2

The origins of the modern concept of ``neuroscience´´

Wilhelm Wundt between empiricism, and idealism: implications for contemporary neuroethics

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INTRODUCTION

With the Age of Enlightenment, a sociocultural transformation process began on a large scale. This process can defined concisely by the triple trends of individualization, secularization, and scientification (Kohls 2004; Benedikter 2001; 2005). As a consequence, rational and scientific concepts replaced those of religion and spirituality in social life. This was especially true for the role of institutionalized religion as a genuine compass for social values and an epistemological framework as well as for morally and socially acceptable behavior. In the main, religious adherence was gradually substituted by a pluralism of scientific concepts and by philosophical systems. With the rise of academic psychology in the 1880s as a new, independent scientific field of inquiry, the explaining of consciousness and its underlying mechanisms became the focus of science in accordance with the aforementioned *Zeitgeist* as predicted by French thinker Auguste Comte. Psychology as a secular, rational, and ``measuring´´ science overtook religion and philosophy as the new center of intellectual and perhaps social gravity. It was within this new paradigm that the ``essence of the human being´´ was now to be studied.

These developments had enormous impact on the explicit and implicit interpretational frameworks for explaining consciousness and

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the scientific theories of mind that emerged of the time. Of note is that, in the first half of the nineteenth century, a paradigm shift also occurred in biology and medicine. The focus of studies about the nature of mind moved from anatomy to physiology. From then on, it became possible and, most importantly, culturally and paradigmatically acceptable, to define terms such as ``life´´ and ``energy´´ mainly in physiological, and not only in philosophical or aesthetic, terms. When physiological research was increasingly applied to scrutinizing perception on the basis of underlying physiological mechanisms, the groundwork for a physiological psychology was formed. Seen from a viewpoint fostered within a history of ideas, the Cartesian ontology that differentiated between body (``res extensa´´) and mind (``res cogitans´´), and the corresponding idea of the ``homunculus´´ as ``primum movens´´ was gradually displaced by a psychophysiological theory of sensation and mentation. This paved the way for the historical separation of philosophy and psychology. However, as enlightened philosophy had engaged a meta-narrative of rationality, psychology (as an upcoming academic endeavor) had to offer stark contrast to mystical and folk beliefs of mental (and behavioral) activity. Psychology was increasingly encouraged to devise a theory of mind that was free of metaphysical concepts such as ``soul´´ or ``spirit.´´

Interestingly, the inception of academic psychology as an independent scientific endeavor, separated from philosophy on the one hand and from the natural sciences on the other, coincided with the rise and eventual clash of two contradicting world views: experimental spiritism and rational empiricism (Kohls 2004; Kohls & Sommer 2006; Stromberg 1989), both of which were exploiting experimental methods in order to substantiate their fundamental hypotheses and premises. Experimental psychology was initiated – at least as an institutionalized academic endeavor independent from philosophy – in 1879, when Wilhelm Wundt established the first genuine psychological laboratory harnessing experimental methods at the University of Leipzig. This is well known as the birth of experimental psychology, the forerunner of cognitive neuroscience, yet it is worthwhile to examine more closely the circumstances surrounding this event, as relevant to the current status and possible trajectories that cognitive neuroscience, neurophilosophy, and neuroethics might assume. Less well known, although well documented, is the fact that from 1877 onwards Wundt – at this time a rather junior figure at the University of Leipzig – had to struggle to establish psychology as an independent academic field (Bringmann & Tweney 1980).

Looking more closely at this historic situation, we argue that it is a basis for the origin of the modern inquiry into consciousness and the

human mind. Our hypothesis is that the clash between psychology and spiritism had a major impact on Wundt´s later views, which can be seen as explicitly contributory to current cognitive neurosciences.

To build a valid basis for this hypothesis, we present an overview of relevant events from 1877 to 1879. It is useful to start with some background information about Wundt´s scientific and philosophical development. We next outline the status of the epistemological debate in the second half of the nineteenth century. We examine the hypothesis that Wundt might have banned altered states of consciousness from the research agenda of experimental psychology, not only because he was traumatized by his encounter with spiritism as a young professor, but mainly because he regarded spiritism as a materialistically distorted form of spirituality. In a final step, we discuss some of the arguments against spiritism originally brought forward by Wundt some 130 years ago in light of the present debates in cognitive neurosciences and the theory of mind, particularly paying attention to ethical considerations of determinism, free will, and moral responsibility.

We pose several core questions. First, can Wundt´s rejection of spiritism be interpreted, from a contemporary point of view, as a ``negative´´ defense of a dimension of transcendence, that has to be re-integrated adequately – i.e. strictly empirically – in the contemporary quest for an inclusive, holistic concept of consciousness? And if so, does this ``negative defense´´ show some similarities to the more recent developments within the leading ``postmodern´´ philosophies and world views? Some of them seem to have gone through a late ``ethical and theological turn of deconstruction´´ (Caputo 2005; Benedikter 2008a), and, as a consequence, tended to re-integrate both the achievements of radical (secular) rationality and empirically oriented spirituality into a ``spiritual´´ concept of the human self, although in negative language. Put bluntly, might there be a convergence in the history of ideas that conjoins developments of the late nineteenth and the early twenty-first century regarding the search for an empirically grounded, inclusive epistemological concept of the human mind? In this case, what can be learned from past developments for the current and future debate on the role of Neuroethics in our progressively plural cultural and intellectual climate?

WILHELM WUNDT: THE FOUNDING FATHER OF EXPERIMENTAL PSYCHOLOGY

Wilhelm Wundt (1832–1920) is well known as the founder of experimental psychology, establishing the first experimental psychology

laboratory at the University of Leipzig and training several generations of important American and European psychologists (Boring 1950; Lambertini 1995). Having graduated in medicine in 1856 from the University of Heidelberg, Wundt began his academic career in the laboratory of the physiologist and anatomist Johannes Peter Müller (1801–1858) in Berlin, after a short interim working as a physician in a local clinic. Two years later he returned to Heidelberg and became an assistant to one of Müller´s most important disciples, the physicist and physiologist Hermann von Helmholtz (1821–1894), the so-called ``Imperial Chancellor of Physics´´ because of the influence of his ideas. Here, young Wundt was able to familiarize himself with the current methods and knowledge of physiology. As a consequence of his training in Helmholtz´s laboratory, Wundt published a ground-breaking two-volume book on the principles of physiological psychology in 1874 (Wundt 1874). Whereas Helmholtz was more focussed on physiological questions, Wundt developed a specific interest in the psychophysiological ``fringe area´´ of the field, where exact and objective physiological mechanisms were – at least from Helmholtz´s perspective – distorted by hazy and fuzzy psychological processes (Krüger 1994). Wundt gradually shifted his focus of interest from physiology to psychology (Ziche 1999). Nevertheless, the two scientists managed to get along for some time despite a level of scientific disagreement, and Wundt continued to work as assistant in Helmholtz´s laboratory from 1858 to 1867. Remarkably, in 1871 – when Helmholtz was appointed to the prestigious Berlin chair – Wundt, a seemingly natural candidate, was bypassed for appointment to succeed his mentor in the then vacant Heidelberg chair. After this, the relationship between the two men seems to have deteriorated, and Wundt, after a period as professor of inductive philosophy at the University of Zurich, managed to obtain an appointment as full professor for philosophy in Leipzig in 1875. It is interesting to note that he was supported by Johann Zöllner (1834–82) and Gustav Fechner (1801–87), who were both sceptical of Helmholtz´s positivist ideas on physics, but were rather interested in ideas associated with a more romantic world view (such as a universal metaphysical dimension *within* physics) (Heidelberger 2004). It was at the University of Leipzig that Wundt, surrounded by scholars who were disapproving of Helmholtz´s anti-idealistic approach, established a psychological laboratory in 1879, where subsequent generations of young psychologists were to be trained in experimental (psychophysiological) methods. However, because Wundt perceived a narrow-mindedness in the experimental approach to explaining complex cultural phenomena, he dedicated the last 20 years

