

Jarosław Rolewski

## HUSSERL'S PHILOSOPHY OF SCIENCE<sup>1</sup>

### ABSTRACT

The paper presents Husserl's conception of the relation between science and the living world (*Lebenswelt*), i.e. the world of everyday experience and communication. In Husserl view, science, or, more precisely, its basic aprioric structure is founded on the primal, essential core of the living world (*a priori*) from which it obtains its sense. Science (scientific *a priori*) modifies, idealizes, and mathematizes the primal aprioric *Lebenswelt*. Due to those operations scientific theories can represent empirical reality.

**Keywords:** Husserl; phenomenology; science; *Lebenswelt*.

As an introduction, I would like to explain the title of my article. In what sense is the term "philosophy of science" used here? Is it in the sense employed by the major modern philosophical discipline known precisely as the philosophy of science—in the style of Popper, Lakatos, Russell or Kuhn? Certainly it is not in this logical and methodological sense. Husserl's phenomenology surely is not and does not want to be a scientific meta-theory, striving to discover by scientific methods the regularities and principles governing the development of scientific theories. Nonetheless, the term "philosophy of science"—although not actually used by Husserl himself—probably fits his thought to the highest degree in all of the 20th-century philosophy.

What is it that particularly drew the attention of the philosophy of science experts? Above all, Husserl's idea of "Life-world" (*die Lebenswelt*), as it functions in relation to science, the concept of idealization (through mathematization) of reality which is the object of scientific theory, the idea of deep structure, a certain "core" of the life-word in the form of an "*a priori Lebenswelt*," and the

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scientific *a priori* correlated with it. Husserl's other ideas regarding science are seen as either outdated or unoriginal.

Therefore, in this article I focus on these three particular threads of Husserl's concept of science, mentioning others only when this is necessary to maintain the coherence and clarity of the exposition.

To begin, while specifying the title issue of my article, I wish to limit my deliberations to the last period of the development of Husserl's phenomenology, dominated by his work *The Crisis of European Sciences and Transcendental Phenomenology*, which was published in 1936 in Belgrade, in the journal *Philosophia* (being of Jewish descent, Husserl was subject to the so-called Nuremberg Laws in Nazi Germany, which prohibited Jews from publishing in the Reich).

*The Crisis of European Sciences and Transcendental Phenomenology* is also the so-called (in phenomenological jargon) "Large Crisis", that is, the VI volume of *Husserliana* published by Husserl's assistant Walter Biemel—a series of Husserl's texts published successively by the Husserl Archives of the Catholic University of Leuven in Belgium, where the manuscripts of author of the *Ideas* safely survived World War II. This "Large Crisis" was published in 1954, and—apart from the "Small Crisis"—contains all sorts of supplements and drafts (their subject matter also related to problems in the philosophy of science), on which Husserl had been working continuously since the 1920s, including the famous text *The Origin of Geometry*.

Famous mostly thanks to Jacques Derrida, who published *The Origin of Geometry* in French as a separate, self-contained work (unlike Biemel, who treated *The Origin of Geometry* on par with other supplements to the *Crisis* proper), which Derrida prefaced with a comprehensive philosophical commentary, proving extremely crucial to the reception of Husserl's phenomenology.

My deliberations will therefore be based mainly on these two source texts as well as, of course, a number of smaller works published in the further *Husserliana* volumes, which shed a new light on the problem of science in Husserl's thought. After outlining the source basis of my research I would like to move on to the subject proper in the further parts of the article.

Science, scientific theory, always occupied an important place in Husserl's philosophical reflection. This is true both of the "pre-phenomenological" period, when the author of the *Formal and Transcendental Logic* was still fascinated with psychologism and published the *Philosophy of Arithmetic* (as a matter of fact, a work in the field of the philosophy of mathematics), as well as of the time when he had already become an ardent anti-psychologist in the *Logical Investigations*, which to a large extent can be regarded as a work devoted to the philosophy of logic, mathematics and psychology.

By contrast, having already formulated the program of a new philosophical school, i.e. phenomenology, "*als strenge Wissenschaft*," science and scientific theory become the most important reference point in relation to which the field

of research of this new philosophical reflection, new philosophical science, is defined. It is Husserl's intention to make the latter the foundation not only of the remaining philosophical disciplines, but also of all sciences, as the new, fundamental "science of essence."

