

## CHAPTER 10

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# GOTTLOB FREGE: SOME FORMS OF INFLUENCE

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THE products of great philosophical minds are often seminal in two interestingly different ways. One is to contain *prima facie* opposing elements or emphases that influence contrary developments, each feeding off the original. The other is to contain ideas that are initially neglected or rejected, but that come to seem lasting. Their fruitfulness can derive either from providing an exemplar that deepens understanding of later ideas or from opening possibilities that come to seem viable only after substantial philosophical changes have occurred.

A dramatic example of the first sort of seminal fruitfulness is Kant's providing resources for both empiricist and rationalist views. Twentieth-century logical positivists took up his empiricist emphases. They did so both in their rejection of logic as a source of genuine knowledge and in their looking to natural science as inspiration for formulating a principle to distinguish cognitively worthwhile enterprises from philosophical delusion. Kant's rationalist emphases were influential both in the twentieth-century development of a sharp distinction between pure and applied geometry and in more recent accounts of constitutive conditions on thought.

A dramatic example of the second type of influence is Aristotle's doctrine that the forms of physical objects reside in perceptual or intellectual states, only in a 'different way'. This conception of psychological states and their representational powers had, from the early modern period onward, been widely regarded as quaint and nearly worthless. It came to be seen in late twentieth-century philosophy as the ur-ancestor of anti-individualism.

These points have implications for doing history of philosophy. The history of philosophy is both a resource for materials to build with and an instructive limit on temporal parochiality. To preserve the former sort of value, one must study the history of philosophy with contemporary philosophical projects and interests firmly in mind. To preserve the latter, one must avoid anachronism and respect historical context—do genuine history, not simply engage in scavenging hunts in the temples of the dead.

Preserving each value is enhanced by taking seriously the other. Given that the older philosophical projects are not incommensurable with our own, approaching historical work with a keen sense of difficulties and possibilities inherent in our own projects sharpens an understanding of the great minds' earlier points of view. Given the richness, depth, and *historical foreignness* of the great minds, an understanding of exactly what they meant by their claims is likely to yield richer, more subtle building materials than if one treated the claims as issuing from the mind of a contemporary interlocutor.

In this chapter, I discuss some aspects of Gottlob Frege's influence on philosophy during the last hundred and twenty-five years. Frege (1848–1925) is the undisputed father of 'analytic philosophy', or of what I prefer to call the mainstream tradition in twentieth-century philosophy.<sup>1</sup> I discuss seven respects in which Frege influenced subsequent philosophizing. The last five illustrate one or the other of the just cited ways in which a great philosopher can be seminal. The first two constitute a different, more unusual form of philosophical influence.

## 10.1 DEVELOPMENT OF LOGIC

Frege's greatest intellectual contribution was his development and nearly flawless formulation of first- and second-order logic.<sup>2</sup> His logic is what is used in logic texts today. Frege did not produce a model theory. But his semantical construal of his logic formed the basis for more modern treatments; and the syntax of his logic, though not his symbolism, is almost identical to modern versions.

Frege's logicism was one of the earliest of what became a number of attempts to provide a 'foundation' for mathematics. Dedekind, Hilbert, Russell, and Zermelo—the latter building on the set theory of Cantor—and others offered various basic principles from which all, or substantial parts, of mathematics could be derived.<sup>3</sup> Frege's own

<sup>1</sup> For a discussion of the term 'analytic philosophy' and this preference for the term 'mainstream philosophy', see my *Truth, Thought, Reason: Essays on Frege* (Oxford: Clarendon Press, 2005), pp. 6–14.

<sup>2</sup> Gottlob Frege, *Begriffsschrift* (1879), in *Begriffsschrift und Andere Aufsätze*, ed. Ignacio Angelelli (Hildesheim: Georg Olms Verlag, 1977); reprinted and translated in *From Frege to Gödel*, ed. Jean van Heijenoort (Cambridge, MA: Harvard University Press, 1981).

