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# KANT ON A PRIORI CONCEPTS: THE METAPHYSICAL DEDUCTION OF THE CATEGORIES

In chapter 1 of the Transcendental Analytic, in the *Critique of Pure Reason*, Kant establishes a table of the categories, or pure concepts of the understanding, according to the "leading thread" of a table of the logical forms of judgment. He proclaims that this achievement takes after and improves upon Aristotle's own endeavor in offering a list of categories, which Aristotle took to define the most general kinds of being. Kant claims that his table is superior to Aristotle's list in that it is grounded on a systematic principle.[1] This principle is also what will eventually ground, in the Transcendental Deduction, the a priori justification of the objective validity of the categories: a justification of the claim that all objects (as long as they are objects of a possible experience) do fall under those categories.

Kant's self-proclaimed achievement is the second main step in his effort to answer the question: "how are synthetic a priori judgments possible"? The first step was the argument offered in the Transcendental Aesthetic, to the effect that space and time are a priori forms of intuition. As such, Kant argued, they make possible judgments (propositions) whose claim to truth is justified a priori by the universal features of our intuitions. Such

[1] What allows Kant to make a claim to the completeness and systematic unity of the table of categories is the demonstration that the latter have their origin in the understanding as a "capacity to judge." This point will be expounded and analyzed in the third section of this chapter.

propositions are thus both synthetic and a priori. They are synthetic in that their truth does not rest on the mere analysis of the subject-concept of the proposition. They are a priori in that their justification does not depend on experience but on a priori features of our intuitions that make possible any and all experience. However, space and time, as forms of intuition, do not suffice on their own to account for the content of any judgment at all, much less for our forming or entertaining such judgments. Kant's second step in answering the question, "how are synthetic a priori judgments possible?" consists in showing that conceptual contents for judgments about objects of experience are provided only if categories guide the ordering of our representations of those objects so that we can form concepts of them and combine those concepts in judgments.

The two aspects of Kant's view (we have a priori forms of intuition, we have a priori concepts whose table can be systematically established according to one and the same principle) gradually took shape during three decades of Kant's painstaking reflections on issues of natural philosophy and ontology. His questions about natural philosophy include for instance the following: how can we reconcile the idea that the reality of the world must be reducible to some ultimate components, and the idea that space is infinitely divisible? Are there any real interactions between physical things, and if so, what is the nature of those interactions? Such questions call upon the resources of an ontology, where Kant struggles with questions such as: what is the nature of space and time? How does the reality of space and time relate to the reality of things? Do we have any warrant for asserting the universal validity of the causal principle? Is the causal principle just a variation on the principle of sufficient reason and if so, what is the warrant for the latter principle?

Kant's argument for his table of the categories (what he calls, in the second edition of the *Critique of Pure Reason*, the "metaphysical deduction of the categories" [B159]) is one element in his answer to these questions, as far as the contribution of pure concepts of the understanding is concerned. Further elements will be the transcendental deduction of the categories, in which Kant argues that the categories whose table he has set up do have objective validity; and the system of principles of pure understanding, where Kant shows, for each and every one of the categories, how it conditions any representation of an object of experience and is thus legitimately predicated of such objects. From these proofs it follows, as Kant maintains in the concluding chapter of the Analytic of Principles, that "the proud name of an ontology, which presumes to offer synthetic *a priori* cognitions of things in general in a systematic

doctrine ... must give way to the more modest one of a mere analytic of the pure understanding" (A247/B303). In other words, where the ontology of Aristotelian inspiration defended by Kant's immediate predecessors in German school-philosophy purported to expound, by a priori arguments, universal features of things as they are in themselves, Kant's more modest goal is to argue that our understanding is so constituted that it could not come up with any objective representation of things as they present themselves in experience, unless it made use of the concepts expounded in his table of the categories.

It would be futile to try to summarize even briefly the stages through which Kant's view progressed before reaching its mature formulation in the *Critique of Pure Reason*. Nevertheless, it will be useful for a proper understanding of the reversal Kant imposes on the ambitions of traditional ontology to recall a few of the early formulations of the problems he tries to address in the metaphysical deduction of the categories.

## Historical background

In the 1755 New Elucidation of the First Principles of Metaphysical Cognition, Kant offered a "proof" of the principle of sufficient reason (or rather, as he defined it, of the principle of determining reason) understood inseparably as a logical and an ontological principle, as were also the principle of identity and the principle of contradiction.[2] From this general "proof" he then derived a proof of the principle of determining reason of every contingent existence (i.e. of every existing thing that might as well have existed as not existed). He also derived a proof of the "principle of succession" (there is a sufficient reason for any change of state of a substance) and a "principle of coexistence" (the relations between finite substances do not result from their mere coexistence, but must have been instituted by a special act of God).[3] Although these proofs differed from those provided by Christian Wolff and his followers, they nevertheless had the same general inspiration. They rested on a similar assumption that logical principles (defining the relations between concepts or propositions) are also ontological principles

[2] See *Principiorum primorum cognitionis metaphysicae nova dilucidatio*, AA1, pp. 388–94, ed. and trans. David Walford and Ralf Meerbote, *A New Elucidation of the First Principles of Metaphysical Cognition*, in *Theoretical Philosophy, 1755–1770* (Cambridge: Cambridge University Press, 1992). On Kant's pre-critical defense of the principle of sufficient reason, see ch. 5 of this book.

[3] AA1, pp. 396–8, 410–16.

(defining the relations between existing things and states of affairs), and that one can derive the latter from the former.

In his lectures on metaphysics from the early 1760s, as well as in the published works of the same period, Kant expresses doubts on precisely this point. In the 1763 *Attempt to Introduce the Concept of Negative Magnitudes into Philosophy*, he distinguishes between logical relations and real relations. And he formulates the question that he will later describe, in the preface to the *Prolegomena*, as "Hume's problem": how are we to understand a relation where "if something is posited, something else also is posited"?[4] It is important to note that the question is formulated in the vocabulary of the school logic in which Kant was trained. The relation between something's "being posited" and something else's "being posited" is just the logical relation of *modus ponens*, according to which if the antecedent of a hypothetical judgment is posited, then the consequent should also be posited. In his *Lectures on Metaphysics* of the 1760s, Kant notes that the logical *ratio ponens* or *tollens* is analytic, but the real *ratio ponens* or *tollens* is synthetic: empirical. By this he means that in an empirical hypothetical judgment, the relation between the antecedent and consequent of the judgment is synthetic: the consequent is not conceptually contained in the antecedent. Kant's question follows: what, in such a case, grounds the connection between antecedent and consequent and thus the possibility of concluding from the antecedent's being posited that the consequent should also be posited.[5]

[4] See *Prolegomena*, AA IV, p. 257. Cf. *Attempt to Introduce the Concept of Negative Magnitudes in Philosophy*, AA II, pp. 202–4, in *Theoretical Philosophy, 1755–1770*.

[5] See *Metaphysics Herder*, AA XXVIII–1, p. 12; *Negative Magnitudes*, AA I, pp. 202–3. Note that Kant's hypothetical judgment thus differs from our material conditional: for the *modus ponens* Kant mentions here has to be grounded on a connection, which Kant, like his contemporaries, calls *consequentia* (in Latin) or *Konsequenz* (in German) between antecedent and consequent (on this point see also the fifth section of this chapter). Kant's question is: in cases where the consequent in the hypothetical judgment is not conceptually contained in the antecedent, and so the relation between antecedent and consequent is synthetic, what is the nature of the connection? To my knowledge, the passage from *Metaphysics Herder* characterizing causal connection in terms of a synthetic *ratio ponens* is the first mention we find of the distinction between analytic and synthetic judgments which will become so prominent in the critical period. It is interesting that it should occur in the context of what will become, in Kant's terms, "Hume's problem," and thus in considering a kind of judgment which is not of the form "S is P" but "If S is P, then Q is R" (a hypothetical judgment). Contrary to a widely held view and *pace* the characterization given in the Introduction to the *Critique of Pure Reason* (A6–10/B10–14), Kant does not restrict the distinction between analytic and synthetic judgments to categorical judgments. On the relation between Kant's hypothetical judgment and Kant's understanding of the concept of cause, see ch. 6, pp. 151–6; and ch. 7, pp. 188–90.

During the same period of the 1760s, Kant also becomes interested in the difference between the method of metaphysics and the method of mathematics. Metaphysics, he says, proceeds by analysis of confused and obscure concepts. Mathematics, in contrast, proceeds by synthesis of clear, simple concepts. In the same breath, Kant expresses skepticism with respect to the Leibnizian project of solving metaphysical problems by way of a universal combinatoric. This would be possible, Kant says, if we were in a position to completely analyze our metaphysical concepts. But they are far too complex and obscure for that to be possible.[6]

Note that the notions of analysis and synthesis by way of which Kant contrasts the respective methods of metaphysics and mathematics are not the same as the notions of analytic and synthetic connections at work in the reflections on *ratio ponens* and *tollens* mentioned earlier. The latter describe a relation of concepts in a (hypothetical) proposition. The former characterize a method. Nevertheless, the two uses of the notions are of course related. Just as mathematics proceeds by synthesis in that it proceeds by combining concepts that were not contained in one another, similarly a synthetic *ratio ponens* is a relation between antecedent and consequent that does not rest on the fact that the concepts combined in the latter are contained in the concepts combined in the former (as, for instance, in "if God wills, then the world exists" or "if the wind blows from the West, then rain clouds appear").[7] Just as metaphysics proceeds by analysis in that it proceeds by clarifying what is contained, or thought, in an initially obscure concept, similarly an analytic *ratio ponens* is a relation between antecedent and consequent that rests on the fact that the concepts combined in the latter are contained in the concepts combined in the former. It is also worth noting that in both cases, analysis and synthesis, and respectively analytic and synthetic connection, are defined with respect to concepts. There is no mention of the distinction between two kinds of representations (intuitions and concepts) that will play such an important role in the critical period.

