einem gewissen Komplex von anderen Elementen (Empfindungen, Erinnerungen) vorkommt. Wenn *ich* aufhöre Grün zu empfinden, wenn *ich* sterbe, so kommen die Elemente nicht mehr in der gewohnten geläufigen Gesellschaft vor. Damit ist alles gesagt. Nur eine ideelle denkökonomische, keine reelle Einheit hat aufgehört zu bestehen.<sup>82</sup>

To carry out a psychological investigation we need to recognise the *continuance* of the becoming complexes of sensations, a fact that allows us to recognise external things, but that is also necessary to describe the subject. Indeed, as stated above, Mach writes that he should take the boy he then was for a different person, were it not for the existence of *the chain of memories*. This continuity is of course something fictitious made up by our thought to conserve what is contained in the individual life, which needs both spatial and temporal determination: “Die *Kontinuität* ist nur ein *Mittel*, den *Inhalt* des Ich vorzubereiten und zu sichern”.<sup>83</sup> Mach’s closing remark is that the *ego* cannot be saved; indeed, according to his monism, the “I” dissolves in the relation between the elements and one must leave any claim to assign an absolute existence to it. In other words, since one admits that the subject is composed of sensations, it is impossible to save the “psychical unity”, as science tried to do in the past times:

Die Gewohnheit, den unanalysierten Ich-Komplex als seine unteilbare Einheit zu behandeln, hat sich wissenschaftlich oft in eigentümlicher Weise geäußert. Aus dem Leibe wird zunächst das Nervensystem als Sitz der Empfindungen ausgesondert. In dem Nervensystem wählt man wieder das Hirn als hierzu geeignet aus, und sucht schließlich, die vermeintliche psychische *Einheit* zu retten, im Hirn noch nach einem *Punkt* als Sitz der Seele.<sup>84</sup>

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<sup>81</sup> Ibid. p. 18.

<sup>82</sup> Ibid. p. 19.

<sup>83</sup> Ibid.

<sup>84</sup> Ibid. p. 21.

One can easily see that Mach's view on subject entities is in compliance with his *antimetaphysical intent*, a perspective that characterises his investigation and that in many ways he shares with the philosophy of Nietzsche. Indeed, the latter defines the *ego* according to the main topics stated above and, most of all, to the perspective of Phenomenalism, which pays attention to perceptions as component parts of the "I". Dealing with this notion Nietzsche rejects the idea that our *ego* is the subject of brain activity, rather he thinks that it arises from our intellect processing sense data:

Was mich am gründlichsten von den Metaphysikern abtrennt, das ist: ich gebe ihnen nicht zu, daß das "Ich" es ist, was denkt: vielmehr nehme ich das Ich selber als eine Konstruktion des Denkens, von gleichem Range, wie "Stoff" "Ding" "Substanz" "Individuum" "Zweck" "Zahl": also nur als regulative Fiktion, mit deren Hülfe eine Art Beständigkeit, folglich "Erkennbarkeit" in eine Welt des Werdens hineingelegt, hineingedichtet wird. [...] Das Denken setzt erst das Ich. (Nachlass 1885, KGW VII 3, 35[35])

The "I" is a product of our thought, nothing but a mental unity whose value is limited to its practical usefulness, since it helps us to categorize external world and schematize it in a pure logical way. Nietzsche puts the *ego* on the same level of the other things we usually claim to be absolute; thus, he carries out his argument on human disposition to *translate* the external world in a language our intellect could comprehend and use, i.e. his idea of human knowledge as *generating schemes and forms*. Even if unconsciously (the note is from 1885), Nietzsche's ideas are in compliance with Mach's view. The former admits that the *ego* plays the same role as the atoms, so as any other substantial entity, being but a reference point for our intellect fixing the world of becoming and making it computable. The brain activity out of which our believing in absolute things and subjects arises follows an inner disposition to admit something *being* while the whole world becomes and there're no fixed parts in it – i.e. the same perspective of any metaphysical thought. Later, in a notebook from 1887–1888, Nietzsche sums up more distinctly his idea that the false notion of *ego* is closely related with the Logic; above all, he highlights that men *must* admit this mental unity to rule (theoretically) the world:

[D]ie Annahme des Seienden ist nöthig, um denken und schließen zu können: die Logik handhabt nur Formeln für Gleichbleibendes / deshalb wäre diese Annahme noch ohne Beweiskraft für die Realität: "das Seiende" gehört zu unserer Optik. / das "Ich" als seiend (– durch Werden und Entwicklung nicht berührt) / die fingirte Welt von Subjekt, Substanz, "Vernunft" usw. ist nöthig –: eine ordnende, vereinfachende, fälschende, künstlich-trennende Macht ist in uns. "Wahrheit" – Wille, Herr zu werden über das Vielerlei der Sensationen. (Nachlass 1887, KGW VIII 2, 9[89])

This note, that could be seen as sign of a thought still alive in Nietzsche's mind, highlights even further the close continuity between Nietzsche's remarks about the material dimension and his observations on psychology. According to

him, describe a subject does not mean to detect a content that can be isolated, rather to find a relatively permanent basis of both sensations and all the variations within the sphere of individual life. Therefore, the *ego* is just a *logical need of unity*, which allows us to think and, consequently, to know the external world; obviously, it means that this notion is but a think of thought, i.e. it has no absolute existence at all.

