The Priority Principle from Kant to Frege

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Abstract

In a famous passage (A68/B93), Kant writes that “the understanding can make no other use of [...] concepts than that of judging by means of them.” Kant’s thought is often called the thesis of the priority of judgments over concepts. We find a similar sounding priority thesis in Frege: “it is one of the most important differences between my mode of interpretation and the Boolean mode [...] that I do not proceed from concepts, but from judgments.” Many interpreters have thought that Frege’s priority principle is close to (or at least derivable from) Kant’s. I argue that it is not. Nevertheless, there was a gradual historical development that began with Kant’s priority thesis and culminated in Frege’s new logic.

In a famous passage at the beginning of the Transcendental Analytic in his Critique of Pure Reason, Kant claims that concepts are “predicates of possible judgments”:

Whereas all intuitions, as sensible, rest on affections, concepts rest on functions. By ‘function’ I mean the unity of the act of bringing various representations under one common representation. Concepts are based on the spontaneity of thought, sensible intuitions on the receptivity of impressions. Now the understanding can make no other use of these concepts than that of judging by means of them.

[... ] Concepts, as predicates of possible judgments, are related to some representation of a still undetermined object. The concept of body thus signifies something, e.g., a metal, which can be cognized through that concept. It is therefore a concept only because other representations are contained under it by means of which it can be related to objects. (A68–9/B93–41)

The thesis expressed here is often called Kant’s thesis of the priority of judgments over concepts, or just Kant’s “priority principle” for short. The principle is rightly considered one of the most significant philosophical innovations in the first Critique, where it plays a central role in the central argument of the book. For this reason, several recent philosophical works have placed the principle at the center of their interpretations.2

In a number of writings, Frege makes a series of claims that have sounded to many interpreters much like the Kantian priority thesis.

In fact it is one of the most important differences between my mode of interpretation and the Boolean mode—and indeed I add the Aristotelian mode—that I do not proceed...
from concepts, but from judgments. (“On the Aim of the ‘Conceptual Notation’” [1882], *Conceptual Notation and Related Articles*, 94)

As opposed to [Boole], I start out with judgments and their contents, and not from concepts. . . . I only allow the formation of concepts to proceed from judgments. (“Boole’s Logical Calculus and the Concept-script” [1880–1], *Posthumous Writings*, 16)

Now I do not believe that concept formation can precede judgment because this would presuppose the independent existence of concepts, but I think of a concept as having arisen by decomposition from a judgeable content. (Letter to Marty [1882], *Philosophical and Mathematical Correspondence*, 100)

The constellation of ideas expressed in these three passages is often called Frege’s priority principle. Frege interpreters as diverse as Burge, Ricketts, Sluga, and Sullivan have each seen the principle as one of the most fundamental ideas—if not the fundamental idea—of Frege’s logical writings.3

It is therefore of great interest to note that a host of Kant and Frege interpreters—including David Bell, Graham Bird, Robert Brandom, Tyler Burge, A.B. Dickerson, Michael Dummett, Michael Kremer, and Hans Sluga4—have concluded that Frege’s priority principle is identical to or derivable from Kant’s principle. Frege thought of his priority principle, as we will see, as one of the most important differences between his logic and the traditional logic, and a key conceptual breakthrough that made possible the much greater expressive and inferential capacity of the Begriffsschrift.5 It would be very surprising indeed if this central Fregean idea were already contained in Kant’s philosophy. Those interpreters who think that it is are therefore putting forward an unexpected claim: that Kant, whose conservative statements about Aristotle’s logic are notorious (B viii), had within his own philosophy the seeds of modern logic. The effect of such an interpretation would be, I think, to play down Frege’s originality and, I’ll argue, underestimate the very substantial intellectual work that had to take place before Frege could write *Begriffsschrift*.6

When determining the relationship between Kant’s thesis and Frege’s thesis, we should not put too much weight on the fact that the ideas expressed by Kant and Frege in these passages can each be glossed as “priority theses.” As Michael Dummett has pointed out:

More important than whether other people said that judgments are prior to concepts before Frege did is, however, the question whether Frege meant the same by it as others did; for, after all, the sense of the statement is by no means immediately apparent.7

Indeed, among readers of Kant there are at least eight different ways of reading the thesis given in A68–9/B93–4:

1. An indistinct concept can be made distinct only “by means of a judgment.” (Kemp Smith8)
2. “The act of abstraction or *analysis* whereby we make a concept *is* a judgment.” (Paton9)
3. “It is impossible that we might learn concepts without already having some grasp of judgment and its forms.” (Bird)

4. “Concepts are formed in order to be combined with other concepts in judgments.” (Longuenesse)

5. “The ability to have objects come into view for one is essentially dependent on the ability to make judgments.” (McDowell)

6. The intuitive representations from which concepts are derived “contain the form and content of a judgment”: that is, the intuition “this cube” already contains the conceptual content <cube> and the logical form “This is an F.” (Sellars)

7. “Kant pursues a pragmatist order of explanation, in that concepts and their contents are understood in terms of the role they play in . . . judging”: the content of a concept, as a “rule that determines what is a reason for what,” consists in its role in judgments. (Brandom)

8. “Judgments are not formed out of previously given constituents, but they possess an initial transcendental unity out of which we gain concepts by analysis.” (Sluga)

Although interpreters do not always note this, these readings give fundamentally different answers to key interpretive questions. What exactly is judgment prior to? Is judgment necessary for forming a concept, for making an already formed concept distinct, or for securing the object-directedness of concepts? What precisely does concept formation presuppose? Does it presuppose that a subject has the ability to judge? that a subject has already grasped the forms of judgment? or has grasped some specific judgments? (Or is concept formation itself a judgment?) What is the nature of the priority? Is the priority that of a final cause—with judgment being the goal of concept formation—or is the priority temporal and epistemic—with a subject forming concepts from already grasped complete judgments? One final question that will occupy us throughout this paper: is the priority thesis inconsistent with the traditional theory that concepts are formed by abstraction (as Bird, Brandom, Keller, McDowell, and Sluga think), or is it consistent with the traditional theory (as Kemp Smith, Longuenesse, Paton, and Sellars think)?

The interpretation of Frege’s priority principle is no less controversial. For convenience’s sake, we can think of the various readings of Frege’s priority principle as falling into four classes. First, Frege might be asserting the ontological priority of judgments over concepts: that is, that the being of a concept depends on the being of the judgment (as the being of a part in an organic whole depends on the being of the whole). Second, we distinguish an epistemic priority thesis: that a subject can come to grasp a concept only through coming to grasp a judgment containing that concept. Opposed to epistemic and ontological readings are semantic ones, a particularly strong version of which is provided by Brandom. On his strong semantic priority thesis, the meaning of a concept (or concept-word) consists in the contribution it makes to the meaning of a judgment (or sentence). In Brandom’s hands,
Frege (and Kant, also) provides a semantic reductionism, since the meaning of a subsentential expression consists in the effect it has on the inferential relations that a sentence that contains it has to other sentences (and we can know which sentences follow from which independently of knowing the meanings of particular words).\textsuperscript{20} This strong thesis is opposed by a \textbf{weak semantic priority thesis:} that a concept (or concept-word) has meaning because it is part of a judgment (or sentence) that has meaning.\textsuperscript{21}

I’ll be arguing that Frege’s priority thesis is an epistemic thesis—a thesis about how a thinker comes to \textit{grasp} a concept (or, as it is often put, to \textit{form} a concept).\textsuperscript{22} Furthermore, I will show that this epistemic thesis in fact depends on a \textit{logical} thesis about the structure of Frege’s logical notation. In particular, I’ll be claiming that for Frege, judgments are prior to concepts because the formation of concepts requires grasping a complete judgment and replacing some of its components with variables. As I’ll make clear, I see Kant’s priority thesis as a weak semantic claim. Kant’s view is that judgments are prior to concepts because a concept is a mediate representation of an object, and it is in virtue of being combined in judgments that concepts relate to objects.

The topic of my paper, then, is both the philosophical and historical relationship between Kant’s weak semantic thesis and Frege’s epistemic thesis. The paper has two sections. In the first section, I argue that Kant’s priority thesis is not identical to Frege’s priority thesis. Indeed, there is no argument using premises Kant would accept that would allow us to infer from Kant’s priority thesis to Frege’s priority thesis. Interpreters who think that Frege’s thesis is derivable from Kant’s—like Brandom, Burge, and Sluga—do so because they erroneously attribute to Kant a strong semantic or an epistemic reading of the priority principle. In this sense, then, the Fregean thesis is not a further development of the Kantian thesis. In the second part of the paper, I trace out the history of the priority thesis from Kant to Frege. I show that Kant’s priority thesis, originally intended as a thesis about object-directedness, came to be seen over time as a thesis with implications concerning the formation of concepts and the structure of concepts, judgments, and inferences. I will present this historical development in five steps, highlighting the contributions made by Hegel, Trendelenburg, and Lotze. The discussion in the second part of the paper, by showing the substantial philosophical moves that logicians had to take to get from Kant’s thesis to Frege’s, will then reinforce the conclusions from the first section.

The interpretations of Kant’s and Frege’s principles are highly complex and highly contested issues. I will not be able to give a full reading of either principle in this paper. Nor will I be able to engage with the full range of interpretations extant in the literature. However, readers who are antecedently convinced of a reading opposed to my own, I believe, can still profit from following the story I will be telling. In particular, those readers who interpret Kant’s thesis more robustly than I do are free to read my story as the gradual unfolding of the full logical significance of Kant’s ideas.
I.

