

A Brentanian Philosophy of Arithmetic

My aim in what follows is to identify the main respects in which Husserl's early philosophy, and in particular his early writings on the foundations of arithmetic, were influenced by Brentano's thought. My claim will be that that influence was extensive and profound enough to warrant calling Husserl's philosophy of arithmetic 'Brentanian'.

The historical background can be stated quite briefly. Like his contemporaries Gottlob Frege and Bertrand Russell, Husserl began his academic life as a mathematician. He studied mathematics at the universities of Leipzig, Berlin (where he was taught by both Kronecker and Weierstrass) and Vienna, where in 1882 he received his Ph.D. for a thesis entitled *Contributions to the theory of the Calculus of Variations*. Although Husserl had in fact studied philosophy as a subsidiary subject - in Leipzig, for example, with Wilhelm Wundt - there is little evidence that his interest in the subject was, during this period, anything other than cursory. And in 1883 he left Vienna to take up a post in Berlin as assistant to Weierstrass. According to his wife, Husserl felt himself to be, at this time "totally a mathematician".¹

Within a year this feeling had changed, and Husserl again left Berlin for Vienna; this time, however, to study philosophy with Brentano. He later recalled that during this period "my philosophical interests were increasing and I was uncertain whether to make a career in mathematics, or to devote myself totally to philosophy. It was Brentano's lectures that finally settled the matter", in favour of philosophy.² Between 1884 and 1886 Husserl attended Brentano's lectures, seminars, and discussion groups, visited Brentano often at his home, and even accompanied him on his summer holidays. Brentano's teaching, Husserl reports, "gave me for the first time the conviction that encouraged me to choose philosophy as my life's work." In 1887 Husserl completed his *Habilitationsschrift* entitled *On the Concept of Number: Psychological Analyses*; and four years later there appeared the first volume of *Philosophy of Arithmetic: Psychological and Logical Investigations*, a work that is dedicated "To my teacher Franz Brentano".

The subsequent fate of these early writings on the foundations of arithmetic is well known: Volume I of *The Philosophy of Arithmetic* was reviewed by Frege, who found it both half-baked and pernicious. Volume II never appeared; and Husserl's attempts to contribute to our understanding of numbers and number theory quickly fell into the obscurity in which they have remained to the present day. Symptomatically, for example, the vast majority of works, written in the last

eighty years by mathematicians and philosophers concerning the foundations of arithmetic, have contained not even a passing mention of Husserl.

This is at least in part a result of the anti-psychologistic bias of much twentieth century philosophy, combined with a virtually universal belief that Husserl's early works are explicitly and irremediably psychologistic - a belief encouraged not only by Frege's influential review, but also, ironically, by Husserl's own lengthy polemic against the evils of psychologism in his next major work, the *Logical Investigations*. Frege, for example, wrote:

If a geographer were given an oceanographic treatise to read which gave a *psychological* explanation of the origins of the oceans, he would no doubt get the impression that the author had missed the mark! [Husserl's treatise] has, however, left me with exactly the same impression.³

"It is clear", Frege goes on, that according to Husserl "numbers are supposed to be ideas. But where is the objective something *of which* a number is an idea?"

This mingling of the subjective and the objective spreads such an impenetrable fog that the attempt to get clear on this point is doomed to failure.

And Husserl himself prefaced his subsequent denunciation of psychologism with Goethe's remark that "there is nothing on which one is more severe than the errors one has just abandoned."⁴

The impression which remarks such as these have created, and indeed the verdict that history has given us on the value of Husserl's early philosophy are both, I think entirely mistaken. For Husserl did not attempt to reduce arithmetic to psychology; nor did he identify numbers with subjective ideas. And his philosophy of arithmetic is more interesting and more viable than those who only know it via Frege's review have been inclined to judge. But in order to see this, we need to place Husserl's early philosophical enterprise in an adequate perspective, that is, to set it against the background of doctrinal, conceptual and methodological concerns and assumptions in the absence of which that enterprise will inevitably remain unintelligible and unmotivated. The claim that I want to make is that the doctrinal, conceptual, and methodological perspective within which Husserl's philosophy of arithmetic is conceived and executed (but which remains very largely suppressed in Husserl's texts) is that which he inherited, more or less without modification, from Brentano in the period to which *Psychology from an Empirical Standpoint*, *The Origin of our Knowledge of Right and Wrong*, and the *Lectures on Descriptive Psychology* belong. More specifically, the very discipline to which the *Philosophy of Arithmetic* is intended to make a contribution; the analytic machinery which Husserl therein employs; the 'empiricism' and 'methodological solipsism' which provide the theoretical framework for that work; as well as specific doctrinal commitments concerning intentionality, objects and aggregates, mental and physical phenomena, self-evidence, presentations and judgements, authentic and symbolic presentations, and inner perception - all of these Husserl inherited from Brentano. In the remainder of the present paper I shall try to provide a reconstruction of Husserl's account

of the foundations of arithmetic, in a way that will, I hope, make clear the nature and the extent of this inheritance.