The last phase of Husserl's philosophy, which already exceeds the "hard paradigm" of phenomenology<sup>2</sup> in its earlier stages of development, e.g. the stage of the *Ideas I*, or the *Cartesian Meditations*, even more strongly emphasizes the relationship between philosophy and science, and the dependence of scientific theories on philosophical solutions. However, in contrast to the earlier works, the theoretical solutions pertaining to science presented in the *Crisis* do not necessarily implicate the entire sphere of "egological" deliberations, i.e. leading to the sphere of the transcendental ego ("pure consciousness," "transcendental consciousness") as the final arrival point of any mature philosophical reflection and the source of all sense (also scientific) and all being (including the scientific).

Husserl's ideas regarding science, scientific theories, the history of science and its relation to philosophy easily manage to do without bringing into being a new theoretical attitude, i.e. the phenomenological attitude, postulated by Husserl himself as the opposite of the "naive" natural attitude. "Naive," since it assumes the objective (i.e. independent of the cognizing subject) existence of a world. By contrast, Husserl considers the right, i.e. the philosophical attitude to be the phenomenological attitude, namely an attitude whose aim is not so much to accept the objective existence of reality, as to formulate into a problem and investigate the belief in its objectivity as well as objectivity as such.

It seems to me, and I am not alone in holding this belief, that this typically Husserlian phenomenological attitude in the investigation of science can be rejected—it contributes no directly relevant threads in the reflection on science, while implying very far-reaching metaphysical postulates. Therefore, all the deliberations undertaken in this article consciously and intentionally remain within the natural, "pre-phenomenological" and—as the author of the *Crisis* would put it—naive investigative attitude, which does not turn the objective existence of reality (i.e. for Husserl, the reality of the life-world) into a problem.

In order to embark on a philosophical investigation of the subject of European science, one has first to separate it from the wider context in which science is immersed as its integral part, i.e. from the entirety of the life-world (*Lebenswelt*).

To achieve this, Husserl applies a philosophical method which is one of the pillars of his phenomenology: the *epoché* method with respect to European science. This method, briefly, consists in a certain "suspension" of judgment re-

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<sup>2</sup> I wrote about the overcoming of this hard paradigm of phenomenology in: Rolewski, J. 1999. *Rozum, nauka, świat przeżywany. Studium filozofii "późnego" Husserla* [Reason, Science, Life-world. Studies on "Late" Husserl's Philosophy]. Toruń: Wyd. UMK.

garding the object to which the *epoché* is applied. It is a type of “bracketing off” the domain, with the assumption that one knows in advance what is and what is not a part of it. However, Husserl’s *epoché* differs from the methodical doubt of Descartes (although of course in the historical and philosophical context Descartes is the “inventor” of a similar method), above all because it neither questions nor prejudges the ontic, logical or veritative status of the suspended judgments. Subjecting them to an *epoché* only means that in the following methodical steps one should refrain from referring to or using the suspended judgments and the theses contained therein.

“Because of the peculiar nature of the task which has arisen for us, the method of access to the new science’s field of work (...) is articulated into a multiplicity of steps, each of which has, in a new way, the character of an *epoché*, a withholding of natural, naive validities and in general of validities already in effect. (...) Clearly required before everything else is the *epoché* in respect to all objective sciences. This means not merely an abstraction from them, such as an imaginary transformation, in thought, of present human existence, such that no science appeared in the picture. What is meant is rather an *epoché* of all participation in the cognitions of the objective sciences, an *epoché* of any critical position-taking which is interested in their truth or falsity, even any position on their guiding idea of an objective knowledge of the world. In short, we carry out an *epoché* in regard to all objective theoretical interests, all aims and activities belonging to us as objective scientists or even simply as people desirous of knowledge. Within this *epoché*, however, neither the sciences nor the scientists have disappeared for us who practice the *epoché*. They continue to be what they were before, in any case: facts in the unified context of the pre-given life-world; except that, because of the *epoché*, we do not function as sharing these interests, as co-workers, etc.” (Husserl, 1970, 135)

The aim of an *epoché* with respect to science is not only to separate it from the life-world, within which science—as any field of human activity, any practice, also theoretical—functions, but also a certain “purification” of the *Lebenswelt* (life-world) from an element unnatural in a sense, not belonging to it, “artificial”—that is, from science. But an *epoché* carried out properly is supposed to give us something much more in effect: it is to reveal the foundations and *a priori* premises on which science is founded; to reveal its internal, deep *a priori* and general structure, which makes science objective and determines that science actually gets to know reality, and is not merely a collection of arbitrary formal or symbolic constructs.

