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Reviewed by Tyke Nunez

Review: *Kant and the Science of Logic: A Historical and Philosophical Reconstruction*, by Huaping Lu-Adler

Tyke Nunez

1. Introduction

Kant is the first to have worked out the doctrine that logic is formal, even if "formal" means something quite different to him than it does to us.[1] As he makes clear in the introductions to the *Critique of Pure Reason*, his science of metaphysics has the science of general logic as its model (Axiv; also Bix, Bxxiii–xxiv; *Br*, 10:340).[2] And arguably Kant's most distinctive contribution to both sciences is his separation of transcendental logic, as a branch of metaphysics, from pure general logic, as the science of thinking, independent of what is thought about (A55/B79–A57/B82).

Given this fundamental place of logic in Kant's philosophy, it is surprising how little attention has been paid to the topic in his twentieth century anglophone reception. Dissertations aside, Lu-Adler's is the first book-length treatment in English since Tonelli's posthumously published manuscript, *Kant's Critique of Pure Reason Within the Tradition of Modern Logic: A Commentary on its History* (1994). Tonelli's ill-fated book is a work in intellectual history. It is not a work in the history of philosophy, as it is now practiced in philosophy departments. And in the middle of the twentieth century, the study of Kant's logic seemed more the province of historians than philosophers.[3] In more recent years, however, a healthy, historically informed discussion of Kant's logic has sprung up in philosophical circles. In her dissertation and subsequent work, Lu-Adler has been one of the main participants. As its subtitle suggests, in *Kant and the Science of Logic: A Historical and Philosophical Reconstruction*, she has steered a middle course between intellectual history and the history of philosophy. It is a work that contributes equally to the recent philosophical discussions of Kant's logic, and to the tradition of intellectual history of which I take the work of, say, Tonelli, Pozzo, and Sgarbi to be representative.

The book has an expansive historical sweep, running from Aristotle and the stoics up through the Arabic commentators, the reception of Aristotle's logic in the Latin west (chap. 2), into the early modern period with Bacon and Locke through German antecedents like Wolff and Meier (chap. 3), to Kant's pre-critical (chap. 4), then critical views of logic (chap. 5). To focus this discussion of logic's development from Aristotle to Kant, Lu-Adler lets her discussion be guided by Kant's eventual distinctions between (i) applied and pure logic; (ii) canons and organons, and (iii) general and transcendental logic. For this reason, she focuses on three topics in examining pre-Kantian accounts of logic: (i) "the relation of logic to ethics or to philosophy in the sense of wisdom", (ii) "the status of logic qua science", and (iii) "the relation between logic and metaphysics" (31–32). In turning to Kant's logic in chapters 4 and 5, she works to situate Kant's views within the logical traditions surrounding these three topics, while also addressing new topics that emerge specifically within Kant's philosophy. Two topics of the latter sort include

[1] See MacFarlane (2002, 45), MacFarlane (2000, §4.5), and Tolley (2012, 427 n 25)

[2] Unless otherwise noted, all page references will be to *Kant and the Science of Logic*, and section references will be to its fifth chapter. References to Kant's works will follow the standard citation practices of "volume:page number" of the Academy Edition and the standard A/B edition numbering of the *Critique of Pure Reason*.

[3] An exception is the dissertation, and subsequent essays, of Kirk Dallas Wilson (1972). Some discussion of Kant's logic from the period can also be found in the work on Kant's philosophy of mathematics.

what exactly the critical Kant means when he claims that pure general logic is "formal" and whether the laws of pure general logic stand in need of a deduction, analogous to Kant's transcendental deduction of the categories in the *Critique of Pure Reason*.

So far in its reception, Lu-Adler's important new book has not received much substantive critical engagement.[4] In this piece, then, I would like to focus on some of the controversial dimensions of her interpretation that have wide-ranging consequences for Kant's philosophy of logic and his place within the historical tradition. For these reasons I will leave the task of giving a more complete summary of the book to other reviewers (see, e.g., Buroker 2019 and Kim 2019). Nor will I comment on the pre-Kantian developments around (i) to (iii).[5] Rather, I'll focus my attention on examining Lu-Adler's claims about the formality of Kant's pure general logic and its need for a transcendental derivation. The formality of Kant's conception of pure general logic is arguably both the topic that stands the best chance of being of interest to philosophers and historians of logic more broadly and the most fundamental topic in his philosophy of logic, since it is critical to his division between logic and metaphysics (or his pure general and transcendental logics). Lu-Adler's primary aim in her fifth chapter, the one on Kant's mature view, is to argue that although Kant himself "never explicitly offered the requisite justification" (142), "something like a critique of the understanding in general [is needed] to secure the status of general logic" (143), which "comes down to something like a *transcendental* derivation of logical rules as the *a priori* conditions for the possibility of all thinking, a derivation resembling that of" the categories (175). If, as I will argue, there is a more fundamental sense in which pure general logic is "formal" than those addressed by Lu-Adler, then we will be able to bring together various strands in Lu-Adler's interpretation as well as show that pure general logic's laws do not need a transcendental derivation.

[4] Blecher (forthcoming) critically addresses Lu-Adler's method and Rosenkoetter (2020) gives a brief critical overview.

[5] For some critical discussion of Lu-Adler's treatment of (i) and the Humanist logical legacy, see Merritt (2019).