Moreover, by carrying out his argument Nietzsche highlights an aspect one doesn't find in Mach's writings, even though it's coherent with his view. Nietzsche states that the notion of *ego* rises from our *will* to find a subject causing actions, in compliance with a general disposition of men to *anthropomorphise* nature working. This fact is most of all clear in the case of our interpretation of the relationship between cause and effect, a pure necessarily working we describe as a human – even intentional – *acting*. Thus, we usually put into the things our way of acting, and attribute to the *force* driving the material world the properties of a subject.<sup>85</sup> This aspect has been presented by Lange in *Die Geschichte des Materialismus*, where he wrote that one *personifies* the force together with the matter, since “man sie sich als einen Ausfluß des Stoffes, gleichsam als ein Werkzeug desselben denkt. [...] Das, was am Kraftbegriff anthropomorph ist, gehört im Grunde noch dem Stoffbegriff an, auf den man, wie auf jedes Subjekt, einen Teil seines Ichs überträgt”.<sup>86</sup> Nietzsche states that men have the tendency to attribute to the external world their own properties, since their necessary perspectivism make them unable to get rid of their limited point of view and, therefore, to objectively look at the world. According to this view, he admits that the basis of our categorization of reality is the idea of a “subject”, for in compliance with this model we define “beings” and “things” as absolute entities. In concrete terms, the subject is a reference point that enables us to recognise an object all along his development and makes it possible to assign an identity to things. With no reference to this pure psychological element there would not be the conditions to define the notion of substance; indeed, what drives us to admit a basic unity, something of permanent and unchanging that could be seen as “real” and on which ground we could build the world of becoming, is just our devotion to a substrate bringing together the various states of both our psychic and physical life.<sup>87</sup>

Our creating substantial entities comes from the simplification of a chaotic variety and the isolation of fixed and unitary forms; even if our detecting an “I” follows the same perspective, it shows a peculiar difference. Indeed, if one analyses this *basis psychical unity*, one immediately sees that it's not just a material sub-

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<sup>85</sup> See GM, “Gut und Böse”, “Gut und Schlecht” 13; Nachlass 1885/86, KGW VIII 1, 2[83] and Nachlass 1888, KGW VIII 3, 14[95].

<sup>86</sup> Lange, *Geschichte des Materialismus*, p. 651.

<sup>87</sup> See Nachlass 1887, KGW VIII 2, 10[19].

strate which the set of sensation is related with – e.g. our body (*Leib*). Rather, one looks for something *acting* as cause of our feelings, perceptions and memories, and which could unify them all. Therefore, one finds a *spiritual* entity under the variety of sensations, something that could be defined just from its acting; that's the reason why it is not possible pretending it to exist, as if one could detect and describe the cause of an action while one just sees its effects. Nietzsche's remark on this argument, presented in his *Zur Genealogie der Moral*, is clear: “es giebt kein “Sein” hinter dem Thun, Wirken, Werden; “der Thäter” ist zum Thun bloss hinzugedichtet, – das Thun ist Alles” (GM, “Gut und Böse”, “Gut und Schlecht” 13). Thus, the subject is but a creation of our intellect, “ein “Ding”, wie alle Andern: eine Vereinfachung, um die Kraft, welche setzt, erfindet, denkt, als solche zu bezeichnen, im Unterschiede von allem einzelnen Setzen, Erfinden, Denken selbst” (Nachlass 1885/86, KGW VIII 1, 2[152]).