of his life to devising a voluminous cultural anthropology that he called ``Völkerpsychologie´´ (comparative folk psychology). Wundt was appointed as Chancellor of the University of Leipzig in 1890, and awarded honorary citizenship of the city of Leipzig in 1902. After having published more than 55,000 pages of scholarly work during his professional career, he retired from teaching in 1915 and died in 1920, shortly after finishing his autobiography (Wundt 1920).

BUILDING AN EPISTEMOLOGY FOR THE MODERN AGE: NINETEENTH CENTURY SCIENCE STRUGGLING WITH KANTIAN PHILOSOPHY

But what was the greater paradigmatic framework of Wundt´s life achievements, and in which developmental lines of the history of ideas was this embedded? Speculative ``Naturphilosophie´´ (philosophy of nature) was an offspring of romanticism, asserting that all forms of life are imbued with a spiritual power that can only be grasped by means of speculative transcendental concepts. This was predominant in most scientific fields within Central Europe during the first half of the nineteenth century. In contrast, the rapidly developing field of the natural sciences was progressively grounded in an empirico rational experimental approach, and challenged the older view (Paul 1984). Consequently, the decline of ``Naturphilosophie´´ in the second half of the nineteenth century made room within German academia for idealism and empiricism, two antithetical philosophical directions that were increasingly confronted with nationalistic ideas. During this time, the German scientific climate and professional environment of Wundt was preoccupied with an ongoing tension between proponents of idealism and materialism. This became gradually more apparent in most sectors of society and science (Treitel 2004).

The controversy between idealism and empiricism was viewed by the educated class as an unavoidable consequence of Kantian philosophy. Kant´s central thesis was that the possibility of human knowledge presupposes the active participation of the human mind. Despite its deceptive simplicity and seeming straightforwardness, it turned out to incur an epistemological pitfall (Pippin 2005): Kant maintained that the human mind had to operate within given categories (or as Kant termed them ``synthetic judgments a priori´´). Thereby he had inevitably linked the concept of reality – or at least whether human beings could determine and perceive reality – to the human condition itself. In modern terms, Kant had moderated empirical realism with a kind of

transcendental constructivism. Although this insight was seen as a large step towards an enlightened critical development within epistemology, Kant´s philosophical system also generated an insecurity regarding the question of whether we can actually perceive reality in the first place. Despite Kant´s desire to overcome the flaws of both empiricism and idealism by means of acknowledging the importance of inductive a-priori and deductive a-posteriori judgements, his philosophy was revealed to be notoriously complex to apply in detail. Correspondingly, depending on the precise interpretation, there was room for (proto-)positivist and empiricist, as well as (proto-)metaphysical, viewpoints in Kantian constructs. Specifically, the ongoing necessity to continuously renegotiate the limits of empiricism against the boundaries of idealism emerged as a weak point of Kantian philosophy. When used for demarcating the ``borders´´ of science and philosophy, Kant failed to create a viable construct that would allow valuable grounding notions. Hence, extensive debates concerning the ontological foundations of world views were inevitable as new theories of mind were formed.

Nineteenth Century Physics Testing the Limits of Empiricism

In the second half of the nineteenth century, physics had become the epistemological spearhead of the natural sciences. Although, or even because, physics was primarily empirically oriented, it was also inevitably confronted with the epistemological loopholes of Kantian philosophy. In the middle of the 1860s, mathematicians, physicists, and philosophers were starting to debate the question of ``geometric epistemology´´. This scientific question may sound quite innocuous at first glance; however, it had an explosive effect on the *Zeitgeist*. In realizing its full scope, it is important to recognize that the discourse over non-Euclidean geometry, and the issues about the certainty of knowledge and limits of empiricism, tended to aggravate the relationship between science and (Christian) spirituality (Valente 2004). In other words, an important pillar of idealism was actually at risk of being overthrown by empiricism. The pivotal question within mathematics and physics was whether Kant´s a priori of time and space was the final border that had to be nominally defined by means of transcendental axioms (a priori), or whether *n*-dimensional spaces could be formally devised by means of empirical observation. The latter would allow for determining the metric structure of the dimensions by means of empirical data, which would be (and as a matter of fact actually is) an

important prerequisite for modern physics. Specifically, non-Euclidian, Riemannian geometry contradicted not only the Kantian a priori of space, but also challenged the view of the transcendent nature of such a-priori categories. It is equally important to note that this epistemological debate was not merely of interest to mathematicians and physicists, but also the educated public, primarily for its implications regarding idealistic and transcendental philosophy. Edwin Abbott´s 1884 novel *Flatland* provides an example of the epistemological importance of addressing the spiritual aspects of this debate (Abbott 1991).

As the root of the problem was associated with an important aspect of transcendental philosophy, it is not surprising that German physicists were also divided over this question. Hermann von Helmholtz was seen as a leading figure of what was regarded as a modern, anti-metaphysical, empirically oriented positivistic physics. On the other hand, at the University of Leipzig was Johann Karl Zöllner, an expert in astrophysics, under the influence of Gustav Fechner, both of whom were keen on reconciling speculative and metaphysical natural philosophy with empirical physics (Heidelberger 2004). Although both scientists agreed that *n*-dimensional spaces could exist, they had diverging ideas about the cosmologic, ontologic, and epistemologic consequences.