<sup>3</sup> Richard Dedekind, *Was Sind und Was Sollen die Zahlen?* (Minneapolis: University of Minnesota Press, 1988); David Hilbert, *Grundlagen der Geometrie* (1899); 'On the Foundations of Logic and Arithmetic' (1904), reprinted in *From Frege to Gödel*; Bertrand Russell, 'Mathematical Logic as Based on the Theory of Types' (1908), reprinted in *From Frege to Gödel*; Ernst Zermelo, 'Investigations in the Foundations of Set Theory I' (1908), reprinted in *From Frege to Gödel*. For more recent attempts to defend a neo-Fregean conception of logicism (with which I believe Frege would have had scant sympathy), see Bob Hale and Crispin Wright, *The Reason's Proper Study: Essays Toward a Neo-Fregean Philosophy of Mathematics* (New York: Oxford University Press, 2001).

foundational effort attempted to reduce the mathematics of *number* to *logic*.<sup>4</sup> Because the logic that he proposed relied on a defective principle that cannot be included in first- and second-order logic (which he otherwise correctly formulated), his attempt failed. But his was one of the most influential attempts at establishing foundations for mathematics. More specifically, his work provided a paradigm for subsequent attempts to reduce substantial parts of mathematics to logic, notably Russell's attempt.<sup>5</sup> More broadly, the rigor and depth of Frege's thinking established a paradigm for all work in the new branch of mathematics—mathematical logic—whether reductive or not.

Frege's first influence on *philosophy* was on the philosophy of mathematics, especially the epistemology and proof structure of mathematics. The initial conduit of this influence was Russell.<sup>6</sup> But Frege's work on logic had a much wider effect on philosophy. Russell himself used Frege's logical techniques in metaphysics and epistemology.<sup>7</sup> The early Wittgenstein constructed a metaphysics using Frege's work in logic.<sup>8</sup> Carnap offered his own metaphysics using Frege's logical apparatus, and later applied Frege's logic in rejecting metaphysics and in attempting to understand the logical structure of natural science.<sup>9</sup> Church steadily advocated the relevance of Frege's logic to the philosophy of language.<sup>10</sup>

Frege's logic provided a versatile tool for thinking about a great variety of philosophical problems. This tool brought with it new standards of rigor in doing philosophy. Frege's use of and reflection on logic for philosophical purposes suggested both new approaches to old problems, and a new set of philosophical problems. These problems figured very prominently in twentieth-century philosophy.

Thus Frege's largest impact on philosophy was to connect philosophy more closely to the explicit use of logic, and to direct philosophical inquiry to problems suggested by and tractable to the application of logic. For example, Frege's attempt to find the structure of inference in the logical structure of language, and his attempt to understand the structure of thought through an underlying deep structure of language, helped create

<sup>4</sup> Gottlob Frege, *Begriffsschrift; The Foundations of Arithmetic* (1884), tr. J. L. Austin, with German text, 2nd edn. (Oxford: Blackwell 1953); *Grundsetze der Arithmetik*, vols. I–II (1893, 1903) (Hildesheim: Georg Olms, 1962); Preface, Introduction, and parts of vol. I translated as *The Basic Laws of Arithmetic*, tr. M. Furth (Berkeley: University of California Press, 1967). Frege took geometry to be *non-logical*.

<sup>5</sup> See note 3. Also A. N. Whitehead and Bertrand Russell, *Principia Mathematica*, vol. I (1910), vol. II (1912), vol. III (1913) (Cambridge: Cambridge University Press, 1910, 1912, 1913).

<sup>6</sup> Bertrand Russell, *The Principles of Mathematics* (Cambridge: Cambridge University Press, 1903); *Introduction to Mathematical Philosophy* (London: Allen & Unwin, 1919).

<sup>7</sup> Bertrand Russell, 'On Denoting', *Mind* 14 (1905): 479–93; *The Problems of Philosophy* (Oxford: Oxford University Press, 1912).