That distinction is introduced in the 1770 Inaugural Dissertation, *On the Form and Principles of the Sensible and Intelligible World*.[8] There Kant maintains that all representations of spatiotemporal properties and relations of empirical objects depend on an original intuition of space, and

[6] *Inquiry Concerning the Distinctness of the Principles of Natural Theology and Morality, Being an Answer to the Question Proposed for Consideration by the Berlin Royal Academy of Sciences for the year 1763*, AA11, pp. 276–91, especially p. 283; trans. in *Theoretical Philosophy, 1755–1770*.

[7] Cf. *Negative Magnitudes*, AA11, pp. 202–3.

[8] *On the Form and Principles of the Sensible and the Intelligible World*, AA11, pp. 385–419. trans. in *Theoretical Philosophy, 1755–1770* (henceforth: Inaugural Dissertation).

an intuition of time, in which particular objects can be presented and related to one another. These objects are themselves objects of particular intuitions. All intuitions differ from concepts in that they are singular: they are representations of individuals or, we might say in the case of particular intuitions, they are the representational counterparts of demonstratives. And they are immediate: they do not require the mediation of other representations to relate to individual objects. Concepts, in contrast, are general: they are representations of properties common to several objects. And they are mediate or reflected: they relate to individual objects only through the mediation of other representations, i.e. intuitions. In saying that space and time are intuitions, Kant is saying that they are representations of individual wholes (the representation of one space in which all particular spaces and spatial positions are included and related, and the representation of one time in which all particular durations and temporal positions are included and related) that are prior to, and a condition for, the acquisition of any concepts of spatial and temporal properties and relations. And this in turn allows him to distinguish two kinds of synthesis: the classically accepted synthesis of concepts; and the synthesis of intuitive representations of things, and parts of things, individually represented in space and in time.[9]

The Dissertation thus has the resources for solving many of the problems that occupied Kant over the preceding twenty years. In particular, because space and time are characterized not only as intuitions, but as intuitions proper to our own sensibility or ability to receive representations from the way we are affected by things, their property of infinite divisibility makes it the case that things as they appear to us can be represented as susceptible to division *ad infinitum*. But from this, one need not conclude that there are no ultimate components of the world as a world of purely intelligible things, things independent of their representation in our sensibility.[10]

[9] In the Inaugural Dissertation, the distinguishing feature of intuitions, in contrast with concepts, is their singularity: see Inaugural Dissertation, AA11, pp. 399, 402. Immediacy is not explicitly mentioned. Moreover, the contrast between intuitions and concepts is not firmly fixed: Kant also calls intuitions "singular concepts" (ibid., p. 397). In the *Critique of Pure Reason*, Kant emphasizes not only the singularity, but also the immediacy of intuitions: see A19/B33. For a discussion of these two features of intuition in the critical period, see Charles Parsons, "The Transcendental Aesthetic," in Paul Guyer (ed.), *The Cambridge Companion to Kant* (Cambridge: Cambridge University Press, 1992), p. 64. On the two kinds of synthesis in the Inaugural Dissertation, see AA11, pp. 387–8.

[10] Inaugural Dissertation, AA11, pp. 415–16.

Moreover, Kant asserts that in addition to space and time as forms of our sensibility, i.e. original intuitions in which things given to our senses are related to one another, we also have concepts "born from laws innate to the mind" that apply universally to objects. Among such concepts, he cites those of cause, substance, necessity, possibility, existence.[11] It is our use of such concepts that allows us to think the kinds of connections that befuddled Kant in the 1760s. For instance, in applying the concept of cause to objects, whether given to our senses or merely thought, we come up with the kind of synthetic *modus ponens* Kant wondered about in the essay on *Negative Quantities* and the related lectures on metaphysics.

However, in a well-known letter to Marcus Herz of February 1772, Kant puts this last point into question: how can concepts that have their origin in our minds be applied to objects that are given? This difficulty concerns both our knowledge of the sensible world and our knowledge of the intelligible world. For in both cases, things on the one hand, and our concepts of them on the other hand, are supposed to be radically independent of one another. Having thus radically divided them, how can we hope to put them back together? In that same letter, Kant announces that he has found a solution to this quandary, and that it will take him no more than three months to lay it out.[12] In fact, it took him almost a decade. The result of that effort is the *Critique of Pure Reason*, its metaphysical deduction of the categories and the two related components in Kant's solution to the problem laid out in the letter to Herz: the transcendental deduction of the categories, and the proofs of the principles of pure understanding (see *Critique of Pure Reason*, A50/B74–A234/B287).

Of these three components, the first – the metaphysical deduction of the categories, i.e. the establishment of their table according to a systematic principle – has always been the least popular with Kant's readers. In the final section of this chapter, I shall consider some of the objections that have been raised against it, from the time the *Critique* first appeared to more recent times. Whatever the fate of those objections, it is important to keep in mind that the key terms and themes at work in the metaphysical deduction – the relation between logic and ontology, the distinction between analysis and synthesis, between synthesis of concepts and synthesis of intuitions – are all part of Kant's effort to

[11] Ibid., p. 395.

[12] Letter to Herz of February 21, 1772, AAx1, p. 132; ed. and trans. Arnulf Zweig, *Philosophical Correspondence 1759–1799* (Chicago: Chicago University Press, 1967), p. 73.

find the correct formulation for questions that have preoccupied him since the earliest years of his philosophical development.

## Kant's view of logic

The metaphysical deduction of the categories is expounded in chapter 1 of the Transcendental Analytic in the *Critique of Pure Reason*, entitled "On the Clue to the Discovery of All Pure Concepts of the Understanding" (A66/B92).[13] This chapter is preceded by a fairly long introduction to the Transcendental Analytic as a whole, where Kant explains what he means by "logic." This is worth noticing. For as we saw, one main issue in his pre-critical investigations was that of the relation between logic and ontology, and the capacity of logic to capture fundamental features of the world. But now Kant puts forward a completely new distinction, that between "general pure logic" (which he also sometimes calls "formal logic", e.g. A131/B170) and "transcendental logic" (A50/B74–A57/B81). In putting forward this distinction, Kant intends both to debunk Leibnizian-Wolffian direct mapping of forms of thought upon forms of being, *and* to redefine, on new grounds, the grip our intellect can have on the structural features of the world. As we shall see, establishing a new relation between logic and ontology is also what guides his "metaphysical deduction of the categories," namely his suggestion that a complete and systematic table of a priori concepts of the understanding, whose applicability to objects given in experience is impervious to empirical verification or falsification, can be established according to the "leading thread" of logical forms of judgment.

Kant's primary tool for his twofold enterprise, first prying apart logic and ontology, but then finding new grounds for the grip our intellect has on the world, is the distinction between two kinds of access that we have to reality: our being affected by it or being "receptive" to it, and our thinking it or forming concepts of it. Each of these two kinds of access, he says, depends on a specific capacity: our acquiring representations by way of being affected depends on "receptivity" or sensibility, our acquiring concepts depends on "spontaneity" or understanding. Kant

[13] Here as elsewhere I am following the translation by Paul Guyer and Allen Wood. "Clue" is their choice for translating Kant's *Leitfaden*. It is certainly correct, but I prefer "leading thread" which captures better what Kant is doing: following the lead of logical forms of judgment to establish his table of the categories. In citations I will follow Guyer and Wood, but in the main text I will adopt "leading thread." The reader should be aware that both words translate the German *Leitfaden*.

differentiates these capacities primarily by way of the contrast just mentioned, between receiving (through sensibility) and thinking (through understanding). But they are also distinguished by the kinds of representations they offer, and by the ways in which they order and relate to one another these representations. Sensibility offers intuitions (singular and immediate representations), understanding offers concepts (general and reflected representations). As beings endowed with sensibility or receptivity, we relate our intuitions to one another in one and the same intuition of space and of time. As beings endowed with understanding, we relate concepts to one another in judgments and inferences. These modes of ordering representations are what Kant calls the "forms" of each capacity: space and time are forms of sensibility, the logical forms of judgment are forms of the understanding (cf. A19–21/B33–5; A50–2/B74–6).

These initial distinctions have important consequences for Kant's characterization of logic. Logic, he says, is "the science of the rules of the understanding in general," to be distinguished from aesthetic as "the science of the rules of sensibility" (A52/B76). Characterizing logic in this way is surprising for a contemporary reader. We are used to characterizing logic in a more objective way, as a science of the relations of implication that hold between propositions. Learning logic is of course learning to make use of these patterns of implication in the right way for deriving true proposition from true proposition, or for detecting the flaw in a given argument. But that is not what the proper object of logic is, or what logic is about.[14] Now, Kant's more psychological characterization of logic is one he shares with all early modern logicians, influenced by Antoine Arnauld and Pierre Nicole's *Logic or the Art of Thinking*, also known as the Port-Royal *Logic*. However, as the very title of Arnauld's and Nicole's book shows, even their logic is not just preoccupied with the way we happen to think, but establishes norms for thinking *well*.[15] But Kant is more explicit

[14] On this point, see Gilbert Harman, "Internal critique: a logic is not a theory of reasoning and a theory of reasoning is not a logic," in *Studies in Logic and Practical Reasoning*, 1 (2002). On the contrast between Kantian and Fregean logic with respect to this point (i.e. does logic have anything to do with the way we think or even ought to think?), see John MacFarlane, "Frege, Kant, and the logic in logicism," *Philosophical Review*, no. 111 (2002), pp. 32–3.

