

Five Reviews*

by Moritz Schlick

Natorp, P., *Die logischen Grundlagen der exakten Wissenschaften* (The Logical Foundations of the Exact Sciences), Berlin and Leipzig 1910, B.G. Teubner, xx and 416 pp.

Natorp's new book, which has all of the virtues of the author's forceful, rich style of writing, seeks to give a systematically consistent theory of mathematical and exact-scientific knowledge – and this of course from the author's familiar philosophical position, i.e., the Neo-Kantianism of the Cohen School.

Natorp intends for it to be a purely logical foundation of mathematical thought, which stands in sharp contrast to the reduction of all mathematics to logic that a number of modern scholars are aspiring to. For these thinkers, logic is purely formal science, which treats given premises in a purely analytical way and, in strong opposition to the Kantian view, regards mathematics as a system of analytic propositions. Natorp, in contrast, sees logic as a transcendental logic which in this Neo-Kantian school has an even greater scope than in Kant himself in the sense that it also makes what the latter referred to as “pure intuition” its subject matter, and rejects the dichotomy of intuition and thought. Only in this way is it possible for the Neo-Kantians to argue for a purely logical foundation of mathematics. For Kant, the nature of mathematics had been not a matter of logic but one of transcendental aesthetic.

This then is what Natorp addresses first of all (in Chapter 1, where he sets out the problem, but already hints at the solution): the rejection of the formalist view of logic according to which logic does and can do nothing other than combine propositions and conclusions according to precisely defined rules. In all this, the meaning of the basic logical concepts plays no role at all, the most important thing being that the rules of combination (i.e., those of syllogistic reasoning) are followed correctly. According to Natorp, by contrast, logic al-

* First English translation. Bibliographical references are provided in each review. The English titles of reviewed books are added for the readers' benefit only.

ways has to do with the meaning of what is stated – as this is the true *logos*. Accordingly, logic does not proceed only analytically but in its true essence and basic function is synthetic. The justification of this claim already leads us straight to the core of the logical idealism of the Marburg School. “The formalist view”, says the author (p. 8), “was closely related to the basic mistake of naïve realism: that the things are given [...] by way of perception and that the entire task of cognition only consists in the analytical processing of this [...] objective content”. However, seen from the position of this idealism, objects are not at all given in advance, but are rather infinitely distant from thinking. For thought, the object remains, as Natorp reiterates untiringly, an “infinite task”, since thinking, being nothing but determining, moves forward in an endless process to ever-new determinations, never being able to grasp the object as something absolutely determined. Thought thus first creates its objects, its basic function must be constant progression, and expansion, that is, synthesis, and all analysis in logic can only serve to “reveal the underlying syntheses” (p. 10). Natorp believes that also the proponents of the formalist position (e.g., Couturat) basically agree with him, since they, too, believe that analysis could be ampliative and thus showed that they did not have the analysis in mind at all which he spoke of and which Kant contrasted with synthesis, for that could never be ampliative but only elucidatory. Therefore as the author claims (p. 19) what we have before us here is only “an unnecessary, ill-founded change in logical language”. However, before we can convince ourselves that until now the proponents of both sides have been so blind as to view a mere quibble over words as an irreconcilable opposition of basic epistemological views, it would have to be proven that the term “ampliative” is being used by both sides in the same sense, which is at least highly problematic and would certainly be denied by the opponents.

The process character of knowledge, in which the “real meaning of synthesis a priori” consists, is elucidated in great detail, with reference to Plato in particular. The process never comes to an end; one may no longer speak of any “fact” in science as finished knowledge as “each insight that closes a gap in previous knowledge, will bring forth new, larger problems”. “So the ‘*factum*’ of science can only be understood as ‘*fieri*’ [...]”. The basic function of thought is synthetic, but the origin from which everything logic springs is neither synthesis nor analysis but rather a certain “interconnectedness through original unity” which Natorp referred to in earlier works by way of the Kantian concept of synthetic unity, for which he now, however, employs the Cohen’s term “origin”. It stands for a “primal law of thinking”, the law of “maintaining unity in separation and separation in unity” (Cohen); beyond this “nothing at all can be said about it without anticipatory reference to what

should flow or stem from it [...]” (p. 26). Everything logical is “already hidden in the origin so conceived only to be retrieved again later” (p. 25). In it “everything is anticipated: identity and negation, unity and multiplicity, quantity and quality, and no less relation, permanence, change [...]. It is the unity of all of these, the unity through correlation”.

