Introduction to H. Dingler: "Method Instead of Epistemology and Philosophy of Science" (pp. 369-409).

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# Hugo Dingler

## I

Hugo Dingler lived from 1881 to 1954. During the academic years 1901–2 and 1903–4 he studied mathematics and physics at the University of Muñich. He spent the intervening year (and then the summer of 1906) in Göttingen, where he studied mathematics with David Hilbert and Felix Klein as well as – for the first time – philosophy (with Edmund Husserl). In 1907 Dingler completed his doctorate in Munich with Aurel Voss with a dissertation on general surface deformation. His *Habilitation* followed in 1912, also at the University of Munich, but only for the prospectless field of "Method, Didactics and History of Mathematical Sciences."

In the years following 1912, interrupted by military service (1914–19), Dingler taught at the University of Munich, first as a *Privatdozent* and then with the title of Professor. However, he had no fixed salary and had to live on auditors' fees and voluntary assistance from the university. Only in 1932, at the age of fifty-one, did he receive his first permanent salaried university position as professor of philosophy at the Technical Institute in Darmstadt. The professorship was connected with teaching duties at an institute for teacher training in nearby Mainz. This institution was closed in 1934 in a cutback to economize. On this occasion, however, Dingler was also pensioned as a professor in Darmstadt. The occasional antisemitic and anticommunist statements with which Dingler sought to recommend himself to the new rulers after the *Machtergreifung* of the Nazis in Germany (January 1933) should be seen in this context: he explained the "empty formalism" of the recent physics that he combatted, especially the theory of relativity, and its philosophical sanctioning by the Vienna Circle, through the Jewish descent of most of its proponents. Furthermore, he thought it necessary openly to draw attention to a supposedly "strong analogy [of physical-philosophical formalism] to the senseless absolute positing of forms of organization in political Bolshevism (in the sociological and personal dimension as well)" (Dingler 1933, iv).[1] The success of this kind of servility was modest. He succeeded neither in saving his professorship in Darmstadt nor in acquiring another. Even his offer to teach without pay as an "honorary professor" at the University of Munich was refused. Not until 1940 was Dingler – almost sixty – allowed once again to teach some courses at the University of Munich. Dingler spent the years following

[1] Dingler is not to be reckoned to the "German Physics" inaugurated by Lenard. Although he valued their rejection of relativity theory, he considered the "German Physicists" philosophically to be rather artless empiricists.

the end of the war in 1945 working tirelessly as a private scholar in Aschaffenburg in northern Bavaria.[2]

## II

According to Dingler the task of all science is to orient our action by the *certainty* of its propositions. The fulfillment of this task requires philosophical reflection on science. Accordingly, Dingler saw the significance and the distinction of his philosophy of science in its ability to ground scientific statements on certainty. He even claimed "absolute" certainty, i.e., certainty not revisable by any future experience.[3] Dingler saw as absolutely justifiable – and, at least in outline, actually justified by himself – the following certainties in the area of natural knowledge: (a) Euclidean geometry as absolute knowledge about space; (b) Galilean kinematics as absolute knowledge about force-free motions, i.e., motions considered only with respect to space and time; and (c) classical mechanics including gravitation theory as knowledge about moving masses.

Since these three areas of knowledge determine the measurement of the three physical basic magnitudes, space, time, and mass, all further grounded knowledge of nature, especially the physical, must build on the insights of the classical theories. Under no circumstances whatever may scientific knowledge stand in contradiction to the classical basis of measurement. This led Dingler to an uncompromising rejection of the theory of relativity while allowing quantum theory some, albeit temporary, legitimation. This legitimation rested on Dingler's distinction between scientific "work on the front" and "work on the system" or "front physics" and "system physics." Front physics puts natural processes which at first glance seem to be disparate into a relationship by means of mathematical formalisms. It thus stimulates new experiments and thus possibly scientific progress, too. Such theoretical front-relationships are, however, not definite because the theory is undeterminable in principle through empirical data, and thus they can stand in contradiction to other front theories; furthermore, they are naturally only hypothetical and therefore temporary. Front physics thus does not realize the ultimate and most profound goals of all science: front physics does not provide certainty. There always remains

> the great need for unity and consistency that in the end serves a practical need. For in the long run humans can only then retain the intellectual orientation in their dealings with reality if the latter is as unified and free of contradiction as possible. They are only then certain that they have achieved completeness in the theoretical treatment of the possible cases, if everything is ultimately traced back to elementary building blocks. . . . Thus it can be seen that alongside work on the

[2] For more extensive biographical information on Dingler, cf. Wolters 1987, 35.

[3] A general and to some extent critical presentation of Dingler's philosophy of science in the context of his philosophical system is given by Lorenz and Mittelstrass 1969, Willer 1973, Mittelstrass 1974, Janich 1985, Weiss 1987.

> front . . . a second kind of work must play a part, which strives for the intellectual processing of the front results, their possible assimilation and integration into a unified and consistent system (work on the system). . . . For it [i.e., system work], theory is that systematic structure that is erected on an absolutely certain foundation in unbroken consistency and in conformity to all the architechtonic rules of the systematic and the most rigorous demands for continual justification, at least in the foundations. (Dingler 1938, 68)

For quantum theory this meant that it must be replaced sooner or later by a physics of the micro-area using classical-mechanical models.

Dingler's demands, which are indeed rather extreme in their consequences, have found little resonance among physicists and philosophers, in fact they have met almost exclusively with staunch rejection. Nonetheless Dingler's conception has a rational core worth considering.[4] This core comes into view if one examines more closely the certainty-motivation of Dingler's enterprise.

Dingler believed that the endeavors of traditional philosophy of science to demonstrate the dependability of the foundations of science were all deficient. The reason for this lay in the lack of comprehension of the fact that some parts of physics are not the results of empirical research but rather precede all empirical work. For instance, what length and thus "space" is cannot be determined by empirical hypotheses about "space" or by supposed spatial facts (Riemann, Helmholtz). What length is results according to Dingler from the normative implications guiding the technical production of those devices with which we measure length. The search for the basis of physical theory thus leads to the practice of manufacturing measuring instruments for lengths, times, and masses. This (artisan or industrial) practice and the production and quality norms embedded in it do not, e.g., in the measurement of length, systematically presuppose geometry. The methodical or pragmatic order, as Dingler called it, is just the opposite. In general in the methodical order, the norms of production in the manufacturing of measuring instruments precede all empirical physical theory and make it possible in the first place. In this sense they are a priori. From this a hierarchical conception of science is derived in which the systematization of the norms of production of measuring instruments (Dingler: "the system") and thus classical mechanics including Euclidean geometry takes the first and highest place.

In Dingler's view, all other attempts made in the course of history to bring about a decision on the validity of classical theories have been failures. For Euclidean geometry, for example, (1) the *empiricist* attempt to prove the "truth" or "falsity" of its axioms by measurement "in nature" is circular: The measuring instruments, with whose help Euclidean geometry is to be shown to be the true geometry, already

[4] This rational core was rarely seen, due to Dingler's often aggressive manner of presentation and to his dogmatic claims to absolute validity, and also as a consequence of a certain blindness on the part of physicists with regard to the philosophical implications of physics. One exception to the rule is C. F. von Weizsäcker 1939 and 1974.

require for their production that Euclidean geometry applies.[5] (2) The old opinion that the Euclidean axioms are *evident* independent of concrete experience had no general power to convince even in antiquity. There were again and again attempts to prove the apparently nonevident parallel postulate. Besides that, it is not obvious why "nature" should correspond to our axiomatic evidences that are prior to and independent of concrete experience of nature. (3) The *Kantian* solution, too, according to which geometrical propositions are synthetic judgments a priori, is deficient. Although Kant rightly sees the a priori character of geometry and thus does not succumb to the empiricist circle of justification, he too, cannot meet the demands of a certain grounding of natural science. According to Dingler, Kant's solution rests (a) on an unproven psychological-metaphysical hypothesis about the cooperation between the human mind and the data of perception and (b) on the assurance – albeit correct but unproved by concrete argumentation – that certain laws are the conditions of the possibility of every imaginable experience. (4) *Hilbert's* formal axiomatic solution, in Dingler's view, simply avoids the problem, inasmuch as in a formal system the meaning of the predicates no longer plays a primary role. Hilbert's axiom systems can raise no claim to real applicability, something that Hilbert (in contrast to Frege and Dingler) perhaps did not clearly see. Axiom systems acquire an empirical validity only through a later empirical interpretation, which however also did not fit Dingler's requirements for correct scientific concept formation. (5) The *conventionalistic* way out of the dead end is, on the other hand, expressly praised by Dingler. In fact Dingler himself was often designated as a "conventionalist" and for a time consented to this characterization of his position.[6]

Dingler agrees with conventionalism that (a) there is no transcendental justification for (geometrical) axioms as synthetic judgments a priori in Kant's sense and that (b) (geometrical) axioms do not express empirical facts but rather are a kind of stipulation. According to Poincaré they are neither true nor false and thus not propositions in the logical sense. They are rather definitions disguised as propositions. Their selection is made from the point of view of convenience. That Euclidean geometry would be chosen as most convenient, about which Poincaré had no doubt, is suggested by its structural simplicity as well as by the behavior of solid bodies. As opposed to this, Dingler insists (a) that the geometric axioms are true and (together with the true propositions about time and mass) constitute the condition for the truth of other scientific propositions. However, "truth" is not to be understood here in the standard ontological sense. Geometrical axioms do not say anything about space "out there" but only about the possibility of experiencing space.

[5] The charge of circularity against geometrical empiricism is also independent of the choice of measurement methods. It would apply just as well if one used, e.g., wavelengths or the like for length measurement: "Euclidean" concepts are – according to Dingler – in the final analysis unavoidable. An analogy between Dingler's position here and Bohr's opinion that measuring instruments must be causally describable in the space and time of our everyday sensuous world was pointed out by von Weizsäcker 1974, 62f. Weizsäcker distinguishes two possible interpretations of Bohr's intention. One leads to Dingler's conception, the other provides a decisive methodological argument against it.

[6] Cf. Wolters 1985.

This experience rests solely on manual operations. Geometrical axioms are therefore operationally true. From this internal characterization of the axioms it follows that (b) Dingler rejects external criteria of choice such as Poincaré's. There is nothing at all to choose, since there is only one geometry, the one that Dingler has constructed from the norms of concrete human manual practice, and it is Euclidean.[7] The same applies to measurement of time (chronometry) and measurement of mass (hylometry).

What happens to Dingler's "system" if measurements, for example, show that light rays under certain conditions are not straight? The empiricist standard reply in this case is that the global structure of "space" is non-Euclidean.[8] This kind of falsification of the a priori basis of physics is however fundamentally impossible according to Dingler. Like the hard core of a Lakatosian research program or the structural core of a theory in the structuralist conception of science, Dingler's "system" is protected from falsification by apparently contrary empirical data – permanently protected, Dingler believed.[9] Dingler's procedure of "exhaustion" corresponds to the protective belt of hypotheses of Lakatos: Empirical statements that (apparently) are directed against the a priori basis of the fundamental laws of the "system" are induced by interference with the correct functioning of the measuring instruments. What an interference is, is determined according to the purposes of the measuring device and thus according to the norms that enter into its production. Since these do not change as long as the desire to pursue science persists at all, a change (e.g., in the Euclidean geometry at the basis of natural science) based on some empirical measurement datum or other is fundamentally impossible. Even the question, whether "space" is Euclidean or non-Euclidean, is strictly speaking meaningless, for the Euclidean geometry constructed in Dingler's sense does not represent a true or false system of propositions about "space" but, as Dingler puts it, a methodical operation (Dingler 1938, 95). Its truth lies not in its correspondence to reality, but rather in the concrete feasibility of the appropriate construction operations for measuring instruments. These serve the purpose of making possible an empirical physics and thus natural science in general.[10]

## III

Dingler's philosophy of science occupies a special position in terms of originality among the approaches of this century. Three considerations seem to justify this evaluation: (1) Contrary to most other philosophies of science, which in this respect

[7] A good presentation and critique of Dingler's geometry is given by Torretti 1978.
[8] Cf. Nagel 1961, 259f.
[9] I follow here the good presentation in Tetens 1987, 7ff.
[10] Dingler embeds his philosophy of science in a voluntaristic metaphysics: the ultimate and uncircumventable authority on all knowledge and action is the will. His philosophy of science is independent of this metaphysical framework.

agree with Popper, it is not refutation-oriented but justification-oriented.[11] (2) It represents a (today) uncommon aprioristic grounding of scientific knowledge in historical, prescientific technical practice. (3) Most importantly, the a priori justification is derived for its part from a uniquely consistent coupling back of physical basic concepts to operations systematically built up one on the other. Therefore I think it appropriate to designate Dingler's position as radical pragmatism.[12]

Dingler's philosophy of science combines a number of themes without being syncretist. The existential *Leitmotif* of all Dingler's philosophical endeavors is certainty. The historical point of departure of his doctrine of science is the observation that predicates within formal axiom systems in Hilbert's sense have no meanings. Their retrospective empirical "interpretation" only puts off the problem, since the semantics thus acquired only names the objects, but does not constitute them, that is, demonstrate their possibility (or existence) and justify their conceptual form. Dingler was introduced by Husserl to the problem of constitution derived from Kant and to the related issue of the structure of knowledge.[13] Furthermore, the grounding of science in the prescientific practice of "the standpoint of everyday life" (Husserl: *Lebenswelt*) and its technical culture points back to Husserl (but also to Mach). Dingler oriented the operative construction of physics itself on Mach's economy principle, which he took to mean that in the construction of the "system" those representations (e.g. functions) are to be chosen that manage with a minimum of determinations ("principle of greatest simplicity"). The greatest simplicity of the a priori basis, that is, of the "system," takes precedence over the greatest simplicity of the physics erected on it.[14] What separates Dingler from Bridgeman's operationalism is the latter's nonconstitutive, analytical-empiricist approach that accepts the given theories and simply strives for a retrospective operative definition of concepts; he also criticizes Bridgeman's lack of consistency in allowing not only concrete manual operations for operative definitions but also "paper and pencil operations."[15] Dingler's concept of science was at first almost without effect. Only since the 1960's have his ideas again been taken up by the constructivism of the "Erlangen School." In particular Dingler's program of an operative grounding of physics in the prescientific technical practice of producing measuring instruments has been renewed under the title of "protophysics" by Paul Lorenzen, Peter Janich, Rüdiger Inhetveen, and Holm Tetens. These recent approaches in the tradition of Dingler dispense with Dingler's voluntaristic metaphysics and reject his dogmatic claims to absolute validity as well as his discarding of modern physics.[16]

[11] In this it is in agreement with Carnap's inductive justificational approach or with von Weizsäcker's conception of a "construction of physics" (cf. von Weizsäcker 1985).