Hans Sluga has claimed that we should understand Frege’s priority thesis in the context of an idealist philosophical tradition deriving from Kant:

Kant had argued against the theory of ideas . . . that judgments are not formed out of previously given constituents, but that they possess an initial transcendental unity out of which we gain concepts by analysis. By the late nineteenth century the doctrine had become a standard argument in anti-naturalistic theories of knowledge. . . . Through Lotze’s influence the doctrine also reached Frege. (Frege, 55)

In 1882 [Frege] wrote: “I do not think that the formation of concepts can precede judgment, for that would presuppose the independent existence of concepts; I rather imagine that the concept originates in the analysis of a judgeable content.”

Such an emphasis on the priority of judgments over concepts links Frege to the Kantian tradition in logic. Kant himself had considered it his greatest achievement in logic to have seen beyond the traditional view of judgments as mere composite concepts. Concepts, he had said, presuppose judgments since “the only use which the understanding can make of these concepts is to judge by means of them” (A68). (“Frege Against the Booleans,” 87)

I.1 Frege’s Priority Principle and the Abstractionist Theory of Concept Formation

Frege’s priority principle is fundamentally a thesis about concept formation, and is opposed to the traditional philosophical thesis that concepts are formed by abstraction. Frege’s fullest discussion is in the unpublished essay “Boole’s Logical Calculus and the Concept-script,” where he contrasts the priority given to judgment in his method of forming concepts with the abstractionist theory used by Boole and traditional Aristotelian logic:

My concept-script commands a somewhat wider domain than Boole’s formula-language. This is a result of my having departed further from Aristotelian logic. For in Aristotle, as in Boole, the logically primitive activity is the formation of concepts by abstraction, and judgment and inferences enter in through an immediate or indirect comparison of concepts via their extensions. . . . As opposed to this, I start out with judgments and their contents, and not from concepts . . . I only allow the formation of concepts to proceed from judgments. (“Boole’s Logical Calculus,” 15–6)

As Frege goes on to explain in the next paragraph of this essay, the priority of the judgment makes possible the enhanced expression of content that comes with the Begriffsschrift’s way of expressing generality.

The $x$ [in ‘$2^x = 16’$] indicates here the place to be occupied by the sign for the individual falling under the concept. We may also regard the 16 in $x^4 = 16$ as replaceable in its turn, which we may represent, say, by $x^4 = y$. In this way we arrive at the concept of a relation, namely the relation of a number to its $4^{th}$ power. And so instead of putting a judgment together out of an individual as subject and an already previously formed concept as predicate, we do the opposite and arrive at a concept by splitting up the content of a possible judgment. (17)
The concepts <4th power>, <4th root of 16>, <base 2 logarithm of 16> are all formed in this example, not by compounding concepts by addition (or inclusion and exclusion), but by starting with a relational judgment, ‘2⁴ = 16,’ and replacing in its linguistic expression one or more constants by variables. When concepts are expressed by relational expressions with one or more constants replaced by variables, it is literally the case that they only appear after a full judgment has been made and various components of the judgment are replaced. In this sense, in Frege’s logic judgments are prior to concepts: concepts like <4th root of 16> are first grasped subsequently to grasping the judgments from which they are extracted. The variables in these extracted concept expressions can then be bound by the sign for generality to form the quantified relational expressions that give Frege’s new logic its great expressive power. Since the same judgment can be decomposed in different ways, a thinker can form the judgment ‘2⁴ = 16’ without noting all of the ways in which the judgment can be decomposed. This in turn explains how the new logic can be epistemically ampliative. It is thus because Frege’s logic allows for this new method of forming concepts from judgments that his logic so far exceeds the traditional logic in the complexity of structures it captures.²³

Frege opposes his priority thesis to the traditional doctrine of concepts with which a traditional logic text (like Kant’s *Logic*) opens. This doctrine of concepts has two interdependent parts. According to the traditional model of the *structure of concepts*, concepts are either simple or are composed of simple concepts by conjunction, disjunction, or exclusion. According to the traditional model of *concept formation*, concepts are formed by noticing similarities or differences among particulars and abstracting the concept, as the common element, from these similarities or differences; compound concepts can arise from simpler concepts either by conjunction, disjunction, and exclusion, or by noticing similarities or differences among concepts and abstracting from these similarities or differences. The theory of concept formation and conceptual structure are two sides of one coin. On this traditional model, all concepts can be placed onto a Porphyrian genus/species tree. These conceptual structures lend themselves to Boolean treatment in terms of conjunction, disjunction, and negation. Specification of a genus can be expressed as the *conjunction* of a genus and differentia: <human> is <rational and animal>. The extension of a genus is *disjoined* into the extensions of its various species: animals are either rational animals or brutes. Since the species of a genus are disjoint, each is then the *negation* of the rest. Concept formation by abstraction, as Kant himself emphasizes in the first Introduction to the *Critique of Judgment*, is the inverse operation to specification. In abstracting, we move, as it were, up the tree.²⁴

Frege thus denies that *any* concept is formed in the way the abstractionist model describes, and he rightly sees the limited expressive power and epistemic value of the traditional logic as bound up with that model. However, Frege’s example from “Boole’s Logical Calculus” does not at first blush substantiate this wholesale rejection. The concepts <4th power>, <4th root of 16>, and <base 2 logarithm of 16> were all formed by replacing constants with variables in the sentence “2⁴ = 16”—but doesn’t grasping this sentence require *already* understanding the proper names “2,” “4,” and “16,” and the concept expressed by “x⁴ = z”? And wouldn’t
this concept have to be formed in some other way, perhaps even by abstraction? As the quoted passages show, Frege does not believe so. However, Frege's precise views on the issue have been the subject of extensive interpretative debate, and I will have to be brief.

Frege allows that some concepts can be first grasped simultaneously with a judgment containing them (“Boole’s Logical Calculus,” 17). Still, though, the process of forming a concept simultaneously with a judgment contravenes the abstractionist model just as much as the process of forming concepts after grasping a judgment containing it. As his examples make clear, to form a concept from a sentence requires seeing the sentence as having certain replaceable components, which amounts to seeing the sentence as standing in certain inferential relations. For instance, to form the concept \(<4^{\text{th}}\) root of 16> in Frege’s example requires seeing the “2” as replaceable, and so the sentence as implying “There is a 4\(^{\text{th}}\) root of 16” and following from “Everything is a 4\(^{\text{th}}\) root of 16.” The same point would hold if a concept were formed simultaneously with a judgment containing it: also in this case, forming the concept would require that a subject grasp a judgment and view the judgment as having replaceable components and thus as standing in certain inferential relations. So (contrary to the abstractionist theory) the concept could not be formed prior to grasping a judgment containing it.

In Frege’s mind, then, the priority of judgment is fundamentally a thesis about how to form concepts. Now it is manifest right away that it will be quite difficult to read Frege’s priority thesis—with Sluga—as derived from Kant’s. Surely Frege’s best known and philosophically richest discussion of the traditional picture of concept formation is from Foundations of Arithmetic §88:

Kant obviously . . . underestimated the value of analytic judgments . . . He seems to think of concepts as defined by giving a simple list of characteristics in no special order, but of all the ways of forming concepts, that is one of the least fruitful. If we look through the definitions given in the course of this book, we shall scarcely find one that is of this description. The same is true of the really fruitful definitions in mathematics, such as those of the continuity of a function. What we find in these is not a simple list of characteristics; every element in the definition is intimately, I might almost say organically, connected with the others. . . . What we shall be able to infer from [a fruitful definition], cannot be inspected in advance; here, we are not simply taking out of the box again what we had put into it. The conclusions we draw from it extend our knowledge, and ought therefore, on Kant’s view, to be regarded as synthetic; and yet they are proved by purely logical means, and so are analytic.

Much of the content of this paragraph appears earlier in “Boole’s Logical Calculus”—a paper whose content Frege reused when it became clear that no journal would accept it. In the parallel passage in the Boole paper, Frege identifies his target as the Aristotelian or Boolean model of concept formation by abstraction, and characterizes his alternative model as one in which judgments are prior to concepts. It is thus because multiple distinct concepts can be extracted from the same judgment that deduction can be ampliative and the analytic judgments of arithmetic can extend our knowledge. In this fuller context, we can present Frege’s fundamental argument in the following progression:
1. Since in the Begriffsschrift judgments are prior to concepts,  
2. concepts expressible in Begriffsschrift are not all formed by simple lists of common characteristics (by abstraction),  
3. and so, some of the concepts expressible in Begriffsschrift have a richer structure than Kant (or Boole and Aristotle) allow for,  
4. and so, there are concepts expressible in Begriffsschrift that are fruitful,  
5. and so, the deductions represented in Begriffsschrift can be epistemically ampliative, unlike the inferences Kant (or Boole and Aristotle) recognize.

As we saw, Sluga claims that Frege’s priority thesis “links Frege to the Kantian tradition in logic,” and we’ve also now seen that it is the priority thesis that makes possible a new way of forming concepts. But it is here Kant himself who is targeted for holding onto the traditional theory of concept formation. Kant was not Frege’s inspiration, but his target.

Frege’s priority thesis is opposed to the theory of concept formation by abstraction. In presenting this thesis as Kantian, Sluga suggests that Kant’s priority thesis was also opposed to the theory of abstraction. Kant, however, in his logic lectures and in his logic text (more or less) repeats the traditional theory of concept formation by abstraction.

To make concepts out of representations one must thus be able to compare, to reflect, and to abstract, for these three logical operations of the understanding are the essential and universal conditions for generation of every concept whatsoever. I see, e.g., a spruce, a willow, and a linden. By first comparing these objects with one another I note that they differ from one another in regard to the trunk, the branches, the leaves, etc.; but next I reflect on what they have in common among themselves, trunk, branches, and leaves themselves, and I abstract from the quantity, the figure, etc., of these; thus I acquire a concept of a tree.  