This “retrieval” takes place in the second chapter of the book. But before we proceed to examine it, we should look back and ask how, i.e., on the basis of what facts did the author manage to reach all these conclusions with their many concepts and interrelationships? The entire way in which Natorp develops his ideas is more illustrative than evidence adducing. At the end of the first chapter we can read: “[...] We were led to all of this, on the one hand by [...] an induction actually taking place in the development of the sciences, as it were, by general consensus [...] from the *fieri* of the sciences, [...] on the other hand, by individual preliminary assumptions [...] which [...] I can name no better justification than that in the long preoccupation of those working on these problems they have more and more proven their worth”. “Generally, one must be clear about the fact that where one arrives at the origin of knowledge, a different type of justification cannot be demanded than that it proves useful in making intelligible the construction of knowledge in its lawfulness”.

If the reasoning of the first chapter leaves the reader dissatisfied, I fear that the next chapter too (“The System of Basic Logical Functions”) will hardly convince him that the arguments described there, and these alone, can make intelligible the construction of knowledge in its lawfulness. In this chapter, the author shows how from this synthetic unity emerge, to begin with, judgment and concept and then not just all of the twelve Kantian categories but also the concepts of time and space, which in the unfortunate view of this idealism are also products of pure thought. From the very outset, one will have the suspicion that it is impossible that so much can emerge out of such an unassuming principle without an unconscious (and of course unintentional) surreptitious act. And so indeed, the further the author’s elaborations proceed, the less everything developed here seems to emerge from this ‘origin’ alone. All of the concepts employed here are of such an abstract nature that the reflection cannot comprehend them at all without automatically creating intuitive images, while language proceeds completely by means of metaphors in describing them. So here we are met with a large number of metaphorical expressions such as “origin of thought”, “peripheral and central direction of thought”, “discretion of thought points”, etc. and are ultimately left with the impression that certain functions of thought have been described very ingeniously by certain analogies, but that here we do not by any means have the only possible and necessary tool to understand these difficult issues and that much what seems to have resulted from the

original principle stems, in reality, from the intuitive images used. While Kant rested content with “discovering” the categories on the basis of a guide, everything here is supposed to be developed “by way of pure thought”. Several times it is rejected as unreasonable that logic should at some point in these derivations “take refuge to the ‘given’ real”. Thus every reference to psychological facts, in particular to perception, is condemned, since facts are not given but rather the goals of the infinite process of knowledge. And when Kant speaks of an a priori sensory manifold, which transcendental logic has as its material, he is scolded for being “too unbiased”. One must again and again protest against all of these attempts to outdo Kant in favor of pure thought prior to being (“For the most primal being is the logical [...]”, p. 49). It is not Kant’s spirit – and this must be said with all due respect for the aspirations to precision and the exceptional knowledge and attention given to the exact sciences by this philosopher – but it is Hegel’s spirit that speaks from these pages.

That the much maligned “intuition” is implicated in the results that seemingly have to be attributed to pure thought is especially evident in the discussion of time and space which, as noted, are introduced in the second chapter and are then taken up again in a separate chapter, the sixth (“Time and Space as Mathematical Formations”). In the former, the author derives certain concepts of order from the category of relation and immediately calls them time and space. There is, however, no legitimacy for this, since a simple sequence of order is not yet time, a multi-dimensional order not yet space. The *differentiae specificae* that distinguish time and space from other manifolds that can be represented mathematically in the same way, in reality are provided by intuition. There is no justification at all for juxtaposing time (p. 73) defined as “a common underlying uniform sequence” with space coordinates as different instead of viewing them as of the same type. As an “order sequence” of the type envisioned one can designate, on purely mathematical, purely conceptual grounds, also an arbitrary spatial coordinate. Here Natorp himself claims (p. 78): “If time is nothing other than an identical sequential order of points, then time becomes purely mathematically a ‘parameter’ just like the spatial coordinates”. But time is something different, not exhausted by the concept of the one-dimensional continuum. It must be joined by something else. This also did not elude Natorp’s keen intelligence, since he asks later (p. 279): “What distinguishes the sequences in time from sequences in counting?” and he answers: “Nothing other than the immediate reference to existence”. That then is the “condition of determination of existence in possible experience”. This direct reference to existence must not, however, have anything to do with intuition so that one by all means remains in the realm of pure thought. This reference “*does not move from and go beyond thinking* but rather advances towards the thinking of the full object which at

