Epistemology of Psychiatry Between Applied Biological Sciences and Humanities

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FOREWORD

The importance of epistemology for neuroscience consists above all in showing the limits of knowledge. For only if the psychophysiologist can rely on a consistent foundation will it be possible for him to pursue his task of bringing brain function and experience into a relationship.

The process of cognition begins with hunches. They aim at an abstraction beyond life-world concerns. The end point is marked by general principles of explanation, which themselves can no longer be circumvented. Gregory Bateson (1984) saw the indispensability of such "explanatory principles" like matter, mind, force, field, space, time etc. in explaining others. The richer a theory is as a unifying explanatory principle, the more it explains. The ideal of a theory that encompasses everything conceivable ("theory of everything") is not attainable.

CHAPTER 1

ON THE CURRENT RELATIONSHIP BETWEEN PHILOSOPHY AND INDIVIDUAL SCIENCES

Motto: The Importance of Epistemology consists above all in showing the limits of knowledge

From today's perspective, Kant's writing "Der Streit der Fakultäten" (1797) reveals a fundamental change in the relationship between philosophy and the individual sciences. Whereas for Kant philosophy, as the "lower faculty" ("lower" in the sense of fundamental), was committed to the search for truth, the three "higher faculties" were to serve the welfare of man - theology, the spiritual welfare, medicine, the physical welfare and jurisprudence, the worldly welfare. Philosophy was to support the "higher faculties" in this. Due to its expertise regarding the truth located in the transcendent, it was granted a special position. It lost this position with the rise of anti-metaphysical empiricism. Thus, epistemology also lost its fundamental importance for the sciences. What today is called "philosophy" in the universities is only one single science among others. It has long since relinquished its original authority to set norms and values. Let's listen to the university philosopher Jürgen Mittelstraß:

> *"When the breath of Hegel's philosophy of mind, which still sought to grasp the whole world of spirit, including the natural sciences, and to comprehend it in its unity, began to grow weak, philosophy lost its universal essence and came under the methodological and institutional yoke of the historical and philosophical sciences" (Mittelstraß, 2000).*

The original unity of philosophy and science was replaced by scientific understanding on the one hand, and a new kind of self-sufficient philosophical reason on the other. If we - following G.W.F. Hegel (1817) - see the task of reason (Ger. Vernunft) in recognizing and overcoming the limitations of understanding (Ger. Verstand), the individual sciences have

lost their methodological external criterion with their emancipation from philosophy. Instead, a technical pragmatism prevails, which is gladly passed off as theory. Polytechnic and technical colleges - formerly “higher vocational colleges” - saw the chance to gain the status of a “Universitas Litterarum”. But the pure book sciences and humanities also underwent a shift in emphasis, away from purposeless knowledge and toward what is currently considered useful. Surveys among students of those very subjects that demand “spirit” (Ger. Geist) show that even more practical relevance and application orientation of studies is demanded - even when nothing more than practice is taught anyway. A demand like that of Wilhelm v. Humboldt (1809) for “study in solitude and freedom” or “knowledge for its own sake” meets at best with pitying amazement. Equally superfluous became the preoccupation with the history of the studied subject, especially since it is not to be seen to what extent such knowledge could be of advantage in the job search. Today's universities are - one may welcome or regret it - mass teaching institutions, which justify themselves above all by imparting useful specialized knowledge. Purposeless knowledge for its own sake has gone out of fashion, as has the dotty “scholar”, who has degenerated into a figure of fun and is regarded as the epitome of the university teacher who stands for education and science par excellence. Today, the commercialization of “training units” in human resource management, as well as the teaching of modern media techniques, is booming. Philosophy and sciences have adopted different rationalities that preclude a rapprochement. Ludwig Wittgenstein (1921) took a clear position on the ambivalence of philosophy. On the one hand, he treated it as a meta-discipline in the sense of Kant. On the other hand, however, philosophy strove for autonomy as a new individual science:

> *Philosophy is not one of the natural sciences (“Tractatus logico-philosophicus” 4,111).*