To understand this complex issue, let us first consider Helmholtz´s point of view. In the course of working on his *Physiological Optics*, Helmholtz contested the Platonic assumption, upheld by Kant, that the axioms of Euclidean geometry are simply given as necessary, transcendental forms of intuition, existing a priori. In other words, Helmholtz was questioning the thesis that Euclidean metrics are ``innate´´ to the human mind in such a way that they that cannot be resolved by further psychological processes (Kaku 1995). Helmholtz argued that the perception of a fourth dimension could potentially be learned, but only if this level could also be phenomenologically (i.e. experientially) accessed by human beings. To make his point, Helmholtz devised a thought experiment and posited a fictitious species that he named ``surface dwellers´´. According to this thought experiment, the ``surface dwellers´´ were restricted to living in a two-dimensional space and correspondingly could not think of an object moving along a third dimension. For them, an object allowed to move into a third dimension would simply appear to have vanished (Stromberg 1989). According to Helmholtz, human beings are in a position comparable to the ``surface dwellers´´ when it comes to perceiving a fourth dimension. Thus, although Helmholtz argued that the conceptualization of Euclidean geometry may be attributed to learning processes (Richards 1977), he did not hold that the

potentially possible *n*-dimensional space could overlap with the ordinary real world, and interact with its objects. That is to say that, according to Hemholtz, although *n*-dimensional spaces are potentially possible, there was (in his opinion) no need to postulate such a fourth dimension, at least not until empirical evidence could show that three-dimensional bodies can escape the three-dimensional space. Hence, he correctly assumed in accordance with Riemann´s theorem, that there would be a distinct barrier between the abstract metrics of non-Euclidean geometry and the concrete phenomena of the natural world.

Zöllner used the same argument as originally developed by Helmholtz in his thought experiment about the ``surface dwellers´´ for demonstrating the possibility of a fourth transcendental dimension, although in a contrary manner and without crediting Hemholtz for devising the idea (Zöllner 1879). Whereas Helmholtz believed that the existence of a non-Euclidean fourth dimension might be (in principle) empirically inferable, Zöllner deemed it to be not only experimentally verifiable, but also tangible. Thus, Zöllner assumed that the fourth dimension could physically overlap and interact with the three-dimensional Euclidean-based common sense reality of the ordinary world. It is noteworthy that Zöllner´s conviction about the substantiality of the fourth dimension was probably fanned by a small work called *Space has Four Dimensions*, written in 1846 by Fechner under the pseudonym ``Dr. Mises´´ (Heidelberger 2004). In this ironical essay, Fechner – arguing in the tradition of idealistic–romantic science – tried to save the idea of a unifying metaphysical background principle (that subserves the phenomena of empirical physics) by introducing a fourth transcendental dimension (Ellenberger 1970).

So, whereas Hemholtz interpreted the fourth dimension as an abstract concept, Zöllner thought this to be a concrete space capable of hosting Euclidean objects. The only thing Zöllner had to do was to provide experimental proof for the existence of a fourth dimension by means of an ``experimentum crucis´´. He claimed to have found such an experimental approach by the means of spiritualistic séances.

THE SCHOLARLY DISPUTE ON SPIRITISM IN LEIPZIG 1877

In central Europe during the second half of the nineteenth century, spiritualistic ideas co-existed with the modern secular world view as derived from science, despite the sharp contrast in method (Sawicki 2002). In short, spiritists or spiritualists believed – in accordance with an important pillar of Christian faith – in the survival of the soul

beyond the body and the possibility of communicating with it, for example by means of a séance. They would sometimes call themselves ``radical idealists´´ (Benedikter 2001; Thissen 2000).

Leipzig was particularly well known for a somewhat anti-modern disposition, and for a certain occult flair. The latter had been enthused by the Oswald-Mutze-Verlag, a very active publishing house specializing in spiritualist and occult literature, established in 1872 (Linse 1999). Apart from Victorian literature on spiritism, Mutze also published the works of German ``avantgarde spiritists´´ such as Carl du Prel (1839–1899) and Baron Lazarus Hellenbach (1827–87). Thus, it seems to be possible that when Wundt was appointed as a young professor at the University of Leipzig, his happiness may have been slightly diminished by the fact that he actually found himself to be in the lions´ den of late romantic, ``radical idealistic´´ occultism.

When an American psychic of questionable reputation, Henry Slade (1839–1909), began a tour of Europe in 1877, Leipzig seemed to be a reasonable starting point. The American medium, who had been sentenced to three months´ hard labor for deception and fraud in England and had therefore fled the country, delivered some startling exhibitions, such as the famous knot experiment (Klinckowstroem 1925). Here, Slade allegedly went into a trance, in which he was able to present strange phenomena such as communicating with spirits and asking them to tie a knot in a closed rope loop (Treitel 2004; Staubermann 2001). In other words, Slade was offering the type of experimental proof that Zöllner had been looking for. Seen from Zöllner´s perspective, Slade was not only providing experimental validation of the existence of a fourth dimension and the existence of spirits, but was also demonstrating their tangible interrelation with the natural world.

Within a short time Slade managed to both attract a broad audience, and befriend Zöllner. The Leipzig academic *intellegentsia* was also attracted by the American medium, as were leading scholars at the University, such as the mathematician Wilhelm Scheibner. Fechner, Zöllner, and Weber also attended Slade´s séances. On two occasions Wundt himself attended his séances (Treitel 2004). Zöllner and – at least to some degree – Fechner were thereafter convinced that the phenomena produced by Slade were genuine and could be regarded as empirical proof of the existence of a transcendental dimension.

According to Zöllner, this usually concealed dimension would be inhabited by the disincarnated spirits of the deceased, who could nevertheless be brought to interact with the world if summoned by a gifted medium (such as Slade). Zöllner skilfully devised an experimental

protocol to prove that the phenomena were genuine and not artifacts of sleight-of-hand. A professor of logics, Hermann Ulrici (1806–1884), although not personally attending the séances, went so far as to make Zöllner´s experiments with Slade public by describing them in a scientific journal, in which he stated that Wundt and other professors had attended the séances (Ulrici 1879). Ulrici concluded that spiritism would be a scientific question of utmost importance as it could bring new and significant insights, empirically corroborated, to the human condition. Moreover, he urged the scholars who had attended the séances to publicly testify about what they had experienced.

When Wundt read Ulrici´s paper, he was compelled to write a harsh rejoinder (Wundt 1879). His argument against Ulrici was threefold.

First, if the phenomena produced by Slade were true, spiritism would correspondingly violate the assumption of universal causality, which has always been, and remains one of the most important prerequisites for the empirical sciences. To quote from Wundt´s letter:

> The natural scientist accesses his observations with an unshakable belief in the veracity of the objects he is studying. [...] He cannot be deceived by nature as there is neither caprice nor randomness within the natural things. However, you have to admit that one cannot speak of a distinct lawfulness with regard to the spiritual phenomena in question; quite to the contrary, it seems rather that every form of lawfulness is derided by spiritism
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> Wundt 1879, pp. 8–9, translated by NK.

Second, it is by no means clear that scientists were the best profession to be charged with judging the phenomena produced by Slade under obscure conditions, as sleight-of-hand could primarily be unveiled by trick magicians, illusionists, and similar professions more familiar with the trickery that might be potentially involved. Thus, Wundt argued that scientific observations under poor experimental conditions (as common for séance settings), would be comparable to ``... scrutinizing the swinging of a pendulum through a keyhole,´´ or – possibly in an allusion to Zöllner – ``recommending to an astronomer to install his telescope in the basement.´´

Third, if spiritism was true, this would also entail a moral problem, as the spirits of the deceased would not only fall victim to a medium but also show themselves to be in a deplorable intellectual state.