Kant repeated passages like this in his logic lectures and logical writings throughout the critical period, and he never explicitly suggests that there is any tension between his priority thesis and the theory of concept formation by abstraction. Nevertheless, Kant interpreters have not been of one mind about the seriousness with which we should read Kant’s seeming endorsement of the theory of concept formation by abstraction. One reason for the reluctance to take these passages at face value is an apparent conflict between the theory of abstractionism and Kant’s deeply held view that intuitions, which would have to be the ultimate abstraction base for concepts, must be synthesized into a unity using rules that are themselves supplied by concepts. I believe that this tension is real, and I will argue in part II that Hegel, having noticed this discord within Kant’s thinking about concepts, was led to reject abstractionism and search for an alternative theory of concept formation. But the fact remains: Kant never acknowledged that there is any conflict between abstractionism and any other aspects of his philosophy, he repeated the doctrine on multiple occasions without questioning it, and he never expressed the need for an alternative model of concept formation. Now, as Brandom has argued, if Kant had believed that judgments are prior to concepts in the strong sense that the semantic content of a concept is simply a “node in a network of reasons,” then Kant’s theory
would have ruled out abstractionism immediately: an inferentialist holism is simply inconsistent with the atomism of the abstractionist picture. But Kant’s apparent endorsement should motivate us to look for a weaker reading of Kant’s priority principle that would be consistent with Kant’s texts.

I.2 Burge on Frege’s and Kant’s Priority Principles
Tyler Burge also thinks that Frege’s priority principle is Kantian. On Burge’s view, two key insights of Frege’s were already held by Kant “at least in germ”:

1. “One understands the structural nature of thoughts and components of thoughts . . . by reflecting discursively on a large number of deductive inferences among sentences.”

2. “The key to understanding such structure lies in understanding the contribution of such components to determining truth conditions and to preserving truth in deductive inference.”

These two insights had already been enunciated by Kant, at least in germ [A65–9/B90–4]. Kant held that concepts are essentially predicates of possible judgments. He held that judgment aims at truth and is essentially propositional. Thus, he regarded components of thoughts as having their function and structure only in the context of propositional judgment and inferences among judgments. (Truth, Thought, Reason, 14)

Burge reads Frege as expressing these two insights in a series of notes written very late in Frege’s life.

What is distinctive of my conception of logic is that I began by giving pride of place to the content of the word ‘true,’ and then immediately go on to introduce a thought as that to which the question ‘Is it true?’ is in principle applicable. So I do not begin with concepts and put them together to form a thought or judgment; I come by the parts of a thought by analyzing the thought. (“Notes for Ludwig Darmstaedter” [1919], Posthumous Writings, 253)

Frege gives pride of place to the word “true” because he claims that we understand the structure of a thought by looking at the conditions under which various judgments are true. This means that we analyze sentences into their components based on what inferential relations the judgments as a whole stand in, where these inferential relations are understood in terms of truth-preservation. In this sense, grasp of the inferential relations among judgments is epistemically prior to full grasp of the structure and content of concepts.

Burge is isolating a deep feature of Frege’s thought. How do we identify the correct definition of “natural number”? How do we know that “Prime numbers less than 20 exist” has a different logical form from “Prime numbers less than twenty are odd”? How do we know that words are divided into proper names and typed n-place concept expressions, rather than simply subject and predicate terms? In each of these cases, Frege does not base his answers on the surface grammar of ordinary language, nor on psychological facts about which ideas comes before our minds as we think. Rather, Frege’s method is experimental and pragmatic, noting
inferential patterns and attempting to recast our knowledge as an inferentially ordered structure from basic laws. It is in carrying out this process—which is clearly not distinct from theory-building—that we come to recognize the logical form of our sentences and grasp fully our concepts.\footnote{Burge believes that Frege is expressing these two insights when he claims (in these notes from 1919) that “I do not begin with concepts and put them together to form a thought or judgment; I come by the parts of a thought by analyzing the thought.” This is a plausible reading of these notes.\footnote{Burge, moreover, thinks that the core passages elaborating Frege’s priority principle (written almost forty years earlier!) were meant to express the same thought as these late notes.\footnote{However, it is clear that Burge’s two insights, though complementary to the priority principle (as I have been reading it), are distinct from the thesis about concept formation that we discussed in the previous section. Here the topic is not how concepts are formed (as it was in the core passages on the priority principle from the 1880s), but the rather different question how concepts come to be fully grasped. There the question was How are new concepts formed from a given sentence in Begriffsschrift? Here the question is How is the content of a sentence to be analyzed so as to be translated into a sentence of Begriffsschrift? And even, what justifies Frege in adopting this logical language with this logical grammar, instead of an alternative language with different logical types? Importantly, then, the “pragmatist” epistemology that Burge attributes to Frege could be understood and adopted by someone unacquainted with the Begriffsschrift. The priority principle, on the other hand, since it describes a way of forming concepts from judgments by replacing constants with variables and thereby forming n-place relational expressions, could only be grasped by someone who understood the basic idea of the Begriffsschrift. Nevertheless, we can put aside the justness of Burge’s reading of the passages where Frege puts forward his priority principle and ask a question that for this essay is more pressing: Is the idea that Burge is attributing to Frege Kantian? Burge is surely correct that a central idea in Kant’s Critique is that what distinguishes a judgment from other compound representations is its capacity for being true. In §19 of the B Deduction, Kant criticizes the standard definition of judgment in the German textbook tradition, namely, that a judgment is a “representation of a relation between two concepts” (B140). This definition does not rule out merely subjectively valid relations, which only express associations of ideas. Instead, Kant argues that a judgment is a relation of given representations that is objectively valid (B142), or purports to be true. Objective validity, for Kant, is equated with (the capacity for) truth (A125). So truth distinguishes judgments from other compound representations. But now in what sense are judgments prior to concepts? For Kant, judgments are prior to concepts insofar as it is in virtue of a cognizing subject’s capacity to judge that it has the capacity to have representations that relate to an object. Judgments are, as Kant puts it in 1786, the “act[s] by which given representations first become cognitions of an object.”\footnote{We can get a better sense of why Kant thinks that judgments in particular make possible the relation of representations to an object if we reflect on Kant’s critical notion of an object. At A104, Kant asks, “What does one mean, then, if one speaks...}
of an object corresponding to and therefore also distinct from the cognition?” Here is how he answers:

[O]ur thought of the relation of all cognition to its object carries something of necessity with it, since namely the latter is regarded as that which is opposed to our cognitions being determined at pleasure or arbitrarily rather than being determined *a priori*, since insofar as they relate to an object our cognitions must also necessarily agree with each other in relation to it, i.e., they must have that unity that constitutes the concept of an object. (A104–5)

The relation of a representation to an object brings with it a requirement that different representations agree with one another, or can be combined into a unity. Of the many ways in which representations can be related with one another, Kant thinks that the unity of representations in judgments is unique, in three ways. First, in the judgment $S$ is $P$, for instance, the purported agreement of the judgment with the object referred to by the subject $S$ makes it necessary that $S$ and $P$ not be in conflict with one another. Second, as he makes particularly clear in a late unpublished note, the copresence in an object of various properties is uniquely expressed by the complex of predicates attributable to one and the same subject in various judgments. The requirement that these various predicates be consistent with one another is a kind of subjective correlate to the fact that in an object multiple properties are instantiated together in a unity. Third, Kant claims in the *Prolegomena* that making a judgment brings with it necessary universal validity: when I judge that $p$, I require that other people’s judgments be consistent with my own.

Kant considers and rejects the possibility that other kinds of relations among representations—associations of representations, comparisons of concepts, formations of compound concepts—would be sufficient of themselves to constitute the relation of a manifold of representations to an object. For instance, in a letter from 1792 Kant argues that, though the formation of a compound concept is, in a sense, the production of a unity among representations, it does not bring about the kind of unity that could constitute object-directedness. If I form the concept $<\text{red square}>$, there is nothing preventing me from forming the concept $<\text{red circle}>$, nor would there be any necessity that you not form the concept $<\text{red pentagon}>$.

This does not mean that no other representation besides judgments can relate to objects. In particular, concepts are mediate representations of an object. But it does follow that a concept is essentially “a predicate of a possible judgment,” since a representation is a concept “only because other representations are contained under it by means of which it can be related to objects” (A69/B94): it is only in virtue of being a predicate in a judgment that concepts relate to objects. In a thesis:

Kant’s Priority Thesis: Judgments are prior to concepts because a concept is a mediate representation of an object, and it is in virtue of being combined in judgments that concepts relate to objects.

This is the sense in which judgments are prior for Kant. Not only is this thesis not the same as Frege’s, it is not obvious that one could even infer Frege’s priority thesis from it. Contrary to Sluga’s reading, Kant did not himself put his priority
thesis to use in giving a new theory of how concepts are formed; instead, it says something about what makes it the case that concepts refer to objects. And—as Frege argued in §88 of *Foundations of Arithmetic*—it is because concepts are formed in a certain way that concepts and judgments have the structures that they do. So if Kant’s thesis has no implications for how concepts are formed, it won’t tell us how much about how concepts are structured either.

On Burge’s reading, concepts are epistemically posterior to judgments, because it is only by reflecting on how the truth of sentences is preserved in good inference that we come to fully grasp the parts of thoughts. In attributing the germs of this idea to Kant, Burge claims that for Kant the “components of thought have their function and *structure* only in the context of propositional judgment” (my emphasis). Burge is correct that for Kant the function of a concept—to relate mediately to objects—is possible only in the context of a judgment. But there is nothing in Kant’s discussion to imply that the second conjunct follows from the first.