[12] Dingler himself speaks of "operationism" or "operativism."

[13] Cf. Wolters 1989.

[14] Dingler insists on this point against Carnap, who in light of relativity theory was willing to sacrifice the simplicity of Euclidean geometry for the simplicity of "physics as a whole" (cf. Wolters 1985).

[15] A German translation of Bridgeman's *The Logic of Modern Physics* appeared in 1932 at Dingler's suggestion and with a preface by Dingler.

[16] Works on protophysics in Böhme 1976 and Pfarr 1981; cf. also the works of the authors mentioned listed in the bibliography. More strongly in the spirit of Dingler is Thüring 1967. For an orientation on constructivism, cf. Butts and Brown, 1989.

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# Method Instead of Epistemology and Philosophy of Science

## I

The peculiar situation of epistemology has often been remarked upon, meaning that [346]
sort of epistemology which issued from English empiricism and whose father is taken to be John Locke. Epistemology in the general sense has existed as long as there has been scientific philosophy, and in truth it has always formed the basis and core of all scientific philosophizing.

Epistemology can be understood in two fashions, the word itself is ambiguous; it can refer (a) to a theory of *given* knowledge, (b) to the theory of knowledge *to be obtained*. The first of these meanings leads to contradictions that have often enough been noted: how can a theory of given knowledge be provided which does not itself in the process already use, that is presuppose, elements of knowledge (Hegel). The search for a truth criterion for such knowledge as might be available leads to the well-known regress, which in turn shows that some "knowledge" must always be presupposed.

The second meaning avoids these objections. For, if knowledge is yet to be acquired, then it is programmatically implied that one wants to undertake the attempt *without* presupposing knowledge. The question is then only directed at the *way* in which knowledge might be acquired; it is then only a question as to the *method* (of "the way to . . ."). For such a beginning all previously given "knowledge" must naturally be considered at the outset to be once again problematical.

The decisive difference between the two conceptions thus lies in the fact, that in the first conception "given knowledge" is to be considered and "grounded," whereas in the second a way is to be sought to find something that we would want to call "knowledge."

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If, as it implicitly always is, "knowledge" is understood to be a secure and, to a specifiable extent, indubitable insight, then it is immediately clear that the first conception contains within it a contradiction: for, something certain which has yet to be secured (that is, is not yet certain) is a contradictory notion. Some thinkers succumb all too easily to the belief that there is something "certain in an unknown manner," whose basis of certainty need only be sought. The above contradiction shows, however, either that this is not yet "knowledge" in the sense implied in the justification requirement, or that, if one nonetheless wants to call it "knowledge," it is something conceptually distinct from that, the certainty of which is subsequently to be justified by an epistemology. The contradiction is thus resolved only if "certainty" means something different in the two cases.

Perhaps the most important part of an epistemology refers to the so-called natural scientific cognition of laws. Applied to this example, the considerations presented
[347] above take the following form: If we succeed in realizing again and again experimentally in nature a process, such as, for instance, the process of free fall as a simple accelerated motion, and instinctively call this "secure knowledge," then this must be a different kind of "certainty" than what we can give in a "methodical justification." If these two kinds of securing were not different, the above contradiction would in fact hold. In any case the latter must prove itself to be the genuinely certain knowledge by successfully giving a rigorous foundational justification of this constancy as well as specifying the exact limits.

But these considerations in the form of circumstantial inferences, where the object is so to speak treated *in absentia* and judged *in contumaciam* are quite immaterial compared to those occasioned by the second view of epistemology.

If, in line with the *second* view, we ask about the ways in which knowledge can be acquired, about the ways the certainties discussed above can be gained anew – this time securely – then we right away enter a much more palpably corporeal realm. In our example this leads immediately to the question: how are the repeatable, reproducible realizations of these free fall processes achieved? The second question: how this certainty is afterwards to be grounded in an "epistemology," disappears completely. For, if I possess a method for reproducing these processes again and again securely, then the certainty lies in the *method* itself and no longer needs special grounding by means of an "epistemology."

From Locke (to fix a historical point) up to the present, the first of the two views on epistemology has been dominant. It already lies in Locke's empiricist basic attitude. Empiricism means the assertion (always unprovable due to the regresses) that unmediated cognitive possibilities are available, so that the task that remains for epistemology is the post hoc explanation of given knowledge – with the logical difficulties (or better impossibilities) treated above. Empiricism thus always also means the assertion of the immediate presence of the graspable and ready-made intellectually epistemorphic in nature; it means the dogmatic assertion of an inner constitution of nature especially arranged for our human cognitive purposes (a sort of – *sit venia verbo* – rational regurgitation of these victuals so that they are prepared

for our intellectual digestion) – certainly a metaphysical hypostasis which can confidently match its volume against that of any other that has ever put in an appearance in the field of human fantasy. Kant attempted valiantly to extricate himself from this attitude, but he succeeded only partially and not really in terms of principles.

Kant is torn in his attitude. For a part of the forms that appear in the law-governed character of pure science he assumes with his "pure intuition" a pregiven preformation, which is able to influence experience because the latter in the form of the "phenomenon" so to speak meets with these pre-forms at the same "place," namely in inner experience (first a priori). Here the attempt is made to explain a given, encountered knowledge, and this must naturally lead to the above contradiction and regress (this is perhaps the reason why Kant never seriously contemplated a further substantiation of his postulates nor sought to perfect them to a system, as did K. L. Reinhold and J. C. Fichte later). He possessed no criterion for certainty capable on its part of securing his assertion about pure intuition.

For another part of the lawful character of pure natural science he possessed, on the contrary, a new and fundamentally different foundational procedure. This part he attempted to understand as a necessary *precondition of possible experience.* Here, [348] the way to knowledge is suddenly taken out of the sphere of the ontological and moved into the field of the "teleological": that is, such knowledge is no longer a given event which is passively presented as an object to my pure observation and registration; rather, there is the dawning of the insight that knowledge is something that I myself must very essentially also work at – not just as an observer and registrar but as a coproducer of the knowledge. However, it is not quite clear in Kant, whether and to what extent this process can become *conscious* and can be transformed into conscious goal-directed actions under precisely specifiable rules.

Clearly Kant could not have conceived the state of affairs as if the understanding first consciously figures out which laws make knowledge possible in the first place and then acquires knowledge with them. For he would have had no means of explaining how these laws come to apply to the real world, that is, how by treating reality according to these laws, they could be found there apparently independent of us. Thus he probably conceived these circumstances as such that we somehow (in an unknown and unconscious manner) acquire knowledge, whereby an unknown and unconscious process of reason arranges the phenomenon precisely so that cognition is possible. Afterwards, one can then discover concerning some of these laws that knowledge would not be possible without them and thus secure their a priori character (in the second sense).

The Copernican turn presents itself without doubt most beautifully, but everything else remains shadowy. But one sees here how Kant could be forced to confront the question of how in this case the intellectual forming manages to act on the phenomenon. For, even though he had probably at first also ascribed this action to the unconscious as with his first a priori, nonetheless much change could be wrought in this action because it was here and there raised into consciousness (e.g. with the principle of the conservation of mass). Considered in bright daylight, it was not

intelligible that *an insight of mine* to the effect that the principle of conservation of mass is a precondition of possible knowledge, could *influence measurements carried out in the real world,* and Kant was unable to specify more closely any such possibility. In his *opus posthumum* Kant worked in vain on this problem of "application" up to his death.

When we see how the methodical attitude to be discussed here accomplishes all this, and more as well, in the most perfect manner, the extent of the path that still lies between Kant's first Copernican turn pointing in this direction and the actual accomplishment of the methodical program will also become clear.

The fundamental approach of all modern philosophy since Descartes, the approach of taking the "I" as the point of departure of cognition, thus led in Kant to an active (although not yet conscious) participation of the subject in the provenance of knowledge. Fichte already goes a step farther in seeing the essence of this "I" in "doing," but no way could yet be found to show concretely and in detail, how, for instance, the knowledge of geometry or of mechanical laws arises. The bridge across this gap had to be spanned throughout the entire nineteenth century with all sorts of unprovable metaphysical suppositions, that is, no connection was in fact found. Only the methodical conception, as I have shown, is really capable of carrying through the program down to the last detail.

From this same deficiency sprang the juggernaut of Schelling's identity system. If, as Kant had believed, it was possible to proceed from thought to reality, albeit in an entirely unknown manner, then it must also be possible, Schelling thought, to go from the objective to the subjective, to consciousness and thus both were one and the same. He overlooked the possibility, already beckoning in the distance in Kant's
[349] work, that thought could be an *instrument* and the real world could be the *material* to be worked upon by the instrument, and that while a scissors can cut cloth, the converse relation need not necessarily be possible. Thus it appears that the objective and the subjective sides of existence were not vitally distinct for him but merely pieces on his metaphysical game board. In other words, he found it self-evident that the artisan and the material, that the shaper and the shaped could exchange places and functions. This shows that in his mind Mind and consciousness never advanced beyond the role of a passive metaphysical substance, that they could not even really have acquired the nature of Fichte's active "I," for otherwise he would never have propounded the doctrine of identity.

But even in Fichte, this "I" never advanced beyond unperformable or at least unexperienceable metaphysical actions. Since he assumed that it "posited" itself and the "Not-I," he was unable to explain how this was to take place *in concreto.* It probably never occurred to Fichte that drawing the boundary between the "I" and the "Not-I" could be a stepwise process capable of precise methodical execution. For him it always remained a metaphysical action (and thus again an only supposed action) located beyond the conscious.

Even farther from real action and thus from Method than Fichte stands Schopenhauer, in spite of his giving the central role to his "will." But for him, too, it is

so far removed from being the real vital will of the methodically acting human who thereby produces knowledge in the first place, that it is rather merely the metaphysical basic substance and thus again merely a (more or less) new figure on the metaphysical stage, which Man as a purely contemplative being sits opposite to and looks at, thus putting an end precisely to the human's own action.

This kind of "philosophizing," a propagation of metaphysics in which Man never leaves his spectator role, has up to now been considered the only possible kind of philosophy; but it should have been demonstrated sufficiently in two and a half millennia that it can only lead to ever new unprovable fantasies, never to anything secure (this can be proven in a purely logical manner, since the mere spectator can never overcome the infinite regress of validity justification, which makes all really secure knowledge impossible for him).

And even though it has occasionally been believed that all possible system constructions attainable in this contemplative fashion could be surveyed, *one* possibility was overlooked, namely that of *altogether* leaving the contemplative path, which relegated Man to a passive spectator's role, and of turning once to the opposite path where Man really acts, really becomes active – but not simply that he once again *considers* himself as an actor, but in such a manner that the knowledge sought after only originates in the first place through action and in action. That is the *new path* which *method,* as I want to call it, teaches. And with this path a possibility indeed opens up that has not yet been tried, that offers quite new hope, and indeed does not disappoint these hopes but rather most beautifully and completely confirms them.

Of course, this critique of the contemplative systems of idealism does not deny their great merits (they are the only ones for whom the relation between idea and reality, between mind and the given, was taken to be a problem at all; in relation to these, all other systems such as positivism, materialism, critical realism lie on much [350] more primitive levels, for they cannot even raise this central problem because it has already been conjured away by dogmatic assumptions in the basic principles). The idealistic systems had their historical function and provided a most valuable stimulus for the *Geisteswissenschaften* and touched off important developments there. But the question of certainty, the question of the really well founded scope of the postulates is answered for a particular system first and almost solely at the place where it can be tested with the *most rigorous* methods and where the relationships are at the same time accessible to the most exact logical analysis; this is the point where the *most exact logical sciences have their first foundations,* which must be secured by the system. In the following, too, our attention will be directed primarily towards this point.

Our second attitude, however, the methodical attitude of epistemology, lies completely outside the Lockean line.

Certainly, it, too, is in the position of "having to justify given knowledge." But it succeeds in avoiding the contradiction that lies in the task.

Certainly, the tremendous treasures of science lie before it as well as everything, so infinitely varied in dignity, that science designates as "knowledge" (often without

making much of a distinction). Certainly, it, too, wants to understand, judge, and justify such knowledge in its certainty. But it avoids the contradiction of wanting to secure the secured, since it recognizes that the empirical certainty of the practical scientist is a *different certainty* from the foundationally justified certainty that it itself is striving for.

Method is so rigorous, logically consistent, and systematic in its requirements that it considers methodically all "given knowledge" without exception, all given practical certainties, as *"knowledge to be obtained."* Such an attitude indeed could already be justified on the basis of "methodical doubt," which ever since Descartes has belonged to the standard props of epistemology. But we shall see that it means much more here than that sword of the Lockean school which unfortunately is usually only used for purposes of parading.

The procedure of methodical epistemology or method must be to strive to show exactly the ways by which it attains all the achievements designated as "knowledge." Insofar as it succeeds, no further securing is needed for this knowledge, for, since the way, the procedure, by which the definiteness and exact arbitrary reproducibility of certain real processes can be effected is known precisely, these are secured to precisely the extent that they present themselves to the practical scientist, and, furthermore, in optimal cases the field in which they can be obtained can be specified in principle. Insofar as method does not succeed or insofar as it can prove that such "knowledge" cannot be so acquired, no knowledge in this sense is given.