Finally, Wundt stated that he could only wonder why a trained and experienced philosopher such as Ulrici had not recognized the fact that spiritism as a cultural phenomenon would only draw a distorted picture of a higher metaphysical order in a deformed materialistic manner, and correspondingly this could in turn only be seen as a sign of the ``... cultural barbarism of our times´´.

Having written the rejoinder, Wundt himself was then furiously attacked by Zöllner, who threatened Wundt with a formal lawsuit as he deemed his (and Slade´s) professional and private reputation damaged by the young professor of philosophy (Zöllner 1879). In his ire, Zöllner went so far as to accuse Wundt, who had insidiously been identified as ``a medium of strong power´´ by Slade, of being possessed by (evil) spirit (s) while writing his critique against spiritism. Zöllner claimed that his conversion to spiritism had actually healed him from a deep depression that he developed as a consequence of a materialistic world view. Of interest is that during the controversy Wundt was indirectly supported by Helmholtz, who had declared Zöllner to be insane (Cahan 1994). The debate gradually ceased, and ended completely after Zöllner´s sudden and unexpected death in 1882. Notably, when Wundt was made head of the commission for nominating Zöllner´s successor to the astrophysics chair, he – in clear contrast to the appointed astronomers of Leipzig Observatory – recommended *not* appointing a successor. Interestingly, as the saved budget was then bestowed upon Wundt to equip his own ``Institute for Experimental Psychology´´, the young professor could go on and develop his laboratory, which is well known to represent the birthplace of ``modern´´ experimental psychology (Bringmann & Tweney 1980; Staubermann 2001).

Wundt´s pragmatic way of dealing with spiritism: narrowing the scope of experimental psychology and setting up a proto-``inclusive´´ cultural anthropology

At first glance, one might consider the clash over spiritism, between the founding father of experimental psychology Wundt, and the astrophysicist Zöllner, to be an isolated event. However, the fact that similar clashes between proponents of spiritism and positivistic scientists also took place in Victorian Britain show that the Leipzig events were not isolated (Lamont 2004, 2005), but part of the larger picture within the modern history of ideas. This process can be understood as a consequence of converting the spiritual doctrine of the soul into a

scientific theory of mind. Taken together, these events can be taken as illustrations or historical symptomatologies of how modern psychology struggled with old supernatural ideas in order to obtain a theory of mind that was allegedly free of metaphysical assumptions.

However, these can also be taken as symptoms of how deeply the battle connected with this attempt was tainted with ethical dimensions and implications. Thus, experimental psychology, the new science of the mind and behavior, as the forebear of (post)modern ``neurosciences´´, was connected with ethical questions from its very beginning. The majority of these questions have still not been resolved, but are part of the dialectic of contemporary ``neurosciences´´, and the quest for a reliable ``neuroethics´´ amid renewed controversy between (post)-idealistic and (post)-empiricist positions. However, we must ask how, and why, this has come to be.

The epistemological incompatibility between holistic science, empiricism, and positivism became ever more visible in the course of the second half of the nineteenth century, especially when spiritists claimed to have produced experimental proof for their transcendental beliefs. This is what Lamont has felicitously called the ``crisis of evidence´´ (Lamont 2004). Wundt was presumably more stunned by his older colleague´s reactions to the séances than by the experience with spiritism itself, and saw not only the scientific but also the moral problem(s) associated with spiritism as a cultural phenomenon. According to Wundt, spiritism could only be understood as a materialistically disfigured form of spirituality, mirroring the materialistic predilection of the contemporary *Zeitgeist*. However, when evaluating Wundt´s stance against spiritism, it is crucial to keep in mind that he considered himself to be not only a scientist but also a politically and socially engaged philosopher (Bringmann & Tweney 1980; Lambertini 1995). Thus, Wundt saw probably not only the scientific but also the social and moral problems that would inevitably emerge as a consequence of spiritism.

It is thereby noteworthy to remember that Wundt had been receiving scientific training from Helmholtz, who considered his antispeculative positivistic program not only a scientific, but also a social necessity in order to transfer the values of humanism into an increasingly technological German culture (Paul 1984). Thus, despite his antipathy to speculation, Wundt should actually be recognized as a protector of the humanistic cultural tradition, as he saw – together with others – the necessity for overcoming the speculative approach of holistic science in order to make progress, but at the same time the need to

maintain certain humanistic values. Correspondingly, although he saw society´s spiritual needs and demands, he viewed these as deformed by spiritism, and opposed spiritism not only for scientific, but also for moral reasons in order to enable intellectual and social progress. Hence, Wundt`s fight against spiritism as well as his firm belief in scientific and intellectual and moral progress may (at least from our contemporary perspective) actually be interpreted as a ``negative´´ defence of moral and humanistic values. In this light, one could speculate that whereas Wundt rejected a materialistically distorted, regressive form of spirituality, he may have actually intended to pave the way for a progressive, more ``rational´´ form of spirituality. In Wundt´s rejection of spiritism and the possibility of metaphysical components influencing or producing conscious phenomena, he not only defined consciousness as a natural phenomenon but also paved the way for the development of secular inquiry into human consciousness through the use of experimental methods.

For Wundt, the only pragmatic way of saving the experimental approach to secular theories of mind was by removing studies of altered states of consciousness from the research agenda. This is exactly what Wundt did when he wrote a book on hypnotism and suggestion in 1892, in which he stated that hypnosis (together with other dubious altered states of consciousness) should be regarded as epistemologically more or less inconsequential, and from the viewpoint of mental hygiene even as perilous states (Wundt 1892). In sum, Wundt´s conclusion was twofold. First, as one cannot seriously build an academic psychology on the basis of altered states such as trance, somnambulism, and hypnotism, experimental psychology should restrict its research scope to ``ordinary´´ states of consciousness. Second, as altered states of consciousness can in principle be dangerous, they do not belong in a psychological laboratory but rather in the hands of specially trained psychiatrists.

By allocating the study of altered states of consciousness to the field of medicine, the groundwork for the separation of experimental psychology (as an epistemological science) and clinical psychology (as an applied field) was established. Altered states of consciousness and their importance in medical contexts were scrutinized by means of clinical concepts that were developed by scientists like Bernheim, Charcot, Breuer, Freud, and Janet.