### 1.3 Kant’s Priority Principle and Frege’s Context Principle

Frege famously claimed that “it is only in the context of a proposition that words have meaning” (*Foundations of Arithmetic*, §62). This principle, when understood as a thesis about Fregean Bedeutung, is a semantic priority thesis, and is plausibly quite close to Kant’s idea that concepts relate to objects in virtue of their being combined in judgments. Am I then downplaying the relationship between Kant’s thesis and Frege’s philosophy by not looking at the context principle?

Let me note first that, even if Frege’s context principle were quite close to Kant’s priority principle, it would not follow that Frege’s priority principle is. This is because Frege’s priority principle is not identical to the context principle. The priority principle only holds of concept expressions, whereas the context principle makes a claim about all words. (And Frege, always at pains to emphasize his concept/object distinction, is careful to use the priority principle only when discussing the formation of expressions for concepts.) Nevertheless, Frege clearly thought of the context principle as in some sense an extension of the priority principle. Frege wrote in his letter to Marty (quoted above on p.2), “I do not believe that concept formation can precede judgment because this would presuppose the independent [or “self-subsistent,” *selbständig*] existence of concepts.” Frege used very similar language when employing the context principle in §60 of *Foundations*. After arguing that every number is a “self-subsistent object” [*selbständiger Gegenstand*], Frege clarifies:

> The self-subsistence [*Selbständigkeit*] which I am claiming for number is not to be taken to mean that a number word signifies something when removed from the context of a proposition, but only to preclude the use of such words as predicates or attributes, which appreciably alters their meaning.

It is not surprising, then, that Burge (like many other readers) sees a strong connection between Frege’s context principle and his priority principle. Though Burge takes the two insights discussed in the previous section to be articulations of Frege’s priority principle, he nevertheless argues that thesis #1—that we understand the
structural nature of thoughts and components of thoughts... by reflecting discursively on a large number of deductive inferences among sentences”—is “closely associated” with Frege’s context principle. Indeed, he believes that Frege’s (weak semantic) thesis that a word has meaning only in the context of a sentence “provides a philosophical rationale” for his (epistemic) thesis #1.46

I have already expressed skepticism that Kant’s weak semantic thesis implies Frege’s epistemic priority thesis, even when interpreted as Burge’s thesis #1. And this is also not the occasion to give and defend a full reading of Frege’s context principle—let alone his conception of the “self-subsistence” of objects. Nevertheless, given the prominence of readings that closely connect Frege’s context principle with the priority principle, and of readings that find Kantian roots for the context principle, some remarks are in order.

Frege employs his context principle in the body of *Foundations of Arithmetic* in §60 and §62. In §60, Frege uses the principle to defend and clarify his thesis that numbers are objects. He defends his thesis by arguing that, when we consider the meaning of a number word in the context of a sentence, we can hold that numbers are objects without being pushed into the implausible view that they must be internal images. He clarifies his thesis by arguing that, on his conception of objecthood, the “self-subsistence” characteristic of objects should be understood by comparing the roles of proper names and concept words in sentential contexts. As Frege understands it, then, the context principle is inexplicably linked with his distinction between concepts and objects, and with his new “logical” conception of objecthood.47

Frege’s distinction between concepts and objects, and his logical conception of objecthood, are also implicated in the new method of concept formation that Frege articulates in his priority principle. This method introduces a kind of expression—those expressions that can be formed from complete judgments by replacing constants with variables—that is distinct from proper names, which contain no unbound variables. The priority principle thus helps explain the logical difference between proper names (which name self-subsistent objects) and concept expressions (which name non self-subsistent concepts). The greater expressive and inferential power of the logical language that results from the priority principle then demonstrates that this distinction among expressions is well-motivated. As Frege employs it in §60, the context principle bids the reader to understand Frege’s thesis that numbers are self-subsistent objects using this logical notion of objecthood (as what is named by proper names) and not some psychologistic substitute. In this way, the context principle extends the priority principle, and it is for this reason that Frege describes both the priority principle and the context principle as grounding the self-subsistence of objects but not concepts.

Given the role that the context principle plays in Frege’s argument in *Foundations*, it is very significant that in §89 Frege takes Kant to task for confusing the very points that in §60 the context principle was meant to secure. He complains that Kant’s concept/object distinction is confused, that Kant’s notion of an object is different from his own, and that Kant therefore mistakenly denies that numbers are objects.
I must also protest against the generality of Kant's dictum [A51/B75]: without sensibility no object would be given to us. Zero and one are objects which cannot be given to us in sensation. [...] Perhaps Kant used the word “object” in a rather different sense; but in that case he omits altogether to allow for zero and one, or for our \(\infty_1\),—for these are not concepts either, and even of a concept Kant requires that we should attach its object to it in intuition.

Frege is correct in noting these very fundamental differences.\(^48\) Kant denies that numbers are objects.\(^49\) He thinks of objects as that to which all of our (cognitive) representations refer, and conceives of every component of a judgment as a concept. On Frege's view, then, Kant's distinction confuses the difference between unsaturated and saturated things with the difference between a representation and what it refers to. Indeed, from Frege's point of view, Kant makes these confusions because he did not have Frege's context principle.

Frege invokes the context principle for a second time in §62. There he writes:

> How, then, are numbers to be given to us, if we cannot have any ideas or intuitions of them? Since it is only in the context of a proposition that words have any meaning, our problem becomes this: To define the sense of a proposition in which a number word occurs.

Frege's thought is that, if we have given a sense to every sentence in which a number word occurs, we have thus given a sense to the number word itself. In so doing, we have secured that the numbers are given to us—in the only sense of “given” that the context principle requires. We do not need a further story (or a further set of conditions) to make it possible that the mind can come into cognitive contact with the numbers.

Who would be an example, for Frege, of a philosopher who thinks it necessary to have an account of how objects, outside of the context of a sentence, could be given to us? Again, Foundations §89 makes it clear that Kant’s requirement that all objects be given to us through sensibility is just such a violation of the context principle. In the case of the context principle, then, just as with the priority principle, Kant is not Frege's inspiration, but his target.

Indeed, there is a significant disanalogy between Frege's conception of the role of concept-expressions in sentences and Kant's conception of the role of concepts in judgments—a disanalogy traceable to Kant's distinctive understanding of a judgment. Admittedly, both Frege and Kant think that conceptual expressions or representations refer to something in virtue of the fact that they play a role in judgments (or sentences). On Kant's view, however, concepts relate to objects in judgments only mediately, through intuitions being subsumed under them. “In every judgment,” he writes, “there is a concept that holds of many, and that among this many also comprehends a given representation, which is then related immediately to the object” (A68/B93). As Kant makes clear in surrounding sentences, “no representation pertains immediately to the object except intuition alone,” and “we cannot partake of intuition independently of sensibility.” So, for example, in the judgment “All bodies are divisible,” the concept <divisible> is related to objects through a chain of representational connections: <divisible> is related back to
the concept \(<body>\) through predication; the concept \(<body>\) then is related to the various intuitions of bodies that are subsumed under the concept; and these (sensible) intuitions then relate immediately to objects—that is, to the given bodies that affect our sensibility. Thus, the requirement that concepts be related to objects only through sensibility is built into Kant’s priority thesis. But that requirement is opposed to Frege’s context principle.

II.

Our argument thus far has been negative: Kant’s priority thesis is not identical to Frege’s priority thesis, and there is apparently no argument using premises Kant would accept that would allow us to infer from Kant’s priority thesis to Frege’s priority thesis. Nevertheless, there is a clear historical development beginning with Kant’s priority principle and ending with Frege’s. In the rest of this paper, I am going to trace out the outlines of this development in five steps. The story I will tell is specifically how the priority thesis, as a thesis about object-directedness, came to be seen as a thesis with implications concerning the formation of concepts and the structure of concepts, judgments, and inferences.

Let me emphasize that my five-step historical story is not a historical reconstruction of how Frege himself came to his priority principle. Though there is conclusive evidence that Frege studied Trendelenburg’s and Lotze’s logical writings, there is little evidence that Frege read Kant widely or sensitively. But regardless of who influenced whom when, I think there is little doubt that Frege’s frequent invocation of the priority principle in his early writings was intended as a way of engaging with some of the issues most widely discussed by Frege’s contemporaries, and a way of presenting his own work as advancing those debates. I think it is in keeping with Frege’s intentions, then, to engage these early writings in just this spirit.

STEP #1 (Hegel): Kant’s priority thesis is inconsistent with the theory of concept formation by abstraction.

The first two steps in the historical development from Kantian priority to Fregean priority were taken by Hegel. Hegel is not often spoken of in histories of logic, and his hostility to symbolic logic is legendary. But Hegel was a sensitive reader of Kant, and he exerted a strong and unexpected influence on subsequent German logicians. This is especially so, I think, with respect to the theory of concept formation by abstraction.

Hegel believed that Kant’s official view is that concepts are formed from intuitions or lower concepts from abstraction.