2. Lu-Adler's Arguments for the Critique of Reason in Pure General logic

Lu-Adler finds an antecedent for her project in Salomon Maimon, who (anticipating a later more famous complaint of Hegel's) wrote to Kant that pure general logic stands in need of a critique, whereby one seeks to determine logical forms "and make them complete by reflecting on the faculty of cognition" (162; *Br*, 11:470–71). Kant never replied to this letter, and a few months later confessed to Reinhold that he "never really understood what [Maimon was] after" (*Br*, 11:495). Still, in light of one place in Kant's notes where he raises these issues (20:339), Lu-Adler concludes that "we can at least expect Kant to acknowledge the need to account for the possibility of logic", "which requires some sort of critique" (162).

This leaves her with the question of "what the requisite critique should be". She holds the examination of the possibility of pure general logic will consist in a critique of *reason in general*, that will be analogous to the examination of the possibility of metaphysics—Kant's own critique of *pure reason*. As with that critique, which limited the dialectical pretenses of pure reason to extend its knowledge past its proper limits, Lu-Adler holds that the critique of reason in general will limit its dialectical pretentions (162). Within Kant's discussion of dialectic in pure general logic she distinguishes two strands. There is the use of pure general logic as a putative organon to extend our material knowledge. And there is the ancient sophistical art of using logic to give ignorance the air of truth (164). Lu-Adler holds Kant's attack on the second strand is "no more than cliché", but that Kant's attack on the use of general logic as an organon was an attack on Meier and Wolff. Accordingly, she discounts the ancient craft of tricking others into believing logical illusions and argues

this "logic of illusion" is not why pure general logic stands in need of critique. Rather, it is only because there is something so seductive in giving all of our cognitions the form of the understanding, that general reason has been surreptitiously tricked into extending the use of general logic past its boundaries and mistaken it for an organon in the production of cognition. As Lu-Adler sums up her case, "the misuse in question is not logical illusion, but illusion about logic" (166).

Lu-Adler's separation of the modern attempt to use logic as an organon from the ancient sophistical use of logic is astute. But here, as with other parts of Lu-Adler's case, I wonder whether what Kant has given us in the *Critique of Pure Reason* (supported by the logical works) isn't already critique enough. In the section "On the Division of General Logic into Analytic and Dialectic", Kant first introduces its dialectical use as an organon for extending our knowledge in the manner of Wolff and Meier, claiming that "general logic, as a putative organon, is called *dialectic*" (A61/B86). Then, noting how different from its modern use as an organon "the significance of the employment of this designation of a science or art among the ancients may have been", he marshals this ancient sophistical use as "a certain and useful warning that general logic, *considered as an organon*, is always a logic of illusion" (A61/B86). Here Kant is arguing that the sophistical use of logic among the ancients shows us that the modern attempt to use general logic as an organon is doomed, and that if we reflect on the dialectical uses to which logic has historically been put, we can see that "the effrontery of using [general logic] as a tool (organon) for an expansion and extension of" the understanding's cognition "comes down to nothing but idle chatter" (A61/B86). This argument is ultimately grounded in the overall claim that pure general logic, or "the formal conditions of agreement with the understanding, which are entirely indifferent with regard to the objects" cannot expand our material knowledge (A61/B86). Once we accept this argument that logic oversteps its boundaries when it is used as an organon, especially within the broader context of the *Critique*'s separation of pure general from transcendental logic,[6] why think a *further* critique of general reason's dialectical use is required? It seems that in this passage Kant has done what Lu-Adler claims he needs to do. So Lu-Adler needs some further reason why the proper boundaries of pure general logic need fixing, if she is going to vindicate Maimon's claim.

We can find a deeper justification for Lu-Adler's critique of reason in general in how she thinks Kant should have attempted it. Turning to this in the next section she claims this critique will require "an analysis of our cognitive faculty that explains the possibility of logic as a proper science (much as the critique of pure reason is to reveal the possibility of metaphysics)" (§4.2, 169). This analysis will be "a study of our cognitive faculty that reveals the source" of the laws of pure general logic (169). These remarks are tied to a second and third reason why reason in general may need critique, besides curtailing its use as an organon.

Lu-Adler argues for the second, which concerns the source of pure general logic's laws, in §4.2, and presents her interpretation of where these sources lie in §5.3. She claims that Kant cannot maintain the justification of logical laws is empirical, like Locke, nor can he hold that it is divine, like Leibniz. If it were either, then these laws would be merely subjective. And she argues that just as the transcendental deduction aims at showing the origin of the categories lies neither in experience, nor in divine implantation, but in an "epigenesis of pure reason" (B167), the laws of pure general logic stand in need of a similar deduction to establish their origin in a "radical" kind of epigenesis (193).

Lu-Adler's third reason is closely related to Maimon's (§5.1). Kant uses pure general logic as a model for his transcendental logic. In transcendental logic, he places a lot of importance on its completeness—that it exhausts the entire field of pure reason—

[6] Within this context I include, say, Kant's warning to separate understanding and sensibility in the Amphiboly chapter, or his argument that Wolff is mistaken to treat the principle of sufficient reason as analytic, not synthetic.

and this is supposed to be one of the main respects in which it is similar to pure general logic. In both cases their completeness is supposed to stem from an exhaustive analysis of our cognitive faculty. And seeing why the rules of pure general logic are exhaustively presented and strictly proved through such an analysis is critical for understanding why the same is true of the rules of transcendental logic.[7]

Lu-Adler is right that Kant holds the source of logic's laws must lie first and foremost in the faculty for thinking (understanding and reason), not in experience or the divine. She is also correct in maintaining he holds pure general logic consists in an exhaustive analysis of this faculty. Nonetheless, we will see that Lu-Adler's position that this requires proving the necessity of pure general logic's laws through a transcendental derivation is inconsistent with pure general logic's formality. To see why, we will first need to uncover a positive sense in which pure general logic is formal that is more fundamental than the ones Lu-Adler identifies. On this understanding of pure general logic's formality we will see that its laws need not, and indeed could not, be established by a transcendental derivation of the sort that Kant gives of the concepts of space and time or the categories. Finally, we will return to Kant's claim that pure general logic consists in the analysis of the faculty of thinking. Lu-Adler identifies an apparent tension between Kant's claims both that we must know this analysis is complete, and that the necessity of this analysis—that there must be these functions and not others—cannot be proved. We will see how our positive account of pure general logic's formality, together with Kant's logocentrism—his position that in logic we can only investigate the laws of reason with reason—provides a more satisfying explanation of the tension than Lu-Adler's.