In other words, as is frequently the case at an early stage in the evolution of complex biological, social and conceptual systems, an important pediment was established within the secular theory of

mind. Within clinical psychology, in order to be able to explain extraordinary states and the concomitant phenomenon of being influenced by intrusive, strange and alien and unexplainable sensations, emotions, thoughts and associations, concepts such as ``*unconsciousness*´´ or ``*subconscious processes*´´ were frequently harnessed, whereas Wundt´s experimental psychology focused more on the activity of the subject and correspondingly paved the way for his theory of voluntarism (Kohls 2004; Kohls & Sommer 2006). With regard to the construct of the ``unconscious consciousness´´ Wundt stated in the second edition of *Hypnotism and Suggestion* that this oxymoron reminded him of a key principle of mysticisms, the ``coincidence of opposites´´ (``*coincidentia oppositorum*´´). Accordingly, as Wundt reveals in a footnote of this treatise, from his perspective Freud´s ideas ``*touch on occult theories associated with the medical natural philosophy of the Schelling school at the beginning of the 19th century*´´. Experimental psychology, in contrast, was restricted for a long time to the examination of ordinary states of consciousness and their concomitant psychological, predominantly conscious, cognitive processes, in accordance with Wundt´s pragmatic decision.

It is, however, important to note that Wundt was far from considering himself to be a disbeliever in a divine principle. He actually reveals in his last work that although he had personally experienced phenomena that he would not hesitate to label as mystical, he simply could not support the view that non-causal, metaphysical factors are involved in conscious processes (Wundt 1920). The epitaph on his grave in Leipzig summarizes his creed in a concise way: ``God is spirit, and those who worship Him, have to venerate him both in spirit and in truth.´´[1]

WUNDT´S PARTITIONING OF CONSCIOUSNESS STATES AT A TURNING POINT IN THE HISTORY OF THE SUBJECT AND ITS IMPRINT ON THE CANON OF MODERN NEUROSCIENCE

The proposed partitioning of consciousness into subversive extraordinary states and potentially normal ordinary states may be seen not only as the inception of academic psychology, but also as a turning point in the history of the subject that paved the way for a

[1] German original: ``Gott ist Geist und die ihn anbeten, müssen ihn im Geiste und der Wahrheit anbeten.´´

two-fold conceptualization of a secular theory of mind that has since then been divided into an experimental and a clinical field. As a matter of fact, this has influenced not only the cognitive, but also the moral image of academic psychology and neuroscience up to the present. Let us briefly consider three important, interrelated aspects.

1 An integrative approach of neuroscience striving to overcome Wundt´s twofold (Kantian) solution to the problem of consciousness

Although Wundt´s work has unfortunately been mostly confined to his contributions to experimental psychology, his actual scientific program was much broader. Wundt held the opinion that experimental approaches within psychology would be restricted to the exploration of the inferior mental processes, and in order to explain the superior mental processes, he dedicated the last twenty years of his life to the development of a complex cultural anthropology that he called ``völkerpsychologie´´. It is in this voluminous part of Wundt´s work, where he deals with the complex cultural phenomena that also embrace occult and mystical phenomena, not in an empirical way, but from a cultural–anthropological perspective. Interestingly, whereas Wundt treated his two approaches as methodologically distinct but epistemologically necessary if not complementary orientations, modern neuroscience strives towards combining them by means of an integrative but neuroscientifically grounded perspective, which must take the complex interaction between genetic, physiological, psychological and social variables into account in order to provide the best explanatory model for the human condition. Although the demarcation line that separated neuroscience from other disciplines (such as philosophy) has been gradually extended, (cognitive) neuroscience, in contrast to Wundt´s experimental psychology is no longer restricted to scrutinizing inferior mental processes; this discipline seems to have developed a rather inclusive self-concept. Nevertheless, one of the questions that remain unsolved is associated with how inclusive neuroscience can actually be without falling prey to producing categorical errors. For example, one controversy is whether neuroscience is capable of providing a basic epistemological foundation that is fully or only partly able to explain the phenomenon of consciousness, as well as embrace questions of philosophy, theology, and ethics.

2 Psychophysiological paralellism as a non-reductionist basis for a secular theory of mind

Wundt did not believe in materialist reductionism, or in Cartesian interactionism, and correspondingly he had to find a middle ground. Hence, he was willing to assume that brain and mind states are two independent yet synchronized layers of description that are both necessary in order to understand and describe consciousness in a complementary way. In other words, he assumed that conscious processes are associated with brain functions, although both bodily processes and mental processes appear to have a ``causality´´ of their own. Thus while thinking along the lines of the Leibnizian idea of a pre-established harmony, as well as Spinozian concept of psychophysical parallelism as possible explanation for the synchronization of the physical and the mental realm, Wundt introduced his appealing idea of a psychophysical parallelism of consciousness processes in the brain as a pragmatic working hypothesis. It is thereby noteworthy that the postulated mechanism responsible for the synchronization of the two layers ``brain and mind´´ still – at least implicitly – requires a metaphysical construct similar to Leibnitz´s monadology, unless one is willing to accept monism. Thus, as one can easily see the idea of physiological parallelism immediately created (and still creates) problems associated with the question of free will. In short, if there is no such metaphysical entity as a soul or homunculus (dualistic theories) on the one hand, and no strict mechanical causality of brain functions producing respective mental phenomena on the other (reductionistic theories), how can the connection between the realm of mind and body, as well as their interaction, be conceived? Either, as it is assumed within emergentism, consciousness emerges as a result of complex brain functions, which would – at least partly – support determinism and cast doubt on the concept of free will and freedom of choice, or alternatively, if it is assumed that mental processes may have impact upon brain functions, then the contemporary physical worldview would be incomplete at best.

3 The triumphant structuralistic approach and its focus on the experimental investigation of substantive states of consciousness

Wundt adopted the experimental approach utilized by early psychophysiologists like Fechner. This had proven to be successful in studying sensory perception by manipulating stimuli and having subjects

trained in the method of introspection report their sensations and inner experiences.[2] Hence, as conscious processes (i.e. sensations above the subliminal threshold of consciousness) can only be empirically observed by means of introspection, Wundt understood experimental psychology as the analysis of the structure of stable states of conscious experience that are tangible and expressible; according to this line of thought, direct observation of unconscious processes – and consequentially analysis of content free thinking – would be impossible. Wundt´s aim was to find the ``basic elements´´ of conscious experience by systematically breaking mental processes into the most basic but still perceivable components by means of introspection. This structuralistic approach, by focusing on the tangible ``substantive´´ (i.e. verbally expressible) elements of consciousness has had major impact on the development of the later course of psychology, and particularly cognitivism, as this paradigm allowed the application of an efficient form of rationally oriented (psycho) logics (Kohls 2004; Kohls & Sommer 2006). This is supported by the fact that the emotional aspects of conscious processes were neglected for a long time within cognitivism, very likely owing to emotional phenomena of consciousness being frequently ambiguous with regard to meaning, and correspondingly semantically difficult to describe.