Husserl set himself two kinds of task in the *Philosophy of Arithmetic*: one was to explain the nature and origin of the most fundamental *concepts* employed in number theory; the second was to account for the most important *judgements and assertions* involving those concepts. Like Frege before him, Husserl identifies the notion of a cardinal number as the most basic and problematic arithmetical concept. And, again like Frege, he distinguishes between two sorts of judgement or assertion in which the notion of a cardinal number participates. On the one hand, that is, there are everyday ascriptions of number in which a numeral or number word appears in an attributive role - as for example in sentences like "I met three people yesterday", or "There are thirty eight counties in England". And on the other hand, there are genuine assertions of arithmetic such as " $5+7=12$ " or "Two is the only even prime number". Frege had argued that the best, indeed the only way to get clear about number concepts was, first, to get clear about the judgements and assertions which contain or employ those concepts. Husserl, however, followed Brentano in adopting the more traditional approach, according to which presentations are prior to, and provide the foundation for, judgements. Husserl also follows Brentano's empiricist lead in assuming that concrete, sensory presentations are prior to, and form the foundation for, abstract or conceptual presentations. Indeed, these very considerations determine Husserl's entire strategy. Having identified the notion of a cardinal number as his primary target, he needs to show how the concept number in general, as well as the concepts of the individual cardinal numbers (1, 2, 3, and so on), originate from concrete presentations; he then needs to give an account of the nature of the different kinds of judgement which employ those concepts.

This overall strategy is complicated, however, by Husserl's intuition that our grasp and use of very small numbers differs quite radically from our grasp and use of larger ones. The entire strategy has, therefore, to be implemented twice. And so in Part One of the *Philosophy of Arithmetic* Husserl attempts to provide an empiricist account of how we acquire and use concepts of numbers less than about ten. In Part Two he attempts to give a quite different (though equally empiricist) account of our acquisition and understanding of concepts of arbitrarily large numbers greater than ten. It is important to note, however, that Husserl does not subscribe, and is not committed, to the absurd thesis that there are two different kinds of *number* - small ones and large ones. He in fact gives a perfectly univocal explanation of the nature of all numbers, small and large. His point is rather that, epistemologically, we need to distinguish between the way in which we acquire, grasp, and use a concept like *three*, from the way in which we acquire, grasp, and use a concept like *12*⁵. In essence Husserl's claim is that concrete, sensory experience can be such as to contain items that are threesomes, trios, triples, or other tripartite phenomena. I can, so to speak, *see* that the apples in the bowl are green. And my concept of the number three is in many ways as intimately related to concrete perceptual presentations as is, say, my

concept of the colour green. Quite clearly, however, nothing of the sort is even remotely the case with respect to a number like 12^6 . In sharp contrast to my understanding of a small number, my grasp of a large number, according to Husserl, can be exhaustively characterized in terms of my ability to calculate with it, rather than, say, in terms of my ability to apply it to items that are experienced as possessing a certain cardinality. To grasp the concept 12^6 is no more and no less than to be able to calculate that 12^6 is 2,985,984; that it is $12^7 + 248,832$; that it is $9^2 + 2,985,903 \dots$ and so on. Husserl calls the grasp we have of small numbers "authentic" (*eigentlich*), and our grasp of large numbers "symbolic" or "inauthentic". He writes:

The distinction between 'authentic' and 'inauthentic' or 'symbolic' presentations is one on which Fr. Brentano always laid the greatest stress in his university lectures. I owe to him a better understanding of the crucial importance that inauthentic presentations have for our entire mental life - an importance that, as far as I can see, no one before Brentano had fully grasped.⁵

So - we need first to ask - what sort of theory does Husserl provide of authentic presentations of number? The theory is formulated entirely within the constraints definitive of Brentanian descriptive psychology. Husserl, that is to say, adopts the following principles as axiomatic:

1. Concrete, sensory presentations are prior to, and form the foundation of, abstract, conceptual presentations. In Husserl's words: "No concept can be grasped that lacks a foundation in concrete intuition".⁶
2. Presentations are prior to, and form the foundation of, judgements. Every judgement is founded on a presentation.
3. Presentations are mental acts that have intentional contents.
4. The intentional content of a presentation is immanent to that presentation, it is a proper part of it.
5. The only objects of study of descriptive psychology are phenomena, that is, mental acts and their intentional contents. (Mental acts are called "mental phenomena", their contents, when those contents are not themselves mental acts, are called "physical phenomena".)
6. Mental phenomena are known immediately and indubitably via inner perception or secondary consciousness.
7. Phenomena can form complex wholes of two radically different kinds. There are strong or integral wholes, in which the parts depend for their existence on the existence of the whole of which they are a part; and there are weak wholes or mere aggregates, in which the parts do not depend for their existence on the existence of the whole.