According to Mittelstrass (2000), we need a philosophy that prevails in an expert world of diverging rationalities, keeping alive the idea of a unity of scientific and philosophical rationality. The anti-metaphysical transformation of the newer philosophical movements was misunderstood by the individual sciences as a liberation from restrictive rational control. The original commitment to classical epistemology was replaced by a subject-specific

rationality - under the catchword, or better, buzzword, “anything goes” (Feyerabend, 1968) - as a methodological underpinning in the service of the respective partial interests. One will hardly have to reckon with contradiction if one states that “search for truth” has become an anachronism for the individual sciences. They have a firm grip on the instruments of third-party funding, the peer-review system, and the appointment of key positions. Funding is provided primarily for standardized research on trivial issues, mostly follow-up research on long-outdated topics. Projects are eliminated if it cannot be ruled out that they are breaking new ground. In this way, small privileged groups have seized control of the entire research enterprise, with the consequence of narrowing down the ideas dealt with to a small, irrelevant, but risk-free spectrum. Genuine innovation coming from outside, on the other hand, has only little chance. According to Richard Münch (2007), the capital procured by the cartels is used for “acts of consecration” with the aim of keeping the cartels in line with the prevailing knowledge. The renunciation of an epistemological basis of the research conducted is camouflaged by an ideology of pluralistic diversity of opinion and tolerance, which is connoted as progressive. Although occasionally branded as “postmodern arbitrariness”, the basic criticism of pure anti-metaphysical empiricism is very limited. When submitting manuscripts with mainstream critical content, one has to take into account that a sophistic “rhetoric of flattery” has become part of the new academic commentary! Today, we have to distinguish between a past philosophy with 2500 years of tradition and a discipline that is only a few decades old. The latter is largely preoccupied with itself and has given up any claim to interfere with the rest of the scientific community. The philosopher in the Socratic sense cannot be a university teacher today, the university teacher of the subject philosophy cannot be a philosopher. That this development was already set in motion some decades ago is evident from a remark of Nietzsche. According to this, the philosophy professor is

> *“at most an overthinker ... proficient philologist, antiquarian, linguist, historian but never a philosopher”.*

A little later, Max Weber (1919) saw the new epoch of practical utility dawning,

"dominated by specialists without spirit".

and further,

"The spirit has left the universities. Practical utility reigns supreme".

Weber sees only destruction without creativity, because the whole lacks the legitimacy-giving meaning - and where, he asks, should this come from, if there is no place for "meaning-giving scholarship" in the new academic world?

CHAPTER 2

JUXTAPOSITION OF PHYSICS AND BIOLOGY

This chapter is the quintessence of a dialogue between the author and the theoretical physicist Hans-Jürgen Treder (1928-2006), conducted orally and by letter over a period of 8 years, which dealt with a differentiating consideration of the epistemological foundations of exact natural sciences on the one hand, and biological natural sciences on the other. The correspondence was published under the title "Im Spannungsfeld von Aletheia und Asklepios" (Nexus-Verlag, Düsseldorf, 2000). In March 2001, the author invited 8 renowned scientists to a two-day interdisciplinary symposium on the topic "Medicine between exact natural science and humane obligation" in Berlin. Participants were Thure v. Uexküll, Freiburg; Friedrich Gaede, Halifax/ Freiburg; Hans Heimann, Tübingen; Sven-Olaf Hoffmann, Mainz; Georg Schönbächler, Zürich; and Hans-Jürgen Treder, Potsdam.

Friedrich Schiller, as a student of Kant, denied that the primordial plant presented to him by Goethe as scientific knowledge could be assigned to the realm of experience. The primordial plant is rather a (Platonic) idea, which implies a homomorphism in the construction plans of all plants. From here the thread can be continued to the "Umweltlehre" of Jakob v. Uexküll as it was formulated more than 100 years later. The "Umweltlehre" (science of the subject-environment interdependence) states that there is a homomorphism between the individual space-time structure, claimed by a living being and the physical space-time world. With his Umweltlehre, Jakob v. Uexküll (1920) founded biology as a science sui generis under the header "Theoretische Biology". "Biology" should no longer have been misunderstood as applied physics and chemistry after the "discovery" of this fact.

While the physicist Einstein, as well as Heisenberg, provided a definition for the term "space-time-world" with the theory of relativity, the environmental theory (and only it!) enables a definition of the term "life".