The “life-world” (*die Lebenswelt*) is of interest for us here, e.g., as a certain “environment” for science, in general. However, in Husserl’s phenomenology from the *Crisis* period this notion plays a much more important and varied function. The category of *Lebenswelt* as such appears, naturally, much earlier than in

Husserl's works, more precisely, in the tradition of the German "philosophy of life," on which Husserl had a rather poor opinion before writing the *Crisis*, viewing it as typical "humanist" prattle which has little to do with real science. This changed when the author of the *Ideas* began to ponder the historicity of science and historicity in general. A dimension Husserl had neither noticed, known, grasped or appreciated earlier became extremely important to him, especially in the context of his theory of science, while the philosophy devoting the bulk of its attention to historicity (the philosophy of life) inspired the author of the *Cartesian Meditations* to take up and develop the notion of the life-world—one of the central categories of the philosophy of life.

What exactly is the *Lebenswelt*—the "life-world"? To put it as briefly as possible, it is the world given naturally, and in the natural—as Husserl calls it—attitude whose most important characteristic is the belief that the world exists objectively, independently of any particular subject. Furthermore, it is the world of all things, material objects, human beings, animals, plants; the world of everyday human life and practice, intersubjective, culturally, historically, linguistically, socially variable to the point that sometimes Husserl talks not about one *Lebenswelt*, but a multiplicity of life-worlds, relative to a given community, culture, tradition, language etc.

"If our interest is exclusively in the 'life-world,' we must ask: Has the life-world, through the *epoché* in respect to objective science, already been laid open as a universal scientific subject matter? Do we already have thereby, the subject matter for statements that are generally valid scientifically (...) How do we have the life-world as a universal field, fixed in advance, of such establishable facts? It is the spatiotemporal world of things as we experience them in our pre- and extra-scientific life and as we know them to be experienceable beyond what is [actually] experienced. We have a world-horizon as a horizon of possible thing-experience [*Dingerfahrung*]. Things: that is, stones, animals, plants, even human beings and human products; but everything here is subjective and relative (...) But if we set up the goal of a truth about the objects which is unconditionally valid for all subjects, beginning with that on which normal Europeans, normal Hindus, Chinese, etc., agree in spite of all relativity—beginning, that is, with what makes objects of the life-world, common to all, identifiable for them and for us, such as spatial shape, motion, sense-quality, and the like—then we are on the way to objective science." (Husserl, 1970, 137–138)

Of course, the notion of the life-world as such underwent significant modifications in phenomenology compared to the philosophical tradition in which it originated. From the very beginning, Husserl's research was aimed (unlike the philosophy of life paradigm) at finding—under the layer of variable, fluctuating, intersubjective and cultural facts of the life-world—a deep layer: non-relative, permanent, invariable and universal. Therefore, his understanding of the *Leben-*

*swelt* differs significantly from the way this category was understood and used in the philosophy of life.

As Husserl claims, after carrying out a successful *epoché* with respect to science, a separation of science from the life-world takes place. How is science understood here? Husserl's understanding of the term generally overlaps with the semantic field of the English-language concept of science: it mainly denotes the exact, mathematical and natural sciences, which have always been and will always be exact sciences.

"Physics, whether represented by a Newton or a Planck or an Einstein, or whomever else in the future, was always and remains exact science. It remains such even if, as some think, an absolutely final form of total theory-construction is never to be expected or striven for." (Husserl, 1970, 4)

The category of science does not generally pertain to what is commonly called the humanities; nor does it really include the historical sciences, or for example sociology. And it is this understanding of science that Husserl has in mind: science, understood in this sense, is precisely what the *epoché* reveals. And here already certain doubts arise. If an *epoché* is to be applied to all judgments included in science (in the abovementioned sense), we immediately run into what the philosophy of science terms the demarcation problem. In simple terms, this problem is about the impossibility (not just technical, but also eidetic) of the precise and exact separation of science, i.e. the propositions of scientific theories, from the "surroundings" of science, i.e. the judgments which are in various ways linked with strictly scientific judgments (theoretical judgments). Such a strict, clear boundary simply does not exist, and this is the view currently seen as obvious and shared by almost all philosophers of science.

However, the consequences of such an attitude are devastating to Husserl's theory—if scientific judgments cannot be separated from non-scientific ones, and as a result scientific propositions cannot be suspended, "bracketed off," then it is impossible to perform an *epoché* with respect to European science. The author of the *Formale und transzendente Logik* did not realize himself these difficulties. He considered science fully separable from its extra-scientific environment.