[15] Antoine Arnauld and Pierre Nicole, *La Logique ou l'art de penser*, ed. P. Clair and F. Girbal (Paris: Librairie philosophique Vrin, 1981); trans. Jill Vance Buroker, *Logic or the Art of Thinking* (Cambridge: Cambridge University Press, 1996). The full title contains, after the subtitle ("or the Art of Thinking") the further precision: "containing, in addition to the common rules, several new observations proper to form judgment" (*propres à former le jugement*).

than they are about the normative character of logic: logic, he says, does not concern the way we think but the way we ought to think. It "derives nothing from psychology" (A54/B78).[16] More precisely, logic so considered is what Kant calls "pure" logic, which he distinguishes from "applied" logic where one takes into account "the empirical conditions under which our understanding is exercised, e.g. the influence of imagination, the laws of memory, the power of habit, inclination, and so on" (A53/B77). Logic properly speaking or "pure" logic has no need to take these psychological factors into account. Rather, its job is to consider the patterns of combination of concepts in judgments that are possible by virtue of the mere form of concepts, i.e. their universality; and the patterns of inference that are possible by virtue of the mere forms of judgments.

The idea of taking into account the "mere form" of concepts, judgments, and inferences rests in turn on another distinction, that between logic of the "general use" and logic of the "particular use" of the understanding. A logic of the particular use of the understanding is a science of the rules the understanding must follow in drawing inferences in connection with a particular content of knowledge – each science, in this way, has its particular "logic."[17] But logic of the general use of the understanding is a logic of the rules presupposed in all use of the understanding, whatever its particular domain of investigation.

Kant has thus identified "general pure" logic: a logic that, as "pure," does not derive anything from psychology; and as "general," defines the most elementary rules of thought, rules that any use of the understanding must follow. Now, that he also defines this logic as formal is where his radical parting of ways with his Leibnizian-Wolffian rationalist predecessors is most apparent. For the latter – just as for the early Kant of the 1760s – the most general principles of logic also defined the most general structural features of being. But as we saw, ever since he distinguished relations of concepts and relations of existence (in his metaphysical essays of the early 1760s), Kant has not taken the identity of logical and real connections for granted. This being so, forms of thought are just this: forms of thought. And the question arises: just what is

[16] Cf. also *Logik*, AA1x, p. 14; ed. and trans. J. Michael Young, *The Jäsche Logic*, in *Lectures on Logic* (Cambridge: Cambridge University Press, 1992).

[17] Kant was quite aware, for instance, that mathematical proof has rules of its own: see A716–18/B744–6. Similarly, the mathematical science of nature has to combine the constructive methods of mathematics, the inductive methods of empirical inquiry, and the deductive methods of syllogistic inference.

their relation to forms of being, or to the way things are? Logic, as "general and pure," is thus only formal.[18]

On the other hand, the distinction between forms of sensibility and forms of understanding helps delineate the domain for a logic that is just as pure as formal logic, because it does not derive its rules from empirical-psychological considerations of the kind described above, but that is not as general as formal logic, in that the rules it considers are specified by the content of thought they are relevant for. They are the rules for combining representations given in sensibility, whatever the empirical (sensory) content of these representations may be. Those rules are thus not merely formal (concerning only the forms of thought in combining concepts and judgment for arriving at valid inferences) but they concern the way a content for thought is formed by ordering manifolds in intuition (multiplicities of qualitatively determined spatial and temporal parts). These rules are the rules of "transcendental" logic.

I now turn to Kant's argument for his table of the logical forms of judgment, in section one of the chapter on the "Leading Thread for the Discovery of all Pure Concepts of the Understanding" (A67–9/B92–4), and to the table itself, expounded in section two (A70–6/B95–101)

## The Leading Thread: Kant's view of judgment, and the table of logical forms of judgment

In the Inaugural Dissertation, Kant distinguished what he called the "logical use" and the "real use" of the understanding. In the real use, he said, concepts of things and of relations are given "by the very nature of the understanding."[19] In the logical use, "the concepts, no matter whence they are given, are merely subordinated to each other, the lower, namely, to the higher concepts (common characteristic marks) and compared with one another in accordance with the principle of

[18] Michael Wolff notes that Kant is not the first to make use of the expression "formal logic." He cites Joachim Jungius' *Logica Hamburgensis* (Hamburg, 1638) as an earlier source for this expression. See Michael Wolff, *Die Vollständigkeit der Kantischen Urteilstafel. Mit einem Essay über Freges "Begriffsschrift"* (Frankfurt-am-Main: Vittorio Klostermann, 1995), p. 203n. He is right. Nevertheless, Kant's emphasis on the idea that "general pure logic" is merely formal, as opposed to the various "logics of the special use of the understanding" (including transcendental logic) which are specified by the particular content of thought they take into consideration, seems to be proper to him and certainly does not play anywhere else the groundbreaking role it plays in Kant's critical philosophy. On this point, see again John MacFarlane, "Frege, Kant, and the logic in logicism," pp. 44–57.

[19] Inaugural Dissertation, section 2, §5, AA11, p. 393.

contradiction."[20] The real use is what we saw Kant put into question in the letter to Herz of February 1772: how could concepts that have their origin in the laws of our understanding be applicable to objects independent of our understanding?[21] But the logical use remained unscathed, and it is precisely what Kant describes again in section one of the *Leitfaden* chapter under the title: "On the logical use of the understanding in general" (A67/B92). By "logical use of the understanding," it is thus clear we should not understand the use of understanding in logic – whatever that might mean. Rather, it is the use we make of the understanding according to the rules of logic when we subsume sensible intuitions under concepts and subordinate lower concepts to higher concepts, in accordance with the principle of contradiction, thus forming judgments and inferences. As we shall see, Kant argues that considering precisely this "logical use of the understanding" gives him the clue or leading thread (*Leitfaden*) he needs for a solution to the problem he raised about its "real use." For the very acts of judging by way of which we subsume intuitions under concepts and subordinate lower concepts to higher concepts also provide rules for ordering manifolds in intuition and thus eventually for subsuming objects of sensible intuition under the categories. Or so Kant will argue in section three of the *Leitfaden* chapter.

But before we reach that point, we need to consider the "logical use" in more detail, to see how Kant thinks he can derive from it his table of the logical forms of judgment.

The key term, in Kant's exposition of the "logical use of the understanding," is the term function:

> All intuitions, as sensible, rest on affections, concepts therefore on functions [*Begriffe also auf Funktionen*]. By a function, however, I understand the unity of the action of ordering different representations under a common one. (A68/B93)

The term "function" belongs to the vocabulary of biology and the description of organisms. Kant talks of the "function" of mental capacities as he would talk of the "function" of an organ. In this very general sense, sensibility too has a "function." Indeed, in the introduction to the Transcendental Logic Kant writes:

[20] Ibid.
[21] AAx, p. 125.

> The two capacities or abilities [*Beide Vermögen oder Fähigkeiten*] cannot exchange their functions. The understanding is not capable of intuiting anything, and the senses are not capable of thinking anything. (A51/B76)

However, in the present context, Kant employs "function" in a more restricted sense. Concepts, he says, rest on functions, as opposed to intuitions which, as sensible, rest on affections. More precisely: because intuitions rest on affections or depend on receptivity, concepts have to rest on functions, namely they depend on our unifying representations (intuitions) that are given in a dispersed, random order, in sensibility. In this context, function is (as quoted above) the "unity of the action of ordering different representations under a common representation." Another ancestor for the notion of function in this context, besides the biological one, is then the notion of a mathematical function. The "function" we are talking about here would map given representations – intuitions – on to combinations of concepts in specific judgments.[22]

The "action" mentioned in the citation given above should not be understood as a temporally determined psychological event.[23] What Kant is describing are universal modes of ordering our representations, whatever the empirically determined processes by way of which those orderings occur. They consist in subsuming individuals under concepts, and subordinating lower (less general) concepts under higher (more general) concepts. These subsumptions and subordinations are themselves structured in determinate ways, and each specific way in which they are structured constitutes a specification of the "function" defined above. Interestingly, introducing the term "function" in section one of

[22] For a fascinating historical survey of the term "function," its twofold meaning (biological and mathematical) for Leibniz, for Kant's immediate predecessors, and finally for Kant himself, see Peter Schulthess, *Relation und Funktion. Eine systematische und entwicklungsgeschichtliche Untersuchung zur theoretischen Philosophie Kants* (Berlin: De Gruyter, 1981), pp. 217–47.

[23] Michael Wolff maintains that according to Kant, the functions are not temporal, but the actions (*Handlungen*) are (see *Vollständigkeit*, p. 22). I do not think that is correct. To say that the actions by way of which representations are unified are temporal would be to say that they are events in time. But surely this is not what Kant means. When he talks of actions of the understanding what he means to point out is that the unity of representations is not given with them but depends on the thinking subject's spontaneity. What particular events and states of affairs in time might be the empirical manifestations of that spontaneity are not questions he is concerned with. I would add that the actions in question are no more noumenal than they are phenomenal: the concept "action" here does not describe a property or relation of things, but only the status we can grant to the unity of our representations: the latter is not "given" but "made" or it is the contribution of the representing subject to the structuring of the contents of her representations.

the *Leitfaden* chapter to describe the logical employment of the understanding is already making space for what will be the core argument of the metaphysical deduction of the categories:

> The same function, that gives unity to different representations in a judgment, also gives unity to the mere synthesis of different representations in an intuition, which, expressed universally, is called the pure concept of the understanding. (A79/B104–5)

I will return to this point in a moment

The "function" in question is from the outset characterized as a function of judging. This is because we can make no other use of concepts than subsuming individuals under them, or subordinating lower concepts under higher concepts, namely forming (thinking) judgments. This being so, the "unity of the action" or function by way of which we acquire concepts results in judgments that have a determinate form (a determinate way of combining the concepts they unite).