It's now clear that Nietzsche thinks that the “I” has the same origin as any other substantial entity; it comes from our thought, which simplifies the external world gathering together sense data in unities seen as permanents. The main difference between bodies and souls concerns the hypothetical basis of their becoming: in both cases one invents a substrate remaining the same while properties change, but, while the ground of the atoms must be material, the *ego* is a model of action, i.e. it unifies the varieties of drives and feelings for it *causes* them. Therefore, an investigation on this matters should consider the claim that the actions of the subject are *intentional* and *free*, and the analysis of the psychical unity leads us to another level, since it concerns the last metaphysical element still alive: the *will*.<sup>88</sup>

### 3.2 The necessity of inner working

This would be of course a tricky question in an investigation devoted to Nietzsche, since it obliges us to deal with the notion of “will to power” he concerned with in the last years of thought. Without enter into the debate on this subject, which many scholars dealt with and that cannot be treated in these few pages, I will concentrate my attention to the way Nietzsche tries to modify the common meaning of the word “will” by emphasising the physiological – therefore necessarily – nature of the actions one usually sees as *intentional*. In *Die fröhliche Wissenschaft*, for example, he directly criticises our claim to control our actions,

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<sup>88</sup> See Nachlass 1887, KGW VIII 2, 9[98]: “Die logisch-metaphysischen Postulate, der Glaube an Substanz, Accidens, Attribut usw. hat seine Überzeugungskraft in der Gewohnheit, all unser Thun als Folge unseres Willens zu betrachten: – so daß das Ich, als Substanz, nicht eingeht in die Vielheit der Veränderung. – Aber es giebt keinen Willen”.

i.e. the idea that we really *want* everything we make. Rather, this interpretation just skims the surface of our acting, since we must consider the inner mechanism working at the organic level *before* our becoming aware of what we make, the chain of causes whose sequence is strictly necessary.<sup>89</sup> Nietzsche's statements on this subject rise from the last results of physics and physiology; he looks at the nature from a perspective showing him a world of ever changing forces, of elementary particles dissolving under observer's eyes, and of organic entities disclosing their inner dynamical structure.<sup>90</sup> The outcome of this inquiry is a world view rejecting any voluntaristic principle which considers the whole world revolving around men, and which gives absolute priority to our thought, as if it would guide the development of live beings. Our intellect is but the end product of the long history of the species, and one cannot pretend it to be the cause of something our brain just registers and categorizes. "Wollen" – writes Nietzsche – "nur ein so gut eingespielter Mechanismus ist, dass er dem beobachtenden Auge fast entläuft" (FW 127). Thus, we believe so much us to be the real subjects of our actions, since we're unable to understand the inner working of any movement. Anytime we admit the voluntariness of an action and define it as of our own, we're just thinking to the *final outcome* of a long lasting working which we're not aware of: "Wir begreifen den allerkleinsten Theil dessen, woraus sich jede Handlung zusammensetzt, und die lange Kette von streng in einander greifenden Nerven- und Muskelvorgängen dabei ist uns sogar ganz unbekannt" (Nachlass 1880, KGW V 1, 3[120]).

In his defining the thinking subject Nietzsche pays attention to the physiological plane; indeed, he refers to the muscular and nervous processes, and rejects any external and spiritual force as cause of its development and action. Any drive, any will could effectively be taken back to the mechanical working of the body, made up by muscles, tendons, bones whose movement is coordinated by the brain. Human thought, and the will together with it, are but secondary things, arising from that organic substrate which they do not control at all, since they could just know the effects of its working – even not all of them. In a notebook from 1880 Nietzsche wonders if representations could be the real cause of our actions; or if they rather are "ein Nebenher, welches der Intellekt bei solchen Handlungen, die überhaupt von uns bemerkt werden, erzeugt". Furthermore,

<sup>89</sup> See FW 127.

<sup>90</sup> The works here referred to are three books Nietzsche read during his writing *Die fröhliche Wissenschaft*: the works of Ruggero Boscovich, *Theoria philosophiae naturalis*, Vienna 1758; Robert Mayer, *Die Mechanik der Wärme*, Stuttgart 1874; Wilhelm Roux, *Der Kampf der Theile im Organismus*, Leipzig 1881. But one could also consider the many writings of other scientists such as O. Caspari and G. Vogt, or other books that Nietzsche studied in these years. See on this subject Alwin Mittasch, *Nietzsche als Naturphilosoph*, Stuttgart 1952; Abel, *Nietzsche. Die Dynamik der Willen zur Macht und die ewige Wiederkehr*, and Andrea Orsucci, *Dalla biologia cellulare alle scienze dello Spirito*, Bologna 1992.

Die meisten Handlungen werden nicht bemerkt und gehen ohne intellektuelle Reizung vorüber. Ich meine selber: die intellektuelle Handlung, der eigentliche Gehirnprozeß eines Gedankens sei etwas wesentlich Verschiedenes von dem, was uns als Gedanke bemerkbar wird: unsere Vorstellungen, von denen wir wissen, sind der kleinste und schlechteste Theil derer, die wir haben. Die Motive unserer Handlungen liegen im Dunkel und was wir als Motive glauben, würde nicht ausreichen, einen Finger zu bewegen. (Nachlass 1880, KGW V 1, 5[44])

Thus, we should widen our horizons, and leave the narrow view of human being and his psychological perspective which makes him “feel” of his own – for their being stronger than others – the actions he performs. From a wider view, looking at men as part of the whole working of nature, the voluntariness of actions reveals itself as a mere product of our thought, which processes sense data coming from events out of our range of control. Once again in *Die fröhliche Wissenschaft* Nietzsche writes:

[D]ass ein heftiger Reiz als Lust oder Unlust empfunden werde, das ist die Sache des interpretirenden Intellects, der freilich zumeist dabei uns unbewusst arbeitet; und ein und derselbe Reiz kann als Lust oder Unlust interpretirt werden. [...] [N]ur bei den intellectuellen Wesen giebt es Lust, Unlust und Wille; die ungeheure Mehrzahl der Organismen hat Nichts davon (FW 127).