Thus, methodical epistemology also ceases to be merely "philosophy" in the sense of an academic discipline. Wherever it is carried through it becomes largely an element and research instrument of the individual discipline, an element that in certain situations is quite capable of intervening in the discipline by changing or giving decisions on its results. Its connection to philosophy, however, remains intact inasmuch as it is constrained to begin far "behind" the individual discipline, that is, in areas that are already logically prior to and foundational for some or all individual disciplines, and inasmuch as it must often use methods which do not, or do not yet, belong to the usual equipment of the purely empirical and, in the higher sense, methodically naively pursued individual disciplines, although these methods *in it* are of the same rigor and binding character as the usual methods of the individual disciplines. This unequivocal rigor of its methods, with which it stands or falls, makes
[351] it in this regard equal and superior to the individual sciences. During the era of positivism philosophy displayed a traditional timidity, even recognizing all the assertions of the individual sciences as being of greater certainty than its own, since it was conscious of its own inability to attain rigorous methods from its standpoint at the time. In method this has changed.

Occasionally the point of view of certainty (*Sicherheit*), which comes to the foreground here, has falsely been conflated with the concept of "life security" (*Lebenssicherheit*). Whereas we must reject the wish for security in life as the highest goal of existence as a base ethical goal determination, which arises from the, in a pejorative sense, bourgeois attitude towards life, this does not imply that all

circumstances are *prima facie* to be condemned in which the word "certainty" occurs. In this connection certainty is merely a not so well chosen word for definiteness (*Eindeutigkeit*). We abstract here from the fact that in the realm of ethics, too, the rejection of life security cannot itself be made the highest goal. Any ethics erected on this principle would lack genuine higher goal determinations. The principle of rejecting life security in ethics can only mean that the preservation of life security may never stand in the way of the pursuit of higher goals, that it should never become a goal in itself. Just as little can the avoidance of security be a goal in itself, just as the avoidance of feelings of happiness may not be a goal in itself. Whoever concludes from the proposition, "Life security cannot be the ultimate guideline," that "Therefore insecurity must be the highest guideline," commits a logical error from the logic of immediate inference. From this proposition follows merely "Only something which is not life security can be the highest guideline." Nothing more can be inferred from this. Such a goal determination would make a correct and important ethical auxiliary principle the ultimate goal of ethics. Whether Nietzsche, who is made responsible for this goal determination, really meant his ethics this way cannot be decided here.

For us the point is only whether this important ethical auxiliary principle forbids us to strive for certainty in the rigorous sciences. Something of the kind has in fact been asserted. The attempt has been made to interpret the certainty and rigorous method of thought in the exact sciences and their foundations as the outflow of a detestable bourgeois need for security and to contrast with it the unhesitant daring in these sciences, as that which is worth striving for. Here there seems to be an elementary confusion between the actor and his instrument. While Man may not make his *own* security the ultimate guideline of his action, this does not mean that he therefore ought to make the instruments, which he creates to pursue his higher goals, artificially uncertain. It certainly lies in the interests of the higher goals of the community,† if a mathematical or commercial calculation gives a *definite* unambiguous result, or if we succeed in producing machines and equipment according to definite methods so that their exact reproducibility can be guaranteed. Certainly, it would increase the insecurity of life if we were to avoid this, but the higher goals of the community would suffer damage for it. These higher goals lie, among others, in the most definite possible mastery of the environment, and this is served by the definiteness sought after here. These goals serve the *preservation of the whole,* and insofar as an individual serves this goal, he cannot let himself be guided by the point of view of his own personal security.

Thus, it certainly would not further the goals of the community, if an undirected risk-taking took the place of rigorous and definite methods in the exact sciences because of a confusion of the rightly rejected security needs of the individual with the higher security interests of the whole. If one has announced that methods are the [352]
same as styles in the arts, and that one cannot dispute over methods, this may well hold for the field of arts and letters (if one understands the word "method" appropriately). But certainly it does not hold for the area of rigorous thought and of the exact

sciences. Here methods fulfill the sense of these fields only if they are definite and rigorous.

## II

With what has been said, methodical epistemology or method separates itself from the historical past. In previous epistemological discussions one of the great sources of error was the form of the question. Occasionally even in philosophy departments and almost without exception in the field of natural science, the question of the "*origin*" of the "knowledge" under consideration has been dealt with by conflating quite distinct categories of analysis. The question of the "origin" could have a *historical* and a *psychological* sense, but it could also have a *logical-deductive* sense. We shall meet with yet a fourth sense here, which is very seldom touched on: the *methodical* (or perhaps also systematic) sense. In the end however "origin" always indicates a justification of validity.

The *methodical* "origin" of knowledge consists in the definite manner of its acquisition by methodical actions. If this acquisition is in fact definite, then for logical reasons important propositions about this knowledge necessarily follow from the methodical operations. The methodical acquisition of knowledge makes it *arbitrarily reproducible* and therefore supratemporal, timeless, and placeless in its validity.

The *historical* origin of some knowledge is always a temporally unique process, which has no connection whatsoever to its timeless validity. From the point of view of methodical acquisition, the historical acquisition can have been false.

The same holds for the *"psychological origin."* As opposed to the methodical origin, it can happen that the processes in the minds of researchers who deal with the grounding of knowledge only putatively lead to such knowledge.

Finally, the *logical-deductive* origin refers to the logical derivation of the result from some premises or other. If this succeeds, the premises need not yet themselves be "correct" in terms of their methodical acquisition. This shows that the logical-deductive origin, too, is independent of the methodical. *Only* when the logical, deductive derivation proceeds from the methodical actions themselves, is a definite connection given. For geometry in particular I have carried through this kind of process exactly.[1]

When I speak here of the supratemporal validity of certain exact formulations, I do not mean to assert the existence of an objective mental world independent of humans. Once in the realm of rigorous methodical thought the demonstrably best method for the definite acquisition of a formulation has been discovered by some thinker of other, then this method can be adopted by others and due to its definiteness must always lead to the same result. This result thereby acquires that specific

[1] *Die Grundlagen der Geometrie. Ihre Bedeutung für Philosophie, Mathematik, Physik und Technik.* Stuttgart, 1933.

kind of "objectivity," which from that point on makes it definitely reproducible, independent of other circumstances, for anyone capable of applying the method. In *this* sense the result becomes "supratemporal." This property of course only applies to results which are completely attainable by definite, formal methods which can be learned by others, that is, only to so-called rigorous or exact results. In all parts of [353] science that are not completely under the sway of definite, learnable methods there are no such results. Where such methods are not available, the formulation will depend on the personal or innate peculiarities of the scientist, as for instance often happens in the so-called *Geisteswissenschaften* (cf. the end of Section IV), just as with the rigorously methodical results the *first* discovery has to flow from such peculiarities.

The opinion has occasionally been put forward that even the definite methodical formulations are experienced differently according to the hereditary peculiarity of each individual, so that even propositions like $2\times2=4$ or the Pythagorean formula are to be taken as different. Every one of these rigorously methodical formulations is naturally *imbedded* as an experience (*Erlebnis*) in the experiential background of the individual, influenced to a large extent by heredity. If one takes these psychological, experiential surroundings *in addition* to the rigorous formulation, then this opinion is certainly correct. But the fact is, that a part of this experience can be expressed in methodical actions which belong to the external world and which can be learned and imitated by others. Thus, this part acquires a kind of "objectivity" in the sense given above, and it is precisely this part of the experience that must be designated as "formal." With this, an exact delimitation of the *concept* "formal" has been given. It is from this part of experience that those elements of the so-called exact sciences called "objective" in the above sense are composed. Thus, for instance, the production of technical devices or the solution of differential equations can, as is well known, also be learned by those who did not invent them or could not have invented them. Such productions are actions in the shared external world, which are thus separated from the hereditarily conditioned psychical background from which they all once arose. The "formal" rests precisely in this separability.

Now, when speaking of method, we think of the individual sciences first. However, it turns out that the methodical point of view can be applied with complete success even in the areas that *precede* the individual sciences and which are usually allotted to philosophy. There, too, the methodical point of view shows its astonishing power by replacing the uncertain groping with a straightforward procedure giving definite results.

Once attention has been drawn to the methodical, it is recognized that in the sphere of "philosophy" as well, nothing grounded can be expressed without employing certain intellectual actions (i.e. methods). These elements need only be expounded in a clear and orderly fashion and brought to consciousness in order for clear, definite, and unassailable results to be seen at once for decisive philosophical, ontological, and logical problems.

In principle, the following should be said: non-methodical thinking in philosophy, i.e. thinking that is not conscious of its continual intellectual *action* while it philosophizes, never leads to certain results. By simply "thinking" and writing down what is thought, no certainty can ever be acquired that others must arrive at the same results. In fact only seldom have the results turned out the same. An agreement of the thought of different persons ("personal objectivity") cannot be achieved thus; in any case it cannot be secured. The assertion, that such a securing cannot be attained at all, is of course unproven dogmatism which can only command attention until a way to certainty has been found.

The existence of the so-called exact or rigorous sciences in their really rigorous parts itself proves that there is a broad field of methods that are "objective" in the above sense. Insofar as the methodical belongs to the field of action, it comprises
[354] "the formal" according to the definition above. If there are broad fields of such definite formal methods, then there must also be a *similar kind of foundation.* That means that there must be a definite, formal, methodical science, which lies at the base of the kind of fields already available and which provides their ultimate justification. This must likewise be objective in the sense mentioned. The point here is to isolate precisely those aspects of philosophical problems that are amenable to a rigorous methodical treatment, that is, which belong to the just-named area of the "formal" or the formalizable.

The area forming the common base of the rigorous sciences has always been ascribed to philosophy. One could call it the field of theoretical philosophy. Indeed this area constituted its real core at the time of the first origins of philosophy in Greek antiquity. It follows that *the field designated up to now as philosophy must also contain significant parts that are amenable to definite methodical formulation in the sense above and thus to formal objective formulation.* These must comprehend precisely what is objective in philosophy in our sense. It is this part of philosophy that is dealt with in this essay. As the concept of philosophy has been expanded increasingly towards boundlessness, especially in the last 150 years, a special name must be introduced for this part. I call it here simply "method."

The essential goal of method is thus the acquisition of a comprehensive intellectual and manual "acquaintance" with the real, which I shall call "mastery," by means of rules that are definite, once-and-for-all delimitable, and objective in the sense above. These rules should thus be applicable any place and any time, and every interested and sufficiently gifted human being should be able to apply them with the same success every time. Such rules will be called "universally valid" for short, which is always to be understood only in the sense presented. Only such a rigorous investigation is capable of fully securing the vitally important so-called exact sciences in their content and their method. The assertion that this is unnecessary, because it has already been done by "nature," is false and represents the influence of an unconscious, temporally contingent, dogmatic metaphysics. In fact it is nothing but an expression of the circumstance that the philosophy of the English Enlightenment with its metaphysical empiricism even today holds most minds under its dogmatic spell.

Since such rules must be expressed as "propositions," it is necessary first to survey the kinds of propositions that carry universal validity in this sense in the first place. There are *two* kinds for which this is the case:

(a) Propositions which express according to our best knowledge circumstances of the common external world in words of the common language. I shall call them *hic et nunc* propositions. They are definite within the possibilities of the language, retain permanently their unique validity, and can be common to different people who have the same external experience.

(b) Propositions which express an intention of possible action (perhaps under certain conditions). I shall call these "volition statements." They are definite within the possibilities of the language, they can be called permanent if the stated intent is retained steadfastly, and can be common to all human beings who commit themselves to the same intention.

These two kinds of proposition are *prima facie* universally valid in the above sense and are thus secured in their validity from the start. In my book, *Das System* (Munich, 1930), I have shown that they are also the *only* kinds of propositions that [355]
*prima facie* display this property.

Thus, for instance, all definitions, instructions for action, recipes, production rules, etc., are "secure" as such (although not immediately secure of success). In contrast, all judgments about real things that are not *hic et nunc* propositions are from our rigorous initial standpoint at first uncertain until they have been secured in a rigorous methodical way. Thus, for instance, all inductive statements are at first to be taken as uncertain from this point of view.

*Hic et nunc* propositions according to their definition express only a *one time* validity in the real world. But the purpose of all method is to achieve propositions which possess a *permanent validity in the real world.* Method cannot, therefore, be secured in its essential propositions by *hic et nunc* propositions. The only possibility that remains for it is the employment of volition propositions.

Only through volition propositions, if at all, can propositions (law statements) that are objectively (in the above sense), everywhere, and permanently valid for the real world be grounded in such a manner that they no longer display any uncertainty at all. Put another way: only such law statements as are based completely on volition propositions display no more uncertainty. Now all *method* is clearly based essentially on volition propositions, since all methodical propositions are instructions about the course of action to achieve certain purposes. So it can be seen that all law statements that display no more uncertainty at all can only be grounded on method.

The project of carrying through the method *from the beginning* must in any case be attempted once. It consists in dispensing with all unproven philosophical and ontological assertions (the *Epoché,*[†] the so-called "place of origin," which is always unavoidable for the beginning of philosophy, if thinking is supposed to be clear) and above all in first making available the instruments that are to be employed at the beginning of orderly thinking. It is not necessary and also not possible exactly to

formulate these instruments individually. It is sufficient to be precisely aware of the goal of action that one is striving for.

The essential point here, which makes unobjectionably possible the provision of the "instruments" before all method, is that these instruments themselves do not contain any universally valid law statements. Such instruments are, for example, the ability to compare, to think, to speak, to write, etc. These instruments appear at the starting point of method, *but not as propositions,* that is, not in secondary form but rather in primary form; they appear not in reflection about method but rather so to speak *in persona* as actively exercised operations and only so. If method is supposed to ground all universally valid law statements, then *it cannot already need or contain such statements in its own foundations. The first foundations of method thus consist solely in active operations,* in other words in the ability to perform them, not in propositions, axioms, precepts, principles, etc. The *first* actively exercised operation is to make a decision to acquire law statements that are ultimately grounded. From this will to a goal the other steps of method are derived. It is clear that at the beginning of all method there must stand such a will to a goal.