According to Kant, Epistemology is to be understood as the doctrine resulting from the introduction of the “transcendental subject” (the ideal i.e. extramundane observer). Therewith, Epistemology is the indispensable condition of doing science. It is bound only to the two principles of “freedom from contradiction” and the “excluded third”. In contrast to the exact natural sciences (e.g. physics), biology has to take into account the relations of organisms to their respective environment. The exact natural sciences are based on timeless truths which are completely independent of the process of cognition. The truth of knowledge is essential for the exact natural scientist because only in this way is an intersubjective reliability of scientific statements possible. For the biological practitioner, but not for “theoretical biology”, this statement has to be modified. While for all physicists there is only one environment, namely our cosmos, as the object of cognition, for the physician and his patient there is no such common environment. Every living being has its own environment - Jakob v. Uexküll taught! Of course, also in the biological sciences, statements with a claim to truth are only possible from the perspective of the transcendental subject (theory), but never from the perspective of an empirical subject (practice). From this follows that for all questions which are about experiencing, i.e. subjectivity, the concept of truth of the exact natural sciences has no binding force at all. Just as Baron von Münchhausen could not pull himself out of the swamp by his own hair, it is impossible to arrive at context-independent truths by methodological procedures aimed at “controlling” the subjective factor, i.e. standardization and operationalization. It is precisely the nature of the subjective not to be fixed. Those who do not want to admit this and nevertheless try to objectify the subjective must be aware that they transform biological questions into physical-chemical ones! For questions which have to do with the reality of life, i.e. with the behavior and experience of individuals, it is not possible to abstract from the subjective. Accordingly, one has to be content with answers of limited individual or relative truth. Such answers are true only with regard to a certain context, i.e. the currently given contingencies, which may be quite different from observer to observer. Hence, they can never lead to statements of law. According to Treder (2001), the environmental theory as Platonic idea of a homomorphism of the living subject with its environment is a timeless truth, which was true also before the formation of the solar system and would

remain true if there would be no more living subjects in the whole cosmos, because the physical conditions do not permit this. In the same way, Euclid's proof for the existence of countless prime numbers is valid even if the cosmos contains only a finite amount of particles.

CHAPTER 3

ASPECT DUALISM AS FUNDAMENTUM INCONCUSSUM OF NATURAL PHILOSOPHY

Since the theory-guided scientist does not directly face nature, but only his subjective "images" of nature - for theories are nothing else -, he breaks the prison created by the restriction to sensual perception. The original naive empirical "observer-subject" is oriented to the Kantian construct of the ideal observer or the "transcendental subject". Only this construct allows the scientist to escape pseudo-problems, paradoxes and aporias. For the empirical observer subject, these are unavoidable when making statements about the world of which it is itself a part. Since practiced medicine does not aim at epistemes, epistemology, including the presupposed "transcendental subject", is irrelevant for it. Epistemology is replaced by the psychology of gaining knowledge. Today, it is practiced as a special form of organic physics and organic chemistry, i.e. as "brain physics" or "brain chemistry", based upon the Cartesian method principle of the decomposition of complex problems into more easily solvable subproblems. This procedure always meets its limits, if the whole obeys laws other than the parts. Likewise, the Galilean method principle of exact induction with the "pure case" reaches its limits when identical repeatability is to be excluded due to uncontrollable influences. The impossibility of identical repeatability was demonstrated already more than 100 years ago by Sir Charles Sherrington, through stimulus experiments on the isolated nerve-muscle preparation of the frog. In fact, no physical law provides an explanation for any biological phenomenon. The term "molecular biology" is an oxymoron, since it forces opposites into one term, i.e. the chemistry of "dead molecules" and biology as the science of the "living". Such terms prove that a concise theory of biology is lacking. Viable research of biologically thinking authors could not be assimilated by the mainstream. Examples include Jacob v. Uexküll (1920, 1956, 1980); Konrad Lorenz (1959); Humberto Maturana, Francisco Varela (1982) or Gregory Bateson, to cite only the most profound. A