There is thus an exact correspondence between the functions ("unity of the action of ordering different representations") the understanding exercises in judging, and the forms of the judgments that result from the functions. Unlike the functions, the forms are manifest in the linguistic expression of the judgments.[24]

In section one of the "Leading Thread," Kant makes use of two examples of actual judgments to further elucidate the function of judging. The first is "All bodies are divisible." He insists that in this example, the concept of "divisible" is related to the concept of "body" (or the latter is subordinated to the former) and by way of this relation, the concept "divisible" is related to all objects thought under the concept "body" (or all objects thought under the concept "body" are subsumed under the concept "divisible"). A similar point is made again later in the paragraph,

[24] Both Michael Wolff and Reinhart Brandt have drawn attention to the fact that for Kant, there is no thought without language (see Wolff, *Vollständigkeit*, pp. 23–4; Brandt, *Urteilstafel*, pp. 42, 110. In the *Jäsche Logic*, Kant opposes the distinction that is usual in logic textbooks of his time, between judgments and propositions, according to which judgments are mere thoughts whereas propositions are thoughts expressed in language. Such a distinction is wrong, he says, for without words "one simply could not judge at all" (AA IX, p. 109). Instead he distinguishes judgment and proposition as problematic versus assertoric judgment (ibid.). But in fact, with a few exceptions Kant uses the term "judgment" to refer to all three kinds of modally qualified judgments (problematic, assertoric, apodeictic). Note also that in his usage, "judgment" refers on the one hand to the act of judging, on the other hand to the content of the act (what we would call the proposition). This is consistent with the fact that the function of judging finds expression in a form of judgment (inseparably belonging to thought and language).

when Kant explains that the concept "body" means something, for instance "metal," which thus can be known by way of the concept "body." In other words, in saying "Metal is a body" I express some knowledge about what it is to be a metal, and thus also a knowledge about everything that falls under the concept "metal." The two examples jointly show that whatever position a concept occupies in a judgment (the position of subject or the position of predicate, in a judgment of the general form "S is P"), in its use in judging a concept is always, ultimately, a predicate of individual objects falling under the subject-concept of the judgment. This in turn makes every judgment the major premise of an implicit syllogistic inference whose conclusion asserts the subsumption, under the predicate-concept, of some object falling under the subject-concept (e.g. the judgment "all bodies are divisible" is the implicit premise of a syllogistic inference such as: "all bodies are divisible; this X is a body; so, this X is divisible." Or again: "All bodies are divisible; metal is a body; so, metal is divisible; now, this is metal; so, this is a body; so, this is divisible." And so on). If it is true to say that we make use of concepts only in judgments, it is equally true to say that the function of syllogistic inference is already present in any judgment by virtue of its form. For asserting a predicate of a subject is also asserting it of every object falling under the subject-concept.

This is why, as Kant maintains in what is undoubtedly the decisive thesis of this section, and perhaps of the whole *Leitfaden* chapter:

> We can, however, trace all acts of the understanding back to judgments, so that the understanding in general can be represented as a capacity to judge [*ein Vermögen zu urteilen*]. (A69/B94)

By "understanding" he means here the intellectual capacity as a whole, what he has described as spontaneity as opposed to the receptivity or passivity of sensibility. In agreement with a quite standard presentation of the structure of intellect in early modern logic textbooks, Kant divides the understanding into the capacity to form concepts (or understanding in the narrow sense), the capacity to subsume objects under concepts and subordinate lower concepts to higher concepts (the power of judgment, *Urteilskraft*) and the capacity to form inferences (reason, *Vernunft*). He is now telling us that all of these come down to one capacity, the capacity to judge. The latter is not the same as the power of judgment (*Urteilskraft*). One way to present the relation between the two would be to say that the *Urteilskraft* is an actualization of the *Vermögen zu urteilen*. But for that matter, so are the two other components of understanding.

So the *Vermögen zu urteilen* is that structured, spontaneous, self-regulating capacity characteristic of human minds, that makes them capable of making use of concepts in judgments, of deriving judgments from other judgments in syllogistic inferences, and of systematically unifying all of these judgments and inferences in one system of thought.[25]

This explains why Kant concludes section one with this sentence: "The functions of the understanding can therefore all be found if we can completely present the functions of unity in judgments" (A69/B94). If the understanding as a whole is nothing but a *Vermögen zu urteilen*, then identifying the totality of functions ("unities of the act") of the understanding amounts to nothing more and nothing less than identifying the totality of functions present in judging, which in turn are manifest by way of linguistically explicit forms of judgments. Kant adds: "That this can easily be accomplished will be shown in the next section." The "next section" is the section that expounds (as its title indicates) "the logical function of understanding in judgments," by laying out a table of logical forms of judgments.

But of course, even if we grant Kant that he has justified his statement that "the understanding as a whole is a capacity to judge," this by itself does not suffice to justify the table he presents. How is the table itself justified?

Kant's explanation of the function of judging decisively illuminates the table he then goes on to set up. First, if the canonical form of judgment is a subordination of concepts (as in the two examples analyzed above) then this subordination can be such that either all or part of the extension of the subject-concept is included in the extension of the predicate-concept: this gives us the quantity of judgments, specified as universal or particular. Moreover, the extension of the subject can be included in or excluded from the extension of the predicate-concept. This gives us the title of quality, specified as affirmative or negative judgment. The combination of these two titles and their specifications provides the classical Aristotelian "square of opposites": universal affirmative, universal negative, particular affirmative, particular negative judgments.

Within each of these first two titles, however, Kant adds a third specification, which does not belong in the Aristotelian square of

[25] Above I have translated *Vermögen zu urteilen* as capacity to judge. Guyer and Wood have translated it as faculty of judging. On this difference, see ch. 1, n. 3, p. 18. See also *KCJ*, pp. 7–8. On judgments and inferences, see ibid., pp. 90–3.

opposites: singular judgment under the title of quantity, "infinite" judgment under the title of quality. In both cases he explains that these additions would not belong in a "general pure logic" strictly speaking. For as far as the forms of judgment relevant to forms of syllogistic inference are concerned, a singular judgment can be treated as a universal judgment, where the totality of the extension of the subject-concept is included in the extension of the predicate-concept. Similarly, an infinite judgment (in Kant's sense: a judgment in which the predicate is prefixed by a negation) is from the logical point of view an affirmative judgment (there is no negation appended to the copula). But those two forms do belong in a table geared toward laying out the ways in which our understanding comes up with knowledge of objects. In this context there is all the difference in the world between a judgment by way of which we assert knowledge of just one thing (singular judgment) and a judgment by way of which we assert knowledge of a complete set of things (universal judgment). Similarly, there is all the difference in the world between including the extension of a subject-concept in that of a determinate predicate-concept, and locating the extension of a subject-concept in the indeterminate sphere which is outside the limited sphere of a given predicate (see A72–3/B97–8, where Kant distinguishes the infinite judgments from both the affirmative and the negative judgments). Now it is significant that Kant should thus add, for the benefit of his transcendental inquiry, the two forms of singular and "infinite" judgment to the forms making up the classical square of opposites. It shows that if the logical forms serve as a "leading thread" for the table of categories, conversely the goal of coming up with a table of categories determines the shape of the table of logical forms.

This is even more apparent, I suggest, if we consider the third title, that of relation. It should first be noted that this title does not exist in any of the lists of judgments presented in the logic textbooks Kant was familiar with.[26] On the other hand, the three kinds of relation in judgments (relation between a predicate and a subject in a categorical

[26] Early modern logicians typically distinguish between simple and composite propositions, and their list of composite propositions includes many more besides Kant's hypothetical and disjunctive judgments. More importantly, the distinction between "simple" and "composite" propositions puts Kant's categorical judgment on one side, and Kant's hypothetical and disjunctive judgments on the other side of the divide. Only Kant includes categorical, hypothetical, disjunctive judgments under one and the same title, that of relation. For more details about early modern lists of propositions see *KCJ*, p. 98, n. 44. Note that Kant mostly uses the term "judgment" to refer to the content of the act of judging (an act which is also called "judgment") but he sometimes insists that when

judgment, relation between a consequent and an antecedent in a hypothetical judgment, relation between the mutually exclusive specifications of a concept and that concept in a disjunctive judgment) determine the three main kinds of inferences, from a categorical, a hypothetical, or a disjunctive major premise. This is in keeping with what emerged as the most important thesis of section one: the understanding as a whole was characterized as a *Vermögen zu urteilen* because in the function of judging as such were contained the other two functions of the understanding: acquiring and using concepts, and forming inferences. This being so, it is natural to include in a table of logical forms of judgment meant to expound the features of the function of judging the three forms of relation that govern the three main forms of syllogistic inference.

Still, as many commentators have noted, it is somewhat surprising to see Kant include as equally representative of forms of judgment that govern forms of inference, the categorical form that is the almost exclusive concern of Aristotelian syllogistic, and the hypothetical and disjunctive forms that find prominence only with the Stoics. Does this not contradict Kant's (admittedly shocking) statement that logic "has been unable to make a single step forward" since Aristotle (Bviii)?

I think there are two answers to this question. The first is historical: the forms of hypothetical and disjunctive inference (*modus ponens* and *tollens*, *modus ponendo tollens* and *tollendo ponens*) are actually briefly mentioned by Aristotle, developed by his followers (especially Galen and Alexander of Aphrodisias), and present in the Aristotelian tradition as Kant knows it.[27] The second answer is systematic: it takes us back to the remark I made earlier. Kant's table is not just a table of logical forms. It is a table of logical forms motivated by the initial analysis of the function of judging and by the goal of laying out which aspects of the "unity of the act" (the function) are relevant to our eventually coming up with knowledge of objects. In this regard it is certainly striking that Kant should have developed the view that in the "mediate knowledge of an object" that is judgment, we not only predicate a concept of another concept and thus of all objects falling under the latter (categorical judgment), but we also predicate a concept of another concept and thus of all objects falling under the latter, under the added condition that some other predication be satisfied (hypothetical judgment); and we think both categorical and

the judgment is assertoric, it should be called a proposition. See *Logic*, §§30–3, AA1x, pp. 109, 604–5.

[27] See Wolff, *Vollständigkeit*, p. 232.

hypothetical predications in the context of a unified and, as much as possible, specified conceptual space (expressed in a disjunctive judgment). These added conditions for predication (and thus for knowing objects under concepts) find their full import when related to the corresponding categories, as we shall see in a moment.