Let me already point out here that method is thus not rooted in a metaphysical "mental sphere" but rather in *primary immediate life.* For, the will to the goal of definite law statements derives from vital life, which precedes all such production of science; the latter is only an instrument, that is, an instrument of life.

[356] Similarly, let me also say a word about the extent to which method does and does not take the "I" as its point of departure. This question is closely connected to what was just said about the roots of method in primary life. Certainly, every empirical "I" that wants to become familiar with method is forced to undertake this study for itself. Every such "I" that wants really to understand the method is constrained to build up anew within itself the trains of thought and instructions for action step by step. But method is not rooted in this individual empirical "I"; rather it arises, as we saw, from the highest goal determination of this field, namely, from the will to attain a growing definite mastery of the real world by means of law statements. But this will is in turn rooted in the highest ethical goal determination of the human race, out of which science first arose and which has lead it onward from there. Thus in the end, method *derives from a social goal determination,* and arose from within a particular human group, the ancient Greeks and thus the western Indo-Germanic peoples, to whose greatest creations it belongs, although it did not at first come forward in the shape of the method expounded here. This origin subsists nonetheless, although it (method) must necessarily subsequently appeal to every individual, similarly willing "I," and therefore must be so formulated, that this "I" is capable of going through the ordered series of actions for itself. Since only an "I" can actually carry out the respective individually required actions, the method must *formulate* its instructions for action *from the standpoint of the "I."* Nonetheless, method is rooted in those depths from which the ultimate goal determinations of life arise; these, however, are the hereditarily bequeathed areas of the communal psyche of those who created and create them. Let it be pointed out that only method among all the

suggested explanations of the "objective spirit" has the property of being directly rooted in primary life and of attaining its rigorous validity precisely from this circumstance.

If the structure of ordered thought is to be built anew from the beginning (every "Other" experiences this anew, just as everyone who learns mathematics must so to speak rebuild the edifice of mathematics from the beginning in order to learn it), then all previous scientific knowledge must be set aside. One may also not take the attitude or harbor the wish that the ensuing thought order should be so constituted as for instance to confirm the vitalist opinion or to produce a rational proof of the existence of God or to deliver the assertions of certain theoreticians of physics. With *completely rigorous execution* the course of the methodical is so definitely bound that no opportunity can arise of taking such wishes into account. Many of these wishes lie in and of themselves outside the methodical field.

The methodical attitude has the unique advantage of essentially excluding every such prejudice.

For it places at its beginning no assertions at all, nor propositions of any kind about something "given," about the makeup of reality, etc. It sets only a goal, a goal of action, and asks about the actions (intellectual and manual) that must be carried out in order to achieve this goal.

Of course, its beginning, too, cannot float in empty space; it cannot begin from nothing. But the point from which the methodical attitude takes its departure is the most natural and obvious that there is: it is daily life in its most untheoretical and common form. All the artificiality of hiding-oneself-from-oneself, of thinking-oneself-away, etc., is dispensed with completely. In my quite unproblematical everyday life, I one day make the decision (and can repeat it at will) to construct the edifice of ordered thought. In doing this, I have no other abilities than I always have in this [357] daily life. And I apply nothing else to my goal.

Our goal, however, is to proceed beyond the contingency, unclarity, and disorderliness of daily life and to *acquire a procedure of acquiring, at least in a particular area, a definite and therefore absolutely certain and at any moment reproducible, intellectual and manual mastery of natural circumstances,* which at the same time is so constituted that every normally gifted "Other" can likewise imitate it and achieve it. Whether one wants to designate this as "knowledge" is a terminological question. The desire that in the process, knowledge as previously conceived come to light, would of course be a dogmatic prejudice and must be set aside. If only the mastery and certainty demanded above are acquired to the extent that already exists practically, this would already be a success that is worth the labor, since this would now rest on a firm and unassailable basis.

Thus, through the mere will to the methodical procedure a natural point of departure is extracted for all theoretical philosophy – *the point of departure of our daily untheoretical life,* which must always unavoidably have been the point of departure, for it is the only position that can be taken up without any compulsion and without intellectual artificiality.

Here, a significant problem determination has occurred that differs from those prevalent earlier and which immediately disposes of a number of pseudo-problems. From the foundations described we now build stepwise – that is, subsequent steps all resting on previous steps – all those methodical operations for acquiring definite universally valid and objective law statements for the real world that meet our requirements above. We shall call this structure for short "the system." In contrast to the full and final grounding that these law statements receive in the system, all lawlike statements that do not possess the full foundational justification of the system must be designated as unjustified or not fully justified from the rigorous point of view which we take up here. Even if the wording of the law statement were exactly the same as in the system, the justification would still be incomplete in the one case and complete in the other.

Thus, a boundary line is indicated here between the fully grounded *propositions of the system* and all the rest, the *"presystematic."* This line is entirely definite and sharply defined. The earlier boundaries were such as between thought and being, mind and matter, idea and reality, etc. While these are often practically very useful and important, they prove on closer inspection to be not entirely sharply defined, indeed not even entirely sharply definable. Compared to the system they are preliminary, presystematic concept formations, which, while practically sufficient for broad areas, nonetheless fail in many borderline cases.

## III

At this point of departure of the system we now possess the ability to will and to act in the everyday and usual manner, and these are the only instruments available to us now to do "science." I want to call these abilities, which we bring with us in their naive everyday form, *"basic abilities."*

Based on these, we frame the will to achieve, to the greatest possible extent, "science" in the above sense, i.e., the definite and certain mastery of circumstances.

For this it is first of all necessary that our *designations and concepts* themselves are definite. For it is impossible to achieve certainty if it is not even certain what is meant
[358] by a word. We can, however, undertake to act so that this will be achieved, and we succeed in specifying rules which guarantee this if followed.

These are then: that we may not use the same designation for different things, that we retain the same designation for similar things, and do not change it arbitrarily. The feasibility of these operations is made possible for us by our basic abilities. These stipulations already contain the methodical principle of identity and noncontradiction. If we decide always to understand under negation the entire field of possibility of what the negated concept encompasses, then the principle of the excluded middle also holds. (Thus, for instance, either a statement or its opposite will hold. If, as is obvious, the latter is understood also to comprehend the case in which a decision on the validity of the statement has not yet been reached or is even regarded by some as

impossible, then the attempt to violate the principle made by Brouwer in mathematics is likewise disposed of. The question, whether – and by what means – a decision can then be made, lies on quite a different plane and has nothing to do with the principle itself.)

Let it be noted, that no further justification is necessary for this methodical conception of the three basic logical principles. In this manner the laws of course lose their "ontological sense," since they are restricted to the methodical sphere. But the assertion that they need an ontological sense is itself already a metaphysical assertion about the special nature of being. How is such an assertion supposed to be justifiable at the beginning of all science? We shall limit ourselves therefore to what can be achieved in the methodical sphere (in fact it turns out that nothing of the *effect* of these principles is lost through this conception). According to our definition of "formal," these principles can enter into method only as formal laws and only insofar as they are objective in our sense (and only this aspect of them can be taken into consideration by method). With this, however, they have become universally valid in the sense above and at the same time are secured as such in their validity and freed of every uncertainty.

Already in the area of logic, in "concept formation," other basic abilities begin to be effective, which in the course of time acquire great importance: the ability to fix on an intellectual form and to compare experiences with it. Such intellectual forms will be called *ideas* in the most general sense. If, for instance, an object experienced changes before our eyes, we note the difference from the mental picture of its previous makeup. When the formerly sitting Socrates now walks, we connect this object, which is now behaving much differently, with the earlier one by considering them both to be the same object, on which a particular correction is to be made, an accident attributed. Even daily language is entirely dominated by this principle, in that it designates the changed object by a "further determination," which is attached to the word for the object. The tremendous technical advantage of this methodical procedure is clear, it allows us to relate the unsurveyably many transient processes of experience to relatively few constant intellectual forms and thus at least approximately to master them in an orderly fashion for everyday use in mind and language. (The concept of substance is then the attempt to push this methodical principle to its ultimate consequences by seeking an intellectual constant form, by means of which all real experiences can be designated by attaching further determinations.)

This general methodical basic principle will be called the "*principle of the constant idea.*"

This principle is one of the basic pillars of all construction of science as such. Even to characterize groups of individual objects according to one aspect, their "plurality," we are able to use such constant ideas. We choose particular groups as [359]
comparison groups, the so-called numbers, dissolved into their units and characterize other groups whose members can be assigned one to one to the units, by these numbers.[1]* Thus each of the common numbers is a constant idea, practically

[1] For more information cf. my *Philosophie der Logik und Arithmetik*. Munich: E. Reinhardt, 1931.

connected to a chosen comparison group, for which the appropriate number sign stands, and thus *becomes a methodical operation.* From this point, likewise as a series of methodical operations, arithmetic can be obtained.

A second decisive methodical principle already asserts itself with the counting numbers (*Zählzahlen*):† *the principle of construction.* The counting groups of the more simple kind can be obtained by beginning with a (improper) group of *one* object and then obtaining higher groups by always adding a new object to the given group. The eminent practical, methodical meaning of this principle is clear: if I can compound complicated experiences out of simpler ones, then this methodical procedure likewise facilitates extraordinarily the intellectual mastering of this area, because the mind does not have to note the very great multiplicity of possible combinations, but rather can master these with a few basic elements ("*building blocks*").

The two principles of constant idea and of construction have not only an intellectual meaning, but also just as great a "*manual*" meaning. The expression "manual" is used for "methodically real." If we were to speak of the *real* plain and simple, this would mean a *real* that exists without our action and quite independently of it. It would be a "given." But once attention has been drawn to the methodical, *that aspect* of the real comes to the foreground, which we ourselves somewhere methodically handle, process, form, or at least actively isolate. *For this important area of the real world,* the significance of which is not understood without the methodical attitude and in fact has not previously been understood, a special designation is needed. I shall therefore speak for short of the "*methodically real*" and call the method as applied to the real the *manual method.*

The debates in the sphere of ontology have up to now turned on the seemingly contradictory pair of concepts: real and ideal. Method shows that *a third possibility inserts itself between them:* the just-mentioned "methodically real." These are the realizations of ideas which we ourselves undertake artificially. They are then not ideas, but they are also not "nature," i.e. they do not belong to the given. It is nature formed by us according to our ideas. Whereas in the discussions on the epistemology of the physical (*das Physikalische*) (in the broadest sense) the only possibility ever dealt with is whether the physical belongs to nature or to idea, I have been able to show that here the *third* area, which up to now has not even been taken into consideration, plays the decisive part.

The effect of the principle of the constant idea in the manual sphere is that real relations are sought that display as great a constancy as possible, that is, the *most exact and permanent* constancy possible, or the attempt is made to produce them. These conform best to our way of thought characterized above and designated as the principle of the constant idea; they correspond most immediately to our forms of thought and can therefore be most easily surveyed and mastered. The principle of construction, too, has an immediately manual meaning. In the manual sphere, too, we work with "building blocks" (and, historically, worked with them there long
[360] before the principle became a conscious intellectual one), that is, we compound

complicated structures systematically out of elementary, constant structures (the most everyday example is building a house; all of technology is quite dominated by this principle).

Now, a corollary of the principle of construction is that it is methodically useful in many cases to look for the "*simplest*" building blocks and to complete construction in the "simplest" manner. The simplest building blocks are those that display a *minimum* of determinations belonging to the area in question. In the manual sphere this principle, which may be called the "economy principle," has to a certain extent, though not principally, the meaning of labor-saving or time-saving, since in this manner the greatest effect of the actions can be achieved in the shortest time. In the intellectual sphere, just as in the manual, this principle also has the important function of securing a full survey of all available possibilities and at the same time in many cases of guaranteeing the *definiteness* of the determinations, because the superlative, "simplest," is often equivalent to a definite determination of an element; it is a "requirement that makes definite.'

If the simplest building blocks of an area are methodically definitely determinable as ideas (that would then be a methodical a priori), then the science of this area can be constructed in full methodical rigor and justification with the "principle of synthesis" (as I have, for instance, carried out for geometry in the *Grundlagen der Geometrie*, Stuttgart, 1933). This science is thus permanently acquired for method, i.e. for "the system," and lies beyond uncertainty in its foundations and, insofar as it is rigorously constructed, also in its execution. Since the methodical is at the same time always an instruction for realization in the external world, this statement also applies to the reality treated according to this science.

The principles mentioned show their effects clearly in the treatment of *constant* forms in general. If the simplest forms are sought here, one arrives at the elementary forms of geometry: plane, line, deformation-free body.

Naturally, a *first* constant elementary form may only be obtained in such a manner that such forms are not themselves used in its "definition." Thus the sphere cannot be used as such because it already presupposes a rigid distance. On the other hand, the plane can be obtained in this manner. Building on this, we can obtain the remaining elementary forms, and with them as the simplest building blocks all of geometry can be constructed.[1]*

The *methodical form of the concept of axiom* is of fundamental importance here. At the beginning of the methodical geometry just sketched, i.e. of the geometry constructed on goal-conscious intellectual and manual action, there are no axioms in the old sense. Axioms in the old sense were statements which in a science of the real (*Realwissenschaft*) contained ontological universal propositions about the constitution of nature or natural objects. These assertions, as the first assertions of the deductive structure resting on them, naturally possess no justification within them. They supposedly obtained their justification through so-called "evidence" or among

[1] See my *Grundlagen der Geometrie*, loc. cit.

scientists (and since the English empiricists, often among philosophers as well) supposedly from "experience." In reality these relationships are very different for different sciences and cannot be dealt with further here.* In geometry for the last fifty years a justification has been dispensed with entirely by constructing it (and other geometries) purely as a hypothetical-deductive system and supposedly leaving the decision between
[361] different geometries to experience. Philosophy has again and again brought up serious (and obvious) reasons against the possibility of an empirical decision.

At the beginning of *methodically* constructed geometry stand definition-like statements about how the basic elements ought to be constituted (ideas); and these statements are such that they represent at the same time operational instructions for the real production, for the realization, of such structures in the real world, and thus are "*production instructions.*" They are such that they can take over the *logical* function of the old axioms, i.e. that the propositions of geometry can be derived from them by logical deduction. I have carried out this construction in the work mentioned.