generally unrecognized advocate of genuine biology was Josef Weizenbaum (1976), who is in the first line known as a pioneer of computer science (see Chapter 15). He displayed his ambivalence towards the general understanding of computer technology, especially the so-called artificial intelligence (AI), in his book Computer Power and Human Reason. From Judgement to Calculation (1976); Weizenbaum made a crucial distinction between the programmer simply deciding between a given possibility, and a genuine human decision which includes more or less a subjective assessment that makes us human. But the latter is not programmable. Hence, Weizenbaum cautioned that we should never use computers to make important decisions since those machines lack decisive human qualities such as compassion and wisdom. Although the colloquially formulated argument of Weizenbaum hits the bullseye, the deeper epistemological meaning might not become plain instantaneously. To the philosophy of the German idealism (dated from 1780 to 1830), "*Verstand*" is nothing more than the universal and rational application of rules and principles, whereas "*Vernunft*" is a super-ordinated authority which challenges rules and overcomes limits. According to Hegel, it is up to the "*Vernunft*" to point out the narrowness of the "Verstand". The latter corresponds to decision making between "yes" and "no", whereas "Vernunft" chooses the apparently best and most suitable among different options, basing this on own life experiences or "wisdom". The contrast between the mere choosing of two options and decision making between a multiplicity of options reflects the decisive difference between artificial and human intelligence. Replacing of our own intelligence by computer-based decisions means to eliminate the concrete lifeworld being meaningful to us. The question to be answered is why do people prefer computer-based artificial output compared to own brain-based decisions? In other words, wherein consists the power of the computer (see title of Weizenbaum's 1976 book)? It is firstly in its breath-taking speed, compared to time-consuming human achievements. Comprehensive human judging or natural colloquial language (NCL) is rather slow compared to computer speech. NCL is the language of everyday verbal communication, as well of our thinking and imaging. It is to be distinguished from the denotative scientific languages (DSL). It seems important to stress that our natural colloquial languages are the meta-languages for DSL. W. Heisenberg has pointed out that all, even highly

complicated DSL, may be translated into an NCL, though it may sometimes be difficult. Moreover, attention should be paid to the fact that any DSL is subordinated to the NCL, because only the latter can transport meaning and symbolic contents amounting to metaphysics and poetry. In other words, a psychic phenomenon cannot be expressed by a formalized, unambiguous language, or a respective thinking form. A well-known example of the hard-fought disagreement concerning the scientifically correct theory of color perception was (or is) that between J.W. Goethe and I. Newton. According to Newton and his proponents, "life" and all subjective phenomena are not legitimate objects of science. Science should be bound exclusively to the denotative scientific language (DSL). Goethe's comprehensive definition of science, in contrast, gives evidence that the academic investigation of "life" will maintain its status as an NCL. Hence it is highly desirable that physicians are learning already during their studies to communicate with their patients in the NCL. The monopoly of the physical way of thinking caused an enormous developmental thrust in the field of the exact natural sciences. On the one hand, it was conducive to joining the rationality of the exact natural sciences. On the other hand, however, a physician, who has difficulties with the descriptive distinction of similarly appearing disease pictures will be unable to do justice to the reality of the holistic organism. The German protagonists of the "New Medicine" (e.g. Virchow, established at the turn of the 19th to the 20th century), saw progress above all in the self-understanding of medicine as a subject-free exact Galilean natural science. Since then, the ideal of a supposedly theory-free medicine research has been widely developed. It is characterized by the "let's-try-it-and-see principle", and freedom of any epistemological dictation. Without doubt, this paradigm change was highly prosperous and downright beneficial in most sections of medicine. In psychiatry, it has been known at least since Kraepelin (1920) that the diseases which he originally assumed as natural entities do not exist. "Neurophilosophy", which emerged from the anglophone "Analytic philosophy", claims today a definitional supremacy. "Neurophilosophers" hold that what are called "mental states" are in fact simply products of colloquial nominalism (Sellars, 1956; P. Churchland 1979; Feyerabend,1983; Rorty, 1987; Quine, 1991; Dennett, 1991). The common denominator of the various currents is camouflaged physicalism,

> *"Physics investigates the essential nature of the world and Biology is a site-specific outgrowth of it. The human psychology - describes an outgrowth on this outgrowth. It is astonishing, and moreover a matter of philosophical confusion running through the ages, that some limited sense reactions and thought processes up there in the outgrowth of an outgrowth are thought to be on the same level as the physicist's task of grasping the essential nature of the world" (Quine, 1991).*