Having separated science from the life-world, one can start investigating it from the philosophical or phenomenological perspective. Modern European science—as seen by Husserl—is completely mathematical, formalized, and constitutes a set of linguistic and symbolic structures, which, according to scientists themselves, provide a perfect description of objectively existing, transcendent reality. This conviction, this self-knowledge of science, is fiercely criticized by the author of the *Investigations*. As a result, he arrives at the conclusion that all scientific theories and ideas *de facto* do not so much describe reality as create and construct it using their own methods.

Husserl describes this process using examples of physics (mainly Galilean and Newtonian), but he believes his findings to be universal, i.e. applicable to all sciences.

Physicists believe that their concepts, theories and ideas apply directly to nature (objective and transcendent) and depict it in increasing detail. They could not be more wrong, Husserl claims. In the real world (which for him is tantamount to the life-world) we find no equivalent of what is posited by physical theories. So what do physicists really do?

Physicists construct their own world of physical, ideal, mathematized objects, and relate to real reality through them. They already operate only by means of certain mathematical, symbolic constructs, and their work becomes a type of "game," in which they "dress up" real processes and natural entities in the "garb of ideas."

"In geometrical and natural-scientific mathematization, in the open infinity of possible experiences, we measure the life-world—the world constantly given to us as actual in our concrete world-life—for a well-fitting garb of ideas, that of the so-called objectively scientific truths. That is, through a method which (as we hope) can be really carried out in every particular and constantly verified, we first construct numerical indices for the actual and possible sensible plena of the concretely intuited shapes of the life-world, and in this way we obtain possibilities of predicting concrete occurrences in the intuitively given life-world, occurrences which are not yet or no longer actually given. And this kind of prediction infinitely surpasses the accomplishment of everyday prediction. Mathematics and mathematical science, as a garb of ideas, or the garb of symbols of the symbolic mathematical theories, encompasses everything which, for scientists and the educated generally, represents the life-world, dresses it up as "objectively actual and true" nature. It is through the garb of ideas that we take for true being what is actually a method." (Husserl, 1970, 51–52)

Then, in fact, physicists do not know what they are doing, they have false self-knowledge of their own theoretical work. They claim and believe that they through their theories, concepts and structures get to know and describe the objective, independent (of themselves) and transcendent (with respect to any subject) world of nature "in itself." Husserl wrote about this self-interpretation of physicists in the *Crisis*:

"In connection with this we arrive at a further consequence of the new formation of meaning, a self-interpretation of the physicists which grows out of this new formation of meaning as 'obvious' and which was dominant until recently: Nature is, in its 'true being-in-itself,' mathematical. The pure mathematics of space-time procures knowledge, with apodictic self-evidence, of a set of laws of this 'in-itself' which are unconditionally, uni-

versally valid. This knowledge is immediate in the case of the axiomatic elementary laws of the *a priori* constructions and comes to be through infinite mediations in the case of the other laws. In respect to the space-time form of nature we possess the 'innate' faculty (as it is later called) of knowing with definiteness true being-in-itself as mathematically ideal being (before all actual experience). Thus implicitly the space-time form is itself innate in us." (Husserl, 1970, 54)

However, physicists do something completely different from what they say they do: by means of sophisticated mathematical techniques they construct an ideal world of physicalistic objects, i.e. they model and transform the only real reality—the life-world—into something ideal and mathematical. Real objects in the *Lebenswelt*, real properties and relations obtaining in the life-world are translated into the language of spatiotemporal objects, properties and relationships, completely, utterly and without exception mathematizable, and capable of being captured within physical theoretical constructs by applying mathematics.

For Husserl Galileo is the founder of modern natural science and science in general, the one who founded all of modern European science by proposing the "mathematization" of nature. What exactly does mathematization mean? To put it very briefly, it means that all natural reality becomes a "universe of mathematical objects." This for Galileo himself means that all reality (without exception) can be defined and described by using terms and structures of Euclidean geometry. Therefore, modern science is founded on a certain assumption, a certain axiom concerning the mathematizability of all aspects of objective reality.

Mathematical theory (Euclidean geometry in the case considered by Galileo) turns out to be the beginning of modern science, and it is only on its foundations, within its theoretical reality, that one constructs (it should be stressed that one deals with construction here) a reality correspondent to it.