Here we have a further example of how an exact science is grounded and constructed in the realm of the methodical. It is characteristic that the old philosophical problems about the nature and validity of the axioms become immaterial; for it is tautological that the realizations produced according to the instructions possess the properties thus stamped onto them. Other *purely* geometrical structures than those artificially produced or introjected into nature by us do not exist. The universal and apodictic validity of geometrical principles thus becomes obvious with these structures and no longer constitutes a philosophical problem. The most important factual aspects of what was formerly called the "a priori" in these axioms are thus guaranteed without our having to acquiesce to one of the unprovable theories about the *kind* of a priori, to which the concept was usually connected. In the methodical sphere, too, one can also purely descriptively speak of an a priori (I have occasionally called it the "production a priori").

The methodical grounding of the *exact natural sciences* also succeeds in the same manner. Here, too, according to the above principles the simplest elementary building blocks for the processes to be constructed systematically must be fixed by definition-like propositions, which *at the same time* have the meaning of production instructions and take on the role of axioms for the logical deduction (they are to be called "production axioms"). In the face of what has been said so far, what makes a further science of this kind necessary, namely the exact natural sciences, is the circumstance that in the methodical procedure treated above (in logic, arithmetic, geometry) only *constant* forms are applied. In these there is not yet room for the elementary experience of *change.* The purpose of the science now to be grounded, which can be called "physics in the broadest sense," is to incorporate this elementary experience.

The production instructions that result unequivocally from these endeavors prove to be the foundations of what is today called "classical mechanics," in particular "dynamics."[1]

[1] See the derivations given in my book *Das Experiment, sein Wesen und seine Geschichte* (Munich, 1928), and especially my just-published *Die Methode der Physik.*

By this it can be seen that we are not compelled to conceive the propositions occurring in the foundations of classical mechanics as "laws of nature" in the sense of a metaphysical determinateness of "nature"; rather, that with the methodical point of view these turn out to be simply "methodical operations" or instrumental aids that are necessary as building blocks for the intellectual and manual mastering of the area of the changeable as well. Here, too, the difficult (and insoluble) philosophical questions as to the essence of these laws of nature disappear.

The methodical building-block forms of the dynamic sphere are used in the manual sphere especially for the production of definite measuring devices, with which we can then definitely delimit and master the remaining natural phenomena. All these are not just "philosophical assertions" but rather propositions that are supported by real applicability in individual sciences.

The general result is that it is never necessary to assume that "Nature" contains [362] universal laws; on the contrary it can be seen that all processes in the real world in which such laws seem to become visible either arise through methodical forming on our part or are the spontaneous repetitions of individual phenomena. The rigorously demonstrated universal always lies only in thought and in the methodical sphere.

Above all the building-block principle above proves to be of such general importance that it possesses quite comprehensive effects, which are expressed in what in the intellectual sphere must be called the *system point of view.*

In the procedure described, an immediate and complete cooperation is achieved between the manual and the ideas of the intellect by the consistent methodical attitude. The old problems of epistemology and ontology, which have occupied thinkers since the Greeks and split them into different schools are settled, so to speak automatically. A problem about the relation of thought to being – such as still occupied Kant in his *opus posthumum,* precisely in regard to our field – no longer exists for this field.

The elementary building blocks of the constant and the changeable, whose acquisition was adumbrated above, allow us to ascend by appropriate compounding (synthesis) to ever more complex structures in which intellectual and manual treatment go entirely hand in hand. This construction process, continuously advancing in the course of history, and unbounded in principle, provides what we call *the definite methodical system,* whereby the degree of complication and the methodical use of earlier elements for construction automatically produces a *natural order,* which shows the chain of necessary actions that leads from the elementary forms to the higher structures.

As far as this construction of the synthetic system has reached, there reigns absolute mastery of the structures affected (intellectual or manual) in unbroken and apodictic form. The relationships that arise in the intellectual sphere are known or can be derived with absolute precision; manual realization approaches the intellectual standard in a process of continously *increasing exactness* (which I have carried through in detail for geometry in my *Grundlagen der Geometrie*). If we want to speak of "laws" here (we saw, that they are not laws of "nature" in the old ontological

sense), then these here are of absolute exactitude. At the same time these laws are "eternal," that is, they are not subject to change since the elementary building blocks are themselves definite and are unchangeable by the essence of their methodical origin, because every rigorously executed methodical procedure must always lead again to the same elementary building blocks, which are fully definite through the manner of their determination.

These circumstances hold in this form *only* for the area of the synthetic system, which, although it is continually in the process of unlimited expansion, nonetheless of course at any time can only have been carried out to a certain extent.

Besides the function of being building blocks of the synthetic system the elementary forms described have another more *analytical* significance. In light of the relatively limited extent of the area mastered by the synthetic system, we need to have methods to probe investigatively even those phenomena of the real world that do not yet belong to this area, in such a manner that they, too, are accessible to the most definite possible mastering, although not with the exactitude and absoluteness of the area of the synthetic system.

The elementary building blocks of the definite-methodical system can once again serve this purpose, too. From our short sketch of the acquisition of these elementary forms, it is clear that they are the only ones that can at all be taken into consideration and that they represent, so to speak, the complete alphabet of real
[363] mastery of nature. Just as logic deals with the purely intellectual elementary forms or, in the sphere of the real, with the concept of thing, so arithmetic treats discrete things with regard to their plurality. The continuous forms are divided into the constant and the changeable. The former are treated by geometry, the latter by mechanics. Even this tentative very synoptic consideration shows that exclusive disjunction is being applied so that no possibility remains of introducing further elementary forms.

Although phenomena that do not yet belong to the area of the system (they will be called "presystematic areas" for short) cannot yet be completely dissected into elementary forms, nonetheless the endeavor of science is directed towards gradually realizing this possibility. In order to begin this process of gradual integration, the attempt will be made at least tentatively to *constrain* such presystematic phenomena by means of the elementary forms of the system in such a manner that they can if possible vary with only one degree of freedom. Then all remaining aspects of such an arrangement consist of elementary forms and are subject to our exact intellectual and manual control; and if the varying of one of these circumstances brings about a variation of the phenomenon, we can then compare this dependency using our measuring devices built of elementary forms, i.e., we can *measure* it, and we have its variations definitely under control.

Then, combinations of elementary forms, whose mathematical consequences result in just that measured dependency (hypotheses) are sought in the mind. Here begins the so-called hypothesis research, with the well-known rules, which need not be discussed further here.*

At this point in our construction, what today tends to be the sole concern of the epistemology of natural science first begins to become visible. For today this discipline concerns itself only with hypothesis research (and only in a rather primitive form).

It is this hypothesis research alone that generally draws attention today and indeed exclusively dominates the thought of the practical scientist. The lack of contact of these scientists with philosophical thought and with the history of their sciences[1] has in the last hundred years led to the belief that this more empiricist part of the exact study of nature is the only one that exists. The *essential employment of the elementary forms* just described is completely overlooked; a profounder methodical reflection on the processes of such research did not yet exist. The philosophy of the English empiricists, culminating in John Stuart Mill, seemed furthermore to give a philosophical vindication of this opinion – and so it happens that these scientists today live in the belief that nature offers them all this "of itself" and that the task of the scientist consists only in reading measurement numbers off the scales. The main parts of the methodical sphere, to which these physical results owe their existence in the first place, are still hidden from this generation of scientists, so to speak, in the darkness of the unconscious.

From this point it becomes clear that the methodical conception is not simply a "philosophy" but rather an integrating *part of research itself* and that through it decisive effects on the form of the expressed results will set in as soon as its importance is recognized. Only with this recognition will a firm basis for all research in the individual sciences be obtained, which, especially in the so-called "theoretical sphere," will lead many fantastic efflorescences back again to a sober and methodically rigorous form. [364]

However, to distribute the weight correctly for the reader, I must draw attention especially to the following point: the reader is naturally inclined while reading to perceive what is talked about most as being the most important. Thus he might arrive at the opinion, that the emphasis of all cognition lies on the synthetic system. Since method is most perfect and most clear in this system, it is understandable that precisely here particularly much has to be said about it. In reality, however, the synthetic system represents only a small segment of our entire doing and experiencing. All methodical science is ever merely a very thin net cast over some parts of experience, which is somewhat more closely meshed at some few places, but at most of them extraordinarily wide meshed; it is able to grasp only some very special narrow aspects of experience, while experience itself possesses an infinite wealth and an inexhaustible abundance.

The exact scientist, in particular the physicist, is easily inclined to consider what appears here as the totality of systematic forms and which in the nature of things constitutes his major working instrument to be the sole given and "the true reality." In reality this is just an intellectual methodical instrument, and in comparison to reality it represents a rather coarsely meshed net that is thought for methodical practical purposes to be cast over the real world. When this instrumental net is

[1] See my *Geschichte der Naturphilosophie*. Berlin: Junker und Dünnhaupt, 1932.

described in a popular manner as the true reality, those so-called "physical world views" arise, of which the pseudo-philosophical literature today is so full.

Thus even from the methodical standpoint, the synthetic system with its annexes never says *anything ontological,* but rather in its entire extent always represents solely a methodical operation for the intellectual and manual mastering of the experienced in the service of the ultimate goals of our actions, i.e., of ultimate ethical goals.

Statements to the effect that one would like to "know" something "more" and that the methodical conception does not satisfy the drive to knowledge, are rather sentimental feelings, whose unfoundedness can already be seen in the fact that no one can give a concise definition of this "more." All that can really be demanded in terms of content and logic is achieved by the methodical conception. In general it can at most say that such a "more" is not available in the area of *this* kind of knowledge.

An important logical property of all formulations methodically obtained in the above sense is that all methodically grounded propositions are universal propositions in the above sense and the concepts formed by means of them are universal concepts (*universalia*). As soon as concepts or propositions are grounded purely methodically, they are independent of when and where they are applied or realized. Wherever or whenever a capable human being undertakes again to obtain knowledge methodically, to construct science, and in doing so, sets himself the goal that we set ourselves above, he must on account of their definiteness apply the same methods, and with exact execution he will and must arrive at the same formulations, since these methods derive only from the goal determination of the human being concerned, uninfluenced by the circumstances of the surroundings. This proposition holds naturally only for those concepts and propositions that are constructed methodically from first principles without a gap. It naturally does not hold for all those (much more comprehensive) areas where this is not (or not yet) the case. There, fluctuations of methods and differences of results are still possible, however only so far as methods from the area of the synthetic system are not at least partially applied.

[365] Thus, it can be seen that everything methodical of itself automatically bears the character of the universal and the general. However, this universal no longer possesses the character of a "property of nature," as the non-Kantian systems of philosophy always had to presuppose, which led to the well-known insolvable philosophical and metaphysical problems. The existence of this universal is on the one hand absolutely secured and on the other hand unproblematical and completely intelligible in its essence and function.[1]

## IV

This outline survey of the consequences of the methodical for the foundations of rigorous individual science,[2] which I attempted to give in Section III, was supposed to

[1] The proof that the system is feasible in the area dealt with has been given. In the above-mentioned works the proof is presented in a rigorous manner.

[2] For more details I must refer the reader to my above-mentioned writings.

familiarize the reader with some of the concept formations and methods, to which I shall have to recur occasionally in the following. I shall now discuss especially how this methodical procedure influences some important traditional problems of philosophy.

As indicated briefly in Section II, philosophical reflection is also entirely subject to the methodical point of view wherever it deals with the foundations which lie at the common base of all individual sciences and where it is formalizable.

All so-called "problems," all questions that arise in philosophy, seek an "answer." Such an answer, however, demands an ordering or forming, distinguishing and connecting of acts of thought that proceeds according to certain rules, for an answer is only then really an answer when it is *definite,* i.e., can be obtained in a definite way (= method). Without this requirement all remarks about the problem, even the most senseless, would be completely equivalent, indistinguishable in their value. The rule-governed character of the way to the *one* answer, which is sought by all and which alone can guarantee its definiteness, means, however, that a *method of forming answers* is required. The acquisition of method must thus precede the formation of answers. At the same time, however, this circumstance indicates that a certain uniformity of forming answers in terms of method will result. The age-old requirements of "non-contradiction and consistency" demanded of philosophical answers also act in this direction, and even a superficial examination reveals interdependencies among philosophical problems. Both of these already show that certain logical rules are to be employed in forming answers.

It must be made clear in principle that a kind of inner turn is necessary in order completely to grasp the methodical conception. The usual philosophical attitude was that one had to take up a kind of "*passive stance*" vis-à-vis "thinking" (most clearly in *Lichtenberg*'s "In me it is thought"). If such a stance is not just purportedly but really attained, the mental process would better be called "dreaming" than "thinking." However, generally at least a certain will to a goal and a certain conscious direction is in fact observable. Nonetheless, such an essentially passive attitude can never provide ultimate order, certainty, and solution, because the order sought is not yet given of itself in the passively observed. That is the major reason for the failure of philosophy in this regard ever since it turned away from conscious methods in the Renaissance (although the syllogistic methods of scholasticism were deficient they were at least conscious methods) and tarried all too much in the passive attitude.

It is clear that certainty in the "objective" sense dealt with here, i.e., rigor, can [366]
enter into philosophy only as far as philosophy can be won over to conscious methodization. This applies of course primarily to those of its parts which are concerned with the natural sciences and those that treat knowledge as a formal process in general. These will concern us here.

Is complete methodization and thus full rigor possible in this field? I want to answer this question in the affirmative.

Complete methodization presupposes first the conscious volitional addressing of the task posed to science as such that was formulated above. Such an addressal asserts nothing in need of proof; as an attitude of the will it is already secured in itself. Full methodization then produces further the *conscious separation of "instrument and material."* Now, in the immediately experienced there is nothing more certain than the distinction between what I do willfully and what is not subject to my willful actions. A lot more can be said about this.