the same time is also for the first time full thinking". Since the author is also not supposed to base the difference of time and a spatial dimension on intuition but rather to derive it from pure thought, his only option is to assert the following about this difference: "it must also already be recognizable in purely mathematical characteristics of time and space" (p. 290) and he finds it in the fact "that with regard to time separation, with regard to space the connection remains ultimately determinative". But what does this mean: "ultimately determinative"? Such a notion is completely foreign to pure mathematics, as it only knows determinations. – There are several excellent remarks to be found on the metaphysics of multi-dimensional and non-Euclidean spaces. What has to be regarded as a failure is the author's attempt to prove (p. 307), "that going beyond the three dimensions (that is, of Euclidean constitution) leads to infinite indeterminacy, that is to say, would make an existential determination impossible". Even in this proof, intuition played a tacit role. Conceptually nothing is indeterminate in these spaces. It is also incorrect therefore that the three-dimensional, Euclidean space is the only one that enables an "unambiguous" determinacy of temporal-spatial change" (p. 323).

The reviewer believes that there are several further instances where the author fails to recognize the part that intuition plays in obtaining his results in other chapters of the book. In the third chapter ("Number and Arithmetic") Natorp presents his philosophy of arithmetic and following some lucid historical-critical reflections proceeds to the derivation of number and the operations of calculation. Here he assumes the members of the counting series ("basic series") to be "only posited [...] by the ever-uniform repeating relation" and subsequently defines addition on this basis (p. 134). He then easily derives the laws of addition and subtraction as well as the negative numbers by showing that counting can begin anywhere in the series since one is only dealing with relative postulations here. The numbers thus strike him initially as defined by positions in the counting series. However, this is obviously circular since the positions in a counting series can again only be distinguished and defined conceptually by means of numbers (since the determination is only made in response to the question: at what position in the sequence?). Here it seems that the author has unwittingly succumbed to an intuitive idea of a series of positions given at once: he thus also explains subtraction as being more original than addition. In part he seems to have arrived at his results (something he is not aware of himself) by counting intuitively represented positions and thus succumbed to the error which he strongly takes issue with in other attempts at justification – namely "instead of speaking of number to speak of counted things" (p. 110). The discussion is ingenious and interesting but will hardly find applause for the reasons I have named.

Chapter 4 (“Infinity and Continuity”) offers a good overview of the notion of actual infinity (transfinite numbers) introduced by Cantor and the problem and history of the irrational. With regard to the latter, Natorp agrees with Veronese’s view. Continuity is interpreted as “qualitative allness” (p. 188). Accordingly, the author claims that “by means of the infinitesimal procedure one has found the general means for expressing true qualities in a strictly law-like manner”. This is difficult to accept. Likewise, Cohen’s theory, presented in the last paragraph of this chapter and for the most part approved of, will surprise the reader, namely that in a sense only the infinitesimal procedure gives a foundation for reality, i.e., “makes definable something capable of existence in contradistinction to the nothing (the empty position)”, and that it formulates the “liberating answer” “for the meaning of thought as generator of being”.

Chapter 5 (“Direction and Dimension as Specifications of the Pure Number”) contains, in addition to orienting historical remarks, the attempt to prove the legitimacy and necessity of complex numbers from the requirements of the system, namely by demanding that counting must not just take place in the positive or negative direction but also in the directions lying in between, with complex numbers arising then (for these can, as is known, be represented by the points of the plane, when the positive and negative numbers are conceived as being represented by the points of the straight lines). “The one-dimensional number remains inconstant as regards position; so it lacks the crucial logical unity which always requires continuity” (p. 253). However, for this reviewer it by no means follows from the concept of counting that the opposites of the positive and negative direction can be merged by rotation (this is what this introduction to complex numbers boils down to), but rather only from the intuition (which here, once again, sneaks in unnoticed) of the spatial image in which the series of numbers appears as geometrical straight line. In other places as well, one will hardly find convincing the many efforts of the author to substantiate the necessity of introducing the notions of dimension and direction into pure number. In vain, one struggles to find the following statement plausible (p. 258): “The transgression of the single dimension is given by virtue of the fact that already in the original series of numbers is included not just a difference of the type of relation, but also a new type of relation of these types of relations, a relation of relations, and thereby the basis for a [...] multi-dimensional view”.