"Mathematics as a realm of genuine objective knowledge (and technology under its direction)—that was, for Galileo and even before him, the focal point of 'modern' man's guiding interest in a philosophical knowledge of the world and a rational praxis. There must be measuring methods for everything encompassed by geometry, the mathematics of shapes with its *a priori* ideality. And the whole concrete world must turn out to be a mathematizable and objective world if we pursue those individual experiences and actually measure everything about them which, according to the presuppositions, comes under applied geometry—that is, if we work out the appropriate method of measuring. If we do that, the sphere of the specifically qualitative occurrences must also be mathematized indirectly." (Husserl, 1970, 38)

As far as the quantitative aspect of the world is concerned, i.e. shapes, measurable spatiotemporal magnitudes etc., their mathematization poses no signifi-



cant problems and has been practiced since antiquity. One of the practical aspects of this type of mathematization in relation to spatiotemporal magnitudes is the ancient art of measurement, known and used already at a time when mathematics had not yet been born. That is the reason why Galileo's entire cognitive effort focuses not on this—as Husserl calls it—direct mathematization of the world, but on a sphere which at first glance is completely unmathematizable, namely the sphere of qualities, all other (non-spatiotemporal) properties and aspects of reality. Galileo's genius lies precisely in the fact that thanks to his innovative method he can also mathematize these infinitely diverse, infinitely rich aspects of the culturally, linguistically, historically, socially etc. variable life-world; that he can translate them into a uniform, constant, culturally, historically, linguistically and socially etc. unchanging spatiotemporal form, which he can, in turn, fully mathematize, i.e. objectify and idealize.

“The question now is what an indirect mathematization would mean. Let us first consider the more profound reason why a direct mathematization (or an analogue of approximative construction), in respect to the specifically sensible qualities of bodies, is impossible in principle. These qualities, too, appear in gradations, and in a certain way measurement applies to them as to all gradations—we ‘assess’ the ‘magnitude’ of coldness and warmth, of roughness and smoothness, of brightness and darkness, etc. But there is no exact measurement here, no growth of exactness or of the methods of measurement. Today, when we speak of measuring, of units of measure, methods of measure, or simply of magnitudes, we mean as a rule those that are already related to idealities and are ‘exact’ (...) What constitutes ‘exactness’? Obviously, nothing other than what we exposed above: empirical measuring with increasing precision, but under the guidance of a world of idealities, or rather a world of certain particular ideal structures that can be correlated with given scales of measurement—such a world having been objectified in advance through idealization and construction. And now we can make the contrast clear in a word. We have not two but only one universal form of the world: not two but only one geometry, i.e., one of shapes, without having a second for *plena*. (...) To be sure, it is also part of the world-structure that all bodies have their specific sense-qualities. But the qualitative configurations based purely on these are not analogues of spatiotemporal shapes, are not incorporated into a world-form peculiar to them. The limit-shapes of these qualities are not idealizable in an analogous sense; the measurement (‘assessing’) of them cannot be related to corresponding idealities in a constructible world already objectivized into idealities. Accordingly, the concept of ‘approximation’ has no meaning here analogous to that within the mathematizable sphere of shapes—the meaning of an objectifying achievement. Now with regard to the ‘indirect’ mathematization of that aspect of the world which in itself has no mathematizable world-form: such mathematization is thinkable only in the sense that the specifically sensible qualities (‘*plena*’) that can be

experienced in the intuited bodies are closely related in a quite peculiar and regulated way with the shapes that belong essentially to them.” (Husserl, 1970, 34–35)

Of course, there are other ways of idealizing (or objectifying) the constantly changing and diverse life-world, but its objectification through mathematization was the easiest and most effective solution.

Why? The entire tradition of European philosophy and ancient science paved the way for this operation, by developing the concept of ready, finished and closed mathematical theory, which for Galileo is Euclidean geometry. This geometry is already “finished” and ready, enclosed within a coherent and closed deductive system. Mathematics plays a role of a teacher and provider of a method for all science. Since mathematics has already developed a method for getting to know the entire spatiotemporal sphere, it sufficed to do as little (or as much) as to invent a specific method of including, of capturing by means of geometrical structures all that cannot be directly mathematized. However, certain qualitative aspects of the life-world had already been mathematized in the past (e.g., the Pythagoreans determined the functional dependence of pitch on the length of an instrument’s string, and expressed this dependence numerically). Galileo’s brilliant intuition (according to Husserl, Galileo is a man of genius) consists mainly in the fact that for him not this or that quality or sensible content is subject to objectification and idealization through mathematization, but all natural reality, the entire life-world and all its possible objects, aspects and properties which can be adequately translated into one (and only one), universal, constant spatiotemporal form bound by a network of causes and effects.