The subjective experiencing of the immaterial was considered magical thinking, or at best a scientifically irrelevant epiphenomenon of the material. Materialism, Physicalism, and Objectivism form the triad of being. The commitment to these synonymous principles is considered the epitome of progress in neuroscientific thinking. This is already surprising because even slight reflection makes it clear that subject-free objectivity leads to aporias, contradictions and paradoxes. The assertion of Analytic Neurophilosophy that all reality is material in nature is not more than a statement of faith, since it can neither be verified nor falsified. An empirical verification would require that the measured values, which after all are not self-explicative, can speak for themselves. An empirical investigation that claims to be theoretically grounded fails because it requires a subject that interprets the measured values. Mereological attributions suffer from the fact that they inevitably lead into the aporia of infinite regress due to the inconclusive sequence of questions about the "ultimately responsible" functional substrate (Uttal, 2001). Moreover, the mereological error of reasoning is misleading because it fosters the ludicrous belief that it would become possible for humans to create rational beings in the future (Treder, 1988; Kurzweil, 1999; Ulrich & Treder, 2001). Someone who claims of himself to act only as a puppet on the string of physical brain mechanisms declares himself to be completely extrinsic. If the physicalist is right in his assertion that the subjective/spiritual cannot be a scientific fact, he is coincidently wrong because his assertion is itself a subjective fact. Simultaneously he also denies with his proposal every responsibility for his actions, words and works. Despite their important contributions to natural philosophy those researchers (like Planck, Einstein, Bohr, Heisenberg, Cassirer, Jonas etc.) who exposed the belief in the omnipotence of Laplace's demon as a grandiose error, remain out of consideration (Ulrich & Treder, 2001). Even if the conditions required by Laplace were fulfilled, his demon could neither

predict the future nor infer the past due to the overdetermination of complex systems which follow from their non-linear dynamic of function. In contrast to this, living systems have primarily an autochthonous internal determination which is a product of their development history, whereby the system state changes continuously, resulting from the permanent system-environment interaction. Through interaction of the intrinsic internal with external determination, the complexity of the system is increased to such an extent that it defies any prediction of its behavior. Theoretically, complex systems can assume an infinite number of distinguishable states. They do not (re)act "randomly", but rather in an overdetermined or chaotic-determined manner. It can be assumed that a physically identical stimulus will produce different effects when repeatedly applied in the system. Thus, it eludes any causal-mechanistic explanation, which was already fully explicated by H. Poincaré (1904) more than 100 years ago in his mathematics of complex systems. Heinz von Foerster (1985) called such non-predictable systems non-trivial in contrast to the predictable trivial artificial systems.

CHAPTER 4

THE SPIRITUAL AS A PRODUCT OF THE MICROGENESIS OF THE LIFEWORLD

For the biological sciences, it is of utmost importance to keep the levels of description of physiology (as the function) and psychology (as the performance) separate. In mathematical formulation: between function and performance no reversible-unique allocation exists. This dictum, which goes back to the important, today largely forgotten works of Fechner (1860), Goldstein (1934), Viktor v. Weizsäcker (1948), Conrad (1947) and others, is of crucial importance for a research in which the material correlates of mental states are inquired. In his main work Elements of Psychophysics G.T. Fechner (1860) advocated a psychophysical parallelism, in which he explicitly kept open the question of the nature of the relation between the physical and the mental:

> *"What appears to itself from the inner point of view as spiritual, psychic, can be perceived from another person only as bodily material expression" (Fechner, 1860).*

Furthermore, Fechner explicitly stated an identity view of the body and the soul. He distanced himself from a psychophysical parallelism based on a two-substance theory, thus representing a view which corresponds to the aspect-dualistic monism. In Fechner's wake the most important psychophysiologists of his epoch, like Wilhelm Wundt (1832-1920), Ernst Mach (1838-1936), John Hughlings Jackson (1835-1911) and Emil Du Bois-Reymond (1818-1896) committed themselves to his methodological principle of a purely pragmatically oriented natural research. Fechner's principle enabled physiology and psychology to coexist fruitfully, so that it was welcomed as a methodological Via regia by the philosophically founded trans-classical natural science. As an example, Albert Einstein (1922) shall be quoted:

> *"To avoid a collision of the different varieties of realities of which physics and psychology are concerned, Spinoza and Fechner respectively invented the doctrine of psychophysical parallelism, which frankly satisfies me completely."*

A key role in the dissemination of Fechner's doctrine was played by the psychophysiologist Du Bois Reymond:

> *"Whether we will ever understand the mental processes from material conditions is a question quite different from the question whether these processes are the product of material conditions. The latter question can be answered in the negative, without anything being said about this question, let alone in the negative" (Du Bois Reymond, 1872).*

In doing so, he contradicted his friend Hermann von Helmholtz (1821-1894) - also a student of Johannes Müller - who insisted on a general validity of the mechanistic paradigm within natural research and consistently turned from medicine and physiology more and more to exact physics:

> *"But if motion is the primordial change underlying all other changes in the world, then all elementary forces are forces of motion, and the ultimate goal of the natural sciences is to find the motions underlying all other changes and their driving forces, that is, to dissolve into mechanics" (von Helmholtz, 1869).*

Hence von Helmholtz outlined a research program which had been recently actualized as state of the art (Elger et al. 2004). Du Bois Reymond, in contrast, had convincingly excluded the possibility of the transition from material to mental phenomena more than a century ago:

> *"It seems, indeed, on superficial examination, as if knowledge of the material processes in the brain could make certain mental processes and dispositions intelligible to us ... The least reflection teaches that this is delusion" (Du Bois Reymond, 1872).*

CHAPTER 5

THE PHYSICAL MICRO- MESO- AND MACROCOSMOS AS THE AREA OF CLASSIC PHYSICS

The physical cosmos can be divided into microcosm, mesocosm and macrocosm. The physical mesocosm is the area of classic physics which begins with Galileo and includes Newtonian mechanics, electrodynamics, thermos-dynamics and optics. The Physical microcosm is the area of the physics of the very smallest particles (atomism, quantum physics). The Macrocosm is the area of the very big, also denoted as cosmology. A researcher can only describe his observations, whereby he has to refrain from using empirically unjustified Aristotelian causalities and narratively clothed assumptions. Jakob v. Uexküll has coined the metaphor of the "biological fantasy" when he described the feeding and species preservation using as example of the behavior of the tick. The tick, native to our region, "waits" motionless - sometimes for years - on bushes and grasses for a certain constellation that triggers a "fall reflex". This constellation consists of a temporal and local coincidence of butyric acid molecules and a temperature of about 37 degrees Celsius, which is characteristic of mammals. The starved insect then reflexively drops onto the mammal and begins to feed on the blood after it has attached itself. Methodologically, this means that in contrast to the Galilean natural sciences, with their life-worldly meaningless measure values, the biological natural sciences are based on an ordered sequence of successively measurable data. Only through these higher moments can the organizational invariance going along with structural change be grasped. If I communicate my introspectively won experience contents, then it concerns not a verbal reproduction of a static inner picture, but the processual experience reality directly accessible to me within the psychic thought. The mental/psychic thought-form corresponds to a higher logical type than the physical thought-form, because statements

about something are possible only from a level of description superior to what is said. Because of their logical incommensurability the reflexive mental form of thinking and the irreflexive physical form of thinking cannot be translated into each other. If this is not considered, one gets into the homunculus aporia (see above). He who thinks to disregard his subjectivity, which is essentially inherent to every individual, equates himself with a machine or an externally determined automaton. Such an automaton, however, cannot have an object from which it is able to distinguish itself as an ego. Everything that such a machine can give as output is strictly input-determined and thus tautologically empty. Our thinking and, with it, our natural colloquial language (NCL), have developed at the objects and structures of the mesocosm. Therefore, all those phenomena which form the microcosmic or macrocosmic world view cannot be grasped by our everyday logic and NCL. The spatial and temporal borders of the objects of the physical microcosm are "smeared" in contrast to the objects of the physical mesocosm which are clearly circumscribed in point form. Heisenberg has introduced the term of the uncertainty relation (ger: "*Unbestimmtheitsrelation*") for this. Since the "quantum objects" are not precisely determinable, there is no possibility to distinguish between cause and effect. Particular microcosmic effects seemingly arise without determining causes. A further phenomenon which is characteristic for the microcosm is the "wave-particle dualism" and the physical macrocosm that found its physical meaning in Einstein's General Theory of Relativity. The dimensions are so large that the investigated phenomena are beyond direct sensual perception. Einstein's theory represents a revolution in the traditional meso-cosmic conceptions of space and time. The latter are interdependent. Physicists speak about Spacetime understood as a 4-dimensional space-time which might be a basis of a theory of a finite universe. Translated back into our NCL, this theory says that our physical macrocosm can be understood as a curved, unlimited, but finite space. This abstract statement can be brought cum grano salis closer to understanding from the fact that the sphere, whose surface is also unlimited but finite, is a physical object in three-dimensional space. All immaterial phenomena/facts such as ideas, memories, feelings and volitions, along with the self, do not exist for this form of thinking. Some physicalists hold that certain mental illusions, such as free will, fulfill a useful "individual-pragma-semantic