[7]There are two ways one might understand this relation: Pure general logic could merely be a model (or clue) for transcendental logic, or it could also have a foundational role to play in it. This is closely related to whether the functions of thinking in judgment belong more to pure general or transcendental logic. Lu-Adler does not make much of this complex but interesting issue (see esp. 181), and so nor will I here.

3. Formality

Kant holds pure general "logic is the science that exhaustively presents and strictly proves nothing but the formal rules of all thinking" (Bviii–ix). The key to evaluating Lu-Adler's claims is Kant's conception of this formality. She separates three aspects of it (149):

[Formal_R] Logic is formal in that it treats thought in respect of its mere form, regardless of how it may relate to its object (empirically or *a priori*).

[Formal_O] Logic is formal in that it treats thought in respect of its mere form, regardless of what may distinguish its object from that of other thoughts.

[Formal_S] Logic is formal in that it treats thought in respect of its mere form, regardless of the empirical-psychological conditions under which a thinking subject may undertake it.[8]

On Lu-Adler's account, then, (pure general) logic is formal in that it does not treat how thoughts (Formal_R) relate to their objects, (Formal_O) distinguish their objects from others, or (Formal_S) depend on empirical psychological conditions of the thinking subject. Notice that all three of these are negative claims; they are about what logic *does not* study. This is perhaps not so strange. After all, in the *Critique of Pure Reason,* when Kant introduces his own new transcendental logic by distinguishing it from pure general logic, he introduces pure general logic first through its *generality*, which corresponds to Lu-Adler's Formal_O (A52/B76). He then turns to its *purity*, which contrasts with applied (or empirical) logic, and corresponds to Lu-Adler's Formal_S (A53/B77).

[8]These three distinctions are closely related to a set of distinctions Lu-Adler introduced in the first chapter of her dissertation "Kant's Conception of Logical Extension and Its Implications" (Lu-Adler 2012). The discussion of formality in that chapter is fuller than the treatment here, but Lu-Adler's view also seems to have evolved in the intervening years.

And in the midst of drawing that contrast he indicates pure general logic treats all use of the understanding or reason, regardless of whether its content is empirical or transcendental (A53/B77), which corresponds to Lu-Adler's Formal_R.

Still, a little farther along, when Kant separates off transcendental from pure general logic (A55/B79–A56/B80), he elaborates what the formality of pure general logic amounts to in a way that gives us a positive characterization of it. Transcendental logic does "not abstract from all content of cognition"; it is a canon of the understanding and reason that contains "merely the rules of the pure thinking of an object" (A55/B80). It therefore concerns "the origin" of our cognition of objects, while pure general logic does not. Rather, pure general logic "considers representations . . . merely in respect of the laws according to which the understanding brings them into relation to one another when it thinks, and therefore it deals only with the form of the understanding, which can be given to the representations wherever they may have originated" (A56/B80).

This suggests that both pure general and transcendental logic are logics—sciences of the rules of the "understanding in general" (A52/B76)—in so far as they both study the laws according to which the understanding brings representations into relation to one another when it thinks. While transcendental logic contains "merely the rules of the pure thinking of an object" (A55/B80), or those laws according to which the understanding brings *pure representations* into relation with one another when it thinks *of objects*, the kind of thinking pure general logic treats is more encompassing. It treats, positively, the laws governing how the understanding brings *any representations* into relation to one another when it thinks, regardless of their origin.

Why, however, does pure general logic therefore deal "only with the form of the understanding"? In the next section, when Kant turns to the topic of truth, the formal nature of pure general logic comes to the fore. He is clear that pure general logic concerns "the mere form of cognition (setting aside all content)", that its rules are criteria that "concern only the form of truth, i.e., of thinking in general", and that the merely logical (necessary, but insufficient) criterion of truth is "the agreement of a cognition with the general and formal laws of understanding and reason" (A59/B84). Summing this up, he claims "general logic analyzes the entire formal business of the understanding and reason into its elements, and presents these as principles of all logical assessment of our cognition" (A60/B84). But what is this formal business of the understanding that general logic analyzes? And is this analysis general logic's entire task? Later Kant claims that "merely formal logic, so conceived, abstracts from all content of cognition (whether it be pure or empirical), and concerns itself merely with the form of thinking (of discursive cognition) in general" (A131/B170). And "*since it abstracts from all content of cognition*, nothing remains to it but the business of analytically dividing the mere form of cognition into concepts, judgments, and inferences, and thereby achieving formal rules for all use of the understanding" (A332/B171–A133/B172). Thus, analyzing the formal business of the understanding is in fact pure general logic's entire task.