The fourth title in the table is that of modality. Kant explains that this title "contributes nothing to the content of the judgment (for besides quantity, quality and relation there is nothing more that constitutes the content of a judgment), but rather concerns only the value of the copula in relation to thinking in general" (A74/B100). The formulation is somewhat surprising, since after all none of the other titles was supposed to have anything to do with content either: they were supposed merely to characterize the form of judgments, or the ways in which concepts were combined in judgments, whatever the contents of these concepts. But what Kant probably means here is that modality does not characterize anything further even with respect to that form. Once the form of a judgment is completely specified as to its quantity, quality, relation, the judgment can still be specified as to its modality. But this specification concerns not the judgment individually, but rather its relation to other judgments, within the systematic unity of "thinking in general." Thus a judgment is problematic if it belongs, as antecedent or consequent, in a hypothetical judgment; or if it expresses one of the divisions of a concept in a disjunctive judgment. It is assertoric if it functions as the minor premise in a hypothetical or disjunctive inference. It is apodeictic (but only conditionally so) as the conclusion of a hypothetical or disjunctive inference. Such a characterization of modality is strikingly anti-Leibnizian, since for Leibniz the modality of a judgment would have entirely depended on the content of the judgment itself: whether its predicate is asserted of its subject by virtue of a finite or an infinite analysis of the latter. Note, therefore, that Kant's characterization of modality from the standpoint of "general pure" logic confirms that the latter is concerned only with the form of thought, not with the particular content of any judgment or inference.

So the table, in the end, is fairly simple: it is a table of forms of concept subordination (quantity and quality) where, to the classical distinctions (universal and particular, affirmative and negative), is added under each title a form that allows special consideration of individual objects (singular judgment) and their relation to a conceptual space that is indefinitely determinable (infinite judgment). And it is a table where judgments are taken to be possible premises for inferences (relation)

and are taken to derive their modality from their relation to other judgments or their place in inferences (modality).

Kant's claim that the table is systematic and complete is not supported by any explicit argument. Efforts have been made by recent commentators to extract such an argument from the first section of the *Leitfaden* chapter, the most systematic effort being Michael Wolff's. Even he, however, recognizes that the full justification of Kant's table of logical forms comes only with the transcendental deduction.[28] Indeed, in its details the table can have emerged only from Kant's painstaking reflections about the relation between the forms according to which we relate concepts to other concepts, and thus to objects (forms of judgment), and the forms according to which we combine manifolds in intuition so that they fall under these concepts. It is a striking fact that the first mature version of Kant's table of logical forms appeared not in his reflections on logic, but in his reflections on metaphysics. This seems to indicate that the search for a systematic list of the categories and a justification of their relation to objects determined the establishment of the table of logical forms of judgment just as much as the latter served as a leading thread for the former.[29]

I now turn to the culminating point of this whole argument: Kant's argument for the relation between logical forms of judgment and categories, and his table of the categories.

## Kant's argument for the table of the categories

I said earlier that the fundamental thesis of section one of the *Leitfaden* chapter is "Understanding as a whole is a capacity to judge." I might now add that the fundamental thesis of section three ("On the pure concepts of the understanding or categories") is that judgments presuppose synthesis.

[28] Ibid., pp. 45–195, esp. p. 181.

[29] The *Logik Blomberg* (1771) and the *Logik Philippi* (1772) give a presentation of judgments that remains closer to Meier's textbook, which Kant used for his lectures on logic, than to the systematic presentation of the first *Critique*. See AAXXIV–1, pp. 273–9 and 461–5; *Logic Blomberg*, in *Lectures on Logic*, pp. 220–5. For an occurrence of the two tables in Lectures on Metaphysics of the late 1770s, see *Metaphysik L1*, AAXXVIII–1, p. 187. But see also *Reflexion* 3063 (1776–8), in *Reflexionen zur Logik*, AAXVI, pp. 636–8. For a more complete account of the origins of Kant's table, see Tonelli, "Die Voraussetzungen zur Kantischen Urteilstafel in der Logik des 18. Jahrhunderts," in Friedrich Kaulbach and Joachim Ritter (eds.), *Kritik und Metaphysik. Heinz Heimsoeth zum achtzigsten Geburtstag* (Berlin: De Gruyter, 1966). Also Schulthess, *Relation und Funktion*, pp. 11–12; Longuenesse, *KCJ*, p. 77, n. 8; p. 98, n. 44.

In a way, this statement is a truism. After all, "synthesis" means nothing more than "positing together" or "combination," and it is obvious that any judgment of the traditional Aristotelian form "S is P" is a positing together or combination of concepts. Indeed Aristotle defined it in just this way, and the Aristotelian tradition followed suit all the way down to Kant, including Port-Royal's logic of ideas.[30] What is new, however, in Kant's notion of synthesis, is that it does not mean only or even primarily a combination of concepts. As far as concepts of objects given in sensibility are concerned, the combining (synthesis) of those concepts in judgments can occur only under the condition that a combining of parts and aspects of the objects given in sensibility and potentially thought under concepts also occurs. The rules for these combinings is what transcendental logic is concerned with.

But why should there be syntheses of parts and aspects of objects presented to our sensibility? Why should it not be the case that empirically given objects just do present themselves as spatiotemporal, qualitatively determined wholes that have their own presented boundaries? Kant does not really justify the point in section three of the *Leitfaden* chapter. The furthest he goes in that direction is to explain that in order for analysis of sensible intuitions into concepts to be possible, synthesis of these same intuitions (or of the "manifold [of intuition], whether it be given empirically or a priori" [A77/B102]) must have occurred. The former operation, as we saw from section one of the *Leitfaden* chapter, obeys the rules of the logical employment of the understanding. The latter operation must present the sensible manifold in such a way that it can be analyzed into concepts susceptible to being bound together in judgments according to the rules of the logical employment of the understanding.

[30] See Aristotle, *De interpretatione*, 16a11; Arnauld and Nicole, *Art of Thinking*, part II, ch. 3. As we saw in the previous section, Kant nevertheless gives new meaning to the idea of judgment as a combination of concepts, since in his view the activity of judging determines the formation of concepts, so that the unity of judgment is strictly speaking prior to what it unites, namely concepts. Note also that in the main text I write that "synthesis" means positing together as well as combination. In saying this I would like to emphasize the fact that as with all of Kant's terms pertaining to representation, one should give "synthesis" the sense of the act of synthesizing as much as that of the result of the act. Similarly, "combination" means combining as much as the result thereof. Depending on the context, it is sometimes helpful to use the term expressly connoting the action of the mind rather than the term connoting the result or intentional correlate of the action. In any event, both dimensions are always present for Kant.

Here it will be useful to recall the problem laid out in the letter to Herz mentioned in the first section of this chapter. Mathematical concepts present their own objects by directing the synthesis of an a priori (spatial) manifold according to rules provided by the relevant concept (e.g. a line, a triangle, a circle). But we cannot do that in metaphysics, because there the objects of our concepts are not just constructed in pure intuition. They are supposed to be independently existing things, so that in this case we just do not see how a priori concepts might relate to objects.[31] Well, here (in section three of the *Leitfaden*) Kant is telling us that a function of the understanding, the function of judging, is not arbitrarily producing (constructing) representations of objects, as in geometry or even in arithmetic, but at least unifying according to rules the presented manifold of intuition, so that it can be analyzed into (empirical) concepts and thought about in judgments.

Thus he writes:

> Synthesis in general, as we shall subsequently see, is the mere effect of imagination, a blind though indispensable function of the soul, without which we would have no cognition at all, but of which we are seldom even conscious. Yet *to bring this synthesis to concepts is a function that pertains to the understanding* [my emphasis] and by means of which it first provides us with cognition in the proper sense. (A78/B103)

What might it mean, to "bring synthesis to concepts"? I suggest the following. What is given to us in sensibility is given in a dispersed way – spread out in space and in time, where similar things do not present themselves to us at the same time but rather, need to be recalled in order to be compared. Moreover, the variety and variability of what does present itself is such that which pattern of regularity should be picked out might be anybody's guess. Even the way we synthesize or bind together the manifold might itself be quite random, obeying here some rule of habitual association, there some emotional connection, and so on. So ordering the synthesis itself under systematic rules so that the components of intuition can be thought under common concepts in a regular fashion is the work of the understanding. The understanding thus "brings synthesis *to* concepts." It makes it the case that synthesis does give rise to, opens the way for, conceptualization.

[31] See above, p. 87. Cf. *Correspondence*, AAx, p. 131.

The analogy with the mathematical case is only partly helpful here. Kant writes:

> Now pure synthesis, universally represented, yields the pure concept of the understanding. By this synthesis, however, I understand that which rests on a ground of synthetic unity *a priori*: thus our counting (as is especially noticeable in the case of larger numbers) is a synthesis in accordance with concepts, since it takes place in accordance with a common ground of unity (e.g. the decimal). Under this concept, therefore, the synthesis of the manifold becomes necessary. (A78/B104)

In counting, we add unit to unit, and then units of higher order (a decade, a hundred, a thousand, and so on) that allow us to synthesize (enumerate) larger and larger collections (of items, of portions of a line . . . ). The idea is that similarly, in ordering empirical manifolds, we make use of grounds of unity of these manifolds (say: whenever event of type A occurs, then event of type B also occurs), which we think under concepts or "represent universally" (in the case at hand, under the concept of cause). We thus form chains of connections between these manifolds, in an effort to unify them in one space and one time, in the context of one and the same totality of experience. But of course, whereas it is always possible to enumerate a collection of things or parts of things once one has arbitrarily given oneself a unit for counting or measuring, in contrast, actually finding repeated occurrences of similar events depends on what experience presents to us. Because of this difference, Kant distinguishes the former kind of synthesis, which he calls "mathematical" synthesis, from the latter, which he calls "dynamical," and he accordingly distinguishes the corresponding categories by dividing them along the same line (see B110; A178–9/B221–2). Nevertheless, in the latter case just as in the former, a "ground of unity" that has its source in the understanding is at work in our synthesizing (combining, relating) the objects of our experience or their spatio-temporal parts. This ground of unity, says Kant, is a pure concept of the understanding.