This brilliant project of Galileo founded all modern science, facilitating its cognitive expansion on an unprecedented and still—especially in the XX and XXI centuries—growing scale. This, however, does not change the fact that this fundamental and still valid project of Galileo (the world as a mathematical universe) is a hypothesis, and will never cease to be one:

“... the Galilean idea is a hypothesis, and a very remarkable one at that; and the actual natural science throughout the centuries of its verification is a correspondingly remarkable sort of verification. It is remarkable because the hypothesis, in spite of the verification, continues to be and is always a hypothesis; its verification (the only kind conceivable for it) is an endless course of verifications. It is the peculiar essence of natural science, it is *a priori* its way of being, to be unendingly hypothetical and unendingly verified.” (Husserl, 1970, 41–42)

The question now arises: if physics (and science in general) creates its own, artificial, unauthentic, ideal and mathematical world, can it be claimed that science is true knowledge of reality? According to Husserl, there can be

no doubt about this—science is a reliable, true, since rational, knowledge of natural reality, but its relation to that reality—a true one, after all—appears as something very enigmatic. The author of the *Crisis* calls this “reason-being” relation an “enigma of enigmas” and strives to unravel it. How is it that a scientific theory—ideal, mathematized, formalized and symbolic—still gets to know reality: variable, qualitatively rich, infinitely diverse, dynamic, and fluctuating?

Science itself cannot answer this question: it is not able to investigate and get to know the reason-being, theory-reality relation by means of scientific concepts, methods and constructs. Philosophy has such cognitive competence, and it is philosophy that should answer the above question. But then, unless this relation, fundamental to science itself, is explained in a correct and true manner, science cannot operate at all, the whole large scientific edifice is then without foundations and lacks an extra-scientific (i.e. philosophical) basis.

Nevertheless, before Husserl's time this problem had not been solved (according to Husserl), hence modern science has been subjected to an increasingly severe and broadening crisis, which, however, does not at all pertain to its “nucleus,” its rules, concepts, principles, methods and cognitive results, but to the “truth-meaning.” It is philosophy, however, that bears full responsibility or even blame for this state of affairs, failing to investigate and truthfully describe the relation of science (theory) to its object. Of course, various attempts to unravel this “enigma of enigmas” appeared throughout the history of philosophy, but they were all either merely unsuccessful or completely obscured the essence of this relation. This can be said of “objectivism” and “naturalism”—epistemological approaches which reassured science in its false self-knowledge, and proclaimed that science directly, truthfully and immediately describes transcendent and objective reality; that by way of induction and arduous selection of facts it finally achieves a good description of reality. This is why philosophy—the perpetrator of the crisis of science—has the obligation to overcome this crisis and once and for all determine, unravel the true nature of the relation “reason-being.” It is Husserl's phenomenology that undertakes this task, made all the more important by the fact that overcoming the crisis of science, the crisis of its foundations is crucial to overcome the crisis of all the European civilization, which carries the legacy of rationality, an “entelechy of reason” on whose development the fate not only of Europe (spiritual Europe), but of all the mankind depends—mankind which without the victory of rationality is in peril of falling into barbarity and a state of renewed animality.

In order to overcome this crisis of science, the crisis of its foundations, rationality and purpose, one has to conduct a thorough investigation of science and try to determine its relation to the reality it describes. Apart from the already mentioned *epoché* method with respect to science, Husserl applies yet another method for determining the status of European science: the genetic (or historical) method.

Historical-genetic research is a complete novelty to Husserl in his work—until now he had neither appreciated nor even taken note of the historical dimension of science (and philosophy).

In order to unravel the relation of theory to objective reality Husserl postulates looking back to the very beginnings, the very origins of science. He describes this process by the example of the oldest, and in his opinion most developed, scientific discipline—geometry (his famous text *The Origin of Geometry* from 1936, first published in 1939, is devoted to this subject).

Modern geometry is actually just the tip of the “pyramid of geometric meaning,” and is the last stratum, the last layer of meaning laid on an earlier stratum and including that earlier stratum within itself. This stratum, in turn, is founded on an even earlier one and so on, until the beginnings of geometry, its first “theoretical yield.”

The “archaeology of meaning”—a new philosophical field postulated by Husserl—is supposed to investigate these layers of meaning, breaking through all the “deposits”, until it reaches the first, original sense, essential to all geometry. However, this history of meaning has nothing in common with historical investigation in the ordinary sense. “The inner history of meaning” (as Husserl also calls it) does not investigate historical facts, factual circumstances, people, social and ethnic context etc., but logical connections, the order in which meanings follow from one another, their mutual logical influence.