<sup>8</sup> Ludwig Wittgenstein, *Tractatus Logico-Philosophicus* (1922), tr. D. F. Pears and B. McGuinness (London: Routledge, 2001).

<sup>9</sup> Rudolf Carnap, *The Logical Structure of the World* (1928), tr. R. George (Berkeley: University of California Press, 1967); *Meaning and Necessity* (1947) (Chicago: University of Chicago Press, 1956).

<sup>10</sup> Alonzo Church, 'The Need for Abstract Entities in Semantic Analysis', *Proceedings of the American Academy of Arts and Sciences* 80 (1951): 100–12; reprinted in *The Philosophy of Language*, ed. A. P. Martinich (New York: Oxford University Press, 1985); *Introduction to Mathematical Logic*, vol. I (Princeton, NJ: Princeton University Press, 1956).

the philosophy of language and produced a new way of thinking about the philosophy of mind. His reflection on types of 'meaning' encouraged philosophers to reflect on the nature and meaning of their own subject, to clarify the basis for their claims, and to connect them to clear logical structures. Stated so abstractly, the point seems rather bloodless. But in application, all subdisciplines in philosophy, from philosophy of mathematics to ethics, took on a greater commitment to clarity, explicitness, and self-criticism which in turn furthered philosophical communication and progress. Moreover, Frege's attempt to understand the basis for mathematics and his emphasis on the public, communal nature of scientific claims, revived a concern to ally philosophy with the sciences that had been muted in philosophy since Kant.

The influence on philosophy of Frege's development and application of logic is unusual. The form of influence is unlike the two types discussed in the preamble. It was unitary, pervasive, and steady, from Russell's initial recognition of Frege as a great philosopher onward. It is not too much to say that this influence was the largest factor in initiating a new era of philosophy. The new era was marked by a shared understanding of techniques and problems, a distaste for vague, grandiose claims, and a consequent openness of discussion to communal development.

## 10.2 TAKING PROPOSITIONAL STRUCTURES AS THE BASIS FOR UNDERSTANDING LANGUAGE, THOUGHT, AND ONTOLOGY

The most specific application of Frege's use of logic in philosophy was his taking propositional structures to be the basis for theorizing about logic, language, thought, and ontology. Like the first form of influence, this specific instance is unusual in being unitary, pervasive, and constant, from the beginning.

In the Introduction to *Foundations of Arithmetic* (1884), Frege stated a context principle: (a) 'Never ask for the denotation (*Bedeutung*) of a word in isolation, but only in the context of a proposition.' Later in the book, he associates, either implicitly or explicitly, this methodological recommendation with two substantive claims: (b) Only in the context of a proposition does a word have denotation (*Bedeutung*), and (c) It is sufficient for a word to have a denotation (*Bedeutung*) that it occur in certain positions in true propositions.<sup>11</sup>

When Frege wrote *Foundations of Arithmetic*, he had not drawn his ground-breaking distinction between sense (*Sinn*) and denotation (*Bedeutung*) (1891–2).<sup>12</sup> Later Frege

<sup>11</sup> *The Foundations of Arithmetic*, Introduction, p. x, and sections 60, 62, 106.

<sup>12</sup> Gottlob Frege, 'On Function and Concept' (1891); 'On Sense and Denotation' (1892), the latter translated as 'On Sense and Reference', in *Translations of the Philosophical Writings of Gottlob Frege*, 2nd edn., tr. P. Geach and M. Black (Oxford: Blackwell, 1966); also in *Collected Papers*, ed. B. McGuinness (Oxford: Blackwell, 1984), and in *The Frege Reader*, ed. M. Beaney (Oxford: Blackwell, 1997).