In the first chapter of my ethics, *Das Handeln in Sinne des hochsten Zieles* (Munich, 1935), I have given a concise exposition of the role of what is called there the "vital will" in contrast to everything passive. The distinction between "instrument and material" begins with this distinction and coincides with it. Since I know when I act consciously and when I do not, this distinction which we bring with us and thus experience as given must be the point of connection. In an act of cognition in the presystematic sphere one cannot always distinguish without further ado how much is "given" and how much is "added by the cognitive subject," because in the presystematic this addition takes place so to speak "unconsciously." For this distinction methodical procedures would once again be needed. Only if the previously only *tentative* act of cognition can successfully be carried out in conscious method, is it as such secured in our field of the rigorous, and *only now* can it be said with complete clarity what is methodical in it and what belongs to the given. Thus before the execution of the methodical program, all attempts by means of various circumstantial inferences to gain full clarity about the relation of the methodical to the given or about the participation of the cognitive subject in the cognitive process must always remain *insecure in principle* (consider, e.g., the spatial). That is the reason why these attempts have never led to a fully *secured* result. Thus, *the conscious separation between instrument and material always arises only during the methodical labor itself,* and can never be demanded from the start. Only the distinction between the conscious vital will and its passive counterpart is always primary. And only when the participation of the cognitive subject in cognition has become actively *conscious* through method, can this distinction take root here, too. This distinction occurs then, not by reflection on the act of cognition but rather by the attempt actively, i.e., consciously, to replicate, i.e., to repeat, this act scrupulously following the instructions for action of method, i.e., by the "doing" itself.

It can be seen[1] that in the history of the mind some of what was later recognized as conscious method had earlier appeared to be experience of the external world, and that conflict often prevailed as to whether something belonged completely or partially to the external world or the internal world. The boundary between "inner and outer," internal world and external world was not at all always fixed and in the same place. But investigations of the past with their countless groping attempts have provided the methodical point of view with such a survey of the possibilities available here, that we can today succeed in rigorously carrying out the methodical construction and with it the exact distinction between internal and external.

[1] I have tried to show this development in my *Geschichte der Naturphilosophie.*

All nonmethodical attempts at grounding the separation of the given from what we have effected break down as experience shows and as can be proved,[1] on the insolubility of the problem of validity that arises in them and that leads inevitably to an infinite regress proving the impossibility of an unobjectionable foundational justification. But, as I have been able to prove step for step in a rather long series of books, the justification of rigorous knowledge can really be carried out in a methodical fashion. In these books this construction is already completed in all essentials. [367]

Thus the result is, that on the one side there lie a number of immediate active abilities as instruments of the will striving after science (which we called basic abilities above) and on the other side, vis-à-vis these instruments as material, is the entire abundance of the nonvolitional experiential. In all cases of conscious action, this separation is from the start always an experiential absolute. We begin the methodical constructive action in an area and in such cases, in which even for the most naive attitude there is no doubt whatsoever about the relation. From here onward this exact separation between instrument and material extends further by means of the methodical construction itself, that is, insofar as the exact methodical construction, the "system," has been carried out. That there is an area in which even the most naive attitude knows how to distinguish exactly between the instrument of the will and the material, is, at the beginning of cognition, a lucky circumstance, just like the circumstance that plain procedures of volitional action and an abundance of nonvolitional plain experiences are simply given for us. Before any rule governed cognition, that is, at the beginning of the cognitive construction, there is nothing more to be said about it. Rule-governed and grounded propositions can according to their definition be made only *within* the methodical construction of knowledge itself. Before that, all means and all methods to it are lacking. Such propositions are inescapably bound to the essence of the methodical as such.

To show the effect of the methodical way of treating philosophical problems on a few *examples*, let us begin with what has up to now appeared to be the foundation of epistemology. We read for instance: "It seems justified, even mandatory, to begin our investigation of knowledge in general with perception." There are said to be two kinds: sense perception for the external world and self-perception for the internal world. For sense perception support could be found in the careful and revealing preliminary studies which the modern natural sciences have provided. A sort of physiology of the sense organs then follows.

From the methodical standpoint things look much different. The initial standpoint (which has to be taken up anew by everyone in each investigation) is naturally that point at which conscious goal-directed methods of attaining science are not yet supposed to be employed at all (or where all results of earlier attempts are dispensed with for methodical reasons of consistent new construction – the *Epoché* mentioned

[1] In my book *Die Zusammenbruch der Wissenschaft* (Munich, 1926; 2d ed. 1931) I demonstrated that the only way in which the rigorous grounding of rigorous knowledge is feasible is that which bases itself on the vital will, and this is *method*. All other attempts at this, the book shows, must necessarily miscarry, that is, they remain unprovable.

above). This methodical initial standpoint will be called the "*premethodical or presystematic standpoint.*" No particular abuse of thought is needed to take up this standpoint, it is simply the state of common life without connection to the fully grounded definite-methodical system, which we all take up in daily life. If I then begin with the construction of the system, I simply renounce all earlier scientific
[368] decisions in order to seek them once again, this time in a methodically purified form (initial standpoint).

At the premethodical standpoint no exact methodical decision has been taken as to where the boundary runs between internal and external world. There is an area where we practically effect this separation – my table belongs to my external world, the memories of last night belong to my internal world. But whether, for instance, a law of nature like Newton's belongs to the internal or the external world, whether and to what extent the heteropsychic, or so-called causality, etc., belongs to the one or the other, is temporarily left undecided.

Thus, I have experiences which I already reckon premethodically to my external world (such as my table); but the fact that this experience comes about by means of light rays that act upon the retina through the optical lense, that thus a physical causal chain is given, all this is not a plain experience in the sphere of the premethodical. Knowing this with absolute certainty belongs to the *Epoché.* Similarly for the other sense organs. This conception is not suitable for the initial standpoint, because it makes use of "*pseudo-methodical means,*" i.e., such as can only be secured by method and are not and cannot be fully secured in the premethodical.

For the sake of clarity the following distinctions must be observed: (a) The *premethodical or presystematic standpoint.* This is my normal life with all given knowledge of previous science etc. but merely not yet directed to the conscious construction of the fully grounded methodical system. Here, all pseudo-methodical knowledge is not yet fully secured. (b) The *initial standpoint of the system;* this is the presystematical standpoint plus *Epoché,* i.e., joined to the insight, that none of the previous means has provided a justification of universal law statements free of all uncertainty, and joined to the intention of seeking such statements through the rigorous construction of the methodical system. Instead of this insight it is also enough to have the intention to abstract for the moment from all such previous results, in order to come to a decision in an uninfluenced manner as to whether the system achieves what is desired.

Since we see that the exact separation of the truly given from what is added by the cognitive subject (i.e., the pseudo-methodical) can only be attained through method itself, thus the *Epoché* cannot consist in the demand consciously to refrain from such additions. *This kind of Epoché* is also not necessary for the construction of the system. As we saw, a first goal determination and the presence of those volitional, actively exercised basic abilities of which we spoke are sufficient for construction. *The Epoché then merely consists in not letting oneself be influenced by any other supposed "knowledge" in the rigorous, definite construction of the system.* In this manner the exclusion of the pseudo-methodical occurs automatically.

Thus, in the methodical sphere we have a completely different point of departure from the usual one of the old epistemology that is called *sensualism*. At the initial standpoint of the system I experience everything in the immediate freshness of everyday life unrefracted by theoretical questions. Here I experience, think, and act quite immediately, and from this point only can a structure of methodical operations be erected for the intellectual and manual mastery of the given, can rigorous science in the full sense be erected.

It is of special importance to note that all *clear* separations of a conceptual (and thus general) kind are not yet given at the premethodical standpoint and are not at all possible; that they represent products of later methodical conceptual labor, which, however through primary education has become so natural for Western peoples, that we must make an effort at first to put ourselves in the unbiased initial standpoint of [369] the methodical. There, not even the individual sense areas are strictly separate. A speaking person is an aggregate experience which is not resolved into visual perception plus auditory perception plus mental-psychic processing of the perceptions (which is far from being known exactly). External experience and subsequent psychic experiences (associations, feelings, etc.) are not yet clearly distinct but rather to a large extent still form a unity (as in the magical attitude of primitive peoples or in ourselves when we naively experience people as sympathetic or unsympathetic or when we judge foodstuffs, etc.). The object is often not merely experienced as "external," the experience is rather still a full one, so to speak a round one surrounded with a complete "aura," which is only later split up into an external and an internal part on the basis of methodical causal considerations. All these distinctions already contain methodical elements, and thus they are not yet given in full methodical rigor at the premethodical standpoint.

Just as in the premethodical sphere every concept, indeed every object is surrounded by a floating aura of contextuality which makes the experience different from the methodically acquired concepts and objects, so, too, a more or less broad field of confluence (or better of nonseparateness) is given, where even all distinction may be lacking, and where method later gradually introduces clear-cut divisions. Thus even in the premethodical the beginnings of some later divisions of the two areas exist, so to speak core areas, between which there stretches a belt of the unseparated; within this the exact method begins slowly to draw a boundary, but then these two core areas are *experienced* as different although no conceptual, methodical characteristic has yet been found for them, that would draw the division *exactly* in *all* cases; in other words, the extent of the two areas has not yet been precisely delimited, not yet logically-methodically "defined."

This is especially important for the separation of the internal from the external as such. At the premethodical standpoint the human being is not yet split up definitely into "body and soul"; on the contrary he constitutes to a great extent a unity of body and soul. The complete separation is only a product of methodical (i.e., conceptual and causal) construction.

Similarly, the sensualistic point of departure, which has been the point of departure of all philosophies since the seventeenth century, turns out not at all to be the natural point of departure it has always been considered to be. It, too, already contains extensive methodical elements. It is not the point of departure of philosophy but rather itself a methodical construction.

Thus, some very central basic philosophical problems are already cast in a fully different light by the methodical examination, and this examination provides at the same time a liberation from many tortuous questions that were insoluble without method.

The source of everything immediate, individual, and experienced also lies in the premethodical. Here, I am not yet split up into body and soul, into a collection of various sense perceptions, etc. Here I am still a vital unity vis-à-vis all such later conceptual divisions, which all always fix only rather tenuous abstractions ("membranes") from the inexhaustible abundance of the real world.[1] This in itself entirely confluent whole, not at all cut into pieces by general concepts, not at all dissected into theoretical forms, is the real, the *really given reality.* In contrast, the system is always only a tenuous broad-meshed net, which we ourselves produce as a methodical
[370] instrument and which may never be confused with primary reality. Any confusion leads to a complete impoverishment and constriction that no longer has anything to do with the real world.

This primary real bears that characteristic that one today likes to call "holistic."* The holistic comprises our first and proper life element since it constitutes our proper life and, so to speak, always remains the main point vis-à-vis all methodical concept formations, which always have only an instrumental and never an ontological character and are always themselves embedded in this primary life and only arise out of it. It follows already from this, that the concept of the holistic cannot be a concept of the system, and that all attempts to make it such must necessarily lead to errors. It essentially means precisely the opposite and the contradictory to everything definite and systematical. The recurrent attempts to introduce it into the area of the systematic are based on the implicit belief handed down from the time of rationalism, that in the end the rational system is indeed all-embracing and that, therefore, all additions to it in the direction of the irrational can only be made *within* the system. It is the same belief that led to all scientistic views and to Büchner's† world picture. Only when method has completely dislodged the rational system from the middle point and when its entirely instrumental character has been recognized, as presented here, will we have a clear view of the fact that primary life, of which the system is only an instrumental derivative, must be the sole natural place of all holism and that, for the holistic to receive its due, there is no need to breach with holistic irrationalisms the logical definiteness and consistency of the methodical system wherever it has already become feasible as completely closed in

[1] See especially the discussion in my lecture, "Der Glaube an die Weltmaschine und seine Überwindung," (Stuttgart, 1932) and *Das System,* 1930.

itself. In the field of the definite system the whole is always equal to the sum of its parts, for it has itself been built up out of them. Only outside the definite system and in mixed areas can there be exceptions. There, either the parts or the whole or both may not be defined unambiguously and constructively down to the last detail, since this can only be done from the system.

The concept of the premethodical can, if given a positive turn, be called the "immediate daily experience." Previously the difference was often seen as between a reflected and an unreflected experience, which was taken as the point of departure of philosophy. But this does not get to the core of the problem. Thought of course also occurs in the premethodical sphere. But here thought is still "*nonbinding*" in the theoretical sense, because there is here no *ultimate* theoretical possibility to decide; this is only achieved through the systematical method. Only universally *binding* thought is method. However, a binding character can only be derived from the methods of synthetic construction and can only be found where these prevail or at least play a role, insofar as they play a role. Hence the methodical attitude is so important and decisive in all these questions. The undermining of the belief in methodical thought which has spread since the Renaissance (which itself was only a naive belief), and was decisively aggravated by the English empiricists (previously there had been methodical thinking but its insufficiency and inadequacy was essentially responsible in part for the desertion), allowed *noncommittal philosophizing* to become dominant. Along with this, the belief arose (especially in the natural sciences) that the binding methods of calculation and experiment (which themselves remained completely unanalyzed) were the only binding methods. The theoretical natural sciences still draw sustenance from this belief today, and it has led to the [371] noncommittal state, that is, to the complete insecurity of their foundations and of "natural philosophy" that we see today.

It should be emphasized once again, that the methodical treatment so to speak automatically solves, that is, shows to be nonexistent, the *ontological problems* previously attached to the forms it uses. A methodical operation *never* leads to problems that could be called ontological, for all formations that it employs are instruments purposefully chosen *by us*. As shown in the last section, wherever the methodical synthesis does not yet suffice or, as is usual, only partially suffices, the materials that they work upon, the experiences, produce empirical data, which however are themselves partly determined methodically in their formation and thus are no longer entirely empirical, and, furthermore, according to the tendency of method are inclined to be ever more strongly methodized.