Chapter 7, the last chapter of the book (“The temporal-spatial order of the phenomena and the mathematical principles of natural science”) presents a philosophy of nature, which differs positively in that it is more profound than those “today richly proliferating” ones that go by this name, which in the introduction the author himself refers to as “superficial reflections that often are

connected with exact foundations by means of a surprisingly inexact logic". Of course, given the caution exercised by the author the philosophical yield is also negligible in this area. The main result in this chapter is really only this that the relativity inherent in all empirical specifications of measurement means a welcome confirmation of idealism. The account given of the Einstein's principle of relativity and the related observations that conclude this volume strikes one as being less than confident.

The book is, most laudably, provided with a list of literature and an extensive register.

As almost invariably on such occasions, the criticism here was directed primarily at those parts of the book where the reviewer felt prompted to raise objections. The source of almost all errors seems to be the attempt to deduct everything from "pure thought". Nevertheless also opponents of this logical idealism will find stimulation in every chapter of the book – one that is certainly not so easy to read – and it is a real joy to accompany the enthusiastic author on his daring paths, even though it will perhaps be with a sigh of relief that one will take leave from this realm of "pure thought".

Rostock

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Voss, A., *Ueber das Wesen der Mathematik* (On the Essence of Mathematics), Berlin and Leipzig 1908, B.G. Teubner, 98 pages.

This work can be recommended as an excellent introduction to the problems, the development and the current state of mathematics for anyone interested in understanding the fundamental concepts and logic of mathematics (as any epistemologist has to be). The little book is vividly written and easily readable; and the historical and factual overview of mathematical questions is admirably complete despite the work's small size. A more specific and detailed discussion can be found in the very extensive notes.

The author defines "Pure mathematics [...] the science of numbers" (p. 26), but the most general notion of his science's character for him is, as for many of his fellow philosophers, this: "Mathematics is symbolic logic in the sense that it employs numeric signs understood in the broadest sense" (p. 87). To the criticism that this view reduces all mathematics to a mere gigantic tautology (following an expression of Poincaré), the author responds: "The steady

growth of science is based on the human mind's capacity to gain new experience, to distill general intuitions from it and to transform them again into pure mathematical terms, that is, to subordinate them to the concept of number. In this way, it fills itself with increasingly rich content" (p. 91). He thus seems to recognize a synthetic, intuitive element in mathematics. Even at another point Voss seems to incline towards Kantian thought, see for example p. 85, note: "All propositions of this [...] geometry will turn into theorems of a geometrical system only when we recognize them as necessary due to the general principles of our thought". Nonetheless, the author cannot be considered a Kantian, since there can be found the following statement on p. 76: "The untenability of Kant's conception of the nature of the axioms as synthetic a priori, arises from the possibility, that is not contradicted, of different geometrical systems that would have to be based on mutually contradictory a priori judgments". At this point we encounter the ordinary, unfortunately still common misunderstanding of Kant, who always claimed on the contrary, that the geometrical axioms are necessary for intuition but not for thought. According to Kant, only if they possessed the latter type of necessity would other contradictory axioms be excluded by the law of non-contradiction. The possibility to think mutually contradictory geometries is thoroughly in accordance with Kant's theory.

On page 80 f., Voss addresses apposite remarks to a number of mistakes in Wundt's *Logik*, thus continuing criticism already made by H. Burkhardt about its second edition (see this journal, volume 19), which unfortunately remained disregarded in its third edition.

At the end of his work the author warmly defends the demand for increased instruction in mathematics at secondary schools, stating that: "The concept of coordinates [...] the beginnings of infinitesimal calculus [...], the development of the concepts of functions and limit [...], these are all matters without which not the slightest understanding of natural phenomena could be gained, whilst their knowledge enables us with a single magic blow to gain insight that is barely comparable to another regarding depth and momentousness and, above all, certainty" (p. 94f.).

Rostock

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Frischeisen-Köhler, Max, *Wissenschaft und Wirklichkeit* (Science and Reality) (Wissenschaft und Hypothese, vol. XV), Berlin and Leipzig 1912, B.G. Teubner, VIII and 476 pp.

The main epistemological systems that have emerged in present times have moved apart in different directions and tenaciously adhered to pursuing the path they have once embarked upon. One will thus very much welcome a book that traces back the divergences to their point of departure so that the natural direction for the further development of the problems can be found again. In Frischeisen-Köhler's book we have such a work, which, to begin with, provides this service for the problem of reality.