function" (e.g. Singer, 2000; Metzinger, 2003). The underlying flaw in thinking of physicalists is that the explanandum has no justification independent of the explanans. In fact, no statements can be made with the physical thought-form which could have any life-world meaning for us. Theoretical physicists especially, like Heisenberg (1935; 1942b) and Schrödinger (1942), have emphasized this again and again. Physics has just as little to tell us about the essence of complementary colors as about the "art of the fugue". Physicalism might have found welcome nourishment in a misunderstood fact, to which philosophically founded physicists especially (Heinrich Hertz or Albert Einstein) have drawn attention. How could it be that the "real" structures of physics, the phenomena (necessary by nature), correspond so largely with the a priori "cognitive structures", the noumena (necessary by thinking)? The Physicist Heinrich Hertz, 120 years ago, gave a convincing answer far beyond the narrow horizon of present physicalists:

> *"We make ourselves internal illusory images or symbols of the external objects and we make them of such a kind that the logical consequences of the images are always again the images of the natural consequences of the depicted objects"*

and further:

> *"Different images of the same objects are possible and these images can differ in different directions .... but even a complete knowledge of the neural processes of the brain ... would not in itself tell us what the subject is experiencing" (Heinrich Hertz, 1894).*

In this context, Hertz also pointed out that there are:

> *"infinitely more conceivable images of the world than can be realized in nature".*

He evaluated this as an argument against an identity of mind and matter and for a primacy of mind/spirit/metaphysic. Einstein (1922) asked how it is possible that mathematics, which is a product of human thinking independent of all experiences, fits so excellently to the objects of reality. Could it be that human reason, without any experience, by mere thinking, fathoms properties of "real things"? If one considers that the General Theory of Relativity is completely a product of thinking, being confirmed experiential

only after decades, then this speaks to the fact that scientific knowledge in rare cases does not necessarily need empirical induction, but can be found by correct deduction alone. Physicalists try to refute the accusation of a thinking error by introducing another ultimate explanation, which also cannot be substantiated empirically. G. Roth (2000), for instance, identifies mental with physical, respectively, stating: “certain activity structures of neuronal associations as they can be registered with EEG or by neuroimaging”. However, physiological measurements are indicative quantities or means of cognition rather than cognition or objects of knowledge themselves. Hence, mind/ mental/spiritual cannot be paraphrased in brain language. The object of genuine psychophysiology cannot be a brain imagined as isolated from its umwelt, but exclusively a brain in its interaction with its umwelt. All physical explanations of the spiritual are logically faulty. They are on an epistemological level with phrenologists, esoterics, dowsers etc. Self-critical physicalists should have the highest interest in a research program aiming at the empirically incontestable proof of the physical nature of the spiritual. Instead, physicalism asserts a “data monism” that leaves no room for the distinction between physical and non-physical data (Roth, 2004 a, b). The unsubstantiated claim that there is only one kind of data amounts to a unitary science of an unblemished physicalism, ignoring the fact that physical and psychological forms of thought are logically/epistemologically incommensurable. A monistic communization of physical and psychological data is a scientific as well heuristic aberration. Needless to say, data-monistic physicalism leaves no room for free will as a subject of the mental form of thought or as the Kantian postulate of Pragmatic Reason. Since within subject-free physicalism there is no distinction between a stating subject (explanans) and what is stated (explanandum), there can also be no criterion for the assertion or negation of mathematical theorems (as necessary by thinking) or physical propositions (necessary by nature). This is equally true for all “there-is positings” of phenomena like space, time, mass, matter, energy and information, which are sacrificed to tautological reasoning when restricted to the physical form of thought. Therewith, the Physicalist becomes a Solipsist, since no external criterion of truth is available to him. As intersubjective corrective, we have only the mental form of thought requiring a strict consideration of the respective rules of what is necessary

by thinking. Modern physics teaches that, by far, not everything that exists is sensually imaginable. Experimental physics tries to clarify the question whether the Platonic entities postulated by theoretical physics, for instance Pauli's enigmatic neutrinos, the Higgs particles and the "black matter", can be verified. In contrast to the sensually experienceable objects of the mesocosm, it does not require the direct proof of a material object. Rather, an indirect proof of existence in the form of a certain reproducible effect is sufficient. If the proof of such an effect does not succeed, one has to deal with a so-called Gödel situation (see chapter 14). The transition from the classical meso-cosmic to the trans-classical micro- and macrocosmic physics is reflected also in the used language. All physical phenomena which can be classified in our life-world cosmos of classical physics and therefore have meaning for us, can be expressed by the NCL. This is no longer valid when we leave the mesocosm. Quantum mechanics as the physics of the microcosm, as well as the theory of relativity as the physics of the macrocosm, require their own denotative scientific languages (DSL).