Yet it is important to recall that the American counterpart (amd perhaps also antithesis) of Wundt, the psychologist and philosopher William James, championed functionalism as the opposing position to structuralism and he was – in contrast to Wundt – willing to take the radical empiricist position that nature and experience can never be captured by absolute and objective analysis, as they are naturally dependent on the mind(set) of the observer. Thus, for James, consciousness may be described not only by means of its tangible (verbal) content but also as a process that he dubbed ``stream of consciousness´´. This term is supposed to embrace the full range of thoughts, emotions, and sentiments as complex inner sensations, and not only verbally expressible thoughts. In other words, James held the opinion that in addition to substantive states, transitive states – *``flights to conclusions´´* as he called them – as the instable states, between substantive mental states, although not tangible and directly perceptible, are important for the understanding of consciousness. Hence, it does not come as a

[2] Wundt understood introspection not as a naïve way of self-perception but rather as a method for the examination of one´s own thoughts and feelings that had to be systematically trained in order for an individual to become a skilled introspector.

surprise that James was not only interested in scientifically scrutinizing the ``stable´´ ordinary, but also ``unstable´´ extraordinary states of consciousness. To be more specific, James´ broad approach left a venue for researching spiritual, religious, and meditative experiences, and by focusing on the experiential side of transcendental experiences and their impact upon health, James thereby did important work in both philosophy and psychology of religion. Moreover, James was convinced that altered states of consciousness could be epistemologically useful to explain certain aspects of consciousness.

Whereas Wundt restricted the scope of experimental psychology to scrutinizing the ordinary (``conscious´´) states of everyday consciousness, he made certain assumptions concerning the epistemology, scope, and methodology of academic psychology and in this way also defined its boundaries and limits. His concept left no leeway for harboring spiritual aspects, at least within consciousness. Admittedly Wundt´s approach was swiftly assailed and partly overcome by other approaches developed by his students and immediate successors, such as Gestalt psychology and the movement known as the Würzburg School, and was eventually superseded by behaviorism and functionalism at the beginning of the 1920s (Kohls 2004; Kohls & Sommer 2006). However, as history has shown, some basic aspects of the structuralistic line of thought described by Wundt have prevailed over functionalism and other rival approaches, and Wundt´s work has certainly left an imprint on the scope and methods of experimental psychology, as well as (cognitive) neuroscience, and thus determined the image of academic psychology to the present. As the counterdraft of experimental psychology, holistic psychology in the tradition of William James has not managed to achieve the status of an academically well-respected discipline, and has been relegated to scientifically less respected fields such as parapsychology, humanistic psychology, or transpersonal psychology.

The return of the dispute on a ``postmodern´´ scale since 1990 and since 2002

It is important to realize how much of the debate that took place in Leipzig some 140 years ago is still present as a background to today´s cultural and scientific discussion about studying consciousness and related phenomena in an inclusive way. The dialectic between empiricism and idealism, and between physiological, psychological,

and ``spiritual´´ dimensions of consciousness, still exerts an influence upon the contemporary debate associated with ``neuroethics´´, at least indirectly by means of *implicit* connotations of concepts such as ``psyche´´, ``mind´´ and being. Let us here provide some brief examples.

1. The current debate about the ``easy and the hard problems´´ of consciousness, (i.e. the relationship between the physical brain and the immediate self-awareness called ``I´´ or ``self´´ (Pinker 2007)), centers around ``empirical´´ and ``idealistic´´ viewpoints and hypotheses. One currently influential group, predominantly composed of secular philosophers and experimental psychologists and scientists, offers rejection of any metaphysical assumptions about the nature of consciousness. Whereas Wundt saw the necessity of upholding (1) the dialectics between an irreducible psychophysiological parallelism for explaining inferior mental processes and a cultural–anthropological approach for understanding higher mental processes as well as (2) social conventions and ethical standards, there are those in contemporary neuroscience (i.e. the materialists) who maintain that the physical brain is the monocausal evolutionary origin of consciousness. The apparent self-givenness of the ``I´´ or the ``self´´ usually does not include an immediate awareness of physiological brain processes; for materialists, consciousness seems to be little more than an epiphenomenon of neuronal activity. Seen from the viewpoint of the history of ideas, this group follows a newly ``purified´´ paradigm of physiological reductionism, which is clearly similar to the one developed by the young science of experimental psychophysiology in the second half of the nineteenth century, but to a certain extent is even more radical. Compared with Wundt, this group of contemporary thinkers tends to a much more ``transhumanist´´ or ``posthumanist´´ position. Interestingly, one of the main reasons for monocausalism seems to be a ``negative´´ experience with metaphysics and its moral ideas as such. Steven Pinker, for example, addressed different strands of such traditions (Pinker 2007) and seems to have adopted a view that indistinctly associates *every* metaphysical dimension with a kind of speculative or anti-scientific attitude. This is actually not far from the pivotal reason why Wundt rejected spiritism.

Another group, perhaps less influential but still publicly present, is led mainly by philosophers and humanists such as Colin McGinn, and holds exactly the inverse opinion. The apparent self-givenness of the ``I-feeling´´ or the ``I-experience´´ should be regarded as a primary empirical fact, explicitly comparable to brain processes. Moreover, the fact of the so-called ``conscious mind´´ – understood not as a *passive entity*, but as an *active* and *in actu* process of self-awareness – precedes the fact of the brain

(McGinn 2007). What is the rationale for that statement? A key argument is that the mere concept of ``the brain´´ (i.e. the interpretation of a perception and the creation of a sentence such as ``the brain is the primary cause of the I-feeling, and it creates the I-feeling´´) is only possible because it has been produced by an ``I-feeling´´, i.e. by an immediate self-givenness of a subject (or a first-person, subjective experience) who acts as the rational concept-builder. In other words, the self-givenness is, from a strictly experiential–empirical standpoint, a contextual prerequisite necessary for every statement about the brain. Therefore, for this group of ``neo-humanists´´, from a logical and phenomenological–empirical standpoint, *the ``I´´ must be the primary cause on which the concept of the ``brain´´ is always already dependent.* Thus, this ``I´´ must be regarded – at least to a certain extent – as a ``meta physical origin in itself´´ that cannot be reduced to an epiphenomenon (Gebser 1985). To state the matter differently, seen from this perspective, the ``I´´ is the fountain-head of the self and the world alike, and correspondingly the phenomenal origin of everything else: every experienced phenomenon, be it a perception, sensation, thought, or higher-level interpretations, as well as the origin of the perception itself. It seems to be obvious from this line of thought that this immediate ``self-givenness´´ of the ``I´´ or ``self´´ cannot be reduced to a secondary phenomenon associated with the physical brain by means of monocausal relations. However, in order to be able to fully acknowledge the reality of the conscious self-givenness associated with the ``I´´, it seems necessary to recognize it by a different or even complementary form of empiricism. One of the different forms of empiricism fully able to grasp this ``other´´, rather metaphysical or even idealistic``spiritual´´ origin of the self seems to be a neo-idealistic form of introspection. Possibly, this may be interpreted as a first sign of a realignment of the methodological approach to an examination of (self) with empirical–experimental methods. It is important to recall that this tradition was largely abandoned in Europe after the first half of the twentieth century (Benedikter 2005).