This reasoning leads to the core statement of all three sections of the *Leitfaden* chapter:

> The same function that gives unity to the different representations *in a judgment* also gives unity to the mere synthesis of different representations *in an intuition*, which, expressed universally, is called the pure concept of understanding. The same understanding, therefore, and

> indeed by means of the very same actions through which it brings the logical form of a judgment into concepts by means of the analytical unity, also brings a transcendental content into its representations by means of the synthetic unity of the manifold in intuition in general, on account of which they are called pure concepts of the understanding that pertain *a priori* to objects; this can never be accomplished by general logic. (A79/B104–5)

I indicated above how the introduction of the term function at the beginning of section one already foreshadowed the argument of section three: the very same "unity of the act" that accounts for the unity of concepts of judgments also accounts for there being just those forms of unity in our intuitions that make them liable to being reflected under concepts in judgment. The concepts that reflect those forms of unity in intuition are the categories. But they do not just reflect those forms of intuitive unity. As the mathematical analogue made clear (cf. A78/B104 cited above), they originally guide them. So for instance, as we just saw, the concept of magnitude is that concept that guides the operation of finding (homogeneous) units (say, points, or apples) or as the case may be, units of measurement (say, a meter) and adding them to one another in enumerating a collection or in measuring a line. The end result of this operation is the determination of a magnitude, whether discrete (the number of a collection) or continuous (the measurement of a line) as when we say that the number of pears on the table is seven or the measurement of the line is 4 meters. Here we reflect the successive synthesis of homogeneous units under the concept of a determinate magnitude (7 units, 4 meters). Similarly, the concept of cause (the concept of some event's being such as to be adequately or "in itself" reflected under the antecedent of a hypothetical judgment with respect to another event, adequately or "in itself" reflected under the consequent) guides the search for some event that might always precede another in the temporal order of experience. Once such a constant correlation is found, we say that event of type A is the cause of event of type B. In other words, the sequence is now reflected under the concept of a determinate causal connection.[32]

[32] In the chapter on the Schematism of the Pure Concepts of the Understanding, Kant maintains that the schema of the concept of cause is "the real upon which, when it is posited, something else always follows" (A144/B183). This means that it is by apprehending the regular repetition of a sequence of events or states of affairs ("the real upon which,

The two aspects in our use of categories are explicitly mentioned in §10. Kant says, on the one hand, that categories "*give unity* to [the] pure synthesis" (A79/B104). He says, on the other hand, that the pure concepts of the understanding are "the pure synthesis *generally represented*" (A78/B104; see also A79/B105 quoted earlier, where both aspects are present in one and the same sentence: "the same function ... *gives unity* which *expressed generally*, is the pure concept of the understanding"). These two points are fully explained only in book two of the Transcendental Analytic, "The Analytic of Principles." There Kant explains that categories, insofar as they determine rules for synthesis of sensible intuitions, have schemata (ch. 1 of book two, A137/B176). Being able to pick out instances of such schemata allows us to subsume our intuitions under the categories (ch. 2 of book two, A148/B187–A235/B287). Only in those chapters does Kant give a detailed account of the way in which each category both determines and reflects a specific rule (a schema) for the synthesis of intuitions.

As far as the metaphysical deduction is concerned, Kant is content with making the general case that:

> In such a way there arise [*entspringen*] exactly as many pure concepts of the understanding which apply to objects of intuition *a priori*, as there were logical functions of all possible judgments in the previous table: for the understanding is completely exhausted, and its capacity entirely measured by these functions. (A80/B106)

Kant does not mean that every time we make use of a particular logical function/form of judgment, we thereby make use of the corresponding category. True, absent a sensible manifold to synthesize, all that remains of the categories are logical functions of judgment. But the logical functions of judgment are not, on their own as it were, categories. They become categories (categories "arise," *entspringen*, as Kant says in the text

whenever posited, something else follows") that we recognize in experience the presence of a causal connection. But conversely, we look for such constant conjunctions because we do have a concept of cause as the concept of something that might be thought under the antecedent of a hypothetical judgment, with respect to something else that might be thought under the consequent. Of course Kant's point is also that we can always be mistaken about what we so identify. Some repeated sequence is warranted as a true causal connection only if it can be thought under a causal law, and this involves the application of mathematical constructions that allow us to anticipate the continuous succession and correlation of events in space and in time. However, here I am anticipating developments of Kant's argument that go way beyond the metaphysical deduction properly speaking. See my "Kant on causality: what was he trying to prove?" in Christia Mercer and Eileen O'Neill (eds.), *Early Modern Philosophy: Mind, Matter and Metaphysics* (Oxford: Oxford University Press, 2005); reprinted as ch. 6 in this volume.

just cited) only when the understanding's capacity to judge is applied to sensible manifolds, thus synthesizing them (combining them in intuition) for analysis (into concepts) for synthesis (of concepts in judgments). And even then, there remains a difference between the category's guiding the synthesis of manifolds, and the manifolds' being correctly subsumed under the relevant category. For instance, it may be the case that the understanding's effort to identify what might fall under the antecedent and what might fall under the consequent of a hypothetical judgment, leads it to recognize the fact that whenever the sun shines on the stone, the stone gets warm. This by itself does not warrant the claim that there is an objective connection (a causal connection) between the light of the sun and the warmth of the stone. Only some representation of the overall unity of connections of events in the world can give us at least a provisional, revisable warrant that this connection is the right one to draw.[33]

Kant is not yet explaining how his metaphysical deduction of the categories might put us on the way to resolving the problem left open after the 1770 Inaugural Dissertation: how do concepts that have their source in the understanding apply to objects that are given? All we have here is an exposition as a system "from a common principle, namely the capacity to judge" (A80–1/B106) of the table of the categories, and an explanation of the role they perform in synthesizing manifolds so that the latter can be reflected under concepts combined in judgments. To respond to the problem he set himself, Kant will need to argue that those combining activities are necessary conditions for any object at all to become an object of cognition for us. And as I suggested earlier, only the later argument will provide a full justification of the table of logical forms itself: it is a table making manifest just those functions of judging that are necessary for any empirical concept at all to be formed by us, and thus for any empirical object to be recognized under a concept. This confirms again that the "leading thread" from logical forms to categories is precisely no more (but no less) than a "leading thread." Its actual relevance will be proved only when the argument of the Transcendental Deduction is expounded and in turn, opens the way to the Schematism and System of Principles.

[33] On this example, see *Prolegomena*, AAIV, pp. 312–13. See also the related discussion above, ch. 2, pp. 58–62.

## The impact of Kant's metaphysical deduction of the categories

The history of Kant's metaphysical deduction of the categories is not a happy one. Kant's idea that a table of logical functions of judgments might serve as a leading thread for a table of the categories was very early on an object of suspicion, on three main grounds. First, Kant's careless statement that he "found in the labors of the logicians," namely in the logic textbooks of the time, everything he needed to establish his table of the logical forms of judgment raises the obvious objection that the latter is itself lacking in systematic justification.[34] This in turn casts doubt on Kant's claim that unlike Aristotle's "rhapsodic" list (A81–2/B106–7), his table of the categories is systematically justified. Second, even if one does endorse Kant's table of the logical forms of judgment, this does not necessarily make it an adequate warrant for his table of the categories. And finally, once the Aristotelian model of subject–predicate logic was challenged by post-Fregean truth-functional, extensional logic, it seemed that the whole Kantian enterprise of establishing a table of categories according to the leading thread of forms pertaining to the old logic seemed definitively doomed.

An early and vigorous expression of the first charge mentioned above was Hegel's. In the *Science of Logic*, Hegel writes:

> Kantian philosophy ... borrows the categories, as so-called root notions for transcendental logic, from subjective logic in which they were adopted empirically. Since it admits this fact, it is hard to see why transcendental logic chooses to borrow from such a science instead of directly resorting to experience.[35]

Note, however, that it is not Kant's table of logical forms *per se* that Hegel objects to. Rather, it is the way the table is justified (or rather, not justified) and the random, empirical way in which the categories themselves are therefore listed. Nevertheless, in the first section of his Subjective Logic, Hegel too expounds four titles and for each title, three divisions of judgment that exactly map the titles and divisions of

[34] Cf. *Prolegomena*, AAIV, pp. 323–4.

[35] G. W. F. Hegel, *Wissenschaft der Logik*, II: *Die subjective Logik*, in *Gesammelte Werke*, Deutsche Forschungsgemeinschaft, ed. Rhein-Westfäl. Akad. d.Wiss. (Hamburg: F. Meiner, 1968–), vol. XII, pp. 253–4; *Science of Logic*, trans. A. V. Miller (Atlantic Highlands, NJ: Humanities Press International, 1989), p. 613. What Hegel means here by "subjective logic" is what Kant called "pure general logic," namely the logic of concepts, judgments, and syllogistic inferences. But unlike Kant's "pure general logic," Hegel's subjective logic is definitely not "merely formal." More on this shortly.