Here we run across an addition to the *problem of full methodization* touched on above. There is no doubt that science progresses in its exertions to ever greater methodization, consciously or unconsciously. But again and again here and there assertions are made that full methodization is not possible in a certain area. By this it is not meant that the task can be completely solved only in the distant future or practically never due to its great complexity; rather it is said that it has no chance from the start because this area cannot in principle be so treated. Both cases are

indistinguishable externally. No particular characteristic can be pointed out for the distinction. Now, the above assertion would have to be proved somehow, but that means proved exactly and methodically.

Such a proof would have to be drawn from at least one specific characteristic of this area. But the edifice of method contains no connection whatsoever to particular characteristics of the material to be worked upon. Thus purely in terms of logic, no connection between the area affected and the general method is possible. Such a proof is thus impossible and what masquerades as such is a pseudo-proof.

It should be pointed out ever again that methodization is only an instrument, which subjects more and more areas to itself, but whose effectivity is limited by its own essence. But its effectivity can never be limited by the characteristic of a particular area of being, for these characteristics could not be defined unambiguously without this instrument. Since the essence of all definite method bears the mark of the universal, everything *individual* can never be completely methodized. (The problem of "complete knowability" that already played a role in Plato arises through the equation of knowledge and *episteme* which at least in its idea corresponds to our definite system.) Only the universal is accessible to complete methodization. Wherever the individual plays any role, it is impossible. Everywhere, that, for instance, the "I," history, an individual thing or its essence intrudes, complete methodization is excluded. Because rationalism conceived the rational metaphysically and did not recognize it as methodical, it was unable to see this restriction. But even the universal as a whole cannot be completely methodized. However, here the limitation is not one of principle but only of practice. The methodization will continue to progress here, and there is no specifiable limit in principle, but nonetheless it remains uncompletable because the unlimited cannot be exhausted.

To avoid problems in understanding, we must again as above precisely distinguish between the universal methods of the synthetic system – which are definitionally
[372] precisely known and mastered in their application and scope – and the groping individual methods (heuristic methods) that are tried out for the solution of problems in areas not yet subjected to the synthetic system. The latter can fail, turn out to be insufficient, lead to false conclusions, that is, they can be "false," because they somehow overlap or contradict synthetic methods implicitly contained in the problem. When speaking of method, this distinction must be carefully observed. In the latter case of so-called heuristic methods, the method can indeed be determined by the problem and thus give the impression that it is in fact determined empirically. This determined character, however, lies *only* in the fact that the formation of the problem – that is, the formations which the elements used (consciously or unconsciously) in the construction of the problem already implicitly carry with them – already contains a restriction on the further applicable formations and methods. An exact analysis of problem elements will always make this apparent.

At the premethodical standpoint the person next to me is an immediate vitality and his "inner being" is not separated from mine. Only conceptual method forces us to say that the acquaintance with the heteropsychic is based on "inferences." But how

infinitely shallow is everything that we can express in conceptually purified form about the heteropsychic in comparison to the indescribable abundance of the immediately experienced. Here we can see with particular clarity the *function of the methodical construction* as only a very thin and dry conceptual net, whose internal consistency and logical closure must be purchased at the expense of the extreme meagerness of what is grasped – however necessary for the methodical mastery of the real world this merely meager net happens to be. Only in the methodical conceptual net is another human being a pure object of my external world, about which I know nothing (that is, can assert nothing methodical and conceptual) except what is provided by meager inferences and the only rigorous methodical treatment that the objects of the external world can experience, the rigorously causal.

The feeling of how meager this causal net of methodical explanation is in comparison with real experience, has again and again in modern philosophy issued in the endeavor to break through the rigorously consistent methodical construction by intruding irrational, i.e., unmethodical elements into this construction, which only leads to its destruction, as vitalist formulations of all kinds demonstrate. But such artificial and arbitrary breaches have arisen from a misunderstanding of the true nature of method; they have arisen from the erroneous opinion that there could be a *methodical ontology.* This is where the real mistake has lain. As soon as it is recognized that methodical conceptual operations, which serve only the intellectual ordering and mastering of an intellectual and manual instrumental schema, can never bear an ontological character, the fear that they will transform the real into a false reality becomes baseless. What was to be rescued by such artificial interruptions of rigorous method is not at all in need of rescue because it is given indestructibly and irrevocably prior to all method and remains so in spite of, and unaffected by, all method. Behind these attempts lay unconsciously the quiet belief that scientific theory itself was reality, that is, the confusion of system and reality. Thus it was believed that the irrational could be taken into account only if it were forcibly inserted into the system, thus breaching its logical consistency and rigor. In method the occasion for all such mistaken attempts is removed from the start. For here, this "irrational" is the primary given from which everything proceeds and from which the system itself arises as an instrument for the intellectual and manual treatment of the given that has nothing at all to do with "ontology." The strictest method can never tell [373] us anything about an individual human, who is given us in his entire real abundance. What it tells us holds only for a constructive schema of the "general human being," for instance, as a physiological apparatus. This schema is needed, for instance, by a physician in order carefully to consider in advance and plan his supportive thoughts and actions, so as not to be confused by the abundance of circumstances. This schema changes nothing about the living human being. Only those who out of ignorance of the true nature of method *forget the living human because of this schema or confuse him with the schema,* commit the error that was so common in the nineteenth century and has become the cause of the belief that only through the arbitrary breach of rigorous method can account be taken of real circumstances.

Whoever has once grasped the true essence of the methodical can no longer fall into this error.

## V

What the methodical conception of the philosophical achieves in the sense of *traditional philosophical systematics*, i.e., the study of the various systems of solutions to philosophical questions that have arisen, is the clarifying connection of those elements of these systems that withstand a rigorous examination. Every system that has arisen in history contains enduring elements, some more, some less. The systematics of method does them full justice and puts them in their proper places. However, a few remarks are in order.

Whereas Greek antiquity essentially attempted to make assertions about objective being, since Descartes the focus has shifted to the asserter himself and the "I," which in the course of further development through the psychologizing of this perspective led to the wrong track of sensualism. In the methodical sphere the Eleatic being becomes the *real that is manually formed according to an idea*, which on the one hand contains an objective realization and, on the other hand, achieves its immediate alliance with thought, such as already Parmenides proclaimed when he equated thought and being. But at the same time the centrality of the "I" is taken into account, since the ideas realized are ideas of the creative human mind (earlier one said: cognitive subject), which at the same time is conscious that the doctrine of so-called sensations itself already represents an intellectual causal construction, which has its rightful place in the individual science of physiology but cannot represent the foundation of thought and of philosophy (as we saw above).

Whereas up to and in the nineteenth century a kind of "pure knowing" was always sought after, in the first third of this century tendencies have become prevalent that place their emphasis on "life." Pragmatism and *Lebensphilosophie* were the forms of this new wave of thought. In the methodical sphere these endeavors are also put in their proper places and receive their due. For method, the constructive system as a whole is a pragmatic measure, derived from purposeful goal-directed action, although the *individual steps* are no longer subject to purely pragmatic considerations, as pragmatism believes, but rather, as soon as the basic rules of construction are once fixed, are firmly and definitely bound by them.

Although method cannot accept the complete irrationalism and the multiple magic of some tendencies of *Lebensphilosophie*, it knows quite well that the entire contrivance of science arises out of primary life and only has sense for life. It knows
[374] that it does not lie in "truths" floating somewhere, which science is supposed to pick out (in inexplicable ways), but that these truths of exact science issue in the end from the goal-directed willing and acting of the "I," and that they are not, nor need be, a bit less definite, compelling, and exact for this than the ever so rationalistically conceived knowledge of a pure reason and an idealistic realism. The opposition

between a one-sided metaphysical rationalism and an equally one-sided chaotic and irrationalistic mysticism of nature has disappeared, since each has delivered its tenable elements, each in its place, to the really tenable system of thought.

And even the genuine freshness of life has its place here. In fact this whole thinking and doing arises from it and has in it its indispensable foundation. Even for many of the thinkers who are reckoned to *Lebensphilosophie* today, it is only the word "life" that provides such a connection. For Schopenhauer, Bergson, and others the will and life are themselves only metaphysical, paper powers that they construct behind the things just as others do with being or with atoms. Only with Dilthey and Hugo Münsterberg[†] do we find the beginnings of a correct grasping and interpreting of real primary life, and only with Nietzsche is it woven into and behind thought, although often with peculiar distortions and not in a systematic fashion. In the methodical, however, it has its fixed and unshakable position as the primitive ground from which all orderly thought first arises.

Once again, the opinion has recently been put forward, that the real can be particularly well approached by dispensing completely with causality, with the intellectual supplementing of the real, even with logic and thought in general. It has been overlooked that we are altogether incapable of intellectually grasping the unformed real as such (it would be senseless and self-contradictory even to wish this) and that the only purpose of all our intellectual formations was to make the real graspable. The real world, displaced by the exaggerations of the rationalistic element, has been pushed even farther away by these measures, and thought has become lost in the realm of the disorderly and the incalculable. Method, however, shows the necessary rational elements precisely as operations of the "I" to make the real world graspable, and this *methodically* rational thus loses every possibility of falsifying and obstructing the real and for the first time brings about the possibility of intellectually examining it.

Thus, in method and only there all science becomes an *affair of life,* an operation by humans, drawn from life and for life and thus entirely loses the character of a separate field standing beside or above life. While the attempt was made in physics and biology to take account of the new tendencies by forcibly grafting irrationalistic elements onto particular points artificially and in breach of rigorous and consistent thought, these meager and logically erroneous measures prove to be entirely unnecessary in method. Here, primary life automatically has its rightful place, and science itself is nothing but a derivative from it.

## VI

Finally, let us take up a question belonging to systematics that again and again causes confusion. This is the question of "false systematic order." This problem became topical in modern philosophy with so-called *psychologism.* If one attempts, as did for instance Fries,[††] to base logic and epistemology on the science of psychology, one is

evidently involved in a so-called circle or, to use an expression of the ancient skeptics,
[375] a "diallel." For, in order to have a scientific psychology, it is evidently necessary to have certain epistemological and logical categories and principles, which then would so to speak have to ground themselves in this way and thus in reality would remain ungrounded. An analogous mistake would be so-called *biologism*, which tries to make the *science* of biology into the foundation of epistemology. The attempt recently propounded to base scientific knowledge and even logic on the *doctrine of probability* displays in especially clear form the same offence.

Now, it is entirely impossible to ground science without at the same time making use of abilities which, if they are subjected to a scientific investigation, are objects of psychology. This circumstance shows that a simple rejection of psychologism is not enough, that here some *more subtle distinctions* must be considered.

Why then must psychologism be rejected? Because for logical reasons one must avoid a circle. As logical figures these circles depend not upon the fact that elements occur, whose scientific treatment is the task of psychology, but upon the fact that propositions and methods are employed, that receive their grounding only at a later point of the system. A necessary precondition of such a circle is thus that things *to be justified* are used before they can receive this justification. From this it already follows that *the use of things that are not supposed to be grounded cannot cause a circle*, even when words have to be used that are outwardly identical to concepts later to be grounded.

In the methodical sphere precisely this relation holds, something to which we shall return.

I can take any experience (whether psychical or nonpsychical, but this distinction is not essential here) after I have experienced it, set it before me, and examine it. In this relation the experience is then an object examined; it is *passive* vis-à-vis the active examination. We say it belongs in this relation to the *passive sphere*, the object sphere. An earlier experience of willing becomes passive in this relation. But a current vital willing of mine in an active state, in which it is directed towards something, is entirely different from this. As long as it is active, it can direct itself towards anything except itself. For as soon as it has turned towards itself, it is no longer active, it has become an object, whereas the presently active will confronts it as an examiner, that is, from the subject side. If we call such an active will vital, then the vital will is always on the subject side, it always belongs to the *active* sphere.

The sphere of the active will does not consist so to speak in an empty will-point. It is rather constantly in the process of expansion, since it can draw all potential abilities of the psyche as needed into its sphere and activate them. All psychic processes subject to the influence of the will can be activated in this manner and can appear as elements of the active sphere, just as they can afterwards again become the objects of active processes, i.e., be taken up into the passive sphere.

For the definite methodical system the following relation ensues. All methodical actions for the construction of this system (and thus of definite science) consist in

goal-directed and volitional activations of immediate abilities of ours: imagining, thinking, comparing, remembering, goal-directed bodily movements like speaking, writing, all manipulative and practical actions (*alles Handwerkliche*), etc. It is neither possible nor systematically necessary exactly to delimit, name and catalog all these abilities. It is essential only that they are available to us to be activated by our [376] methodical scientific operations. It is only by means of their primary application that orderly thought, science, and definite system can arise at all.

Their systematic position is that they *must be given before* the beginning of the scientific enterprise. But it would be a mistake to try to express this relation by saying that they are "*logically presupposed*" by the system. That would only be the case if something was supposed to be inferred logically from them. But this is not the case. They are only supposed to do something, they are supposed to act. Let us call this kind of presupposition a "practical presupposition." These two kinds of presupposing must be carefully distinguished.

Thus, it becomes clear that at the start and before the construction of the definite system elements must appear, that are usually denoted by names which in turn also play a role in scientific psychology. But in each case they appear in an *entirely different way.* In *method* they are *active.* They belong to the subject sphere. In *psychology* they are *passive* and are themselves the *objects* of scientific examination, they require explanation, analysis, grounding, i.e., causal underpinning. Thus the possibility of a circle is excluded, because in their active function they can never themselves become a logical element of a causal explanation; to become this, an element must itself already have become the object of examination, must have become passive.

Thus it has been shown that a *"psychologism" can never arise* through the active employment of these various so-called abilities, if this distinction is rigorously adhered to. The uncritical application of this concept in general to the employment of processes called psychological, practiced by some authors, destroys in principle the possibility of any kind of science at all, for science can never arise otherwise than by the active employment of such abilities. These considerations are thus fundamental for the problem of psychologism as such.

It is manifest that quite analogous considerations are to be applied with regard to the point of view of "*biologism.*" Whereas in the *science* of biology vital processes are the *objects* of examination, that is, belong to the *passive* sphere, the *active primary "life"* must precede all biology, indeed all science in general, and the active life, which constitutes our entire being and from which all our actions and expressions, including science, flow, must be *practically* presupposed.