The critical Part 1 sets itself the task of proving that the paths of the logical idealism of the Marburg School and the philosophy of value of Windelband and Rickert are misguided. The arguments of this section are for the most part well selected and well suited for the purpose. The objections Frischeisen-Köhler harbors against Rickert's philosophy (already previously and extensively published) are compelling and the refutation of Natorp's attempt to provide a logical foundation of the exact sciences strikes me as highly successful. To counter the basic theory of the Marburg School, that objects pose an infinite task for cognition and are only defined by thinking, the author claims very aptly "that the object must already possess a degree of determinacy prior to the act of cognition" (p. 55). "Sensation itself is already determined, otherwise it could not be a task" (p. 55). Among the astute remarks in the first chapter of this Part, which specifies more exactly the critical position of the analyses provided, I would like to mention the rejection of the concept of a supra-individual ego as particularly apt (p. 24 ff.). Moreover, in chapter 2 (devoted to the refutation of logical idealism) I found very remarkable the phenomenological proof that the sensual world has its own inherent laws, "which we can retrieve by means of thinking but which do not for this reason appear dependent from the laws of thought or even derivable from them" (p. 97 f.). In the otherwise so appealing observations of Chapter 3 (on the philosophy of value), those relating to the problem of freedom (p. 102 ff.) strike me as the least convincing. It must be firmly denied that consistent determinism by necessity leads to fatalism. Whoever attentively reads the strange arguments invoked for this (p. 104 f.) will easily discover the error on which they are based.

In Part 2 (on the phenomenology of the consciousness of reality), Frischeisen-Köhler offers a positive contribution of his own to the solution of the problem of reality and succeeds here in a laudable way, resisting the urge to stand out as original and carefully proceeding on the basis of quiet, eclectic reflection to reach a remarkably independent position. The first chapter of this

Part begins by elucidating the concept of “consciousness in general” and then attempts on that basis to demonstrate the validity of the “principle of consciousness” which boils down to two claims: first, “that everything given [...] only exists in consciousness and for it” (p. 215) and, second, “that positing existences outside of consciousness makes no sense” (p. 225). The proof for this latter claim is this (*Ibid.*): “Something that does not fill any time, does not exist as being. What, however, fills time, since time is a form for arranging conscious contents, is thus determined to be part of the world of consciousness”. This is, of course, a very controversial conclusion, since the notion of filling time, for instance, need not be applicable to everything that really exists. --- If therefore, as the author elaborates in the second chapter, all being has existence only in consciousness in general, then the issue of transcendent reality loses its meaning and the problem of reality (*Wirklichkeitsproblem*) turns on the meaning of empirical reality, i.e., of the reality outside of individual consciousness, of the ego. After all, solipsism does not follow from the principle of consciousness for the principle only pertains to consciousness in general, and this must be carefully distinguished from the individual, psychological consciousness, from the self. “The entire world [...] is only a world of appearances, it only exists to the extent it is in consciousness; but this consciousness is not mine, not yours; I am not what it does not appear to my ego; it is a fully dynamic reality (*Wirklichkeit*) for me as well as for you, encompassing us both spatially and temporally in its totality” (p. 252 f.). “The ‘being-in-consciousness’ is the most general predicate which we can state of reality” (p. 253). Thus the concept of consciousness in general seems to me to have evaporated, losing all meaning. The refutation of solipsism, i.e., the proof for the existence of the empirical external world, to which Frischeisen-Köhler now turns, can, as he argues, not be provided by any intellectual proof procedure, “since the necessity of ideas does not yet imply a reality independent of us” (p. 268). By continuing the proofs of realism that Wundt and Riehl attempted and drawing support especially from Dilthey, the author seeks to secure the existence of the external world by recourse to experiences. The crux of his proof of an external world independent of our self lies “in the clarification that this cannot just be inferred from the data of our own experience, or derived from pure processes of thought, but only becomes evident, as it were, in the relationships of impulse and inhibition of intentions, of will and resistance” (p. 472). “If I refer to those contents of consciousness which are followed by the experience of an inhibition as the real (*Wirkliche*), then this concept does not assume an existence (*Dasein*) independent of consciousness in general but rather one that works against the ego” (p. 278). “We do not infer reality (*Wirklichkeit*) as something effective on us but rather experience reality (*Wirklichkeit*) through our actions” (p. 280). Since science, too,

“forever remains within the bounds of the experiential perspective”, the existence (*Dasein*) of the external world takes on the status of a scientific truth.