The claim of human actions not to be voluntary, i.e. not different from any other thing happening in the world, is a basic point for Nietzsche’s later theory of *will to power* he uses to explain the whole natural phenomena.<sup>91</sup> Indeed, in many notes devoted to this subject he reckons with his choice to adopt a word in common use, which he had to change the meaning of. The notebooks from his last years of thought show us that Nietzsche was looking for an argument that could sanction this modification of sense, e.g. by proving that what one calls “free will” (*freier Wille*) is but the carrying out of a natural dynamics.<sup>92</sup> Moreover, in some notes he makes a distinction between his new concept and the notion of “will” (in quotation marks), still linked with the belief in the intentionality of our actions. With this word he wants to describe just a necessarily movement, the development of the inner workings of the world, which has no purpose and cannot be described with anthropomorphic attributes. That’s why Nietzsche argues that “[j]ener allgemeine Spannungszustand, vermöge dessen eine Kraft nach Auslösung trachtet – ist kein “Wollen“” (Nachlass 1887/88, KGW VIII 2,

<sup>91</sup> It is possible to show that the notion of “Wille zur Macht” arises directly from the other notion of “Auslösung von Kraft” Nietzsche found in the main work of Robert Mayer and, later, connected with the theory of Ruggero Boscovich and the ideas of the naturalist Wilhelm Roux on the dynamic of living beings. I dealt with this subject in: Pietro Gori, *Volontà di potenza e descrizione del mondo: le ragioni di una scelta terminologica*, in: Francisco Arenas-Dolz / Luca Giancristofaro / Paolo Stellino (ed.), *Nietzsche y la hermenéutica* (2 voll.), Valencia 2007, pp. 511–522 and, more exhaustively, in Gori, *La visione dinamica del mondo*, pp. 239 ff.

<sup>92</sup> See Nachlass 1883, KGW VII 1, 16[120].

11[114]). Moreover, he picks up the thread of his previous thoughts and comes back to his idea that the reason of men's believing in voluntariness of what they make comes by their feeling the final act of the long lasting working carried out unconsciously:

Wille? Das eigentliche Geschehen alles Fühlens und Erkennens ist eine Explosion von Kraft: unter gewissen Bedingungen (äußerste Intensität, so daß ein Lustgefühl von Kraft und Freiheit dabei entsteht) nennen wir dies Geschehn "Wollen". (Nachlass 1884, KGW VII 2, 25[185])<sup>93</sup>

Therefore, Nietzsche thinks the "will" to be a mere product of the interpreting intellect, another scheme of thought useful to explain something one couldn't immediately comprehend. Taking men back to the nature, and stressing the fact that all living beings are involved in the same dynamics as the inorganic elements, Nietzsche removes the basic idea of the notion of "I", generated by our intellect looking for an acting subject as reference for the chain of sensations and memories.

The choice of getting rid of any metaphysical heritage to deal with the notion of will characterizes also Mach's investigation, who followed the same perspective for material and psychological objects such as *bodies* and *ego*. A short chapter of *Die Analyse der Empfindungen* is devoted to *Der Wille*, and concerns an attempt to clarify the meaning of this term. Mach understands very well that his monism changed many reference points of our world description, therefore he must necessarily modify some common used words; in the case of the will this fact is clear, all the more so if one follows Nietzsche's observations. The worldview both these thinkers adopt involves a redefinition of many terms, since they present from a new point of view the same objects described before. That's why Mach pays attention to specify what does he mean with "will", writing that with this word he denotes a well known phenomenon:

Ich verstehe unter dem Willen kein besonderes *psychisches* oder *metaphysisches* Agens, und nehme keine eigene psychische Kausalität an. Ich bin vielmehr mit dem überwiegenden Zahl der Physiologen und modernen Psychologen überzeugt, dass die Willenserscheinungen aus den organisch-physischen Kräften allein, wie wir kurz, aber allgemein verständlich sagen wollen, begreiflich sein müssen.<sup>94</sup>

Mach's perspective is completely in compliance with that of Nietzsche, since he wants to take all voluntary actions back to the physical-chemical working of the organic beings; thence, he sees the notion of will as pure physiological. His stance on this subject clearly comes from a wider cultural horizon that in 19<sup>th</sup> century was dealing with the main questions on living beings, driven by the new

<sup>93</sup> See also JGB 19.