With these considerations in place, Husserl's theory of how we acquire and grasp small number concepts emerges quite naturally; and although some of the details of that theory are obscure, its overall shape and direction are easily summarized.

The concrete, sensory phenomena which for the foundation for such concepts are aggregates, "pluralities of particular objects".⁷ Now, within a Brentanian

framework,⁸ an aggregate or collection of things is a whole whose parts are ontologically independent of that whole. Aggregates therefore possess unity as well as diversity. Husserl writes:

The presentation of an aggregate of given objects is a unity in which the presentations of individual objects are contained as component presentations. Of course, this combination of parts, as present in any arbitrary aggregate, is merely loose and external ... But nevertheless there is a particular unity there, and the unity must, moreover, be noticed as such; for otherwise the concept of an aggregate could never arise ... From now on I shall use the term 'collective combination' (*Kollektive Verbindung*) to signify the kind of unity which characterizes an aggregate.⁹

It is, according to Husserl, by reflection on acts of collective combination that we acquire the concept of *a* multiplicity, that is, of *one*, particular plurality of things. And it is by resolving the numerical indeterminacy in the concept of a mere plurality of things that we acquire the authentic concept of a determinate number.

For present purposes it is relevant to note that the only resources Husserl allows himself are those available within the methodological solipsistic constraints of Brentanian descriptive psychology - namely presentations of physical phenomena, and presentations of mental acts of collective combination.

This theory works well for concepts of numbers up to about ten or so - numbers, that is, which apply to aggregates all of whose members can be simultaneously and distinctly intuited. Clearly, however, the theory fails to account for our possession of numerical concepts which apply to unintuitably large aggregates. For such cases as these, Husserl provides a largely formalistic account, according to which our understanding of numerical notions is constituted by our ability to manipulate a rule-governed sequence of signs. There are four requirements:

1. The sequence of signs should be perceptible; its elements must comprise physical phenomena.
2. The sequence of signs must be recursive, so that every permissible sign has a unique place in the sequence, a place which can be determined solely on the basis of the perceptible characteristics of the sign.
3. The base class out of which the recursive sequence is generated must be such that its elements designate authentic concepts of number.
4. Signs in the recursive sequence are to receive a pragmatic interpretation via rules for mapping those signs, one-to-one, not only onto the members of arbitrary aggregates, but also onto the members of the numeral sequence itself.

If these four requirements are met, then Husserl can plausibly explain our symbolic grasp of large numbers (via our ability to calculate); our ability to apply numbers to items in our experience (via our ability to map numerals onto such items); and also our grasp of the elementary truths of number theory (via mappings of the numeral sequence onto itself).

Again, for present purposes, the important thing to note is that, as with authentic presentations of number, so with symbolic presentations, the entire

account is elaborated in conformity with Brentanian empiricism. All judgements and concepts are traced back to their foundations in presentations of concrete, physical phenomena – in this case presentations of perceptible signs forming a sequence that has certain formal properties. And for Husserl, as for Brentano, physical phenomena are just the intentionally in-existent, sensory contents of the mental acts of presenting and judging.

Notes

- 1 See K. Schuhmann, *Husserl-Chronik*, The Hague: Nijhoff, 1977, p.11.
- 2 E. Husserl, "Recollections of Franz Brentano", transl. by R. Hudson and P. McCormick, in (eds.) P. McCormick and F. Elliston, *Husserl. Shorter Works*, University of Notre Dame Press, 1977, p.342.
- 3 G. Frege, "Review of E.G. Husserl, *Philosophie der Arithmetik*", in *Collected Papers* (ed.) B. McGuinness, transl. by M. Black et al., Oxford: Blackwell, 1984, p.201.
- 4 E. Husserl, *Logical Investigations*, transl. by J.N. Findlay, London: Routledge & Kegan Paul, 1970, p.43.
- 5 E. Husserl, *Philosophie der Arithmetik*, (ed.) Eley, The Hague: Nijhoff, 1970, p.193. Compare F. Brentano, *Vom Ursprung sitlicher Erkenntnis*, (ed.) O. Kraus, Meiner, Hamburg, 1969, § 20, p.17.
- 6 E. Husserl, *ibid.*, p.79. Cf. Brentano, *ibid.*, § 18, p.16.
- 7 E. Husserl, *ibid.*, p.15.
- 8 See e.g., F. Brentano, *Psychology from an Empirical Standpoint*, (ed.) O. Kraus, transl. by A.C. Rancurello et al., London: Routledge & Kegan Paul, 1973, pp.155ff.
- 9 E. Husserl, *ibid.*, p. 20.