recognized that in *The Foundations of Arithmetic* he had used 'Bedeutung' sometimes to mean what he later meant by 'Bedeutung' and sometimes to mean what he later meant by 'Sinn'. Each of (a), (b), and (c) can be taken with either reading of 'Bedeutung'—yielding six principles. Frege accepted all six principles. Even with this sharpening, the specific meanings of (b) and (c) are, of course, not transparent. What does it mean to be 'in the context' of a proposition? What is meant by 'certain positions' in true propositions? I say a little in response to this latter question in what follows. But most of the discussion will not depend on answering these questions.<sup>13</sup>

A key to Frege's revolutionary influence in the study of logic, language, and the structure of thought lay in his focus on patterns of valid *inference* and in his focus on understanding conditions under which the primary function of *judgment* (to connect to truth) is fulfilled. Frege had discovered and formulated modern logic by considering what propositional structures underlie formal, deductively valid inference. His methodological point in (a) was that one can best understand structural and certain functional aspects of language and thought by reflecting on how formal, deductively valid inferences hinge on parts of propositional structures, and how parts of propositional structures connect with a subject matter (the world, broadly construed) and with one another in determining their truth or falsity.

Frege showed how to follow his own methodological advice in his analysis of the logical/grammatical structure of numerical statements,<sup>14</sup> and in his brilliant discussion in 'On Sense and Denotation' of the structure of numerous constructions in ordinary language. Frege's method contrasts with previous approaches to language that focused on definitions of words, or on the association of words with perceptual images, or on ideas in individuals' minds. By contrast, Frege inferred the structural nature of propositional components from their behavior in inferential activity. And he inferred the semantical functions of propositional components from explanations of their contributions to determining conditions whose fulfillment constitutes propositional truth.

Russell took up Frege's approach. He developed it in a competing theory of the structure of thought, especially in his theory of descriptions.<sup>15</sup> The logical positivists concentrated on the cognitive meaning of propositional statements. By mid-century the approach had become the basis for understanding semantics not only in philosophy but in linguistics. Indeed, the focus on the structural behavior of whole sentences, a methodology closely connected to Frege's more semantically oriented (a), became the methodological basis for the study of syntax in linguistics.

The key idea behind both interpretations of the methodological claim (a) and both interpretations of claim (b) is to focus on the way words or thought components contribute to truth conditions and inferential potential. Such focus is impossible unless words and thought components are considered in relation to propositional structures

<sup>13</sup> I discuss these principles at somewhat greater length in *Truth, Thought, Reason*, pp. 15–16, 87–90, 108–11, 307.

<sup>14</sup> *The Foundations of Arithmetic*, sections 29–54.

<sup>15</sup> Russell, 'On Denoting'.

that could contain them. Although there are other aspects of language and thought besides structural ones, many of even these other aspects are best understood in relation to the structural ones.

For example, referential aspects of words—their being connected representationally to subject matters—are best understood in the context of the grammatical roles of the words and the ways the words contribute to truth conditions. Similarly, tonal or pragmatic aspects of language use are best understood in contrast with truth-conditional aspects of the words' meaning and reference. Over the last century and a quarter, these points have been borne out through the fruitfulness of their application in linguistics, formal semantics, and applied mathematical logic. Similar points apply, I think, to understanding the nature of propositional thought.

A second way in which Frege's focus on propositional structure and truth conditions influenced twentieth-century philosophy lay in its contribution to ontology—the metaphysics of being, or of what is. The key source of influence is the principle obtained from the denotational interpretation of (c). Frege's use of the principle, as distinguished from his formulation of it, shows the principle to be that if, under semantical analysis, a word's (or thought component's) having a denotation is entailed by the semantics of a true proposition's truth, then the word (or thought component) has a denotation. The truth of a proposition and its semantical analysis are sufficient for determining that a word or symbol has a denotation: no further considerations are relevant.