What, however, is the analysis of this business? A lot could be said, but here two dimensions are especially worth noting.[9] First, traditionally, a thing's form makes it what it is. Thinking relates representations. And it is the way in which representations are related in thinking that makes the thought in question the kind of thought that it is: a concept, judgment, or inference. Thus, all thoughts will share a common form, a common way in which they relate representations, but this will also have three specifications: conceiving, judging, and inferring. These will be how these three kinds of thinking, constitutively, as the kinds of acts they are, bring representations into relation with one an-

[9]For discussion of another dimension that is relevant to Lu-Adler's interpretation, but not directly to the dimensions I am focusing on here, see my "The Formality of Kant's Logic and Consciousness of Logical Laws" (Nunez Ms.).

other (see, e.g., A130/B169). Pure general logic studies the laws analyzing the formal elements in thinking because it studies the laws governing how the understanding brings representations into relation to one another when it thinks. That is, it studies the laws that constitutively govern the acts of thinking merely as the acts they are.

Second, Kant defines matter as "the determinable in general" and form as "its determination", and these concepts have a wide range of uses in his philosophy (A266/B322). Experience is "the product of the understanding out of materials of sensibility" (*P*, 4:316; also A1). And, in general, Kant holds discursive cognition arises through two stems: a receptive faculty of sensibility that provides (pure or empirical) intuitions of objects and a spontaneous faculty of thinking that combines these into new representations: concepts, judgments, and inferences. On this hylomorphic account of cognition, intuition is the material, while its combination in thinking is the form: cognition arises through the determination of intuition by thinking—its relation in a new thought. Pure general logic is formal, then, because it only treats the formal element in cognition, but abstracts away from the material. That is, it studies the laws governing the relation of representations in conceiving, judging, or inferring, no matter the nature of the representations related. In this sense it studies only the laws governing the formal element in acts of cognition.[10] And we will see that this study consists in dividing up the acts of the faculty for thinking, the various ways in which thoughts combine representations, merely as the thoughts they are.

The positive characterization of logic's formality—as the study of the constitutive acts of relating representations in thinking—can explain the three negative characterizations identified by Lu-Adler. In the first instance, according to Kant, conceiving, judging, and inferring are the three ways in which we bring representations into relation in thinking. Because pure general logic studies the laws governing these activities of thinking in *general*, whenever they are found, not in this or that particular science, it does so without examining what distinguishes the objects from one another that the concepts, judgements, and inferences are about (Formal_O). Because pure general logic studies the necessary rules—the laws—that constitutively govern how any conceiving, judging, and inferring, brings representations into relation in thinking, not merely how we human beings happen to do this, it will not consist in an empirical study of the psychology of how we happen to think (Formal_S). And because pure general logic studies only the way representations are brought into relation with one another in conceiving, judging, and inferring, it will neither examine the content nor the origin of these representations—be it empirical or transcendental—and so it abstracts away from the relation that representations have to their objects (Formal_R).

4. Lu-Adler's Transcendental Derivation and Radical Epigenesis

With this characterization of the formality of pure general logic through how it studies the relations thoughts bring representations into, we can return to Lu-Adler's claim that pure general logic's rules stand in need of a transcendental derivation. She argues for this by appealing to the way that Kant introduces his deduction of the categories (170). In particular, she focuses on how this deduction establishes our entitlement to the categories by answering a question of right (*quid juris*) (A84/B116). She then argues there is a corresponding question of right facing pure general logic, and that answering this is a matter of establishing its laws through the nature of reason *a priori*, where this contrasts with Locke, who establishes logical laws through empirical generalizations, or Leibniz, who establishes them through divine implantation (§4.2). She holds not only that the question

[10] Of course, intuition—the matter of cognition—itself has a matter (sensation) and form (space and time), and pure general logic does not study the form of the matter of cognition.

of right central to pure general logic is analogous to the question of right central to transcendental logic, but that Kant's answers would also be parallel. As the transcendental deduction of the categories establishes that the categories are related to their objects neither empirically, nor through divine preformation, but through an epigenesis of pure reason, Lu-Adler's deduction of the laws of logic will establish them through "a certain epigenesis of reason", where "this epigenesis must be of a *radical* kind that presupposes no preformation" (193).[11]

Working backwards through these considerations, it is hard to see how Lu-Adler's radical epigenesis could work. When Kant endorses a "system of the *epigenesis* of pure reason" he is concluding the deduction of the categories by pointing out that they make experience possible (B167). On an epigenetic theory of sexual generation both the sperm and ovum contribute to the formation of the embryo. This contrasts with a preformationist view, on which one of the germs [*Keime*] is merely the occasion for the process of pre-formed generation out of the other. Kant does not explicitly spell out how his account is epigenetic. What he seems to have in mind, however, is the way that both the categories and space and time ground the possibility of experience. Specifically, in the generation of the form of possible experience, as forms of intuition, space and time contribute a germ from sensibility, while the categories indicate the form of ordering in one consciousness required of any thought of an object, and so contribute a germ from the understanding. After all, "the categories contain the grounds of the possibility of all experience in general from the side of the understanding" (B167), while space and time contain such grounds from the side of sensibility (compare also, e.g., *P*, §36, 4:318-319; *ÜE*, 8:249).

[11]The arguments of §4.2 and the later claims about epigenesis overlap significantly with elements in the arguments of Lu-Adler's "Constructing a Demonstration of Logical Rules, or How to Use Kant's Logic Corpus" (Lu-Adler 2015b) and "Epigenesis of Pure Reason and the Source of Pure Cognitions: How Kant is No Nativist about Logical Cognition" (Lu-Adler 2015a).