The conception of this relation [of the Notion to intuition] both in ordinary psychology and in the Kantian transcendental philosophy is that the empirical material, the manifold of intuition and representation, first exists on its own account, and that then the understanding approaches it, brings unity into it and by abstraction raises it to the form of universality. The understanding is in this way an intrinsically empty form which, on the one hand, obtains a reality through the said given content and, on the other hand,
Nevertheless, Hegel thinks that contained within Kantian philosophy, specifically within the Kantian notions of synthesis and the synthetic unity of apperception, is the beginning of a new understanding of how concepts are formed, which will overturn the traditional abstractionist theory.54

This original synthesis of apperception is one of the most profound principles for speculative development; it contains the beginning of a true apprehension of the nature of the Notion and is completely opposed to that empty identity or abstract universality which is not within itself a synthesis. (Logic, 589; Werke 12:22)

At A105, which we quoted earlier, Kant claims that the concept of an object is constituted by a certain kind of unity among our representations—a unity that is produced when the understanding combines together its various representations in a mutually coherent whole. Kant’s word for this combination is “synthesis.” On the abstractionist view, representations of particulars are treated as given, and the sole role of the faculty of concepts is to take these given representations and raise them to a more general form. But this view simply presupposes that there are representations of particulars (as Hegel puts it: that there are intuitions “existing on their own account”), and it does not consider the prior question: What makes it the case—that is, what syntheses are carried out—so that representations of particulars are possible? Kant answers his own question:

Hence we say that we cognize an object if we have effected synthetic unity in the manifold of intuition. But this is impossible if the intuition could not have been produced through a function of synthesis in accordance with a rule that makes the reproduction of the manifold necessary a priori and a concept in which this manifold is united possible. (A105)

Intuitions do not “exist on their own account” prior to the formation of concepts: they are produced by means of a concept, which provides a rule for the synthesis of the manifold in an intuition. To possess a concept, then, is to have the capacity to combine intuitive representations so as to bring about a certain kind of cognitive unity. (That is, concepts rest on functions.) The critical concept of an object, that in which the manifold of representations is synthetically united, forms the middle term between Kant’s priority thesis and his doctrine of concepts as resting on functions. Concepts are related to objects because they can be combined in judgments that are objectively valid; intuitions are related to objects because the manifold contained in an intuition is combined according to a certain rule provided by a concept.

This line of reasoning is fatal to the view that all concepts are formed by abstraction. If, in order for a representation to be of an object, it needs to be combined according to some concept, then there cannot be an intuitive representation—a singular representation of an object—prior to all concepts. To use Kant’s example, if the concept <tree> could be formed from the given concepts <spruce>, <willow>, and <linden>, there would need to be some explanation of the given representations from which these lower concepts could be formed. If these lower
concepts could be formed from given intuitions, the argument just canvassed forces us to find some concept that provides a rule for my synthesis of the manifold in these given intuitions. And so, on pain of an infinite regress, there must either be innate concepts or at least some concepts not formed by abstraction. Given Kant’s opposition to innate representations, there must then be some other way of forming concepts besides abstraction.\textsuperscript{55}

**STEP #2 (Hegel): The theory of concept formation by abstraction does not discriminate between essential and inessential concepts.**

In the same pages in which Hegel is turning the Kantian idea of synthesis against the theory of concept formation by abstraction, Hegel intertwines a separate objection to the traditional model, an objection that he does not clearly separate from the first. When we form a concept and predicate it of an object, we want to represent the object through its essential properties, that is, we want to predicate of it a concept that explains what the thing really is.\textsuperscript{56} But the procedure of comparing, reflecting, and abstracting to form common concepts does not have the resources to discriminate between essential marks and any randomly selected common feature.

Of course, if what is taken up into the Notion from the concrete phenomenon is to serve only as a \textit{mark} or \textit{sign}, it certainly may be any mere random sensuous particular determination of the object, selected from the others on the basis of any random external interest and of a similar kind and nature as the rest.\textsuperscript{(Logic, 588; Werke 12:21)}

Picking up Hegel’s point later in the century, Lotze claimed that the theory of abstraction would not rule out such degenerate concepts as the common “concept” \textless red, juicy, edible, body \textgreater which is formed by abstraction from the representations of cherries and raw meat (Lotze, \textit{Logic}, §31).

In the appendix to the Transcendental Dialectic in Kant’s \textit{Critique of Pure Reason} (A642–68/B670–96) and again in the introductions to the \textit{Critique of Judgment}, Kant recognizes that the process of concept formation by abstraction does not guarantee that the concepts picked out will be explanatory. Kant argues that we require a further transcendental principle—what in the third \textit{Critique} he calls a principle “of the purposiveness of nature”—to make it possible that our empirical concepts and scientific laws together have the kind of systematicity that in the first \textit{Critique} he says our reason demands. This search for systematicity depends on there being other a priori principles for our concept formations (what Kant calls “reflective judgments”)—principles like Occam’s razor.\textsuperscript{57} These principles together provide rules for concept formation (“Look for concepts that can be used in laws in a systematic theory”) that will rule out degenerate concepts like Lotze’s. But though these principles are a priori, they are not—like the principle of causality—derivable from Kant’s principle of the priority of judgments. And, unlike Hegel, who advocates a different method of forming concepts to supplant the theory of abstraction, Kant does not see these principles as a replacement for the traditional model of concept formation; he sees these principles as supplementing the traditional model and securing its possibility.\textsuperscript{58}

Within the intellectual space of Kant’s own philosophy, Hegel’s second step in no way follows from the first. The first step describes a condition of the possibility
of experience, and thus a condition on the understanding—the faculty to judge. The second step proves the necessity of principles to secure the possibility of systematic experimental science. These principles are not derivable from the priority principle because they are, for Kant, principles of reason, not of the understanding: they are not constitutive principles of experience, but merely “regulative.”

However, for Hegel—ever skeptical of Kant’s dualisms of understanding and reason, the constitutive and the regulative—there is no firm boundary between logical principles, principles of the pure understanding, and Kantian regulative principles. Within Hegel’s world, then, both the regulative principles and the constitutive principles could be seen as falling out from the demand for unity that makes object-directedness possible.

STEP #3 (Trendelenburg): Concepts structured in the traditional way as sums of marks will not be explanatory, and syllogisms containing these concepts will be valueless.

The addition of the second step to the first goes a long way to explaining why passages like Frege’s *Foundations* §88 came to sound like developments of the Kantian priority thesis. But we are really still quite far from Fregean priority. Hegel was critical of the philosophical significance of the traditional logic (he called it “dead bones”) and he criticized the theory of concept formation by abstraction. But Hegel did not draw any connection between the explanatoriness of a concept and its structure, nor between the triviality of the traditional logic and the comparatively simple structure of syllogistic. It was Trendelenburg—in his *Logical Investigations* (1840/1870) and his famous essay on Leibniz’s Universal Characteristic (1867)—who took the argument one step further and claimed that it was also the structure of concepts in the traditional logic that was preventing it from picking out explanatory concepts.

Trendelenburg, who thought of himself as reviving the Aristotelian conception of logic in the face of its perversion in Kantian philosophy, took Hegel’s objections in a more explicitly Aristotelian direction. For Trendelenburg, a concept is not just a general representation; it is a representation that “contains the ground of the things falling under it” (*Investigations*, 18–19). The relation between a genus and a species is not simply a quantitative relationship, where the lower concept (the species) is a part of the extension of the higher concept (the genus). Rather, the higher concept is to provide the “law” for the lower concept. (Think of Aristotle’s claim in the *Posterior Analytics* (I.2) that in a demonstration the premises of a syllogism must be prior to the conclusion and must give the cause of the conclusion.) When the subordination of concepts is thought of in a merely quantitative way, the syllogism will not express grounding relations among truths, and “the value of the syllogism as a grounding of the thing remains more than doubtful” (*Investigations*, 20).

It is because logicians have ignored the true nature of the concept, as providing the ground or law of the things that fall under it, that logicians have represented concepts as a sum of marks, and employed algebraic signs to represent the structure of compound concepts (*Investigations*, 20; “Leibniz’s Universal Characteristic,” 24). But it is not sufficient to represent <human> as <animal> + <rational>.
In such a composition lies indeed an essential error. For the marks that we distinguish in a concept have a particular interconnection among themselves. This organic bond, through which the streaming life of the whole is designated, is destroyed in such a composition and turned into a mere sum of external marks. It is not sufficient in the [concept] human to add the mark animal to the mark rational. The essential relation of the two marks to one another is thereby neglected, namely how the animal life constitutes the foundation of the rational life. (Investigations, 216)

STEP #4 (Lotze): Concepts can be explanatory if and only if they are structured in a way that is more complicated than the traditional Aristotelian logic allows.

Trendelenburg enriched Hegel’s argument that the traditional model of concept formation by abstraction is insufficient for discriminating between essential and inessential marks by arguing that no truly explanatory concept could be structured in a way representable by multiplication, addition, and subtraction. But Trendelenburg thought that syllogistic could be saved from triviality if the machinery of Aristotelian logic was placed within the frame of an Aristotelian conception of science and an Aristotelian metaphysics. He recognized that in important compound concepts, the component parts are interdependent on one another, but he rejected the possibility that a richer logic or a more sophisticated symbolism could capture those organic interconnections.

Lotze, on the other hand, thought that a richer, more sophisticated logic would be able to avoid the problems in the traditional logic that Hegel and Trendelenburg identified. In his 1874 Logic, Lotze argues that the theory of concept formation by abstraction is true only of simple concepts and concepts that lack explanatory value. Concepts formed from abstraction, he argues, fail to be explanatory because they have such a simple structure: in abstracted concepts, a series of marks is simply summed or listed, instead of being connected together in some more determinate way.

Lotze therefore replaces the model of the concept as the sum of its marks with what he calls the “functional” model, where the structure of the concept is expressed by some complicated interrelation between its marks: the content of the whole concept is some nontrivial function of the content of the component concepts.