2. In the debate between post- and neo-humanistic paradigms mentioned above, an ideological but largely unnoticed tension currently manifests itself in the current content of ``neuroethics´´. Although the ``spiritual´´ aspects of the mind–matter problem seem to be a side-bar to the research agenda (Walach 2007), these aspects seem to be ``indirectly´´ at work behind very basic world views of the major participants on both sides of the discussion. For example, some of the arguments brought forward by Pinker as well as by McGinn seem to indirectly hinge on certain conceptualizations of ``metaphysical´´

aspects of the brain-self question. These may be ``negative´´ arguments, and we refer to the notion ``negative´´ in order to address our observation that domains that have been assigned to spiritual realms (within non-secular theories of the mind) are usually not directly addressed within contemporary scientific theories of mind in a positive way, but are only ``negatively´´ defined by means of their exclusion from the scientific debate. In order to illustrate this point, let us briefly consider the psychological function of dissociation and its contemporary and past interpretations.

Dissociative processes are usually considered to be natural psycho-physiological events that functionally exhibit a defocussing effect on the conscious mind. From a clinical perspective, they are regarded as subconscious processes for managing powerful negative emotions. However, depending on the severity of the symptoms, dissociative processes may also be regarded both as a psychological coping mechanism and/or as a psychopathological experience. Historically (in medieval times), psychological dissociation may have been interpreted in a more positive way: a medieval mystic, for example, may have regarded dissociation as a powerful tool for systematically diminishing the ``I´´ in order to allow a ``universal truth´´ to emanate in the realm of consciousness. Within this world view, regular practice of specific introspective practices such as meditation or contemplation – potentially eliciting dissociative processes – may have been interpreted as a venue for voluntarily melting down the self in a systematic manner. Observe that this interpretation might not be feasible from a secular epistemology in a similar way, because from a phenomenological perspective there is no more basic entity than the ``I´´. Thus, it seems that the implicitly positive connotation of dissociative processes must only be possible in world views where the ``I´´ is not seen as the epistemological starting point (Kohls 2004). To draw a line, it seems that at least some conscious phenomena that can – at least potentially – be looked upon favorably within more spiritual world views, may have very different connotations when interpreted within a secular framework. This is both a cultural and an epistemic issue, particularly given that the scientific debate around the mind–matter problem has conjoined certain theological perspectives. This is important given that spiritual and religious beliefs and experiences are basic practices of many individuals and cultures; therefore, a scientific theory to explain human experience and behavior would need, at the very least, to address the human need and desire for spirituality and the cultural manifestations of these beliefs and practices.

3. The debate about the ``easy and the hard problems´´ of the mind–matter relation is increasingly influenced by a tendency that has been called ``the global renaissance of religion´´ since the fall of the Berlin wall in 1989, the collapse of Communism in 1991, and the terror attacks on the World Trade Center on September 11, 2001. The contemporary renaissance of religion adds a strictly metaphysical, if not spirito political aspect to the debate, that may be seen as a counterpart of the radically materialistic concept of consciousness brought forward by the first group mentioned (i.e. Pinker *et al.*). This radicalized ``spiritual´´ concept of the origin of the self is the concept of the ``immortal soul´´ (Joseph Ratzinger, Elio Sgreccia (cf. Benedikter 2008b)) that is totally independent of the physical brain. The advocates of this position add this concept to the current debate as a ``forgotten´´ aspect of the true nature and origin of consciousness (beyond all its restrictions and reductions at the hands of contemporary scientific research). Admittedly, this concept is not identical to the spiritistic assumptions of Zöllner in the debate with Wundt, but it cannot be doubted that, from Zöllner´s viewpoint, a similar line of thought was the main inspiration for his scientific experiments with the medium Slade: materialism and reductionism can be depressing world views. It is therefore not a surprise that in the current debate between (1) radically monocausal, objectivistic, and materialistic views (e.g. Pinker), (2) empirically subjectivistic and neo-idealistic views (e.g. McGinn), and (3) radically monocausal, objectivistic, and ``spiritual´´ concepts of brain, mind, and self-experience there will be problems similar to those that arose in the debate between Wundt and Zöllner. In the main, these pertain to the relationship between physiological, psychological, and spiritual transcendent aspects of the complex and often paradoxical nature of consciousness, which have remained unresolved since debated by Wundt and Zöllner in Leipzig, 1877–79 (Benedikter 2008b).

4. Thus, the debate between ``materialistic´´ and ``spiritual´´ aspects of the ``easy and the hard problems´´ seems to have generated an epistemological controversy *within* the currently dominant ``postmodern philosophies´´, paradigms, and world views of the Western open societies, as well as in the humanities in general. The impact of this epistemologic tension on the future paradigmatic orientation of Western societies can hardly be overestimated.

It is noteworthy that many leading philosophers of so-called ``postmodern´´ or ``mature modern´´ contemporary philosophy who conceive of themselves as the ``principal thinkers´´ of the epoch (e.g. Jean-Francois Lyotard, Jacques Derrida, Paul Feyerabend, Helene Cixous,

Jürgen Habermas), have opened up their earlier, rather radically secular–materialistic paradigm of the mind–matter debate to a ``neo-spiritual´´ dimension in their late works. In the years after 1990, the majority of these thinkers – if in very different ways and forms – began to ponder the necessity of introducing an enlarged, ``empirical–idealistic´´, ``subjective–objective´´ or ``rationally spiritual´´ paradigm in order to fit the requirements of the new epoch, which emerged after the collapse of the old polar ideologies of the post-war world. However, the majority of them, possibly owing to their post-WWII and post-1968 critical education, seemed not to have been well prepared for dealing with the ``return´´ of spiritual and religious dimensions to the world stage. This may be the reason why many of these leading thinkers seem to have fallen prey to the temptation to adhere to old proto- or para-``spiritual´´, if not proto-``spiritistic´´, concepts of the metaphysical dimension connected with the immediate self-awareness of the ``I´´. Nevertheless, in their last years, they all seem to have experienced a certain uncertainty, in which they were deeply divided by the apparent contradiction between an empirical–materialistic framework of their ideas, and the eruption of a new metaphysical awareness. It was the latter that led many to embark on a (sometimes desperate and in many regards mainly ``negative; cf. (Benedikter 2008b; Lyotard 2001) search for a dimension of ``spiritually enlightened´´ or ``rationally spiritual´´ consciousness, which has for example been called the ``realm of the Not-I´´ by Jean-Francois Lyotard (2001).

To draw a line, we believe that the dichotomy between Wundt and Zöllner can be found again in the last works of the main postmodern thinkers mentioned previously. Although the split between materialistic–empirical and ``proto-spirititual´´ aspects of consciousness seems to be irreconcilable within the limits of ``postmodern´´ concepts of these thinkers, those ideas are still dominating the Western humanities and the mainstream of current academic philosophical thinking (Benedikter 2008b). This rift, as identified by the aforementioned ``postmodern´´ thinkers, could only be bridged by ``negative´´ means (i.e. by developing fruitful tensions pointing towards an enlarged concept of the ``I´´ and its inherent psychological dimensions). However, the inability to reconcile ``empirical´´ and ``idealistic´´ dimensions of the self *in a positive way* can not only be found in the leading postmodern concepts, but also manifests itself in the contemporary debate(s) associated with core issues of neurosciences and neuroethics. We opine that the bisection within late ``postmodern´´ mainstream philosophical and cultural thinking sketched above is

similar to the dichotomous viewpoints that are currently debated by ``physiological empiricists´´ (Pinker *et al.*), ``subjectivistic neo-idealists´´ (McGinn *et al.*), and ``radical metaphysicists´´ (Elio Sgreccia *et al.*) and that this debate may shape the form and content of ``neuroethics´´ in the Western hemisphere.