Kant's table, although Hegel starts with the title of quality rather than quantity. Moreover, the names of each title are changed, although the names of the divisions remain the same. Kant's title of "quality" becomes "judgment of determinate-being" (*Urteil des Daseins*), with the three divisions of positive, negative, and infinite judgment. "Quantity" becomes "judgment of reflection" with the three titles of singular, particular, and universal. "Relation" becomes "judgment of necessity" (*sic*!) with the three titles of categorical, hypothetical, and disjunctive. And finally "modality" becomes "judgment of the concept" with the three divisions of assertoric, problematic, and apodeictic.[36] Of course, the change in nomenclature signals fundamental differences between Hegel's and Kant's understanding of the four titles and their twelve divisions. The most important of those differences is that for Hegel the four titles and three divisions within each title do not list mere forms of judgment, but forms with a content, where content and form are mutually determining. So for instance, the content of "judgments of determinate-being" (affirmative, negative, infinite) is the immediate, sensory qualities of things as they present themselves in experience. The content of "judgments of reflection" (singular, particular, universal) is what Hegel calls "determinations of reflection," namely general representations, or representations of common properties as they emerge for an understanding that compares, reflects, abstracts. The content of "judgments of necessity" (categorical, hypothetical, disjunctive) is the relation between essential and accidental determinations of things. And finally the content of "judgments of the concept" (assertoric, problematic, apodeictic) is the normative evaluation of the adequacy of a thing to what it ought to be, or its concept. So certainly Hegel's interpretation of each title radically transforms its Kantian ancestor. Nevertheless, the fact that despite his criticism of Kant's empirical derivation, Hegel maintains the structure of Kant's divisions, indicates that his intention is not to criticize the classifications themselves, but rather to denounce the cavalier way in which Kant asks us to accept them as well as Kant's shallow separation between form and content of judgment.[37]

Nor is Hegel's intention to challenge the relation between categories and functions of judgment. In the *Science of Logic*, categories of quantity and quality are expounded in part one (Being) of book one (The

[36] See *Die subjective Logik*, pp. 59–90; trans. pp. 623–63.

[37] On this point see my "Hegel, Lecteur de Kant sur le jugement," in *Philosophie*, no. 36 (1992), pp. 62–7.

Objective Logic); those of relation and modality are expounded in part two (The Doctrine of Essence) of book one. Logical forms of judgment and syllogistic inference are expounded in section one of book two (The Subjective Logic or the Doctrine of the Concept). If we accept, as I suggest we should, that book two expounds the activities of thinking that have governed the revelation of the categorical features expounded in parts one and two of book one, then Hegel's view of the relation between categories and forms of judgment is similar to Kant's at least in one respect: there is a fundamental relation (in need of clarification) between the structural features of the acts of judging and the structural features of objects. The difference between Hegel's view and Kant's view is that Hegel takes this relation to be a fact about being itself, and the structures thus revealed to be those of being itself, whereas Kant takes the relation between judging and structures of being to be a fact about the way human beings relate to being, and the structures thus revealed to be those of being as it appears to human beings.

Hegel's grandiose reinterpretation of Kant's titles of judgments did not have any immediate posterity, and his speculative philosophy was soon superseded by the rise of naturalism in nineteenth-century philosophy.[38] When Hermann Cohen, reacting against both the excesses of German Idealism and the rampant naturalism of his time, undertook to revive the Kantian transcendental project, he declared that his goal was to "ground anew the Kantian theory of the a priori" ("die Kantische Aprioritätslehre erneut zu begründen").[39] By this he meant that, against the vagaries of Kant's German Idealist successors, he intended to lay out what truly grounds Kant's theory of the categories and a priori principles. According to Cohen, Kant's purpose in the *Critique of Pure Reason* is to expound the presuppositions of the mathematical science of nature founded by Galileo and Newton. The leading thread for Kant's pure concepts of the understanding or categories (expounded in book one of the Transcendental Analytic) is really Kant's discovery of the principles of pure understanding (expounded in book two), and the leading thread for the latter are Newton's principles of motion in the *Principia Mathematica Philosophiae Naturalis*. Thus the true order of discovery of the Transcendental Analytic leads from the Principles of Pure Understanding (book two), to the Categories (book one). This does not

[38] On this point, see Hans D. Sluga, *Gottlob Frege* (London: Routledge and Kegan Paul, 1980), pp. 8–35.
[39] Cohen, *Kants Theorie der Erfahrung*, p. ix.

make the logical forms of judgment irrelevant, in Cohen's eyes. For the latter formulate the most universal patterns or models of thought derived from the unity of consciousness, which for Cohen is nothing other than the epistemic unity of all principles of experience, where experience means scientific knowledge of nature expounded in Newtonian science. So it is quite legitimate to assert that the categories depend on these universal patterns. But the systematic unity of the categories and of the logical forms can be discovered only by paying attention to the unity of the principles of the possibility of experience, i.e. of the Newtonian science of nature.[40]

Cohen follows up on his interpretative program by showing how Kant's systematic correlation between logical forms of judgment and categories can be understood in the light of the distinction he offers in the *Prolegomena* between judgments of perception and judgments of experience. Cohen then proceeds to explain and justify Kant's selection of logical forms by relating each of them to the corresponding category and to its role in the constitution of experience. In other words, he implements the very reversal in the order of exposition that he argues is faithful to Kant's true method of discovery: moving from the a priori principles that may ground judgments of experience, to the categories present in the formulation of these principles, to the logical forms of judgment.[41]

Cohen's achievement is impressive. But it is all too easy to object that his reducing Kant's unity of consciousness to the unity of the principles of scientific knowledge, and his reducing Kant's project to uncovering the a priori principles of Newtonian science, amount to a very biased reading of Kant's *Critique of Pure Reason*. In fairness to Cohen, his interpretation of Kant's critical philosophy did not stop there. In *Kants Begründung der Ethik*,[42] he considered Kant's view of reason and its role in morality. And this in turn led him to give greater consideration, in the second and third editions of *Kants Theorie der Erfahrung*, to Kant's theory of the ideas of pure reason and to the bridge between knowledge and morality.[43] Nevertheless, as far as the metaphysical deduction of the categories is concerned, his interpretation remained essentially unchanged.

[40] Cohen, *Kants Theorie der Erfahrung*, p. 229.
[41] Ibid., pp. 245–8.
[42] Hermann Cohen, *Kants Begründung der Ethik* (Berlin, 1877; 2nd edn 1910).
[43] See *Kants Theorie der Erfahrung*, preface to the second edition, p. xiv.

That interpretation found its most vigorous challenge in Heidegger's reading of Kant's first *Critique*. Heidegger urges that Kant did not intend his *Critique of Pure Reason primarily* to clarify the conceptual presuppositions of natural science. Rather, Kant's goal was to question the nature and possibility of metaphysics. According to Heidegger, this means laying out the ontological knowledge (knowledge of being as such) that is presupposed in all ontic knowledge (knowledge of particular entities). Kant's doctrine of the categories is precisely Kant's "refoundation" of metaphysics, or his effort to find for metaphysics the grounding that his predecessors had been unable to find. This refoundation consists, according to Heidegger, in elucidating the features of human existence in the context of which human beings' practical and cognitive access to being is made possible.

What does this have to do with Kant's enterprise in the metaphysical deduction of the categories? In the *Phenomenological Interpretation of the Critique of Pure Reason* (a lecture course delivered at Marburg in 1927–8, and first published in 1977) and in *Kant and the Problem of Metaphysics* (first edition, 1929), Heidegger develops the following view. Kant's groundbreaking insight was to discover that the unity of our intuitions of space and of time, and the unity of concepts in judgments, have one and the same "common root": the synthesis of imagination in which human beings develop a unified view of themselves and of other entities as essentially temporal entities. Now, categories, according to Heidegger, are the fundamental structural features of the unifying synthesis of imagination which results in the unity of time (and space) in intuition, on the one hand; and in the unity of discursive representations (concepts) in judgments, on the other hand. This being so, the fundamental nature of the categories is expounded not in the metaphysical deduction, which relates categories to logical forms of judgments, but rather in the Transcendental Deduction and even more in the chapter on the Schematism of the Pure Concepts of the Understanding. For it is in these two chapters that the role of the categories as structuring human imagination's synthesizing (unifying) of time is expounded and argued for. This does not mean that the Metaphysical Deduction is a useless or irrelevant chapter of the *Critique*. For if it is true that the unity of intuition and the unity of judgments have one and the same source in the synthesis of imagination according to the categories, then the logical forms of judgment do give a clue to a corresponding list of the categories. But this should not lead to the mistaken conclusion that the categories have their origin in logical forms of judgment. Rather, logical forms of judgment give us a clue to

those underlying forms or structures of unity because they are the surface effect, as it were, of forms of unity that are also present in sensibility (where they are manifest as the schemata of the categories) by virtue of one and the same common root in imagination.[44]

Note that Heidegger agrees with Cohen at least in maintaining that logical forms of judgment can provide a leading thread to a table of categories just because forms of judgment and categories have one and the same ground, the unity of consciousness. Their difference consists in the fact that Cohen understands that unity as being the unity of thought expressed in the principles of natural science. Heidegger understands it as the unity of human existence projecting the structures of its own temporality.

The readings of Kant's metaphysical deduction we have considered so far offer challenges only to Kant's motivation and method in adopting a table of logical forms of judgment as the leading thread to his table of categories. What they do not challenge is the relevance of Kant's Aristotelian model of logic in developing the argument for his table of the categories. A more radical challenge comes of course from the idea that contrary to Kant's claim, logic did not emerge in its completed and perfected form from Aristotle's mind (cf. Bviii). Here we have to make a quick step back in time. For the initiator of modern logic, Gottlob Frege, wrote his *Begriffsschrift* (1879) several decades before Heidegger wrote *Being and Time* (1927). Unsurprisingly, by far the more threatening challenge to Kant's metaphysical deduction came from Frege's *Begriffsschrift* and its aftermath.

As we saw, Kant takes logic to be a "science of the rules of the understanding." But Frege takes logic to be the science of objective relations of implication between thoughts or what he calls "judgeable contents."[45]

[44] See Martin Heidegger, *Phänomenologische Interpretation der Kritik der reinen Vernunft*, collected edn vol. xxv (Frankfurt-am-Main: Vittorio Klostermann, 1977), pp. 257–303; *Phenomenological Interpretation of the Critique of Pure Reason*, trans. Parvis Emad and Kenneth Maly (Bloomington and Indianapolis: Indiana University Press, 1995), pp. 175–207. And *Kant und das Problem der Metaphysik*, collected edn vol. III (Frankfurt-am-Main: Vittorio Klostermann, 1991), pp. 51–69; *Kant and the Problem of Metaphysics*, trans. Richard Taft (Bloomington: Indiana University Press, 1990), pp. 34–46.