Frege appealed to this principle in his defense of taking numbers and functions to be entities in the subject matters of the mathematical sciences.<sup>16</sup> His idea was that there could be no better ground to believe in entities than that the entities are needed to be the denotations of expressions in order to explain the semantics of propositions known to be true—particularly in the sciences. According to his logical-semantical analysis, the explanation of the known truth of propositions of arithmetic appeals (i) to numbers as denotations of singular numerical expressions, and (ii) numerical functions as denotations of predicates (*is a natural number*) and functors (*the successor of*). So he concluded that numbers and numerical functions *are* denotations, and figure in the ontology of mathematics—in mathematics' subject matter.

Frege's principle (c), interpreted in the denotational way, served to undermine extraneous ontological requirements. For example, empiricists might claim that because one cannot be in perceptual or other causal relations to numbers, one should doubt that there are any numbers, or one should claim that numbers are just convenient fictions. Physicalists or nominalists might claim that because numbers lack causal powers or are not in space or time, one should disallow them in ontology. Frege took such views to be undermined by his context principle.<sup>17</sup>

<sup>16</sup> *The Foundations of Arithmetic*, esp. section 60.

<sup>17</sup> For a discussion, somewhat removed from Frege's texts, but in Frege's spirit on this matter, see Michael Dummett, 'Nominalism' (1956) in *Truth and Other Enigmas* (Cambridge, MA: Harvard University Press, 1978). See also Michael Dummett, *Frege: Philosophy of Mathematics* (Cambridge, MA: Harvard University Press, 1991), chapter 16; and my 'Frege on Truth' in *Truth, Thought, Reason*.

Of course, the context principle (c), interpreted in the denotational way, is not self-evident. Some philosophers have flouted or ignored it—citing the intuitive force of their own intuitions. For example, a few philosophers still deride the assumption of abstract entities like numbers. Other philosophers have tried to limit the scope of Frege's principle, or to interpret it differently from the way Frege interpreted it. For example, Quine took predicates and functors not to have denotations. And he revised Frege's principle—focusing on the range of first-order quantifiers rather than the denotations of terms.<sup>18</sup>

Despite such controversy, the relevant principle associated with (c) has been almost as influential in ontology as principles (a) and (b) have been in the study of structural aspects of language and thought. Two forms of this influence can be distinguished. One is that Frege used the principle in conjunction with his deep analysis of propositional structure and truth-conditional semantics. Thus his assertion of the principle provided a methodological ground rule for thinking about ontology that was vastly clearer than anything that had come before. Quine's criterion for ontological commitment (alluded to in the previous paragraph) has been justly influential for precisely this contribution. From a broad historical perspective, Quine's contribution is simply a turn on Frege's.

The second, much deeper form of Frege's influence on ontology lay in the methodology that stands behind his use of the context principle (c). Frege's reflection on ontology occurred within his reflection on the structure and nature of the science of mathematics. In effect, he took ontology not to be an independent discipline. He allied it with other disciplines that yield truths. So his ontology is very closely allied with mathematics. He started with propositions known in the sciences—or otherwise known, but not through some special discipline of ontology. Then he determined what entities the semantical explanation of their truth requires. Frege's approach influenced the practice of Russell, Carnap, and Quine. Quine's pragmatic approach to ontology has been justly influential for grounding metaphysics in epistemologically more sound enterprises, principally scientific enterprises.<sup>19</sup>

Quine was less pragmatic than Frege in some ways. Without any serious justification, he confined 'science' to natural science—as distinguished from logic and mathematics.

<sup>18</sup> W. V. Quine, *Word and Object* (Cambridge, MA: MIT Press, 1960), sections 20–5; and 'On What There Is' (1948) in *From a Logical Point of View*, 2nd edn. (Cambridge, MA: Harvard University Press, 1961); also reprinted in *Quintessence*, ed. R. F. Gibson (Cambridge, MA: Harvard University Press, 2004). For more on Frege's notion of predicate denotation, see Montgomery Furth, 'Two Types of Denotation', in *Studies in Logical Theory*, American Philosophical Quarterly Monograph Series 2 (Oxford: Blackwell, 1968). For a defense of a similar view, see my 'Predication and Truth', *The Journal of Philosophy* 104 (2007): 580–608. For a lucid discussion of issues that are associated with ontological commitment through first- and second-order quantifiers, and through predicates, see Charles Parsons, *Mathematical Thought and Mathematical Objects* (Cambridge: Cambridge University Press, 2008), chapter 1.