Lu-Adler does not seem to be thinking of Kant's epigenesis of pure reason this way. Rather than thinking of the categories as one of the two germs, she seems to be reading the categories as themselves generated through a kind of epigenesis (193). Still, as Lu-Adler notes (171–72), Kant attempts to pursue the categories "into their first germs [*Keimen*] and predispositions [*Anlagen*] in the human understanding, where they lie ready, until with the occasion [*Gelegenheit*] of experience they are finally developed" (A66/B91). This seems in tension with the categories themselves resulting from epigenesis, since this indicates their generation out of only the understanging—one of the two germs in the epigenesis. In any case, she concludes that "the basic lessons from this analysis of pure concepts carry over to the case of logic" (172). Pure general logic, however, only treats the formal laws of thinking: the laws governing how thinking relates representations, merely as thinking. It abstracts away from any features of thoughts that stem from the nature of the representations related. For this reason, it examines only one element in our cognition, thinking, separated from whatever contribution the features of the representations themselves might make. It is, thus, even less clear here than with the categories, what the two germs involved in their epigenesis could possibly be.[12]

It is equally hard to see how Lu-Adler's transcendental derivation of logic's laws could work. A transcendental deduction,

[12]When I first penned the last two paragraphs, I presumed that although I hadn't encountered this interpretation, it would be commonplace. After a more thorough search (Mensch 2013, Sloan 2002, Ingensiep 1994, etc.) however, the consensus is with Lu-Adler: it holds the epigenesis in question concerns the generation of the categories, not the form of possible experience. Clearly this is not the place to defend my apparently contentious suggestion. In addition to what I say above I'll just note, philosophically, that the attack on the preformation-system of pure reason makes more sense if it is directed against a view that denies a genuine distinction between understanding and sensibility. And, textually, interpreters almost never quote the first five sentences of §27 where Kant draws attention to both "the pure intuitions as well as the pure concepts of the understanding" that are "elements of cognition that are to be encountered in us *a priori*" (B166).

Kant holds, is "the explanation of the way in which concepts can relate to objects *a priori*" (A85/B117, also A329/B386). In line with Lu-Adler's considerations, Kant arrives at this formulation after reflecting on how certain concepts are "destined for pure use *a priori*", and that "these always require a deduction of their entitlement", where whether they have this entitlement is a matter of whether they can answer a question of right (*quid juris*). But this question of right asks after "how these concepts can be related to objects" independently of all experience (A85/B117). In the case of the transcendental deduction of the categories, it establishes that these concepts ground the possibility, *a priori*, of objects of experience. In the case of pure general logic, however, it is unclear what the relevant object or relation could be. After all, pure general logic is formal. It only treats the rules governing how thoughts relate representations, while setting aside whatever relation these representations might have to objects.

To make this vivid, consider another of Kant's transcendental derivations, the transcendental exposition of space (B40–41). Kant begins this by explaining that "a *transcendental exposition* is an explanation of a concept as a principle from which insight into the possibility of other synthetic *a priori* cognitions can be gained" (B40). Then he lays out why he holds the concept of space grounds the possibility of geometry and its objective validity. Specifically, he attempts to show how his explanation of space, as the form of outer intuition and as having its seat in the subject, is the only explanation that can be given that properly grounds the synthetic *a priori* propositions of geometry. In this case, then, the transcendental derivation in question aims at vindicating geometrical cognition of spatial objects by showing how this cognition is grounded in the concept of space.

If the kind of transcendental derivation Lu-Adler is looking for is to resemble this transcendental exposition, she would need to find a corresponding concept, or set of concepts, that could be principles from which insight into the possibility of synthetic *a priori* cognitions could be gained. It is not clear, however, what candidates could fit either bill. Synthetic *a priori* cognition is material cognition of an object. For example, the synthetic *a priori* judgment "the angles of a triangle add up to two right angles" is cognition or knowledge of triangles. It relates the concept of a triangle's angles to the concept of adding up to two right angles. Kant holds this is not an analytic matter of the meaning or content of these concepts. Rather, it is a geometrical judgment, grounded in the nature of space and its parts. Pure general logic, however, abstracts from all objects, all meaning or content of concepts. In it we are only analyzing the acts of relating representations in conceiving, judging and inferring, while explicitly *not* treating the relation of representations to objects. For this reason, there is no contentful concept like the concept of space that it treats and there is no body, like geometry, of material synthetic *a priori* cognitions that a corresponding transcendental exposition could explain our insight into.

Perhaps, however, Lu-Adler has in mind a transcendental derivation that is less like the transcendental deduction of the categories or the transcendental exposition of space, and more like Kant's deduction of the transcendental ideas of reason. This does not establish a determinate objective relation between concepts and their objects. Rather, because the concepts that are its topic are ideas, "they have in fact no relation to any object that could be given congruent to them" (A336/B393). This deduction only establishes an indeterminate objective validity for these ideas (A670/B698), "as *regulative* principles for the systematic unity of the manifold of empirical cognition in general" (A671/B699). So perhaps this deduction might be a better fit as a model for pure general logic because it, like pure general logic, does not treat a determinate relation of representations to their objects.

Even though it does not establish a determinate relation between the transcendental ideas and empirical cognition, it still establishes an indeterminate one, and while the objects of the concepts of reason cannot be given to them, "the understanding

constitutes an object for reason, just as sensibility does for the understanding" (A664/B692).[13] Even for this deduction, then, a division is required between concepts and their objects so that their relation can be established. Such a division, however, is immaterial to pure general logic. It does not treat the origin of representations, whether it is in sensibility, the understanding, or reason, but only treats the way representations are related in thinking. That is, it only studies the forms and functions of thinking, with the faculty of thinking. It is "a *self-cognition* of the understanding and of reason, not as to their faculties in regard to objects, however, but merely as to form" (*JL*, 9:14). And as such a self-cognition of the form of thinking by the faculty of thinking, there is no representation of another faculty that could provide (or be) its object, and so no room for a transcendental derivation.[14]