In the third, final chapter of this Part, Frischeisen-Köhler seeks to demonstrate briefly “how, in detail, the construction of our concept of empirical reality (*Wirklichkeit*) [...] is effected”. He tries to show that there are a number of postulates, a priori principles of the understanding of nature that can be derived from the necessity “of relating images of perception of various subjects of cognition to a common substrate” (p. 317). From this, the category of number as well as the system of space and time and causality are deduced on which all natural science is based. This important deduction is not convincing due to its brevity and general nature, but it would certainly be worthwhile to pursue its basic idea further and to see whether it really proves the a priori principles of the understanding of nature to be “the only objective conditions making universally valid statements about common objects of experience possible for a majority of subjects of cognition” (p. 331). In the course of the discussion of the causal principle we find the error, often made since John Stuart Mill (who is also quoted here), of identifying the idea of chaos with the idea of an absence of causality (p. 329). What is original and remarkable are the reflections dedicated to proving the objective validity of these a priori principles. “The profound fundamental idea of Kant’s transcendental deduction [...] can be maintained if one liberates it from its one-sided intellectualist version [...]. Just as the consciousness of the reality (*Wirklichkeit*) surrounding us only emerges from the experiences of volition, so all knowledge of the interconnectedness of this reality (*Wirklichkeit*) is also based on experiences stemming from our will”. The criterion of all truth is verification. Frischeisen-Köhler thus concludes that “the decisive criterion for their truth lies in the realization of our thoughts through action, but at the same time this also shows their necessary objective validity, because we only know about reality (*Wirklichkeit*) through action”. – The second section of this chapter deals with the substrate of appearances, with the problem of substance and discusses more recent theories of the philosophy of nature. The legitimacy of structural theories of matter is asserted as an alternative to the energetic understanding of nature. Finally, the question of the qualitative composition of the substrate is raised and a concluding section on the reality value of sensory phenomena defends the theory elaborated by the author in earlier publications, namely that the pure subjective nature of the sensual qualities, long taken for granted in epistemology and physiology can now no longer be regarded as secure in the light of present-day research. The external world may very well be filled with qualities, just as the world of subjective consciousness.

In sum, the critical parts of the book (which also often interrupt the elabora-

tions in Part 2) strike me as being the most successful and hardest to dispute. Yet the author's positive conclusions are notable as well. With them he nearly always adopts carefully selected positions, which make fruitful discussion possible.

Rostock

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Herbertz, Richard, *Prolegomena zu einer realistischen Logik* (Prolegomena to a Realist Logic), Halle, Niemeyer 1916, VIII and 223 pp.

Herbertz tries to resolve the problematic issue of the relationship between the logic and the real by moving the logic completely to the side of reality (*Wirklichkeit*). He sees it as the "science of the real", defining it (p. 1) as the "science of objects, facts, and relationships between facts", all of which he declares to be *real* (*wirklich*). All intentional objects, even those "only imagined", that is, a nymph, a golden mountain, a mathematical concept are just as real objects (*Gegenstände*) as the table before me. "Radical realism explains *everything* given to be truly real, even those objects, like the mathematical ones, of which it is said that they can *only* (!) be 'given' in our thoughts, not in our perception" (p. 182). "Our notion of reality thus has an extraordinary breadth" (p. 35). Whoever does not understand this notion in this breadth, whoever ascribes to the objects of imagination and abstraction a reality of a lower type or a lower degree than that of perception, is, according to Herbertz, guilty of an impermissible confusion, based on a psychologistic bias, of the problem of reality with that of the knowledge of reality. Differences between these classes of objects only emerge when we seek to understand the origin and the constitution of our insights of reality. The problem of reality is, however, to be dealt completely independent of this. The real facts also include truth. "Truth is the fact that what is actually is; and that what is not is not" (p. 65). Facts, not statements, are true. "Truth is thus to be defined as a real fact". "Truth and reality are ultimately one and the same" (p. 162). Whoever does not recognize this and seeks truth in our judgments and in the relationship between judgment and reality instead of seeing in it a fact of reality, also, according to Herbertz, confuses in an equally unacceptable psychologizing way, the question of the knowledge of truth with that of truth itself. True knowledge is thus that "which makes the real fact of truth its intentional object" (p. 107). The criterion of truth is at the same time the criterion of reality,

as it consists in non-contradiction (p. 166). From this perspective, it seems to me that there is no room for a distinction between analytical and synthetic judgments. The fundamental difference between conceptual truths and real truths is thus completely done away with. The common distinction between ideal and real sciences is seen as a relapse into psychologism and the former, e.g., mathematics, is attributed to the latter (p. 184).