CONCLUSION: ELEMENTS FOR FURTHER DISCUSSION

Distinct problems are associated with efforts to study consciousness. At some level, these seem to repeat debates that occurred in a rather primordial form in the nineteenth century. Perhaps the unresolved fundamental problem can be stated as: how can metaphysical (or ``idealistic´´) and physical (or empirical–materialistic) aspects associated with the ``easy and hard problems´´ of modern neuroscientific research be properly related? The study of the history of ideas of the nineteenth century, and especially of the early rise of modern psychology as an emerging science, might assist our understanding of the conceptual and practical complexity of this problem. From such reflection upon debates of the nineteenth and those we face in the twenty-first century, some conclusions can be drawn.

1. Both the necessity and the desire for scrutinizing, explaining, and interpreting consciousness is unquestionably a constant in the history of modernity. One might speculate that this has probably been a matter of utmost importance for the self-concept and the historical evolution of modernity (and later postmodernity) as such. Yet, the modern field of consciousness studies is usually only seen as having commenced at the eve of Enlightenment. However, Hermann Ebbinghaus´ famous and concise remark that psychology ``has had a long past and only a short history´´ reminds us that its cultural roots are much older and that this needs to be acknowledged in order to be able to consider the tacit transcendental (and perhaps spiritual) undercurrent inevitably associated with the mind–matter problem.

2. One of the most influential European ``post-humanists´´ of the second half of the twentieth century, Martin Heidegger, has described how technology transforms not only our orientation towards the concept of the world, but also our understanding of it. Owing to a process that Heidegger called ``enframing´´, human beings are revealed as orderers of their environments, and consequentially other entities of the world are revealed as being ordered. Thus, one might surmise that a theory of mind as a modern tool for explaining consciousness is also affected by this process of enframing within the modern history

of ideas. To be sure, there has probably always been a certain tendency to explain consciousness in congruence with the most important contemporary epistemological concepts. However, with the advancement of technical methods and processes, technology has increasingly been used as both a metaphorical and a literal model for interpreting consciousness.

One of the most important examples of this is the ``cognitive revolution´´ in the 1950s. Interestingly, after the inception of the computer era, computational metaphors for explaining important aspects of brain–mind function were instrumental in paving the way for the field of cognitive neuroscience. In a similar vein, the nineteenth century spiritism might be regarded as an important example of wedding technological concepts to idealistic theories of mind (Noakes 1999). Remarkably, a decade after the first commercial electrical telegraph was constructed and put into operation on the Great Western Railway in Britain, the basic idea of spiritism arose that telegraph-like communication with the spirits by means of raps would be possible (Noakes 1999). The clash between Wundt and Zöllner on the question of spiritism can be seen as an example of the durable struggle between the old psychology, which was upholding and defending a dualistic theory of mind, and a new, modern, scientific model of consciousness, which has been advocating a non-dualistic, more monistic explanation.

3. Although it may appear odd at first glance, it is interesting to compare the structural and functional similarities and differences between the ``cognitive revolution´´ and ``spiritism´´. First, both concepts harness technological concepts for explaining distinct features of consciousness. Intriguingly, whereas advocates of spiritism used telegraphy as a communicative vector for interacting with spirits dwelling in a transcendental realm, several proponents of the cognitive revolution assume that by studying and developing procedural algorithms in artificial intelligence and computer science it will actually be possible to devise empirically testable theories about human mental processes (if not to create such processes themselves). In other words, whereas spiritists assumed that they had provided empirical evidence for the structural existence of a soul, some cognitive scientists believe that they could draw conclusions from artificial intelligence to human beings or evoke ``human cognition´´ in a machine.

It might be noteworthy to realize that the term ``functional´´ insulates the scientific perspective of modern cognitive neuroscience. Had this term not been used, then it might not be such a stretch to regard the panpsychological inclination of cognitive neuroscience as

roughly comparable to the radical idealistic ideas of spiritism. *Deus ex machina est Deus ex machina*.

4. It is important to note that the debate between Wundt and Zöllner has not ended but only shifted its center of gravity away from psychology. Three examples might suffice by way of illustration: (a) the controversy between Einstein and Bohr concerning the question of determinism in the context of the Copenhagen interpretation of quantum mechanics (Held 1998; Whitaker 1996); (b) the question of the ontological status of a transcencental realm with regard to the ordinary *Lebenswelt* (the everyday world), as addressed by linguistic philosophy in the mid-1920s of the Vienna Circle (specifically, as addressed by Ludwig Wittgenstein in the *Tractatus Logico-Philosophicus*); and (c) emergentism – one of the most promising non-reductionist theories to explain consciousness – which is based on a layered view of nature, and the assumption that higher-order properties supervene upon lower levels without direct causal interaction. Within these approaches, nature has been conceptualized as imbued with a non-causal principle of transgression; surely this would have amazed Zöllner, who was desperately trying to prove the connection between transcendental and ordinary dimensions.

In conclusion, the debate about how to explain consciousness is structurally comparable to the debate between Wundt and Zöllner: although the mind–body–spirit problem has been reduced to the mind–body problem (Walach 2007), there is still a tendency to use black box concepts in order to fill explanatory gaps. Similar to the days of Wundt and Zöllner, the intricacies of physics in light of quantum mechanics provides a current example of the schism between empiricism and idealism. Some scientists, such as the late John Eccles or Roger Penrose, assume that quantum processes might be involved in consciousness in order to defend a non-materialist position (Eccles 1980; Penrose 1994). Others hold that the mind, and correspondingly the self, is a pure epiphenomenon of the brain, and that the self (and free will) should be regarded as a persistent illusion (Metzinger 2004).

Suspiciously, there remains room for spiritual thought in all these beliefs – be it that the soul is an immortal entity as suggested by Abrahamic tradition, or that our ego persona is simply an illusion, as suggested by Buddhist philosophy. It would be difficult to affirm which thought is more or less spiritual. In any case, the idea derived from the Enlightenment that superstition, religion, and spirituality would finally be swept away by science is a rather naïve, if not likewise superstitious assumption. Rather, it seems that these domains that we

label as spiritual or mystical (Forman 1998) adapt as reaction(s) to the mainstream *Zeitgeist* and paradigm(s). This needs to be taken into account within neuroethics, if this endeavor wants to be fully aware of and accountable for its complex and conflict-ridden origins. As a field, neuroethics must confront the reality that these debates not only cause tensions and problems, but concomitantly carry the unparalleled potential for scientific progress and cultural inclusion.

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