5. The Analysis of Reason in General and Logic's Completeness

Setting aside the use of pure general logic as an organon and the transcendental derivation of its rules, there is still something to Maimon's claim that pure general logic requires a critique by which the logical forms are completely determined by reflecting on the faculty of cognition (*Br*, 11:471). After all, Kant famously adapts the table of the functions of thinking in judgment from pure general logic (A70/B95), and then derives his own table of categories from these functions (A80/B106). The completeness of the system of categories seems to, then, depend on the completeness of the system of logical functions. And, it seems that as many have held, unless this latter system is proved complete, the project of critiquing pure reason remains unfinished.[15]

As Lu-Adler rightly notes, the issue extends well beyond the two tables. The whole structure of transcendental logic closely models the structure of pure general logic. As a result, she holds the broader issue is how to understand Kant's claims that "since the time of Aristotle, logic seems to be 'finished and complete' (Bvii)" (176). Here she does not rest content with Kemp Smith's tired complaint that Kant both unreflectively takes over Aristotle's logic and modifies it when it doesn't suit his needs (176). Rather, she identifies a number of passages where Kant complains about the lack of "*exactness*, *determinateness*, and *distinctness*" in Aristotle's logic (*JL*, 9:20), and his inclusion of the categories within this strictly formal science, since concepts of an object in general cannot belong to such a science (R4450, 17:556). On these grounds, Lu-Adler argues that while Kant held "Aristotle has not omitted any moment of the understanding" (*JL*, 9:20), such claims should not be understood as "expressing a commitment to the finality of Aristotle's logic with respect to its actual doctrines" so much "as taking a philosophical stand on the nature of logic as such and affirming its status as a science of the formal rules of all thinking" (178). On this stance, it is because these formal rules can be exhaustively presented and strictly proved, through a common principle, that pure general logic is a science. This principle, Lu-Adler holds, is the faculty of thinking, and the exhaustive presentation of the formal rules of this science happens through an *a priori* analysis of this faculty. In this respect, she holds that just as Kant complains that "Aristotle 'had no principle [*Principium*]' in his search

[13] Here Kant is dividing between the understanding, as the faculty of concepts, and reason, as the faculty of inferences. Sometimes the division between these two parts of the faculty of thinking is salient, and Kant treats them as distinct. At other times it is not, and he will ignore the division. The same is true of the faculty of cognition or reason as a whole and of, say, understanding and sensibility as its two stems.

[14] Note, even if we recognize that pure general logic's formality precludes a transcendental deduction of its laws, we need not endorse Tolley's "non-intentional" reading of it (Tolley 2012, 150). This is not, however, the place to investigate why.

[15] For more of Lu-Adler's thoughts on Kant's Metaphysical Deduction see her "Constructing a Demonstration of Logical Rules, or How to Use Kant's Logic Corpus" (Lu-Adler 2015b).

for categories, but 'rounded them up as he stumbled on them' (A81/B107), . . . [m]utatis mutandis, Kant might make the same point about Aristotle's presentation of the formal rules of thinking" (182). She then goes on to sketch what such "an *a priori* analysis of the understanding as the faculty of thinking" might look like (185–87).[16]

At the outset of §5.3, however, she notes that, "[i]f one wants to know why we are supposed to have exactly such and such logical forms or functions of judgment, it is not clear to what (if any) extent the account [she] sketched on Kant's behalf answers this question" (188). This, she argues, is because of an apparent tension in Kant's remarks. On the one hand, Lu-Adler reminds us that both logic and metaphysics, according to Kant, consist in a self-cognition of reason that "have to do merely with reason itself" (Axiv). As a result, in both, reason only has to "fully and systematically" enumerate its own "simple acts" (Axiv), and in this nothing "can escape" it (Axx, see also Bviii–Bix). "On the other hand", she claims, "Kant rules out the possibility of finding a precise ground for this completeness claim about pure concepts or, for that matter about either the logical functions of judgment or forms of intuition" (190). And in support she quotes Kant's claim that "for the peculiarity of our understanding, that it is able to bring about the unity of apperception *a priori* only by means of the categories and only through precisely this kind and number of them, a further ground may be offered just as little as one can be offered for why we have precisely these and no other functions for judgment or for why space and time are the sole forms of our possible intuition" (B145–46). The apparent tension, then, is "between Kant's claim about metaphysics as an easily exhaustible self-cognition of reason in the A Preface and his later claim about our inability to comprehend why we have such and such logical functions of judgment or pure concepts of the understanding" (191). On the one hand, he claims we must be able to completely elaborate logic from a common principle while, on the other hand, he seems to claim this principle is inscrutable.

Lu-Adler then argues that these two claims are not in tension, but "are profoundly connected" because of how Kant limits "the extent to which we can *meaningfully* inquire about the conditions of cognition as they pertain to our cognitive faculties", where she holds "his position in this regard is best reflected in his comments about" pre-established harmony (191). It is through examining his critique of Leibnizian pre-established harmony, in relation to the objective validity of the categories, that she gets to the generation of logical laws through a radical epigenesis of reason.

Much of what Lu-Adler says about the nature of logic as an *a priori* analysis of the faculty of thinking is right. After all, in the discussion of formality above we saw that pure general logic analyzes how the understanding brings any representations into relation to one another when it thinks and divides up the various activities of the understanding in thinking, in order to clarify its formal rules. In this way, it consists in an analysis of the understanding or reason, as Lu-Adler holds.

Nonetheless, although she is right that there is not really a tension in Kant, we will see that if the tension were as she explains it, then it would be hard to see how it could be avoided. In contrast with the second side of Lu-Adler's tension, Kant claims to have a precise ground for the completeness of his analysis of the faculty of thinking in pure general logic and he held no further critique of logic was needed.