Herbertz anticipates that he will elicit strong criticism not just from the idealistic but also from the realist camp (and from this one, in particular, I believe!). And indeed he will find only few readers who will back him one hundred per cent. The book is really appealing, given its independent ideas; it is written in such a fresh style and is so clearly structured that one is willing from the very outset to agree with the author as much as possible. However, many will find it impossible to follow him on all of his positions. This is not the proper occasion to initiate a discussion on the book. Thus I will only add a few critical remarks. – The author bases his arguments mainly on a criticism of idealist (e.g., Rickert) and moderately realist (e.g., Külpe) theories of knowledge; and he tries to reveal their fundamental weaknesses in a very clever way. However, in my opinion, he does not prove that his position is the only way, which would allow such shortcomings to be avoided. In my view, there are other positions that do the same thing and are, moreover, without the difficulties of Herbertz's theories. I believe to have found such difficulties, for example, in the way that Herbertz is not able to give a satisfying explanation for the essence of falsity. When truth = reality, then falsity must be something unreal. But isn't what is false too often real? According to Herbertz's presuppositions, all facts must be true by necessity, for they are real. And indeed, Herbertz states (p. 65): "Falsity is the non-fact [...]", and a few sentences further on, one reads something that is incompatible with this: "Facts are true or false [...]". To be sure, since judgments cannot be true or false, nothing else remains that can be said about the predicate "false" than once again facts. This, however, contradicts Herbertz's claims. It would have been more consistent to simply declare the word "false" senseless, and Herbertz sometimes also appears to be moving towards this position when he states (p. 71): "The unreal [...] is not the intentional object of false thinking but rather the non-intentional object of thinking", and when he declares (p. 75) that a statement such as "there is a *perpetuum mobile*" is "not at all a judgment but a senseless succession of words". Contradictions appear in all possible formulations: truth, one reads on p. 65, is existence in the sense of being present (*Vorhandensein*), falsity the lack of a state of affairs (*Sachverhalt*). But is not the lack of a state of affairs also a state of affairs, a fact? And falsity thus both a fact (*Tatsache*) and non-fact (*Nichttatsache*)?

These inevitable conflicts seem to me to show in a striking way that the

traditional teaching is correct when it declares facts to be beyond true and false. These adjectives cannot be applied to facts but only to judgments that are coordinated to the facts, and the principle of non-contradiction is not a law of reality, as Herbertz would like to claim (p. 5), but a rule that every coordination has to follow in order to be free of all ambiguity. – Here, however, I do not wish to elaborate on individual arguments, but in closing I would like to once again stress that even those who reject the basic idea of the book will not regret having read it. They will still be able to find enough valuable reflections here. What I find particularly notable are the author's comments on the problem of consciousness and the subject-object issue. Here, however, a mere reference to them must suffice.

Rostock

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von Kries, Johannes, *Logik. Grundzüge einer kritischen und formalen Urteilslehre* (Outlines of a Critical and Formal Theory of Judgments) Tübingen, Mohr 1916, XVI and 732 pp.

When a successful representative of an individual scientific discipline who possesses a universal orientation sets out to give a coherent account of his philosophical convictions, it is almost always the case that philosophy stands to benefit. The *Logik* put forward by von Kries confirms this nicely. The book does not seek to introduce fundamentally new perspectives, nor does it set out to initiate a radical reform of logic. Rather, it offers a wealth of basic and highly solid individual studies. And as is generally the case, such an approach offers something more lasting than do the bold attempts to completely reorganize and establish something new. The structure of this volume is mainly guided by the classification of judgments whose epistemological significance has become increasingly clear in modern times, ever since Leibniz's distinction between *verités de fait* and *verités de raison* or the Humean one between matters of fact and relations between ideas have been used for developing systems of logic, by Riehl, B. Erdmann and in particular by v. Kries himself in his treatise on judgments of reality (*Realurteile*) and judgments of relation (*Relationsurteile*) (1892). For good reasons he has altered the terminology a bit and now refers to them as judgments of reality and judgments of reflection (*Reflektionsurteile*). The former are statements on the behavior of reality, the latter statements on