As a rule, the marks of a concept are not coordinated as all of equal value, but they stand to each other in the most various relative positions, offer to each other different points of attachment, and so mutually determine each other; . . . an appropriate symbol for the structure of a concept is not the equation \( S = a + b + c + d \), etc, but such an expression as \( S = F(a, b, c, \text{etc.}) \) indicating merely that, in order to give the value of \( S \), \( a, b, c, \text{etc} \), must be combined in a manner precisely definable in each particular case, but extremely variable when taken generally. (§28)

In the functional model, the marks are interdependent and vary together according to a rule. Every concept or particular that falls under a concept \( S = F(a, b, c, \text{etc.}) \) has its own specific way of being an \( S \) and exhibiting the marks of \( S \); still, though, how a particular \( S \) exhibits a mark will in general be determined by how it exhibits other marks.
Consider an actual mathematical function, which provides the model for Lotze. At each particular point on a plane curve of second degree, for example, \( a_2x^2 + a_1x + b_2y^2 + b_1y + cxy + d = 0 \), its ordinate(s) \( y \) is determined by its abscissa(s) \( x \). The two different component concepts—the \( x \) value and the \( y \) value—are not just listed, they are interrelated in a precise way. Concepts formed by interrelating component universals like interdependent variables in a function can be explanatory, then, because the dependence of one thing on another is modeled by the functional dependence of component concepts on one another.

STEP #5 (Lotze): Concepts are structured in richer than Aristotelian ways only if they are formed, not by abstraction, but from compound judgments. We can isolate these various structures by reflecting on the various kinds of non-syllogistic inferences.

Lotze agrees with Trendelenburg that the kind of inferences represented by syllogisms will be simply trivial and will not expand our knowledge if the concepts contained in the judgments making up the inference are structured as sums of marks. Unlike Trendelenburg, though, Lotze thinks that there are in mathematics kinds of inferences more sophisticated than syllogisms, and that it is only in these distinctly mathematical inferences that the full resources of the functional interdependence of concepts in judgments are exploited.

The above considerations have taught us that there have to be still other logical forms of thought beyond the Aristotelian figures of the syllogism, forms that provide for the first time a fruitful application to the content of knowledge. [...] Every inference should be an acquisition of new knowledge from the premises, from which this knowledge comes to be, although it is not already contained in them analytically. [...] When the mind seeks a necessary law in the combination of manifold marks, it first believed it could find it in that general concept, but this concept itself came to be only through summing marks, and we can therefore not ground a conclusion through this without surreptitiously presupposing the thing we are seeking. [...] We have sought to compensate for this deficiency of the subsumptive mode of inference through the assumption of [functional] concepts; but in order to find these concepts and their logical form, we must oppose the Aristotelian figures with a series of different [inferences], which are grounded on the content of concepts.65

Lotze devotes a good number of pages in his treatment of inference cataloguing the various kinds of non-syllogistic inferences employed in mathematics. And since the complexity of the structures of mathematical concepts becomes apparent only in the context of these more complex inferences, Lotze’s discussion of the various types of non-syllogistic inference thus runs parallel to a discussion of correspondingly different kinds of non-Aristotelian conceptual structure. Lotze thus thinks that he has arrived at a new “top-down” theory of concept formation: since for each kind of functionally compound concept there is a corresponding type of non-syllogistic inference, these concepts will not be formed prior to the judgments containing them, but after (§8).

In Lotze’s functional theory of the concept, then, we have an argument with the same form as our now familiar argument from Frege’s Foundations §88:
1. Since judgments are epistemically prior to concepts,
2. not all concepts are formed by abstraction,
3. and so, some concepts have a richer structure than Kant (or Boole and Aristotle) allow for,
4. and so, some concepts are fruitful,
5. and so, deductions can be epistemically ampliative, unlike the inferences Kant (or Boole and Aristotle) recognize.

Before Frege’s Begriffsschrift, Lotze had sketched out a new way of forming concepts from judgments, and he had presented a sequence of argumentation with the same basic structure as Frege’s famous objection to Kant. But though Lotze had a rough idea of a program for a new logic, Frege had in his Begriffsschrift the thing itself. Lotze’s logic remains wedded to the subject/predicate analysis of sentences; Frege, on the other hand, has the resources to logically decompose a complex sentence in a variety of ways and to exploit the possibility of multiple decomposition to introduce his polyadic quantification theory. Before Frege, no philosopher had even come close to appreciating the revolutionary potential of the possibility of multiple decompositionality. (Indeed, I suspect, that it is no coincidence that this insight required ultimately not a philosopher, but a mathematician.)

I argued in the first half of my paper that Frege’s epistemic priority thesis—as a thesis about how concepts are formed from judgments—cannot be derived within Kant’s philosophy from Kant’s semantic priority thesis. I hope that my abbreviated historical narrative has now made this claim more plausible. Frege’s priority thesis was intended to overthrow the theory of abstraction, and it was in his eyes a necessary step in discovering an entirely new logic. Kant did not draw these further revolutionary conclusions, but it is not that Kant simply failed to notice the consequences of his own view.66

Notes

1 For the Critique of Pure Reason, I follow the common practice of citing the original page numbers in the first (“A”) or second (“B”) edition of 1781 and 1787. Citations of works of Kant besides the Critique of Pure Reason are according to the German Academy (“Ak”) edition pagination: Gesammelte Schriften, edited by the Königlich Preußischen Akademie der Wissenschaften, later the Deutschen Akademie der Wissenschaften zu Berlin.


Sullivan, “Frege’s Logic,” 699, calls the priority principle Frege’s “central logical innovation” that “inaugurated quantificational logic.”

Peter Sullivan (“Frege's Logic,” 689) writes:

Before writing *Begriffsschrift* Frege had studied only a very little philosophy. Yet with his narrowness of focus, and a remarkable conciseness of thought, he seems to have extracted from that study a profound diagnosis of the failure of a tradition extending over several centuries to make any significant advance on the logical problems that concerned him. The diagnosis was that the tradition had reversed a crucial priority, and Frege set down his correction of that reversal as a central plank of his new approach: “I start out from judgements and their contents, not from concepts.”

As the story I will tell in section II will make clear, Sullivan is seriously underestimating the philosophical work that was done by Kant and his successors to prepare the way for Frege’s new logic.


Commentary to Kant’s *Critique of Pure Reason*, 181. Kemp Smith thus reads the priority principle as already present in the pre-critical Kant (see Kant, Ak 2:47).

*Kant’s Metaphysic of Experience: A Commentary on the First Half of the Kritik der reinen Vernunft*, vol.1, 250–1. Longuenesse (Capacity to Judge, 122) attributes a similar position to Moritz Steckelmacher.

The Revolutionary Kant: a Commentary on the *Critique of Pure Reason*, 264.

Kant and the Capacity to Judge, 92.

*Having the World in View*, 35. On p.6, McDowell claims that this Kantian priority thesis was later expressed by Sellars, for whom an intentional representation is one which requires and provides reasons (Sellars, “Empiricism and the Philosophy of Mind,” §36), and judgments are the sorts of things that provide and require reasons (Sellars, “Kant’s Theory of Experience,” 638–9). See also Longuenesse, *Human Standpoint*, 20; Brandom, *Reason in Philosophy*, 44.

“The Role of Imagination in Kant's Theory of Experience,” §48; cf. “Kant’s Transcendental Idealism,” 406, 8; “Some Remarks on Kant’s Theory of Experience,” 272–3, 9. McDowell also ascribes this view to Kant (Having the World in View, Essay 2), and he suggests that the fact that intuitions and judgments have a common content and form follows from the fact that the intentionality of a representation depends on judgment. McDowell further argues that Sellars in *Science and Metaphysics* does not fully endorse this principle, but instead mistakenly attributes to Kantian intuitions a kind of “proto-conceptual” content.

Reason in Philosophy, 14, 41; at Mighty Dead, 30, Brandom seems to read Kant’s priority principle as a commitment to “inferentialism,” a view that reduces representational content to role in reasoning. Brandom thus reads Kant’s idea that “concepts rest on functions” as the view that the content of a concept consists in its role (or function) in making judgments and drawing inferences (Mighty Dead, 21; Reason in Philosophy, 33). A similar reading of Kantian conceptual contents is given by Pierre Keller, Kant and the Demands of Self-consciousness, 24, 37.

Frege, 55; “Frege against the Booleans,” 87. Graham Bird seems also to endorse the idea that for Kant concepts are formed from analyzing them out of previously grasped judgments (Revolutionary Kant, 264)—though he also sometimes suggests the third and sixth readings in my list. Brandom thinks that the doctrine that concepts are gained by analysis from previously grasped judgments is part of the priority principle (and he attributes this view to Frege: Mighty Dead, 238–9), but he thinks that Kant did not really tell a story about where “determinate” concepts come from (Reason in Philosophy, 66).

Bird, Revolutionary Kant, 264; Brandom, Mighty Dead, 30; Keller, Kant, 59–64; McDowell, Having the World in View, 26, 34; Sluga, Frege, 92.

Kemp Smith, Commentary, 181; Paton, Commentary, 250–1. For Longuenesse, “the operation of comparison/reflection/abstraction is indeed the discursive act par excellence, through which the very form of conceptual universality is produced, whichever kind of concept we consider” (Capacity to Judge, 128). In his early work, Sellars argues that Kant’s philosophy is inconsistent with the “abstractive theory of concept formation in all its disguises” (“Phenomenalism,” 90), though later he argues that “Kant clearly does not reject abstractionism lock, stock and barrel” (“…this I or he or it (the thing) which thinks…”, 11). For Sellars, this issue is intertwined with the earlier question (see note 13) whether an intuition has content that—though formed only under the prior grasp of the forms of judgment—is proto-conceptual and thus able to be the material for abstraction.
This is a natural reading for those who connect the priority principle with the “unsaturatedness” of functions, and read the latter in a metaphysical way. See Bell, Frege, 71. Sluga, Frege, 92. (In fact, both Bell and Sluga read the principle as also having semantic and epistemic implications.)

(Admittedly quite diverse) examples of epistemic readings are provided by Burge, Truth, Thought Reason (discussed in §1.2 of this paper), and Dummett, Interpretation (280ff., 537ff.). See also Sullivan, “Frege’s Logic,” 695–701.

Brandom attributes inferentialism to Frege in “Replies,” 187; Mighty Dead, 57–8; Articulating Reasons, 60–1.