<sup>94</sup> AE, p. 140.



technologic discoveries that enabled men to a better observation of the life phenomena, and complete the description of the workings of nature. Moreover, the investigation on the nervous system contributed to clarify many aspects of both voluntary and reflex movements, and showed that they arise from the same mechanism working under physical forces. Mach carries out his view on voluntary actions from these remarks, completely rejecting the intentionality usually attributed to them and stressing the same topics Nietzsche deals with in *Die fröhliche Wissenschaft*. Mach, too, admits that there's no difference between a reflex movement – pure mechanical – and a voluntary action; they're both sensorial stimuli carrying out their development, with the only difference that under certain conditions they could be registered and *interpreted* by our thought, which, with the help of the memory, anticipates these actions: “Für das reflektierende Subject liegt das Charakteristische der Willkürhandlung zum Unterschiede von Reflexbewegung darin, daß es das Bestimmende derselben in den eigenen *Vorstellungen* erkennt, welche diese Handlung *antizipieren*”.<sup>95</sup>

Therefore, Mach argues that the notion of will is a product of our intellect, and thinks that it's but a mental unity generated to enable us to know something we cannot comprehend. He completely dissolves this notion in the inner working of living beings, looking at them as the basis of those movements we interpret as voluntary. Moreover, Mach carries out his investigation looking at the early stages of an action, i.e. the chain of causes working unconsciously which is the real ground of any movement, but which the observer usually completely overlooks. Once again, his argument starts from a comparison between reflex and voluntary actions:

Vergleichen wir unsere Willenshandlung mit einer an uns selbst beobachteten, zu unserer eigenen Überraschung eintretenden Reflexbewegung, oder mit der Reflexbewegung eines Tieres. In den beiden letzteren Fällen werden wir die Neigung verspüren, den ganzen Vorgang als durch die augenblicklichen Umstände im Organismus physikalisch bestimmt anzusehen. Was wir *Willen* nennen, ist nun nichts anderes als die *Gesamtheit der teilweise bewussten und mit Voraussicht des Erfolges verbundenen Bedingungen einer Bewegung*.<sup>96</sup>

The ideas stated above are clear, and could be directly compared with Nietzsche's view, since he pays attention to the chain of causes which, from a *state* of the world, leads to “ein Neuarrangement der Kräfte [...], je nach dem Maß von Macht eines jeden” (Nachlass 1888, KGW VIII 3, 14[95]). Indeed, his describing the physical world concerns an interpretation of the relationship of cause and effect as an absolutely necessary connection, rejecting all the pure anthropomorphic attributes such as intentionality and voluntariness. Nietzsche agrees with

<sup>95</sup> Ibid. p. 141. Mach's reference here is the theory on living beings of Ewald Hering.

<sup>96</sup> Ibid. p. 82.

Mach that human actions dissolve into natural working, therefore one must consider that the causes of motion directs also our actions, and there's no chance to *choose* or *decide* anything – nor even *will*.<sup>97</sup> Thence, our working has no reference with a subject and one should describe it just looking at the inner – mechanical – causes of it. What really make us claim that we control our actions is the way we feel and remember them, for our intellect can recall some representations to anticipate the next movements. What should be noted in Mach's argument is his care in connecting living organisms with the realm of matter. This fact, that one can find also in Nietzsche's statements, is useful to carry out the final remarks of *Die Analyse der Empfindungen*, i.e. the idea that a scientific investigation connecting the Physical and the Psychological would be possible:

In der *Sinnesphysiologie* können aber vielleicht die *psychologische* und *physikalische* Beobachtung bis zu gegenseitiger *Berührung* vordringen, und uns so neue Tatsachen zur Kenntnis bringen. Aus dieser Unterrichtung wird wohl kein Dualismus hervorgehen, sondern eine Wissenschaft, welche Organisches und Unorganisches umfasst und die den beiden Gebieten gemeinsamen Tatsachen darstellt.<sup>98</sup>

Mach's view on this subject is now clear, and one understands the reasons why he connects these perspectives in one. Indeed, his analysis of the notion of will highlights the deep correspondences between the two areas of inquiry, and his conclusions are in compliance with Nietzsche's claim that one could explain the whole world's dynamics referring to a single principle. Moreover, in a page of Mach's work on *Die Mechanik* (1883), this fact is most clearly stated, since he writes:

Die besonnene physikalische Forschung wird aber zur Analyse der Sinnesempfindungen führen. Wir werden dann erkennen, dass unser Hunger nicht so wesentlich verschieden von dem Streben der Schwefelsäure nach Zink, und unser Wille nicht so sehr verschieden von dem Druck des Steines auf die Unterlage ist, als es gegenwärtig den Anschein hat.<sup>99</sup>

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<sup>97</sup> In a note from 1881, one of the first excerpts where Nietzsche adopts Mayer's scheme of relation between the forces, Nietzsche writes: "Im kleinsten Organism bildet sich fortwährend Kraft und muß sich dann auslösen: entweder von sich aus, wenn die Fülle da ist, oder es kommt ein Reiz von außen. Wohin die Kraft sich wendet? sicher nach dem Gewohnten: also wohin die Reize leiten, dahin wird auch die spontane Auslösung sich bewegen. Die häufigeren Reize erziehen **auch** die Richtung der spontanen Auslösung" (Nachlass 1881, KGW V 2, 11[139]).

<sup>98</sup> AE, p. 109.

<sup>99</sup> Ernst Mach, *Die Mechanik: historisch-kritisch dargestellt*, Darmstadt 1982<sup>9</sup>, p. 443. In a page of *Populär-wissenschaftliche Vorlesungen* Mach states once more that one can compare the "will" with a mechanic movement; moreover, he argues that the reference to a pure *physical* working could be the better way to understand this phenomenon: "Die Kräfte treten uns ja durch Vergleich mit dem Willen näher; vielleicht wird aber der Wille noch klarer durch den Vergleich mit der Massenbeschleunigung" (Mach, *Populär-wissenschaftliche Vorlesungen*, p. 284).

The way Mach expounds his idea is very forceful and his arguments leads to a complete and definitive rejecting the *spiritual* and metaphysical nature of the will and the connection of this notion with the mechanical working of physical world. The comparison between the voluntary actions and the weight of a stone on its support and, above all, the relation between a feeling such as *hunger* and the chemical interaction between two elements, completely dissolves any dualism of Physical and Psychical still alive. Moreover, this firm stance strengthens even more the similarity between Mach's thought and the ideas carried out in Nietzsche's writings (most of all in his notebooks). Indeed, the latter in his first reflections on the instinct of *self-overcoming* of living organisms, refers exactly to the feeling of hunger (probably an usual object of investigation in biology, since it's the basic disposition of a living being that would preserve its life).<sup>100</sup> According to him, the higher functions are but illusions, things of thought, another product of our intellect creating forms and schemes. If, for example, we examine "die unterste und ursprüngliche Thätigkeit im Protoplasma", and consider its drive to assimilate anything it finds in the environment, we must admit that by talking about "hunger" we just give an interpretation of its working, since "'Hunger' ist schon eine Ausdeutung, nach ungleich complicirteren Organismen" (Nachlass 1887/88, KGW VIII 2, 11[121]).<sup>101</sup> Nietzsche uses this example to highlight the way of working of any living being, for the protoplasm is the simplest organism that can be observed; moreover, he emphasizes that these actions are not intentional or aimed, all attributes one can find just after an interpretation of the inner mechanism driving all beings growing and a self-overcoming.

At the light of the accounts stated above the question about the possible relationship between Nietzsche and Mach arises again. The deep similarity between their views on the notion of will and, more in general, their rejecting men's believing in free actions (what Nietzsche defines as a metaphysical principle, since it's but a misinterpretation of the inner working of nature), show how close

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<sup>100</sup> We all know that Nietzsche contrasts his theory of "Wille zur Macht" with the principle of *self-preservation* he finds as the ground notion of Darwinism. Indeed, he thinks that all living beings have an inner disposition to overcome the environment destroying and assimilating it. Therefore, one can detect in nature an ever lasting process of growth, enhancement and self-overcoming of living organisms. See on this subject Günter Abel, Nietzsche contra "Selbsterhaltung". Steigerung der Macht und ewige Wiederkehr, in: Nietzsche-Studien 10/11 (1981/82), pp. 367–407; Dieter Henke, Nietzsches Darwinismuskritik aus der Sicht gegenwärtiger Evolutionsforschung, in: Nietzsche-Studien 13 (1984), pp. 189–210; Werner Stegmaier, Darwin, Darwinismus, Nietzsche zum Problem der Evolution, in: Nietzsche-Studien 16 (1987), pp. 264–287.