an inner connection of contents of consciousness. On the basis of this distinction a theory of knowledge has emerged which constitutes Part 1 of the book and is titled "Critical Theory of Judgment". Its goal is to provide a "systematic account of the logical connections underlying the totality of our knowledge" (p. 5). There are only a few points that will be foregrounded here. According to v. Kries, the judgments of reflection contain "the grounds of their validity within themselves" (p. 34). They possess immediate evidence. But also among the judgments of reality, a "small part, namely those that refer to the immediate experiences of the thinking subject (have) a certainty that was different from the judgments of reflection, but also a definite and not further inferable one" (p. 193). Since, in the final analysis, we never know anything different than our own data of consciousness, "only those statements about reality that state something about the existence (*Vorhandensein*), appearance and succession of the phenomena of consciousness, [...] have a really definite meaning; all others only indirectly, to the extent that they produce something for the processes of that type" (p. 173). Thus it must ultimately be possible to reduce all meaningful real judgments to those of the former type. Von Kries refers to this reduction as "interpretation". He calls those judgments in which such an interpretation is not possible transcendent. They are meaningless. V. Kries believes that these insights by necessity lead to phenomenalism, i.e., to the view that extra-mental objects (things-in-themselves) exist but they cannot be grasped at all (p. 41). I do not think that this conclusion follows as long as cognition is not seen as intuitive representation – something, which the author does not appear to be regarding it as. If one can assert the existence of things, then one must also be able to state something different about them. This is something that v. Kries later also directly admits, when he says (p. 471): "We cannot claim the existence of an object without the concept of this object assuming a meaning which, in turn, stands in certain relations". I would also like to raise some objections against the author's solution of the Kantian question: "How are a priori synthetic judgments possible?". His answer: "Because they are judgments of reflection" (p. 195) – but that according to what was said above basically only refers to the immediate evidence, a reference which, neither here nor elsewhere, can hardly be seen as a satisfactory final word. – Since the author always keeps in mind that all judgments of reality only have meaning to the extent that they are "interpretable", he arrives at a very sound assessment of and judicious position on key philosophical issues, such as for the interpretation of the principle of causality (p. 124), the interaction-parallelism problem (p. 140 ff.), the issue of unconsciousness (p. 169), vitalism (p. 134), etc. These problems strike him "not as metaphysical-objective ones but as formal ones" (p. 140). It appears quite possible different world-views can be equally legitimate and

provide equally good interpretations. “Whether we call will or [...] energy the truly real, whether we claim that mind and matter are incommensurable, or whether, based on the principle of parallelism, we believe to have recognized a particularly remarkable uniformity of the world – in all these cases we make claims that do not say anything about what can be experienced and their seeming meaning is based only on illusion” (p. 173). – In Part II, “Formal Theory of Judgments”, the author proceeds on an equally high level. While Part I provided a critique of knowledge, this part contains the logic in a stricter sense – but by no means the “formal logic” of tradition. V. Kries believes that form and content cannot be separated so that the study of the composition of a judgment can take place independently of considering the issue of meaning of the concepts that are linked in it. This investigation is now the task of this part of the book. At issue is what elements are linked in the judgment and of what type the connection is. Of course, the conception of the older logic that judgment simply involves the notion of a subject and a predicate, with the latter being “attributed” to the former, is completely insufficient. Here the point cannot be to enter into the details of the far-reaching, circumspect observations made, especially since their results cannot be easily summed up in a concise way. According to v. Kries there exists a virtual infinity of judgment forms to which traditional classifications can certainly not do justice. But perhaps it should be noted that the author replaces the many syllogistic forms of reasoning in academic logic by only two, which he calls the conclusion of generality and the conclusion of identity, and to which the many others can be reduced. While already earlier parts of the book contained varied materials taken from different domains of scientific research, prompting one to say that a methodology has already been incorporated, Part III (“On the Theory of Science”) subjects a number of fields of knowledge to a more specialized discussion of issues arising from the critical theory of judgment, so as to explain and complement the systematic account. Seven appendices serve the same purpose. Here the author once again focuses in particular on the logical nature of certain scientific issues and problems related to probability theory. He correctly incorporated the essential points of his best-known text (published in 1886) on the principles of probability calculus in this account of logic. He deviates only in one significant point from his past views, namely with regard to the distinction of “ontological” and “nomological” determinations, in that he no longer sees this separation as being a logically stringent and definitive one, but he concedes this without questioning its scientific significance and relative legitimation. As for the rest, it may be noted, with reference to the methodology, that here, too, the classification in judgments of reality and judgments of reflection finds its place. The author investigates their significance as a classificatory principle of

scientific disciplines and it becomes clear that the reduction of scientific statements to those two classes is possible at least in principle.

The short overview to which I had to limit myself here can hardly give an idea of the rich content of the book. And I was even less able to engage in a criticism of details, as much as several points seemed to demand such. The purpose of these lines was mainly to draw attention to this excellent work and to recommend a thorough study of it. The author and the publisher deserve thanks for having produced such a volume in this day and time.

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