He explains this somewhat in his only lengthy reply to Maimon, which he made through Herz on May 26th of 1789, after reading the first two parts of Maimon's *Versuch über die Transzendentalphilosophie mit einem Anhang über die Symbolische Erkenntnis* (*Br*, 11:48-11:54). In it Kant acknowledges that Maimon asks him how he can "prove the necessity of these functions of the un-

[16] Lu-Alder presents these arguments about Kant's completeness claim and this sketch of the analysis first in "Kant on Proving Aristotle's Logic as Complete" (Lu-Adler 2016).

derstanding whose existence is again merely a fact, since that necessity has to be presupposed if we are to subject things, however conceived, to those functions" (*Br*, 11:51). Kant takes these functions to be the functions out of which logic develops, and so to be logic's foundation, as is evident in his reply:

> But we are absolutely unable to explain further how it is that a sensible intuition (such as space and time), the form of our sensibility, or such functions of the understanding as those out of which logic develops are possible; nor can we explain why it is that one form agrees with another in forming a possible cognition. For we should have to have still another manner of intuition than the one we have and another understanding with which to compare our own and with which everyone could perceive things in themselves. But we can only judge an understanding by means of our own understanding, and so it is, too, with all intuition. It is, however, entirely unnecessary to answer this question. (*Br*, 11:51)

Kant gives this kind of argument often, and there are important differences between how it works for the forms of sensibility and the functions of thinking. Focusing on the functions, Kant thinks Maimon's question only looks pressing if one is entangled in a confusion. Maimon wants Kant to prove their necessity. Kant takes Maimon to be asking not about the nature of this necessity, but about why they are necessary: why we couldn't have had some other functions. In philosophy, Kant seems to hold that *proving* representations *are* necessary requires a transcendental deduction, and pure general logic is "formal philosophy" (*GMM*, 4:387). For such a deduction, however, we saw that there must be a separation between a representation and its object (a form and a matter), with separate faculties providing each. Thus, Kant looks for a separation between two faculties—a standpoint from which we can take the measure of our faculty for cognition, and *prove* its functions to be necessary. But this attempt is confused. There is no reaching outside of our faculty for thinking (with its necessary functions for thinking) in order to think about how these functions compare with the functions of thinking that belong to another kind of faculty for thinking. We can only investigate the laws of reason with reason, and while as laws these will be necessary, this necessity is a fact that cannot be proved.[17]

Still, while we might agree with Kant that we cannot prove that these functions of thinking are necessary through another understanding, we might wonder whether it is possible to show this through our own. Maimon's later 1793 letter suggests he thinks both that we can, and that Kant has not. After all, there Maimon claims to be "at work on a logic that" carries out a critique whereby one uses "reflection on the cognitive faculty to" achieve the systematic ordering of "the operations of thinking and logical forms" by showing "their reciprocal *dependence* on each other" (*Br*, 11:471).

By Kant's lights, Maimon's project will sound a lot like the kind of analysis of reason and its acts of relating representations in thinking that his own pure general logic consists in. This is the letter Kant never replied to. But if we reflect further on how Kant characterizes this analysis, we can see why he would have thought no further critique was needed. At the outset of the Transcendental Analytic we learn that it "is the analysis (*Zergliederung*) [or division] of the entirety of our *a priori* cognition into the elements of pure cognition of the understanding" (A64/B89), and that the Analytic of Concepts is an "*analysis (Zergliederung)* [or division] *of the faculty of understanding* itself" (A65/B90).[18] It is thus not only pure general logic that is in the business of analyzing or dividing up the activities of the faculty for thinking, but transcendental logic also.[19] The principle Kant

[17] For a more in-depth discussion of the issues touched on in this paragraph, of the necessity of logical laws, and of how Kant anticipates what Henry Sheffer calls the "logocentric predicament", see my "Logical Mistakes, Logical Aliens, and the Laws of Kant's Pure General Logic" (Nunez 2019).

[18] This analysis is the topic of my "Kant's Definitions of the Categories" (Nunez 2014).

[19] Readers familiar with attempts to reconstruct Kant's deduction of the forms of thinking in judgment and categories from a common principle like Klaus Reich's classic *The Completeness of Kant's Table of Judgments* (Reich 1992)

uses to carry out the analysis of the understanding in the Analytic of Concepts is the act of judgment with its various moments. Kant takes this analysis to yield an ordering of the functions of thinking in judgment exhibited in their table, where this table exhibits their reciprocal dependence on each other (A70/B95). Although this division departs in several (quite important) respects from the technique of the logicians because of its use in transcendental logic, Kant did not seem to think there was any great difficulty in carrying out this analysis. After all, as is clear in the A preface, he did not seem to think there was difficulty in the larger task of analyzing the whole faculty of thinking in general logic. Now, as Lu-Adler points out, Kant claims no one since Aristotle has legitimately *enlarged* logic (*Log-D*, 24:706), but she does not bring out that this allows for its improvement by *cutting it back.* This is what Kant has done immediately prior to the Transcendental Analytic, in the introduction to the Transcendental Logic. There he has shown how to distinguish the analysis of reason in general in pure general logic from the analysis of pure understanding and reason in transcendental logic, and thereby separated the two logics. So because logic seems incapable of expansion, and the business of both logics is dividing up the faculty for thinking, after Kant has divided between pure general and transcendental logic, it is not surprising that he would have held no further critique of logic was needed.