[45] Gottlob Frege, *Begriffsschrift. Eine der arithmetischen nachgebildete Formelsprache des reinen Denkens*, in *Begriffsschrift und andere Aufsätze* (Hildesheim: Olms, 1964). *Begriffsschrift, a formula language for pure thought, modeled upon that of arithmetic*, in *Frege and Gödel: Two Fundamental Texts in Mathematical Logic*, ed. Jean van Heijenhoort (Cambridge, Mass.: Harvard University Press, 1970). Page references will be to the English edition. On the distinction between judgment and judgeable content, see ibid., §2, p. 11:

Against the naturalism that tended to become prevalent in nineteenth-century views of logic, Frege defends a radical distinction between the subjective conditions of the act of thinking and its objective content. Logic, according to him, is concerned with the latter, psychology with the former. In spite of his declared intention not to mix general pure (= formal) logic with psychology, Kant, according to Frege, is confused in maintaining that logic deals with the rules *we* (human beings) follow in thinking, rather than with the laws that connect thoughts independently of the way any particular thinker or group of thinkers actually think.[46]

According to Frege, Kant's subservience to the traditional, Aristotelian model of subject–predicate logic is grounded on that confusion. For the subject–predicate model really takes its clue from the grammatical structure of sentences in ordinary language. And ordinary language is itself governed by the subjective, psychological intentions and associations of the speaker addressing a listener. But again, what matters to logic are the structures of thought that are relevant to valid inference, nothing else. Those structures, for Frege, include the logical constants of propositional calculus (negation and the conditional), the analysis of propositions into function-argument rather than subject–predicate, and quantification.[47]

In §4 of the *Begriffsschrift*, Frege examines "the meaning of distinctions made with respect to judgments." The distinctions in question are clearly those of the Kantian table, which in Frege's time have become classic. Frege first notes that those distinctions apply to the "judgeable content" rather than to judgment itself.[48] This being said, he retains as relevant to logic the distinction between "universal" and "particular" judgeable

"A judgment will always be expressed by means of the sign ⊢—, which stands to the left of the sign, or the combination of signs, indicating the content of the judgment. If we *omit* the small vertical stroke at the left end of the horizontal one, the judgment will be transformed into a *mere combination of ideas* [*Vorstellungsverbindung*], of which the writer does not state whether he acknowledges it to be true or not."

Later Frege renounces the expression *Vorstellungsverbindung* as too psychological, and talks instead of *Gedanke* to describe the judgeable content to the right of the judgment stroke. See the 1910 footnote Frege appended to §2, p. 11, n. 6.

[46] On the rise of nineteenth-century naturalism about logic, and Frege's conception of logic as a reaction against naturalism, see Sluga, *Frege*, especially ch. 1 and 2. In fairness to Kant, it should be recalled that he does distinguish logic from psychology: he maintains that contrary to the latter, the former is concerned not with the way we think, but with the way we ought to think. But this distinction can have little weight for Frege, who wants to free logic from any mentalistic connotation, whether normative or descriptive.

[47] Strawson's criticism of the redundancies of Kant's table is clearly inspired from Frege's. See Strawson, *Bounds of Sense*, pp. 78–82.

[48] It is worth noting that Frege reverses the Kantian terminology and calls "proposition" the judgeable content and "judgment" the asserted content, whereas Kant reserved the term

contents (Kant's first two titles of quantity), but leaves out "singular." He retains "negation" (Kant's second title of quality, negative judgment) and thus the contrasting affirmation (which does not need any specific notation), but leaves out infinite judgments. He declares that the distinction between categorical, hypothetical, and disjunctive judgments "seems to me to have only grammatical significance." Meanwhile he introduces his own notation for conditionality in the next section, §5 of the *Begriffsschrift* (more on this in a moment). Finally, he urges that the distinction between assertoric and apodeictic modalities (which alone, he says, characterize judgment rather than merely the judgeable content) depends only on whether the judgment can be derived from a universal judgment taken as a premise (which would make the judgment apodeictic), or not (which would leave it as a mere assertion, or assertoric judgment), so that this distinction "does not affect the conceptual content." Frege presumably means that the distinction between assertoric and apodeictic judgments does not call for a particular notation in the *Begriffsschrift*. As for a proposition "presented as possible," Frege takes it to be either a proposition whose negation follows from no known universal law, or a proposition whose negation asserted universally is false. Although this last characterization differs from Kant's characterization of problematic judgments (as components in hypothetical or disjunctive judgments), it remains that Frege's view of modality is similar to Kant's own view, indeed seems inspired by it. For as we saw Kant thinks that modality does not concern the content of any individual judgment, but only its relation to the unity of thought in general. However, Kant does not think that what we might call this "holistic" view of modality makes it irrelevant to logic. This point would be worth pursuing, but we cannot do it here.

In short, according to Frege one need retain from the Kantian table only the first two titles of quantity, the first two titles of quality, and the second title of modality (assertion expressed by the judgment stroke). To these he adds his own operator of conditionality, which one might think has a superficial similarity to Kant's hypothetical judgment. However, Frege makes it clear they are actually quite different. He recognizes explicitly, for instance, that his conditional is not the hypothetical judgment of ordinary language, which he identifies with Kant's hypothetical judgment. And he states that the hypothetical judgment of ordinary language (or Kant's hypothetical judgment) expresses causality.[49]

"proposition" to assertoric judgment: see above, n. 18; *Begriffsschrift*, §2, §4. These are mere terminological differences, but they need to be kept in mind to avoid confusions.

[49] *Begriffsschrift*, §5, p. 15.

However, his view on this point does not seem to be completely fixed, at least in the *Begriffsschrift*, since elsewhere in this text he urges that the causal connection is expressed by a universally quantified conditional.[50] In any event, Kant would not accept any of those statements. For as we saw, he would say that although the hypothetical judgment does express a relation of *Konsequenz* between antecedent and consequent, this relation is not by itself sufficient to define a causal connection. As for the universal quantification of a conditional, it would even less be sufficient to express a causal connection, precisely because the conditional bears no notion of *Konsequenz*. So even Frege's (very brief) discussion of hypothetical judgment and causality bears very little relation to Kant's treatment of the issue.

This might just leave us with Frege's general complaint against Kant's table: the reason this table can have only very little to do with Frege's forms of propositions is that it is governed by models of ordinary language. Consequently, Frege's selective approach to Kant's table does not merely consist in getting rid of some forms and retaining others. Rather, it is a drastic redefinition of the forms that are retained (such as the conditional, generality, assertion as expressed by the judgment stroke). And this, Frege might urge, is necessary to definitively purify logic of the psychologistic undertone it still has in Kant. But then one needs to remember what the purpose of Kant's table is, as opposed to the purpose of Frege's choice of logical constants for his propositional calculus. Frege sets up his list so that he has the toolbox necessary and sufficient to expound patterns of logical inference, where the truth-value of conclusions is determined by the truth-value of premises, and the truth-value of premises is determined by the truth-value of their components (truth-functionality). Kant's logic, on the other hand, is a logic of combination of concepts as "general and reflected representations." And we might say that his setting up a table of elementary forms for that logic should help us understand how the very states of affairs by virtue of which Frege's propositions stand for True or False, are perceived and recognized as such. In fact, I suggest that Frege's truth-functional propositional logic captures relations of co-occurrence or non-co-occurrence of states of affairs that Kant would have no reason to reject, but that for him would take secondary place with respect to the relations of subordination of concepts that, when related to synthesized intuitions, allow us to

[50] Ibid., §5, p. 14; §12, p. 27.

become aware of those states of affairs and their co-occurrence in the first place.

What about Frege's challenge to the subject–predicate model of judgment and his replacement of it by the function-argument model?[51] Here one might think that the modern logic of relations (n-place functions) is anticipated by Kant's transcendental logic, which thus overcomes the limitations of his "general pure" or "formal" logic. For transcendental logic is concerned *not* with mere concept subordinations, but with the spatiotemporal mathematical and dynamical relations by means of which objects of knowledge are constituted and individuated. Indeed the most prolific of Hermann Cohen's neo-Kantian successors, Ernst Cassirer, advocated appealing to a logic of relations to capture the Kantian "logic of objective knowledge" or transcendental logic.[52] Examining this suggestion would take us beyond the scope of the present chapter. In any event, two points should be kept in mind. The first is that according to Kant, the relational features of appearances laid out by transcendental logic are made possible by synthesizing intuitions under the guidance of logical functions of judgment as he understands them. In other words, the source of the relations in question is itself no other than the very elementary discursive functions (functions of concept-subordination) laid out in his table and guiding syntheses of a priori spatiotemporal manifolds. The second point to keep in mind is that however fruitful a formalization of Kant's principles of transcendental logic in terms of a modern quantificational logic of relations might be, it does not by itself accomplish the task Kant wants to accomplish with his transcendental logic and his account of the nature of categories, which is to explain how our knowledge of objects is possible in general, and thus explain why any attempt at a priori metaphysics on purely conceptual grounds is doomed to fail.

[51] Ibid., §9.

[52] See Cassirer, *Substanzbegriff und Funktionsbegriff*. Peter Schulthess has defended the view that Cassirer's emphasis on the relational nature of Kant's transcendental logic as well as his emphasis on the ontological primacy of relations, not substances, is in full agreement with Kant's own view, including his view of logic. See Schulthess, *Relation und Funktion*. Michael Friedman has defended the relevance of Cassirer's version of neo-Kantianism for contemporary philosophy of science: see Michael Friedman, *A Parting of the Ways: Carnap, Cassirer and Heidegger* (Chicago and La Salle, Ill.: Open Court, 2000), especially ch. 6, pp. 87–110; and "Transcendental philosophy and a priori knowledge: a neo-Kantian perspective," in Paul Boghossian and Christopher Peacocke (eds.), *New Essays on the A Priori* (Oxford: Clarendon Press, 2000), pp. 367–84.