<sup>101</sup> The reference to the notion of *hunger* occurs also in the section of *Menschliches, Allzumenschliches* where Nietzsche defines the belief in "freedom of the will" and in "unconditioned substances" as "ein ursprünglicher Irrthum alles Organischen", which metaphysics deals with. In this passage he writes: "Wir haben Hunger, aber meinen ursprünglich nicht, dass der Organismus erhalten werden will, sondern jenes Gefühl scheint sich ohne Grund und Zweck geltend zu machen, es isolirt sich und hält sich für willkürlich" (MAM I 18).

their ideas are. Nevertheless, even in this case one cannot confirm these relationship, for the same reasons as before. First of all, Nietzsche presented many of his considerations before Mach published his work on sensations (even before *Die Mechanik*); secondly, most of Nietzsche's remarks on the notion of will cannot be read by Mach (even if he was interested in his writings), since they are in his notebooks together with other reflections inspired by his reading many texts of natural science. This fact is another element one must consider to discuss the connection between Nietzsche's ideas on will and Mach's statements on this topic, for in Herbert Spencer's *Principles of Psychology* one can find many excerpts concerning the same subject. In 19<sup>th</sup> century Spencer played an important role as popularizer of evolutionism, and he was well known to both Nietzsche and Mach. In his main writing on Psychology, he states a perspective on will closely related with Nietzsche's view, but of course before his first arguing on it.<sup>102</sup> Indeed, in the closing section of the first volume of *The Principles of Psychology*, Spencer deals with the question of the *ego*, stating that it completely dissolves into the flux of sensations which he is the reference of:

Considered as an internal perception, the illusion consists in supposing that at each moment the *ego* is something more than the aggregate of feelings and ideas, actual and nascent, which then exist. A man who, after being subject to an impulse consisting of a group of psychical states, real and ideal, performs a certain action, usually asserts that he determined to perform the action; and by speaking of his conscious self as having been something separate from the group of psychical states constituting the impulse, is led into the error of supposing that it was not the impulse alone which determined the action. But the entire group of psychical states which constituted the antecedent of the action, also constituted himself at the moment – constituted his psychical self, that is, as distinguished from his physical self.<sup>103</sup>

It's easy to see that Spencer's view, as stated in this excerpt, reminds both Nietzsche and Mach's perspectives. First of all, the idea that the "I" is an aggregate of sensations and has no absolute existence, nor can even be distinguished from the complex which is composed by. According to Mach, there's nothing

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<sup>102</sup> Unfortunately there're no proofs of Nietzsche's reading this text. One can even say that he knew Spencer and wrote on his stating on moral and ethic subjects. Nevertheless, one can see Spir as a source where the German philosopher could have found some of the ideas on will published in *The Principles of Psychology*. Indeed, in his main work the neo-Kantian thinker quoted Spencer with reference to this subject, in a section devoted to the nerve activity and the role of the notions of "pleasure" and "sorrow" in constituting the *ego*. Moreover, in his closing remarks Spir writes that would be very useful an "analysis of sensations", an investigation to which could contribute both psychologists and physics (Spir, *Denken und Wirklichkeit*, vol. 2, pp. 141 ff.). Therefore, one can refer to Spencer's book as a source of both Nietzsche and Mach, since in this text they found a peculiar view on "will". Moreover, one must remember that Spencer's thoughts on brain activity were an unavoidable reference for Mach's work (who in many writings quoted his name), as much as for the other psychologists of the 19<sup>th</sup> century.

<sup>103</sup> Herbert Spencer, *The Principles of Psychology*, London 1870<sup>2</sup>, vol. 1, pp. 500–501.

out of the set of elements related with human body, and one can define the *ego* just as a thing of thought generated to unify the variety of drives, memories and feelings. Thus, Spencer admits, too, the ontological priority of sensations and ideas, in general of the physical states forming the human being. Indeed, he claims the deep correspondence between psychical states and nerve stimuli, or even the origin of the former from the physical structure of the brain. Spencer deals with this aspect in the first section of his book, starting from his defining Physiology as an objective science and “an interpretation of the physical processes that go on in organisms”, therefore, which looks at mental states merely as nerve actions.<sup>104</sup> Above all, his perspective on the relation of the Physical to the Psychical, seen as closely related, concerns the biological dimension of our mind, i.e. the origin of feelings from nerve activity. Since we can register only nerve impulses generated by our brain, we cannot claim the existence of a subject working out of the physical (thinking) structure. Therefore, the question on the origin of the *ego* directly leads to the problem of *wilfulness* of human actions, which men admits anytime a not-reflex movement occurs. Spencer pays attention to the chain of physical events constituting the *previous conditions* of any movement, and argues, as Nietzsche does, that we usually don’t comprehend our inability to know the unconscious working driving men to perform an action. Our error, writes Spencer, is that we don’t admit that the real cause of our movements is just the physical impulse, rather we take its place and claim that we *wanted* to act in that way. In a note from 1880 Nietzsche presents this idea in the same way, writing that “[w]ir begreifen den allerkleinsten Theil dessen, woraus sich jede Handlung zusammensetzt, und die lange Kette von strenge in einander greifenden Nerven- und Muskelvorgängen dabei ist uns sogar ganz unbekannt” (Nachlass 1880, KGW V 1, 3[120]). However, Spencer’s argument is even more detailed, leading to a direct attack against the notion of *will*:

This subjective illusion in which the notion of free will commonly originates, is strengthened by a corresponding objective illusion. The actions of other individuals, lacking as they do that uniformity characterizing phenomena of which the laws are known, appear to be lawless – appear to be under no necessity of following any particular order; and are hence supposed to be determined by the unknown independent something called the Will. But this seeming indeterminateness in the mental succession is consequent on the extreme complication of the forces in action. The composition of causes is so intricate, and from moment to moment so varied, that the effects are not calculable. [...] The irregularity and apparent freedom are inevitable results of the complexity.<sup>105</sup>

The reason why we attribute *wilfulness* to our actions is that we are unable to understand the complication of the inner working of forces causing them. We

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<sup>104</sup> Ibid. p. 48.

<sup>105</sup> Spencer, *The Principles of Psychology*, vol. 1, p. 502.

need to orientate in this chaos, and we pretend our actions to be *free*; thence, we invent a faculty – our *will* – which hides all that we cannot comprehend. Even in this case the language of Spencer clearly reminds some of Nietzsche’s notes, most of all those in which he refers to the dynamics of *forces* to describe the inner mechanism we *feel* in a peculiar way, and therefore call it “will”. Nevertheless, this working remains completely unknown to us, thence we are not aware of the “hundertfältigen feinen Arbeit, die abgethan werden muss, damit es zu dem Schlage komme” (FW 127).

This last excerpt from *Die fröhliche Wissenschaft* takes us back to the starting point of this long digression on *will*; therefore, it is now possible to draw the conclusions of this investigation. First of all, I’ve found in Spencer a source of both Mach and Nietzsche, since in his work they found many ideas for a physiological treatment of Psychology. Moreover, Nietzsche knew Spencer long before his reading one of Mach’s work, and probably many statements written in his notebooks are implicitly referred to his thought. Nietzsche’s attention to the nerve action leading our mental working, and the deep correspondence of the language of many excerpts allows us to directly relate the two thinkers. On the other hand, Mach quoted many times Spencer, who probably was a basic reference for anyone dealing with Psychology. Therefore, if one adds this fact to the other accounts stated above, it is possible to argue that the close similarity between Mach and Nietzsche’s thought arises above all from their referring to the same cultural ground, from which they both took the ideas later carried out in their perspectives. Moreover, the peculiar theme of *sensations* they both dealt with led our investigation to the question of a physiological foundation of our actions and thoughts, an idea that has considerable consequences on epistemology. Indeed, it’s the basis of a strong refusal of the main claims of mechanism, as much as of the removal of the ground notions of 19<sup>th</sup> century metaphysics.

I think that the latter could be the most relevant fact to evaluate Nietzsche’s interest in Mach’s work, since one can say that in *Die Analyse der Empfindungen* he found a research program that, carried out inside the science itself, leads to a new definition – or, according to Kleinpeter, an “*Umwertung*” – of its basic notions.<sup>106</sup> Therefore, Mach is a remarkable reference if one considers his critique to the mechanism and its world view, all ideas that Nietzsche shares in his writing on science. Indeed, the philosopher doesn’t carry out a generalized critique on this subject, rather he recognises the limits of the scientific world description as much as its value, since his thought arises from an ever lasting dialogue with contemporary epistemology. Indeed, he collected the many ideas he found in the works on physics, cosmology and physiology he read all along his life, and assimilated them into his philosophy. Most of all, Nietzsche reacts to the crisis of

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<sup>106</sup> Hans Kleinpeter, *Der Phänomenalismus*, Leipzig 1912, p. 263.

the mechanistic world view: moving from the works of neo-Kantians and Darwinists such as Lange, Spir and Spencer, he shows the illusory nature of the notions of *matter*, *ego* and *will*, seen as mere *thought symbols* generated by our intellect and with no match in the external (“real”) world. The same project has been carried out by Mach, who was involved in the renewal process of culture that in 19<sup>th</sup> century realizes the complete lack of reference point that could be taken as the ground of a stable worldview. Even though Nietzsche’s thoughts on the *death of God* and the crisis of values belong to a strictly moral and aesthetic plane, Mach’s theory of the elements carries out the same critical statements, since it emphasizes the relative and unstable nature of the ground notions of the scientific world picture. Therefore, Mach’s role in the history of scientific thought can be compared with Nietzsche’s philosophical stature; even though with a different purpose, they both carry out an expressly *antimetaphysical* intent, and share a perspective leading to the main topics of the 20<sup>th</sup> century philosophy.