CHAPTER 6

EDDINGTON'S DISTINCTION BETWEEN A MESO-COSMIC "SENSE-DESK" VS. SHADOW DESK

For didactic reasons, it is repeated that Eddington drew the representational boundaries of cognition with the meso-cosmic "sense desk", which is recognized by means of the psychic form of thinking, or by visual perception as a piece of furniture for use and furnishing. The "shadow desk", in contrast, is the desk of physics, a sensually qualityless object. It is a spatiotemporal arrangement of theoretically postulated but not sensorial perceptible particles. As a product of scientific theorizing, or as an abstract model of the microcosmic reality, it is only based on the thinking form of the physical. Hence it belongs to the physical cosmos of the natural sciences.

The two desks represent ontologically and epistemologically incommensurable realities which cannot be reduced to each other. Neither of the two desks can be considered the "actual" or even "true" one in the sense of "really existing". Nevertheless, the physicalist or materialist will be inclined to recognize only the abstract shadow desk, the "desk of physics", as the "true" one. The sense desk may be for him nothing more than an illusion or an epiphenomenon of the really existing shadow desk. With the same conviction the idealist will regard the sense desk as the only "real existing" one. If one sees in Eddington's two desks not ontologically different things, but rather the expression of opposite ways of describing one and the same reality, then the sense desk appears as "data supplier" for the shadow desk, as well as vice versa. Aspect-dualistically, the two desks represent mutually dependent totalities, or mutually complementary descriptions of reality. The same applies to the brain if we contrast the "sense brain" with the "shadow brain". The object design of the natural sciences is a setting (or postulate) which our everyday knowledge or our immediate sensual world experience suggests to us. In summary, it can be said: the physical, or physical-

objective form of thought, as exemplified by the shadow desk, creates the Physical Cosmos. Hence it is the basis for all technical achievements. The physical reality is causally closed in itself in the sense of material-mechanistic effectuality. To the psychic cosmos (also to be called semantic cosmos) it has nothing to say: the psychic-subjective form of thought, as exemplified by the sense desk, generates the Psychic Cosmos. Thus, it is the basis for all socio-cultural achievements. To the physical reality (physical cosmos) it has nothing to say. Formally analogous to the Physical Cosmos, the Psychic Cosmos can also be divided into a Micro- Meso and Macrocosm. The Psychic microcosm consists in the individually given contents of consciousness. These arise in the act of structural coupling between an organism and its environment. Psychic contents can be understood as products of a process leading from a diffuse-ambiguous towards a clear-unambiguous experience. The central concept of this research, which is supported by experimental investigations of the German Gestalt psychology of the 1920s and 1930s, is that of "Actual Genesis" (Sander, 1928), which appears as Microgenesis in Anglo-American literature. This concept has gained considerable influence in current psychological research (J.W. Brown, 1988; 2017;2020; 2021; F. Riffert et al. 2019).

The Psychic Macrocosm represents the meta-level of the spiritual. With the self-consciousness based on non-linear system dynamics, being synonymous with the individuation of a person or an organismic self, developmental biology has reached its highest level of knowledge so far. With the Spiritual/Mental/Mind, the realm of the Material is transcended. Only the human being, as well as, in outlines, some higher animal species, are able to make themselves the object of their reflection. We are the only species which lives in the knowledge of its finiteness and do not know which knowledge could be possible beyond that. Nevertheless, or just because of this, there is no reason to assume that what we understand today by our abstract thinking is the final goal of evolution. From what we know so far about developmental biology, we may extrapolate a momentum towards ever higher levels of organization. The question about reaching an even higher level of development seems to be answered with the survival of the human species against all perils and risks. But we cannot meaningfully

formulate the question about a further spiritualization. It is to be noted again that there is no transition from the areas of description and analysis of the physical into that of the psychic/mental, nor vice versa. A correlation, however, can very well exist. Because of the causal closure of the physical cosmos on the one hand, and the psychic cosmos on the other, the safe assumption of an "evolutionary linkage" of physical and psychic, of brain and mind, can also be understood as "coincidental parallelism" (A.v. Auersperg, 1936; 1954).