Thus in 1921 Pasch was close to the approach that, according to the neo-logicists Hale and Wright, Frege should have adopted in the *Grundlagen*: contenting himself with Hume's abstraction principle (that is, to an implicit definition of numbers) instead of relying on the 'highly controversial' notion of extension. For Pasch as for the neo-logicist, implicit definitions need not be grounded on set theory; they are part of our most fundamental conceptual machinery, on which set theory itself should be based. It could be interesting to read (or reread) Pasch's foundational works with these contemporary issues in mind. For instance, I think it might be possible to extract from Pasch some interesting new insights about the notorious Julius Caesar argument, since Pasch emphasized in his foundational works that the areas in which the implicitly defined concept had meaning can be progressively extended.

To conclude, I think there are at least two reasons for opening this volume. First, reading Pasch is a way to apprehend the rich and solidly structured context that Frege, but also Hilbert in the *Grundlagen* and Russell in the *Principles*, had in mind when they wrote their pioneering works. Compared to the work of these giants, Pasch's solutions of the problems he confronted often appear superficial and unconvincing. But the problems Pasch raised were always deep; they were the ones Frege (especially) was struggling with. To grasp these issues from Pasch's unusual perspective helps us to understand them better. The second reason to read Pasch is that some of his developments could still open new vistas. If, as I said, Pasch's general empiricist program was not as sharply defined as it should have been, it remains the case that Pasch sometimes succeeded in stabilizing his thought, and in adjusting his general outlook to the fine-grained structure of the mathematics he considered. When he managed to do that, Pasch's writings suggest unexpected and interesting variants of questions that are still much debated.

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JODY AZZOUNI. ***Talking about Nothing***. New York: Oxford University Press, 2010. ISBN 978-0-19-973894-64. Pp. iv + 273.[†]

Reviewed by GRAHAM PRIEST*

Our normal discourse is replete with discussion of things which do not exist — the objects of fiction, of illusion and hallucination, of religious

[†] Thanks go to Jody Azzouni for very helpful comments on a first draft of this review.

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worship (whichever ones you do not believe to be true), of misguided fears and other intentional states. Let us call such discourse *empty* (my word not Azzouni's). How to account for the meaning of empty discourse, and such truth values as its statements have, are perennial and thorny philosophical topics. Many positions are well known; in this book of five chapters Azzouni advocates another. Empty discourse is literally about nothing; nonetheless, one may give an account of how its sentences are both meaningful and have appropriate truth values. In the first three chapters, the ideas are applied to the objects of mathematics, hallucination, and fiction, respectively. (One might not think of mathematical discourse as empty, but Azzouni's nominalist credentials are well established. So for him, it is.) Chapter 5 fills out the picture with a discussion of truth-conditional semantics. Chapter 4 broaches the question of how all this is relevant to a broader question: the unity of the sciences.

The book is ingenious and clearly argued.[1] There are many perceptive discussions — for example, of the way we talk about fictional objects, and about hallucination. And although it is not the main aim of the book, it mounts a number of telling arguments against alternative positions. (Though I found the arguments against Meinongianism the least substantial of these. Maybe that is because Azzouni feels that few people will take such a position seriously anyway.) And even if the book did not persuade at least this reader of its main thesis, it has estabished a genuinely novel and intriguing position on the subject.

In the rest of the review, I will describe Azzouni's view in detail, and explain why I was not persuaded.

Azzouni's position turns on two crucial distinctions. The first is between two senses of *aboutness* or *reference*, flagged with superscripts 'e' and 'r' (p. 44). In, say, mathematical discourse containing the numeral '1', '1' refers^e to the number 1. But this is just to say that if someone asked what the sentence is about, one would correctly give the answer 'the number 1', and not 'The Sydney Opera House'. By contrast, to say that the numeral '1' refers^r to something is to say that it picks out an object in extra-linguistic reality. For Azzouni, '1' refers^r to *nothing whatsoever*: no object at all, existent or non-existent.

The second distinction is between *truth makers* and *truth-value inducers* (p. 25). Both are things in virtue of which sentences are true (or false). In the case of non-empty discourse, these are truth-makers, and are the objects that the discourse is about^r. They work exactly as orthodoxy has it. But in the case of empty discourse, truth values are accounted for by something else — something other than what the discourse is about^r (there is no

[1] Had I been Azzouni's editor, however, I would have advised him against such a heavy use of footnotes.

such thing) — these are its truth-value inducers. The task, of course, it to explain exactly what these are and how they do their job. Truth-induction works differently in the discourses of mathematics, hallucination, and fiction; fair enough. But if I have a main criticism of the book, it is that the notion of truth-induction needs to be articulated and explained in much more detail. The book could happily have had another chapter giving a systematic account of the notion (including how it functions with respect to empty discourse in general, and not just the three cases targetted).

The place where the notion is clearest is in mathematics. Here, Azzouni takes truth-value inducers to be provided by mathematical practice. As long as our practice of proof establishes that for every number there is a greater prime, then so be it; we do not need objects. There are problems, of course, which arise in those places where truth seems to outstrip proof. Leave unaxiomatizable theories aside (Gödel's theorem is dealt with in one insouciant sentence (p. 40)); it will often be the case that we can establish neither A nor $\neg A$. So it would seem that we have truth-value gaps of some kind. How, then, can we justify using classical logic? — and Azzouni is no revisionist about this. In particular, classical practice establishes everything of the form $A \vee \neg A$. So the classical account of disjunction would seem to go. There is no discussion of these matters in Chapter 1.