Still, insofar as Maimon holds out hope that he can *prove* the functions of the understanding are necessary, that he can *expand* logic, or that he can "define" the logical forms (*Br*, 11:471), Kant would not recognize Maimon's project as like his own. After all, working backwards, as far as "the logical functions of judgment in general—unity and multiplicity, affirmation and negation, subject and predicate" go, Kant claims these "cannot be defined without falling into a circle, since the definition would itself have to be a judgment and therefore already contain these functions of judgment and therefore already contain these functions" (A245). Further, we just saw that Kant held general logic was not capable of expansion, (which goes along with its lack of synthetic judgments about objects). Finally, Kant's analysis of the faculty of thinking into its functions does not give us a *proof* that these are necessary, because it does not take up a standpoint outside this faculty. Rather, it only consists in the division of this faculty into its functions, through reflection on acts of thinking.

Where does that leave Lu-Adler's tension? It is merely apparent, but not because Kant has ruled out "the possibility of finding a precise ground for [the] completeness claim about pure concepts or, for that matter about either the logical functions of judgment or forms of intuition" (190). Rather, in all three cases the ground is the faculty of cognition itself. It is just that if we want to *prove*, say, that these functions are necessary, that would require another understanding with which to compare this understanding, which is impossible. But so long as the ground for the completeness of the pure concepts of the understanding, the logical functions of judgment, or the forms of intuition lies in *a priori* reflection on the nature of our own faculty for cognition and not some standpoint outside this faculty, then Kant holds there is no problem with finding a principle that can ground pure general logic's completeness. After all, "[n]othing here can escape us, because what reason brings forth entirely out of itself cannot be hidden, but is brought to light by reason itself as soon as reason's common principle [*Princip*] has been discovered" (Axx, Axiv).

6. Conclusion

Of course, to have established that Kant held the science of pure general logic consisted in the complete analysis of reason into

will be struck by the fact that Lu-Adler only gives this body of work a passing acknowledgement in her final endnote. Even if the reader is to be forgiven for wanting a bit more, a partial explanation can perhaps be found in the fact that the analysis she is interested in belongs to pure general logic, while the analyses of Reich and others belong to transcendental logic.

its functions and forms of relating representations in thinking is not to have established that Kant's conception of this science was the right one. That would require filling out something like the sketch Lu-Adler presents on pages 185–86 in much more detail, laying out the rules constitutively governing conceiving, judging, and inferring, and arguing that other potential analyses of the faculty of thinking are mistaken. This would be a grand undertaking, to say the least, and it is understandable that Lu-Adler has foregone this project. Perhaps Kant should have done something of this sort. But remember, Kant held there had never been a legitimate alternative analysis of reason that set out a conflicting way of dividing up its basic functions, forms, and acts. To Kant, just as the foundations of geometry came down from Euclid with only modifications in the distinctness of its presentation,[20] Aristotle's logic, too, seemed in essentials unchallenged.[21]

In closing chapter 5 Lu-Adler claims that, "from the Kantian perspective", the question of whether "a specific system of logic—be it Aristotelian, Fregean, or some other system—has precisely captured all the absolutely necessary laws of thought" cannot, "contra Frege, be answered within logic" (196). If she means by "logic" what Kant means, we've seen this can't be right. Kant thinks of pure general logic as the analysis of the faculty of reason. If the question of the completeness of such an analysis cannot be answered within this analysis, then there is no other place this answer could possibly come from. Perhaps, however, with this claim Lu-Adler doesn't have logic in Kant's sense in mind. In these final paragraphs she turns to Frege's logic and to the contemporary discussion over whether logical calculi are normative. But if by "logic" she has in mind systems of basic laws and the propositions derived solely from them, then Frege would no more think whether a specific system of logic has captured all the absolutely necessary laws of thought is a matter of logic than Kant. After all, Frege doesn't hold that the judgment "this collection of basic laws is complete" is justifiable in terms of these basic laws any more than Kant does.[22] So either way, it is hard to see what Lu-Adler had in mind. Nonetheless, the fact that Frege only allows certain very general self-evident laws as the fundamental principles of logic, while the first principle of Kant's logic is the faculty of reason itself, already seems to indicate a large gulf between what goes under the title of "logic" for each. Still, if we were to return to a conception of logic as the analysis of this faculty, then it is hard to see how there could be room for skeptical questions about logic's normativity for reason to arise, even if isolating the necessary laws of reason would be a challenge.

Lu-Adler's is the first philosophical book length treatment of Kant's conception of logic in English. This topic is of central importance for properly understanding, fairly assessing, and learning from Kant. In making sense of the way the nature of logic was thought of in any bygone era it is difficult to keep how one presently thinks about the laws of thought at bay. For this reason, the task facing the philosopher-historian of logic is quite fraught, especially now that we are through the Fregean looking glass. Lu-Adler's work is an important step towards recovering Kant's conception of logic as the science of thinking in general. Its impressive historical sweep makes plain the diversity among views of logic prior to Kant, but also why, in comparison to meta-

[20] Although for a very interesting discussion of Kant's thoughts on the parallel postulate, see Jeremy Heis's "Kant on Parallel Lines: Definitions, Postulates, and Axioms" (Heis 2020).

[21] Although Kant quarreled with the peripatetic style definition of judgment in general as "the representation of a relation between two concepts", he evidently did not see any great difficulty in incorporating the propositional logic of the Stoics, with their hypothetical and disjunctive judgments relating two judgements, into Aristotle's term logic (B141 n).

[22] For a defense, see Goldfarb's "Frege's Conception of Logic". Goldfarb argues that Frege "frames no overarching characteristic that demarcates the logical laws from others", but that he rounded up his basic laws piecemeal or retail, not wholesale (Goldfarb 2001, 56).

physics, Kant could have thought logic was in essentials a stable science. In this respect it not only elaborates discontinuities, but also continuities in the tradition. So while its primary audience is Kant specialists, it will also be of use to other readers interested in throwing into relief our contemporary conception of logic.

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