“In principle, then, a history of philosophy, a history of the particular sciences in the style of the usual factual history, can actually render nothing of their subject matter comprehensible. For a genuine history of philosophy, a genuine history of the particular sciences is nothing other than the tracing of the historical meaning-structures given in the present, or their self-evidences, along the documented chain of historical back-references into the hidden dimension of the primal self-evidences which underlie them. Even the very problem here can be made understandable only through recourse to the historical *a priori* as the universal source of all conceivable problems of understanding. The problem of genuine historical explanation comes together, in the case of the sciences, with ‘epistemological’ grounding or clarification.” (Husserl, 1970, 372–373)

In fact, this historicity of meaning signifies a certain hierarchy, a deductive logical structure, in which the beginning—the first layer of meaning—in a sense determines all the consequences, the whole large edifice of geometry. It can roughly be compared to Popper’s “context of justification.”

Whereas, according to Husserl, all factual circumstances have no effect on the shape and essence of geometry, hence it is not important whether geometry was invented by Thales of Miletus (as tradition would have it) or some other philosopher: this aspect is completely accidental, of no importance of the theory of geometry as such.

When the task of reaching the first yield of the geometric meaning is finally accomplished, another problem emerges—the problem of the genesis of this first meaning, founding the whole subsequent shape of geometry. Husserl, using methods characteristic of phenomenology (i.e. *epoché*, life-worlds variation etc.) discovers that geometry (just like any other science) is founded on a certain primary basis, i.e. on a primary “objective *a priori*”: general, universal, eidetic, necessary, and in a certain sense absolute. “The objective *a priori*” (or scientific *a priori*) is established when a given science is founded, and includes, in idealized, formalized and symbolic form: time, space (or space-time), various categorical structures and a universal, general causality. (Unfortunately Husserl never specifically defined the exact nature of this objective *a priori*, and any information on the subject is scant and very general.) Further reflection leads to a conclusion that the scientific *a priori* was not arbitrarily made up, or constructed by the first geometrician (or any other founder of science), but derived from the world surrounding every cognitive subject: the natural, subjective-relative world, including all things, human beings, animals etc. belonging to the life-world.

A serious problem arises here: if the scientific (objective) *a priori* had been taken directly from the life-world, it would not have been objective (in the *Lebenswelt*, everything is subjective-relative), universal (in the life-world everything is limited to the particular, actual form of the given *Lebenswelt*); supra-historical—in the life-world everything is subjected to the conditions of actual historicity; independent of the cultural, social, and linguistic context—in the life-world everything is immersed in culture, language, tradition, customs etc. In short, it would not have been *a priori* and it could not have been a foundation for all objective, infinitely extending science. That is why Husserl, in the course of further determination, discovers that the objective *a priori* is, in fact, a formalized, idealized and objectified version of the primary “*a priori* of the life-world.”

This “*Lebenswelt a priori*” has, in turn, exactly the same, but not identical content as the scientific *a priori*, i.e. space-time, categorical structures, causality. The difference between these two *a priori* types is that the eidetic *Lebenswelt a priori* is transformed into an objective *a priori* when a new science is founded, i.e. idealized (which leads to objectification), mathematized, formalized and symbolized. The *a priori* of the life-world is also the most important residuum of rationality or even ratio in its pure state. This is precisely the general typical, eidetic, constant, invariable and, to simplify, absolute factor which enables both agreement between different generations of scholars, and passage from one scientific discipline to another, e.g. from mathematics to natural science.

This intermediation becomes possible precisely through a reference to and in a relation to this eidetic, constant, general *a priori* structure, which constitutes the basis of the meaning of mathematics as well as physics (or any other branch

of natural science). It can be transformed in various theoretical ways, depending on the type of scientific thought, but always—despite these modifications—it remains the same, unchanging *a priori*. The *Lebenswelt a priori* can be discovered, for instance, by means of the so-called “*Lebenswelt* variation.” In short, this method consists in juxtaposing and comparing life-worlds which differ in terms of time, space, culture, language, traditions etc., but also possible worlds, and extracting from these the entire spectrum of what is common to all those *Lebenswelts*: a certain “nucleus” or “hard core”—the very *a priori* of the life-world, the same for all types and kinds of worlds, which, apart from this, differ in nearly any other respect: historical period, geographical location, tradition, language, spirituality.

Husserl’s theory of the life-world *a priori*, in his view, is also supposed to provide an answer to the Kantian-style question: “by what law”? (*quid juris?*) is scientific knowledge possible: the objective, universal and rational theory of the only reality given to us, i.e. the reality of the life-world; the theory of the fluctuating, dynamic, relative reality, placed within a cultural, social, historical and linguistic context. For Husserl, this question can be reduced to the question concerning the relation between scientific theory and the world, while the answer boils down to the fact that this relation is essentially the one between the objective scientific *a priori* and the primary *a priori* of the life-world, the source and basic form of rationality concealed in the *doxa* of the *Lebenswelt*.