<sup>19</sup> Quine, *Word and Object*, chapters 1 and 7, esp. section 48.

He took mathematics, I think without justification, to be entirely parasitic for its scientific status on its applications within natural science. Moreover, he showed no openness to or interest in non-natural-scientific sources of knowledge—for example self-knowledge or knowledge through semantics or psychology—as Frege did. Further, Quine placed extensionalist ontological strictures on his investigation that have not accorded with the actual development of the sciences. Natural science is committed to properties, and the human sciences are committed to perceptions, intentions, and beliefs. Quine's strictures on extensionalist explanations have been justly ignored in the sciences. (See also section 10.7 below.) Still, in its primary motivations, Quine's approach to ontology—like the approaches of Russell, Carnap, Church, Strawson, and many others—is rooted in Frege's precept and example.

The approach to ontology that flows from Frege deepens Kant's attempt to make theoretical philosophy concrete by associating it closely with scientific practice, and with other non-metaphysical cognitive enterprises. Although appeals to independent ontological principles ('no abstract objects', 'no entities without causal powers', 'no intensional entities') are perennially tempting, they have not led to progress or agreement in philosophy, much less science. Frege's more pragmatic, scientifically grounded approach to ontology put the subject on a stronger footing.

As noted, both the influence of Frege's use of logic in philosophy and, more specifically, the influence of his context principles in semantics, linguistics, applied logic, epistemology, and ontology were unitary and powerful from the beginning. This type of influence is rare in the history of philosophy. Arguably, such massive and unitary influence is possible in philosophy only because it centers in method, not doctrine. Understanding it requires sensitivity to the many ways in which Frege's logic and his contextualist principles have been applied—or, in the case of the latter, developed, refined, and re-directed in philosophy and in the sciences.

### 10.3 THE LANGUAGE OF SCIENCE VS. ORDINARY NATURAL LANGUAGE

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Throughout his career, Frege took the language of science, principally mathematical science, to be the evidential basis for insight into epistemology, semantics, and ontology. He aimed at discovering a language that was ideal for expressing scientific thought perspicuously. The method of discovery was to reflect on the structure of sentences as revealed through patterns of propositional inference. Thus in *Foundations of Arithmetic* he reflects on ordinary expressions of arithmetic to find their underlying logical structure. In 'On Sense and Denotation' and 'On Function and Concept', he extends this logical analysis to natural language. He extends his analysis partly to understand ordinary reasoning, whether scientific or not, but mainly, I think, to



develop a language for sciences beyond mathematics—including the natural sciences and psychology.<sup>20</sup>

Frege's own experience of his relation to natural language was one of hostile struggle. He wrote,

If it is one of the tasks of philosophy to break the domination of the word over the human spirit by laying bare the misconceptions that through the use of language often almost unavoidably arise concerning the relations between concepts and by freeing thought from that with which only the means of expression of ordinary language, constituted as they are, saddle it, then my ideography, further developed for these purposes, can become a useful tool for the philosopher.<sup>21</sup>

Natural language was both a necessary route to insight and an annoying obstruction. Frege was interested in the subtleties of natural language because he thought that he had to be, in order to understand the underlying structures that support reasoning in the sciences. He gave natural language serious attention only intermittently—pre-eminently in the great articles of the 1890s—'On Sense and Denotation' and 'On Function and Concept'—and in the article 'Thought', published in 1918, but itself begun in the late 1890s.<sup>22</sup>

Frege had a genius-level feel for the structure and nuances of natural language. His success derived partly from his bringing his understanding of logic and his contextualist principles to bear on natural language, but partly from his subtle distinctions between structural and non-structural elements of language. His work harbors materials for two very different types of philosophical development. Both types mined Frege's work.