The necessary practical presupposition of this active "life" can thus never lead to "biologism" if distinctions are rigorously observed. However, it makes method the *only* rigorously practicable and provable doctrine of science that is rooted fully and completely in active life and which derives its meaning and existence only from and for this life (as was presented in more detail in Section II).

An analogous distinction automatically results for the concept of "voluntarism."

Furthermore, this opinion belongs to the area of psychologism, which has been dealt with sufficiently.

On the other hand, it follows that, if an area that is labeled with the name of a particular individual science is to be the foundation of general epistemology and philosophy of science, this area can only appear in the *active* form. It may never appear in a form there that includes logical connections to the theoretical universal. If psychology, biology, anthropology are to provide a basis, they may not already
[377] take the stage as sciences that already contain theoretical-universal elements. For, all such elements acquire their vindication only in the system itself and cannot themselves be used as its foundation.

Thus, for instance, the methodical system does not *logically* presuppose a *science of anthropology.* However, it does indeed presuppose *practically* and *actively* human beings of a certain kind and with certain abilities. If one wants to call this last statement "anthropological," one must take into consideration that it belongs only to an "active anthropology" and not to a "science" of anthropology in the usual sense, which normally presupposes implicitly the presence of theoretical-universal elements. Through the developments of the nineteenth century, the general concept "*Wissenschaft*" has been so expanded that great care is called for when using it.

The *episteme* of the Greeks meant exclusively what we called above the methodical system, although they could not yet formulate and delimit it so. This concept of science was retained, with certain fluctuations, up to the beginning of the nineteenth century. Thereafter everything that was taught at the universities, which included more and more fields, gradually came to be called science.

In order to understand the above, it is now of great importance to make clear that it applies only to the field of universal and exact thought. *Alongside* this field there is another field for the activity of human thought and speech that is very much greater in extent and usually very much more important for the practical life of the individual, which deals *directly with primary life outside* the methodical system. This includes huge areas, cultural disciplines of all kinds, geography, history, all variants of the study of man from descriptive anthropology to pedagogy, many parts of so-called psychology including the study of character and physiognomy, as well as philology and the study of literature. These areas are either completely separate from the methodical system or make contact with it only at the outer edge or only at its very first stages (inasmuch as here, too, the search for definite concept formation prevails and the basic logical principles are used). These areas were *not* dealt with above. For them, too, a method can be developed. This makes use of certain other abilities, which do not enter into the methodical system treated above, since they do not provide complete definiteness, which is the basic requirement of the methodical system. It was *not* our task to deal with these here.

There is now no reason not to designate these areas as "sciences" after the custom of the nineteenth century. For this group the rather uninformative name "*Geisteswissenschaften*" was chosen. For us they are simply the sciences that do not belong to the definite methodical system. They are, as I said, usually much more

important for practical life and probably also more interesting than the sciences that belong to the rigorous system, which are accessible almost exclusively only to specialists and enthusiasts. Nonetheless, the rigorous system is of the greatest vital importance, since all definite mastery of nature and all precision technology, which represent very important vital instruments of the community, are entirely based upon it.

Alongside the enormous vital importance of the "system," it happens, too, that its exact examination and construction is of fundamental significance for all cognition whatsoever. For, wherever epistemology and philosophy of science strive for definite and universal results, these can only be achieved on the territory and with the methods of the system. Furthermore, it follows from the presentation above, that a clear separation of what is subject to the system and what is not can only be obtained by the exact construction of the system itself. Thus an exact method of the sciences [378] not belonging to the system can only be obtained, so to speak, on the background of the system itself. Only so can the necessary exact definitions and delimitations be achieved. This group of sciences deals almost only with "Man." For the system, however, all that is accessible is that ordering ideal thought structure that physiology had to create for itself as a necessary ordering schema and which we designated above as the "general human being." But as soon as I relate a science not to this schema but to the full real human beings of real experience, it is then to that extent entirely outside the system. Therefore, one ought to call those sciences that do not belong to the system "*anthropological sciences*" *rather than* "*Geisteswissenschaften.*" Thus, the foundation of the system must also be designated as methodically primary also with respect to every other epistemology and philosophy of science in general.

At the same time however it becomes clear how much care must be exercised in the use of the general concept "science," if the greatest confusion is to be avoided. In almost all points, the two groups of sciences are so constituted that in one exactly the opposite always holds of what applies to the other. One can scarcely utter a sentence with some significant content that would hold for both groups, that is, for "science" as such. Thus, to give an example, one can in pedagogy justifiably maintain the statement, that all propositions that hold for us need no longer hold even for the next generation. What an impossibility would result if one attempted to assert this statement for "science" (consider only mathematics and the really grounded parts of the methodical system!).

The erroneous narrowness of rationalism consisted in the view that "everything" could be comprehended with what at that time corresponded to the area of the methodical system. Gradually people became aware of this narrowness and noticed that there were vast areas scarcely touched by the methodical system. But the impression of rationalist thought was still so strong and the insight into the subtler aspects of method still so weak that it was often thought that the only means to avoid rationalism was completely to dissolve and destroy everything rational, to oppose the "nothing" of irrationalism to the "everything" of rationalism. Intellectual ignorance did its part in allowing two opposing camps to arise.

That life which we called "primary life" above came to receive more and more attention in the course of nineteenth-century thought. From ignorance of the circumstance that the system is only an instrument of primary life and in the aftermath of the rationalistic conviction that the system must encompass everything, a constraint was felt to make room forcibly for this primary life *within the system.* It was thought necessary to remodel the science of biology in such a way that it could also include this primary life. We saw above why this is not possible and why such a procedure is not only always methodically false but also above all *unnecessary.* For primary life has its full place before the system and as the ground that supports the system and from which alone it arises. Only the exact distinction between primary life and the *sciences* of biology, psychology, etc. can bring clarity here. Indeed, it is precisely method that shows with, so to speak, mathematical certainty that the rational can never be based on itself, but rather has its roots in a nonrational, namely in presystematic primary life.

The plain vital necessity of the methodical system, which incorporates the rigorous part of the rational into itself and grounds it exactly, is so obvious that it is clear that it
[379] can never be disposed of. However, only the insight into its purely methodical nature, such as I have attempted to give here, makes it possible to ascertain precisely the *boundaries* of its field and thus at the same time also fully to secure methodically the existence of the areas not belonging to the system and thus give each area its proper due.

Naturally only a few main lines from the vast problem area could be sketched above. For more, the works mentioned above should be consulted.

## Endnotes

References are to Wolters' Bibliography (pp. 365–67).

Note to p. 375

† The German word used here (and twice more below), "*Volksgemeinschaft,*" has definite *völkisch*-racist connotations; it means literally "national (i.e., racial) community." Cf. Gereon Wolters' Introduction. When Dingler returns to the "community" in Section VI, the racist prefix is omitted.

Note to p. 379

† *Epoché* is a term taken from Greek skepticism and used by Husserl to designate his methodological procedure of phenomenalistic reduction.

Note to p. 383

* For instance, Dingler writes on p. 123 (the abbreviations are written out):

> We create an . . . often used unlimited sequence of signs, *E.* Let its initial element be the sign "1" and let the rule of production or generation consist in adding the sign "+1" [in Dingler's methodical order this is not yet arithmetical addition] to the right of any already constructed element of *E.* In this manner the unlimited sequence of signs arises:
>
> $1,\ 1+1,\ 1+1+1,\ 1+1+1+1,\ \cdots\ (E)$
>
> These elements have in *E* the numbers
>
> $1\quad 2\quad 3\quad 4\quad \cdots\ (N)$

> $E$ has the property that the $k$-th element ($k$ being an element of $N$) contains exactly $k$ signs. . . . We write the $k$-th element of $E$ . . . as
> $1_1+1_2+1_3+ \ldots +1_{k-1}+1_k$.
> . . . Through these indices every element of $E$ has become a sequence of signs with all different members. . . . Let us use the sequences $N$ and $E$ in such a manner that an element of $N$ can always be replaced by the corresponding element of $E$ and vice versa.

On p. 81 Dingler characterizes his constructive-intuitionistic, pre-axiomatic procedure in general as follows: "We are working in a peculiar area, namely in the area of possible sign productions. . . . Let it be clear to the reader that we are working only in this area and that everything that is being said has nothing at all to do (yet) with anything already 'familiar' to him, e.g., with any sort of 'mathematics.' "

Note to p. 384

† Dingler seems to be referring to Helmholtz ("*Zählen und Messen*"). After generating the numbers, he counts (or *numbers*) the numbers (*Zählen der Zahlen*)

Note to p. 385

* Dingler characterizes his three-step procedure for grounding geometry which leads from (a) prescientific experiential distinctions and norms, by way of (b) manual realizations, to (c) the formulation of axioms, as follows:

> At the beginning are *definition-like propositions* which are supposed to provide the immediate contact with reality. They must make use of the language of everyday life and certain expressions. . . . These expressions must be such that they denote immediate intuitions from the common everyday sphere of activity. With these we must determine those actions which intend the production of the appropriate forms. The logical course is that these definition-like stipulations must be so constituted that from them by purely intellectual procedures everything else can be derived.

Dingler's prescientific "definitions" (which in contemporary protophysics are located in a "protogeometry" that precedes axiomatic geometry) differ from the *horoi* of Euclid in that they "provide the only possible connection with the productive operations and as such then contain at the same time the axiomatic elements" (p. 7). Summing up:

> Our solution to the problem of axioms is thus in short the following: The initial propositions of geometry which must be expressed . . . in common language, are:
> 1. Practical instructions for the manual construction of geometry;
> 2. by giving a name to the appropriate basic forms whose construction they teach, they are also definitions of the same;
> 3. by allowing logical inferences to be drawn from them, which coincide with common geometry, they fulfil the logical role of axioms. (p. 8)

The pregeometric idea of a plane is determined in Dingler by a "principle of homogeneity" (Lorenzen 1968, 133ff.). Accordingly, a plane is a surface in which all points (and both sides) are indistinguishable. The inferences drawn from this principle of homogeneity enter into the production norms in the manual production of planes, e.g., in the so-called three-plate procedure:

> One takes *three* steel plates *a*, *b*, *c* (naturally already smoothed in a rough sense – though this is not necessary in principle) and polishes these on one another in such a manner that in continuous exchange *a* and *b* are ground against each other, then *a* and *c*, and *b* and *c*.
> It is clear that the procedure using only two plates does not lead with certainty to a plane because (through small differences in pressure, material, motion, etc.) a part of a spherical surface can thus be produced, since a sphere also has the property that a piece of its surface can glide on it in any arbitrary direction.
> It is clear that this procedure represents precisely the realization of our [pregeometric] "plane definition" used above. For if, e.g., plane *b* should lie on *a* then *b* represents the top side and *a* the bottom side of a plane. If *b* lies on *c* then *c* must in turn be the bottom side of this same plane. But if *a* then lies on *c*, then that means that the top side of this plane is identical to the bottom side, that both can be arbitrarily exchanged, that they are indistinguishable, and that due to the motion of grinding in any arbitrary position at any arbitrary point and for any arbitrary piece. But just this was our [pregeometric] definition of a plane. (Dingler 1933, 38f.)

On the base of the production of planes Dingler builds up the production of straight lines by means of the intersection of planes and the "production" of the deformation-free body. With that, the operative constituent parts for a semantically complete axiomatic geometry have been provided.

Note to p. 386

* Already in his earliest works Dingler raised the objection to Hilbert's formal axiomatics that a formal axiom system expresses nothing about the *meaning* of the predicates occurring within it. Against Hilbert's thesis of the "implicit definition" of the "fundamental concepts" (predicates) Dingler, like Frege (cf. Kambartel 1975), objected that a formal system of axioms only "determines the logical connections of the fundamental concepts" (Dingler 1905, 582). Frege spoke of "second-order concepts" that were defined. In modern terms one can say that a formal system of axioms defines an (abstract) "structure" that can possess arbitrarily many (concrete) "models," for instance, in the case of the abstract structure, defined by Hilbert's axioms, "Euclidean geometry," the model of the synthetic Euclidean geometry of the plane.

Note to p. 388

* With the term "hypothesis research," Dingler refers on the one hand to the method of "modern physics" (relativity, atomic and quantum theory) and on the other hand to the philosophical reflection on this method in the methodology of the logical empiricism of the Vienna Circle. The background of Dingler's terminology lies in a distinction reminiscent of Reichenbach's context of discovery/justification: Dingler distinguishes his own *a primis fundamentis* erected, supposedly absolutely secured and final construction of physics as "system physics" from "front physics" in which physical research is carried out without concern for its ultimate grounding (Dingler 1938, 67ff.). At the research front scientists attempt to deduce actual measurement data from a tentatively proposed mathematical expression $H$ ("hypothesis"). Dingler concedes that this procedure may well lead to new insights and that it is furthermore indispensible in scientific practice. However all "front work" is considered temporary and no claims to truth may be attached to it, since it lacks the philosophically required ultimate certainty. For it cannot be precluded that besides the luckily found hypothesis $H$, "countless other hypotheses achieve the same" (Dingler 1951).

Notes to p. 396

* The concept of holism as well as the concept of Gestalt that belongs to its conceptual context is one of the guiding concepts for science and culture of this century, at least in Germany. It seems to have arisen from an anti-mechanistic, anti-reductionistic reaction, the basic axiom of which is: the whole is greater than the sum of its parts. In the present context Dingler may be referring to Heidegger's "Question of the original wholeness of the structural whole of existence" (*Sein und Zeit*, [Tübingen: Max Niemeyer, [1927] 1972] 39, 180ff.f).

† Ludwig Büchner (1824–99). German materialist philosopher. Major publication: *Kraft und Stoff* ("Force and Matter"), 1855.

Notes to p. 401

† Hugo Münsterberg (1863–1916). German psychologist and philosopher. From 1892 on (with interruptions) professor of experimental psychology at Harvard.

† Jakob Friedrich Fries (1773–1843). German Kantian philosopher. Major work: *Neue Kritik der Vernunft* ("New Critique of Reason"), 1807.