The scientific *a priori* (the necessary basis for any discipline) is created through the idealization, formalization and mathematization of the *a priori* of the life-world. Therefore all subsequent scientific constructs built on this *a priori* foundation refer to the reality of the life-world indirectly and through that *a priori*. As long as it does not stray from its *a priori* premises (the objective *a priori*), theory guarantees a real, i.e. true reference to the reality of the life-world. The rationality of its operations is guaranteed (Husserl often repeats that the statement that science is rational is a tautology) because its own inner rationality has a source and is a transformation of the primary *ratio* hidden in the life-world. Finally, it is guaranteed objectivity—the structures, concepts and scientific constructs describe an objectified, since mathematized, version of the life-world’s “hard core.” It is thanks to this that science has a distinctive “relation” to practice and technique, and can be successfully re-applied in the relative, historical and dynamic life-world. Founding science on the *Lebenswelt a priori* enables it to be fully justified and defended against the charges of constructivism, arbitrariness or manipulation of reality.

According to Husserl’s conception, science is no arbitrary figment of scholarly imagination (as, e.g. some postmodernists claim). It is also not subjected (as far as the rational eidetic core is concerned) to any influences on the part of culture, historicity, society, fashion, tradition etc.—in spite of what skeptical critics of science claim. As Husserl believes, this makes it possible to overcome skepticism—the main and the most dangerous threat to the spiritual develop-

ment of Europe; skepticism as to the possibilities, values and veracity of science. If, as Husserl claims, science is really rooted in the life-world, if it really reconstructs (although in an idealized and mathematized, i.e. deformed form) and represents its most hidden, deep, eidetic rational structure, then it does not have to fear for its objectivity, rationality, cognitive value and truth.

In this way Husserl—even though he is widely believed to be a destroyer of science—becomes one of the most prominent and ardent defenders of science, its validity, value and importance for the whole formation of European civilization, and through it—for the entirety of humankind. His philosophy of science, next to the task of investigating and explaining science—this extraordinary cultural formation—also undertakes to give it an ultimate grounding, justification and protection against the threat of skepticism and the weariness of European spirituality. As Husserl wrote in the ending of the *Philosophy and the Crisis of European Man*:

“The ‘crisis of European existence,’ which manifests itself in countless symptoms of a corrupted life, is no obscure fate, no impenetrable destiny. Instead, it becomes manifestly understandable against the background of the philosophically discoverable ‘teleology of European history.’ (...) To get the concept of what is contra-essential in the present ‘crisis,’ the concept ‘Europe’ would have to be developed as the historical teleology of infinite goals of reason; it would have to be shown how the European ‘world’ was born from ideas of reason, i.e., from the spirit of philosophy. The ‘crisis’ could then become clear as the ‘seeming collapse of rationalism.’ Still, as we said, the reason for the downfall of a rational culture does not lie in the essence of rationalism itself, but only in its exteriorization, its absorption in ‘naturalism’ and ‘objectivism.’ The crisis of European existence can end in only one of two ways: in the ruin of a Europe alienated from its rational sense of life, fallen into a barbarian hatred of spirit; or in the rebirth of Europe from the spirit of philosophy, through a heroism of reason that will definitively overcome naturalism. Europe’s greatest danger is weariness. Let us as ‘good Europeans’ do battle with this danger of dangers with the sort of courage that does not shirk even the endless battle. If we do, then from the annihilating conflagration of disbelief, from the fiery torrent of despair regarding the West’s mission to humanity, from the ashes of the great weariness, the phoenix of a new inner life of the spirit will arise as the underpinning of a great and distant human future, for the spirit alone is immortal.” (Husserl, 1965, 191–192)

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ABOUT THE AUTHOR — professor, Institute of Philosophy, Nicolaus Copernicus University (Toruń). Fields of interests: German philosophy (especially Kant), phenomenology. Main works: 1991. *Kant a metafizyka* [Kant and Metaphysics]; 1999. *Rozum, nauka, świat przeżywany. Studium filozofii "późnego" Husserla* [Reason, Science, Life-world. Study on "Late" Husserl's Philosophy]; 2008. *Kant, Hegel, Husserl. Problemy transcendentalizmu* [Kant, Hegel, Husserl. Problems of Transcendentalism].