In Basic Laws §32, Frege says that the sense of a word is its contribution to the sense of the sentence containing it. Brandom reads this as another expression of the priority principle (“Replies,” 184; Mighty Dead, 63), and he suggests that this is a reduction of word meaning to sentence meaning. Neither of these readings is forced on us. As Burge points out (Truth, Thought, Reason, 88), one need not read Basic Laws §32 reductively, as if we could have a notion of what it is for a sentence to have a meaning entirely independently of knowing what it is for a word to have a meaning. (Burge puts the point in terms of meaning, instead of sense; but his point holds in either case.) After all, Frege may just be saying that the notion of word-meaning and the notion of sentence-meaning are mutually elucidatory.

Such a reading is provided by Sullivan, “Frege’s Logic,” 693. (Under the assumption that relation to an object is part of the content of a representation, reading #5 (but not #7!) of Kant’s priority principle is an example of a weak semantic priority thesis.)

Thomas Rickett’s widely discussed reading does not fit into my four classes. For him, Frege’s priority principle asserts that “ontological categories are wholly supervenient on logical ones” (“Objectivity and Objecthood,” 66). I discuss Rickett’s reading in notes 31, 50, and 53 below.

Frege follows the traditional way of speaking and often talks—as he does when expressing the priority principle—of concept “formation,” though when he is being more careful he prefers to talk of “grasping” a concept (“Law of Inertia,” in Collected Papers, 133). This is because the phrase “concept formation” suggests the un-Fregean metaphysical view that a subject, in first grasping a concept, brings the concept into being. For him, a thinker no more forms a concept than Columbus formed the West Indies. Since the texts I consider here are before Frege draws the Sinn/Bedeutung distinction, I will talk as Frege did then of ‘concepts’ where Frege would later have said ‘sense of a concept word.’ Similarly, though Frege often preferred (especially later) to talk of sentences and concept-expressions, Kant spoke of judgments and concepts. To avoid clutter, I’ll often move back and forth between talking about linguistic items and mental representations where it does no damage to do so. Last, Frege would have objected to confusing a thought with a judgment (which is on his view the acknowledgement of the truth of a thought). Though these distinctions are fundamental for Frege’s philosophy, it will do no damage in this paper to blur them.

See Sullivan, “Frege’s Logic,” 694–9 for a detailed explanation of this point.

Ak 20: 214–5. The interdependence within the tradition of the abstractive theory of concept formation and the theory that concepts are roughly Boolean combinations of marks explains why Frege will move back and forth between describing Boolean concept formation as based on abstraction, and as based on algebraic operations (+, ×, −) on given concepts.

As I read him, then, Frege does not believe that a judgment could be grasped prior to grasping any concepts it contains. Given Frege’s connection between seeing a judgment as articulated into a function and argument and seeing its inferential relations, this would require grasping a judgment without having any sense of what it follows from or implies—in clear violation of Frege’s deep-seated association of conceptual content with inferential potential. See e.g. Begriffsschrift §3 (in Conceptual Notation). This, I believe, is why Frege allows that some concepts can be formed simultaneously with grasping a judgment. To clarify: I am only claiming that it is contrary to Frege’s views to allow that one could grasp a judgment without having any sense of what it follows from or implies; I am not endorsing the strong semantic reading that conceptual content for Frege can be reduced to inferential role, and I am not attributing to Frege the implausible view that grasping a judgment requires knowing everything that it follows from or implies. For a similar reading, see James Levine, “Analysis and Decomposition in Frege and Russell,” §V.
My interpretation is contrary to Hans Sluga’s claim that for Frege one could grasp a judgment initially as unarticulated (“Frege and the Rise of Analytical Philosophy,” 483ff.). This reading seems to me, as I’ve been arguing, contrary to Fregean principles, besides being philosophically unattractive and inconsistent with Frege’s words (“Boole’s Logical Calculus,” 17). However, I contend that I can consistently deny Sluga’s reading without endorsing Dummett’s suggestion that the priority principle is a limited doctrine, applying only to “complex” concepts and not to “simple” concepts like \(x^y = z\) (Interpretation, Chs.15–6). For a defense of the viability of this middle position, again see Levine, op cit, §III.

26 I therefore read Frege’s statements of the priority of judgment, quoted on page 2, as applying to all concepts (as Frege’s wording clearly indicates), and not just to “complex” concepts, as Dummett maintains. Dummett believes that certain simple concepts could not in principle be formed by decomposition from judgments, since to grasp the judgment at all requires grasping its simple components and the particular way they are composed to form the whole judgment. As I interpret him, however, Frege allows that a concept grasped simultaneously with a judgment containing it could have been grasped subsequently to it. This would be possible if the judgment containing it were initially grasped as articulated in some other way; and Frege allows that this is always possible, since he “do[es] not believe that for any judgeable content there is only one way in which it can be decomposed, or that one of these possible ways can always claim objective preeminence” (“Letter to Marty,” 100).

27 For this reason, readings of the principle (like Ricketts’s) that give little attention to the theory of concept formation cannot be the full story about what Frege intended in these key passages.

28 “All these concepts have been developed in science and have proved their fruitfulness. Fruitfulness is the acid test of concepts, and scientific workshops the true field of study for logic. Now it is worth noting in all this, that in practically none of these examples is there first cited the genus or class to which the things falling under the concept belong and then the characteristic mark of the concept, as when you define ‘homo’ as ‘animal rationale’, […]”

29 “If we look at what we have in the diagrams, we notice that in both cases the boundary of the concept, whether it is one formed by logical multiplication or addition, is made up of parts of the boundaries of the concepts already given. This holds for any concept formation that can be represented by the Boolean notation. […]

30 “It is the fact that attention is principally given to this sort of formation of new concepts from old ones, while other more fruitful ones are neglected, which surely is responsible for the impression one easily gets in logic that for all our to-ing and fro-ing we never really leave the same spot.” (33–4)

31 For a detailed explanation of how multiple decompositionality explains the epistemic ampliativity of deductive inference, see Dummett, Frege: Philosophy of Mathematics, 36–42.

32 Kant, Logic, §6. Often referred to as ‘The Jäsche Logic,’ this work was published during Kant’s lifetime and with Kant’s permission, in 1800, by Kant’s student Gottlob Benjamin Jäsche, who compiled it based on the notes that Kant provided him.

Some Kant interpreters reject appealing to Kant’s Logic, because they do not regard it as a genuine work of Kant’s. However, such a view does not give a reason to doubt that Logic §6 reflects Kant’s own views. First, passages very similar to this one appear in the notes from Kant’s logic lectures (see e.g. Vienna Logic Ak 24:907–8). Second, in these lectures and even in Logic §6, Kant frequently criticizes Meier’s textbook, so it is implausible that Kant was uncritically repeating material in these lectures that he did not himself endorse. Third (and most telling), Kant in his other works clearly alludes to the theory of concept formation by comparison, reflection, and abstraction (e.g. Ak 20: 212n).

As an anonymous referee has pointed out to me, an alternative deflationary reading of these passages would be to read Kant as an abstractionist about compound concepts only, leaving open the possibility of a more Fregean story about the formation of simple concepts. Unfortunately, this otherwise appealing alternative founders on philosophical and textual grounds, as Ginsborg has convincingly shown (“Thinking the Particular as Contained Under the Universal,” 39).

31 See notes 16 and 17. Pippin (Kant’s Theory of Form, 116ff.) thinks that Kant does endorse the abstractionist theory, though he thinks that there is no way to square abstractionism with the doctrine of the Deduction. Michael Friedman (“Logical Form and the Order of Nature”) presents a related view. Among earlier commentators, Ernst Cassirer bases his reading of the central arguments of the Critique (in Erkenntnisproblem II, and “Kant und die moderne Mathematik”) on the organizing idea that Kant
is rejecting the traditional model. Ginsborg argues that the abstractionist account given in the Logic would be viciously circular if it were read as an account of how a subject first comes to acquire empirical concepts, and so cannot be Kant’s answer to the question of how empirical concepts are first formed, but instead an explanation of how concepts can be clarified or made explicit. (See “Aesthetic Judgment and Perceptual Normativity”; “Lawfulness without a Law”; “Thinking the Particular.”)

32 Tales of the Mighty Dead, 30.

33 Burge expresses a similar sentiment on p.262: “What is original about Frege’s interpretation of the relation between conceptual insight and the deepest sort of propositional knowledge [this is Burge’s insight #1] is his reversal of the traditional order of priority, and his emphasis on the role of theory in attaining such knowledge. Traditionally, among some rationalists as well as empiricists, conceptual mastery was considered a precondition for judgment. And such mastery was interpreted in terms of what were presumed to be non-conceptual abilities, such as vision . . . His model is not vision but theory. Kant preceded Frege in insisting on the priority of judgment over non propositional cognitive capacities.” Here, as on p.15, Burge is reading the insights 1 and 2 as what Frege meant when he said he proceeded from judgments, not concepts, and again Burge is attributing the germ of the insights to Kant.

34 Burge cites this passage at Truth, Thought, Reason, 123, where he attributes to Frege insights #1 and #2, as well as the view that “truth is the ‘objective’ of judgment.” In addition to “Notes for Ludwig Darmstaedter,” Burge also cites “Boole’s Logical Calculus and the Concept-Script,” Posthumous Writings 16 (quoted above on p.2).

35 I am contrasting Frege’s contention that we understand the structure and fully grasp the content of concepts only through reflection on inferential relations among sentences with an alternative view that these facts are open to introspection, or just consist in facts about our mental images. It is thus significant that Frege highlights the centrality of truth for logic in order to ward off psychologistic philosophies that confuse being true with holding for true. “Notes for Darmstaedter,” 253.