The notion of truth-value inducer is less clear in the case of hallucination, Chapter 2. If H is an hallucinator, the truth of his 'I see Marilyn Monroe in the corner of the room' is induced by his visual experiences. But matters are more complex than this, since hallucination-discourse has an objectivity one might not expect (pp. 70 ff.). H, for example, may, according to Azzouni, be corrected by an observer: 'No, that's not Marilyn Monroe; that's Sophia Loren'. The subjective experiences are embedded in a public discourse. True, but what exactly is this — what are its rules, and how do they function? (The matter is obviously quite different from mathematical proof.) I think that we need much more detail than Azzouni gives us. Moreover, contradiction threatens the account. Suppose that H regularly hallucinates Marilyn. We cannot say 'Marilyn is always in the corner of the room', since nothing is in the corner of the room. We have to say, instead, 'Marilyn always presents to H as being in the corner of a room'. But the details of presentation are not spelled out. And when Azzouni explicitly denies that it can be understood in terms of how things appear to H (p. 87), I find myself losing all grip of the notion.

Matters are different again in the case of fiction. Here we must distinguish between intra-fictional discourse, such as 'Holmes lived in Baker St', and extra-fictional discourse, such as 'Holmes was invented by Conan Doyle' and 'Holmes was a lot smarter than Sarah Palin'. Discourse of the first kind is not, says Azzouni, truth-apt (p. 113): we merely pretend. (In fact, it seems to me, much discourse of this kind *is* truth-apt. 'Holmes lived in Baker St' is actually false. We just pretend that it is true. But this requires

a semantics of empty discourse — of the kind one gets in free logics — which Azzouni eschews.) Matters are different with extra-theoretical discourse. What are the truth-value inducers here, and how do they work? They are some sort of practice or practices (p. 128). But it is obviously not simply the practice of story-telling. Again, Azzouni does not tell us, and the matter is far from clear.

Chapter 4 concerns itself with the unity of science. (Chapter 5 is styled an appendix to the main aim of the book. But, it seems to me, its content is integral to it, and it is rather Chapter 4 which seems to be an appendix to the main game.) Science is fragmented in the following sense. There are lots of scientific languages/theories. (Azzouni explicitly identifies the two notions (p. 168). Given the obvious conceptual distinction, I think that this is unwise.) Each has a domain of things it is about (*e* or *r*). The domains are not to be unified by reduction or supervenience. However, they are unified by the empirical cross-domain regularities we discover. This does not occasion a logical or alethic pluralism, however. A unified theory of truth may be given (more of this anon), and logical pluralism is ruled out because we may always talk about relationships between objects of different domains; so a single logic is required (pp. 202 f.). This last step is too fast. One may give a perfectly coherent account of how science is chunked (each chunk having its own logic), with a limited kind of information being allowed to flow between chunks.[2] Indeed, this sort of account is required to handle reasoning about various topics in science where one uses the results of incompatible theories. For example, in a quantum situation where one appeals to both classical and quantum mechanics; and in a situtaion concerning a fluid, where one might combine the results of a theory which takes a fluid to be a continuum with those of theory concerning its molecular composition.

Back to the main game and Chapter 5. Chapters 1–3 have described how empty discourse can be true/false. How can it be meaningful? We may adopt a truth-conditional account of meaning. But what does a theory of truth conditions look like? We can, according to Azzouni, simply appropriate the standard Tarskian account. The worry here is that such an account appears to invoke the very objects of which there are none. Not so, says Azzouni. And the move, once seen, is obvious. If we have a viable story concerning the object-language discourse, we can apply it to the metalanguage discourse as well. This, therefore, no more requires those objects than does the object-language.

But now another worry arises. Our theory of meaning does not require language to be about^r anything. Our theory of truth for empty discourse does not, either. We still have non-empty discourse, of course; discourse

[2] See, *e.g.*, B. Brown and G. Priest, 'Chunk and permeate I: The infinitesimal calculus', *Journal of Philosophical Logic* **33** (2004), 379–388.

about chairs, stars, and people. But it is not clear that these objects are ultimately any more real than fictional objects. They are, one might think, composed of atoms, which are what is really there. Of course, there are truths about macroscopic objects. But we have a practice of talking about chairs and stars, *etc*. This would seem to provide just as good an account of truth-induction for such objects as our practices concerning mathematics, fiction, *etc*. And exactly the same is true concerning the atoms themselves — indeed, concerning anything of which we talk in a systematic way. A suitable account of reference^{e} and truth-induction would seem to do everything we need. We do not need to have reference^{r} to anything. Ockham's razor suggests that we sweep all objects away. There is nothing. Azzouni's view therefore threatens to collapse into nihilism. Azzouni (in correspondence) suggests that what prevents a collapse into nihilism is our epistemology. There are some objects that exist because we causally interact with them. I am not persuaded. Of course it is true that we causally interact with many objects. The truth of such claims can, however, if Azzouni is right, be accounted for without appealing to reference^{r}.

I am sure that there is much more to be said about all the matters I have discussed. And Azzouni, I guess, is likely to do this in other works. Perhaps the problems I have noted can be sorted out satisfactorily; perhaps not. But even if a novel idea does not ultimately succeed, if the idea is suitably rich, as Azzouni's is, the new perspective it brings deepens our understanding of the entire philosophical landscape connected with it.

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Guillermo E. Rosado Haddock. ***A Critical Introduction to the Philosophy of Gottlob Frege***. Aldershot, Hampshire, and Burlington, Vermont: Ashgate Publishing, 2006. ISBN 978-0-7546-5471-1. Pp. x + 157.

Reviewed by Philip A. Ebert*

Guillermo E. Rosado Haddock's critical introduction to the philosophy of Gottlob Frege is based on twenty-five years of teaching Frege's philosophy at the University of Puerto Rico. It developed from an earlier publication by Rosado Haddock on Frege's philosophy which was, however, available only in Spanish. This introduction to Frege is meant to steer a

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