36 Though interpretive caution is surely required here: these are very late, sketchy, and unpublished notes—so brief that their correct interpretation is unclear.

37 See note 34.

38 “[T]he problem as to how experience is possible by means of these categories, and only by means of them . . . can be solved almost by a single conclusion from the precisely determined definition of a judgment in general (an act by which given representations first become cognitions of an object).” (Metaphysical Foundations of Natural Science, Ak 4:475.) This passage makes it very implausible that Kemp Smith’s reading, which locates the priority principle in pre-critical doctrines, could be correct.

39 Refl 6350 (1790s), Ak 18:676:

What is an object? That whose representation is a complex of a number of predicates appertaining to it. The plate is round, warm, of pewter, etc. etc. Round, warm, of pewter, etc etc is no object, but the warmth, the pewter, are.

An object is that in the representation of which other representations can be thought as synthetically connected.

Every judgment has a subject and predicate. The subject of the judgment, insofar as it contains different possible predicates, is the object. The predicates are all dependent on the subject, as warm on the warmth . . .

The subject of the judgment whose representation contains the ground of the synthetic unity of a manifold of predicates is the object.

40 Prolegomena, Ak 4:298.

41 Critique of Pure Reason §19; Refl 3045 (1776–9), Ak 16:630.

42 Letter to Beck, July 3 1792, Correspondence 192–3, Ak 11:347.

43 Brandom, Articulating Reasons, 125. Dummett writes: “[Kant’s] recognition of the predicative nature of concepts . . . may be regarded as part of the context principle, that is, as an application of it to predicates, when the principle is taken as relating to sense. It is only part of the principle, even then; and it has nothing to do with the principle, conceived as one governing reference” (Interpretation, 545). (In fact, I think, Kant’s thesis is best understood as a thesis about Fregean reference, not about sense.)

44 Here, then, I disagree with Sluga (“Frege Against the Booleans,” 86) and Bell (Frege, 5). For a similar criticism, see Dummett, Interpretation, 539. Ricketts, although he reads the context principle
and the priority principle differently from Bell and Sluga, still, I think, errs in virtually equating the principles. See “Objectivity and Objecthood,” 66 and “Truth-Values and Courses-of-Values in Frege's Grundgesetze,” 190.

45 See Truth, Thought, Reason, 262, 123 (see notes 33, 34 above).

46 More precisely, on Burge's view, the conviction that “truth is the ‘objective’ of judgment” (Truth, Thought, Reason, 123) motivates the thesis that a word has a Bedeutung only in the context of a sentence, which provides the “philosophical rationale” (15) for the methodological prescription that one seek to understand the meaning of words only in the context of a sentence (cf. 90). And it is this methodological prescription that is “closely associated” with thesis #1 (15, 340; cf. 70), which articulates Frege's priority principle. Burge also suggests that thesis #2—that one understands the structure of thoughts and their components only by understanding the contribution of these components to the truth conditions of sentences and to truth preservation in inference—follows from thesis #1 together with the conviction of the primacy of truth in judgment (14).

47 This has been a theme in Rickett's writings on the context principle. See “Truth-Values and Courses-of-Values in Frege's Grundgesetze,” 190; “Concepts, Objects, and the Context Principle.”

48 See Dummett, Interpretation, 321. Charles Parsons (Mathematical Thought and Its Objects, 7) has also recently defended Frege's claim that Kant had a narrower notion of object than Frege did.

49 That mathematical objects are not genuine objects for Kant, see Friedman, Kant and the Exact Sciences, 94.

50 This point makes manifest the inadequacy of readings (like Brandom's or Keller's) that read Kantian concepts as functions for judging and inferring. Concepts rest on functions because they are rules for the synthesis of the manifold in intuition. The very fact that Kant's explanation of judgment includes the relation of the subject concept to intuitions (and intuitions to objects through sensation) makes it clear that it is not possible on Kant's view to reduce the functional role of concepts in sensible intuition to their functional roles in judging and inferring. Thus, it cannot be that the content of a concept is given solely by its role in judging—where these roles can be understood independently of knowing the connection between concepts and sensible representations. (See note 14 above.) The content of a concept is dependent both on its playing a role in judgments and on its relation to sensible, non-conceptual representations. (For a similar criticism of Brandom's connection of Frege and Kant, see Kremer, "Representation or Inference.")

51 Frege cites Trendelenburg's “Über Leibnizens Entwurf einer allgemeinen Characteristik” in Begriffsschrift and in “Boole's Logical Calculus.” He seems to have gotten the name “Begriffsschrift” from Trendelenburg. Frege took a course form Lotze in graduate school, and Dummett has discovered that one of Frege's unpublished works is a series of comments on Lotze's Logic (Dummett, “Frege's Kernsätze zur Logik.”) Bruno Bauch, in a talk before his colleagues at Jena, said: “I heard it myself from the mouth of Frege, our great mathematician, that for his mathematical—and, if I may add what Frege modestly did not mention—epochmaking investigations, impulses from Lotze were of decisive importance” (Schottler, Frege's Anonymous Opponent in Die Verneinung, 45). The most extensive discussion of the relationship between Frege and Lotze is Gabriel, Lotze und die Entstehung der modernen Logik bei Frege and “Objektivität, Logik und Erkenntnistheorie bei Lotze und Frege.”

52 Heis, “Frege, Lotze, and Boole,” gives a defense of the historical claim that Frege's statements of the priority principle in the early 1880s were meant to engage debates among his contemporary German logicians over Boolean logic and the viability of a lingua characterica.

53 In Logic §6, Kant does not say whether or not concepts can be formed by abstraction from intuitions. However, he clearly asserts that they can in What Progress?, Ak 20:273–4.

54 Of course, Hegel thinks that Kant did not take this insight all the way to its conclusion. For instance, in thinking of logic as formal, Kant misses the idea that “the Notion builds up in and from itself the reality that has vanished in it” (Logic, 591; Werke 12:24). But we can put this aside.

55 Against innate representations, see “On a Discovery,” Ak 8:221. The argument I’ve here sketched leaves it open whether a consistent Kantianism would require that no concepts are formed by abstraction, or perhaps only a restricted class (the categories?). Furthermore, it would take additional argumentation to show that abstractionism could not survive in some form, as the view that concepts in a full-blooded sense can be abstracted from other representations (Sellars's “proto-concepts”? schemata?) that can synthesize the intuitive manifold in a rule-governed way according to the
logical forms of judgment. Fortunately, the rest of my argument does not depend on resolving these questions.

56 “Abstract thinking, therefore, is not to be regarded as a mere setting aside of the sensuous material, the reality of which is not thereby impaired; rather is it the sublating and reduction of that material as mere phenomenal appearance to the essential, which is manifested only in the Notion.” (Logic, 588; Werke 12:21)

57 Kant’s version of Occam’s razor is: “one should not multiply beginnings (principles) without necessity” (A652/B680; cf. Ak 20:213). Kant actually mentions three a priori principles, of homogeneity, specification, and continuity of forms (A658/B686; cp. Ak 20:210).

58 In the First Introduction to the Critique of Judgment, Kant considers the principle that “we can always presuppose nature’s products to have a form that is possible in terms of universal laws that we can cognize.” In a footnote (Ak 20:211–2n.), Kant writes:

Logic teaches how we can compare a given representation with others, and form a concept by extracting as a mark for general use, what this representation has in common with different ones. Yet logic teaches us nothing about whether, for each object, nature can offer us, for comparison, many more objects in a somewhat similar form, which is the condition under which it is possible to apply logic to nature.

Here the extra principles for forming concepts are not logical principles, but principles that supplement the logical rules for forming concepts in order to make them applicable. Hegel reacted to the same situation by advocating a new theory of concept formation—his famous theory of dialectical transitions (Encyclopedia Logic, §§81–2)—to replace the abstractionist theory.

59 A664/B692; cp. Ak 20:215 on the “technic” and “nomothetic” of nature. For a contrary view, see Keller, Kant and the Demands of Self-consciousness, 61–4. (Keller acknowledges that his reading pushes Kant in a Hegelian direction, demanding a close connection between understanding and reason, 62.)

60 This, I think, is how Lotze approached logic. For him, the rules of “formal logic,” the rules of Kant’s “transcendental logic,” and the regulative principle of the purposiveness of nature are all derivable from the “the impulse of thought to reduce coincidence to coherence” (Lotze, Logic, §viii).

61 Frege mentions the debate about whether the relationship of the genus and differentia could be represented as genus + differentia at “Boole’s Logical Calculus,” 33.

62 This is the main (negative) argument of Trendelenburg’s famous paper on Leibniz’s universal characteristic. Frege, in playing up the fact that the Begriffschrift allows him to express “organic connections” among concepts (Foundations, §88) in a judgment, is clearly trying to ward off Trendelenburg’s criticism that any symbolic language would have to treat concepts algebraically, and thus overlook the complex interconnections (Trendelenburg’s “organic bond,” Investigations, 21) among concepts.

63 Lotze explicitly compares his approach to these issues with Hegel’s and Trendelenburg’s in the introduction to his 1843 Logik.

64 In a genuine, non-degenerate concept, the fact that the component marks are connected together in this particular way should tell us something significant about the actual objects that fall under this concept: “consequences admit of being drawn from [the concept] that coincide again at certain points with results flowing from the content, that is from the thing itself [Sache selbst]” (§27). What is lacking in degenerate cases is, as Lotze puts it (§27) a “rule” for the behavior of a given object that agrees with the object’s actual behavior [wirklichen Verhalten]. The content of the concept <red, juicy, edible, body> is poor because it allows us to infer nothing more about the objects falling under it than that they are red, juicy, edible, and bodies.

65 Lotze, Logic (1843), 190.

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