One type continued Frege's quest for an ideal scientific language. The aim of this quest was both to make the structure, epistemology, and ontology of science perspicuous, and to provide a basis for philosophical reflection on problems raised by such language. As noted, Russell built on Frege's work in the foundations of mathematics. The logical positivists, notably Carnap and Hempel, shifted attention from the logical structure of mathematics to the logical structure of natural science, but retained Frege's interest in an ideal language for science. Quine discarded positivist principles, but presented in *Word and Object* a detailed theory of an ideal, regimented language for natural science. Current philosophy of science concerns itself less with the logical structure of language than the work of Carnap, Hempel, and Quine did. But the continuing focus on scientific reasoning in actual scientific theory owes much to Frege.

<sup>20</sup> See Gottlob Frege, 'Über das Trägheitsgesetz' ('On the Law of Inertia') (1891) in *Kleineschriften*, I, ed. I. Angelelli (Hildesheim: Georg Olms, 1967); and Letter to Russell 28/12/1902 in *Philosophical and Mathematical Correspondence*, ed. G. Gabriel et al. (Chicago: University of Chicago Press, 1980).

<sup>21</sup> *Begriffsschrift*, Preface.

<sup>22</sup> 'Thought' in *Collected Papers*, and in *The Frege Reader*.

The second type of philosophical development centered on the matter that Frege took to be secondary. Beginning with work by Grice, Strawson, and Austin on ordinary language in the mid-twentieth century and exploding in the work of Donnellan, Kripke, Putnam, Davidson, Montague, Kaplan, Searle, T. Parsons, Kamp, Higginbotham, Schiffer, Stalnaker, Evans, Burge, and others, the use of Fregean ideas in understanding the semantics and logical form of natural language became a central area of philosophy. Some of this work fed into theories of meaning and reference in linguistics, especially from the last two decades of the century to the present. Therein, philosophy again played the role of midwife, indeed parents, of a science. Some of the work provided the basis for philosophical work on philosophy of mind and philosophy of psychology—for example, in work by Kripke, Fodor, Evans, and Burge.

In numerous ways Frege set the questions for serious work on semantics, both of ideal scientific language and of natural language: How is one to distinguish reference from various notions of meaning? How is one to distinguish meaning from use, coloring, implicature, presupposition? What is the logical form of various sentences? What logical resources are needed to capture the contribution of the underlying logical form of a sentence in inference? What are the roles, respectively, of communication and thought in understanding meaning and reference? What are the correct semantical accounts of names, demonstratives, and indexical devices? What is the structure of pronomial cross-reference? How should *prima facie* intensional contexts be construed semantically and structurally?

The fact that philosophical contributions taking such very different directions—with foci on ideal and ordinary language—could be inspired by different aspects of Frege's philosophy is a tribute to the richness and power of his semantical views and logical tools.

## 10.4 COMMUNAL LANGUAGE VS. IDIOLECT

Frege's concern with an ideal scientific language was a concern with the language of a community of scientists. In reflecting on natural language, Frege sometimes centered on a communal language, but other times theorized about idiolects. *Idiolects* are the particular languages spoken by specific individuals, with vocabulary, construals of words, and so on that are specifically the individual language user's—perhaps partly idiosyncratic to that individual.

When Frege first introduces the notion of *sense* (see section 10.5 below) in 'On Sense and Denotation', he remarks that the sense of a specific word ('Bucephalus') 'may be the common property of many'. In the next paragraph, clearly thinking of idiolects, he writes that 'one man can associate this sense and another that sense' with a given word.<sup>23</sup> He contrasts senses with *ideas* by saying that different people are 'not prevented from grasping the same sense; but cannot have the same idea'. (He regards ideas as tokens in

<sup>23</sup> 'On Sense and Denotation', p. 29 in the original pagination, marked in nearly all translation editions. The issues in this paragraph are discussed in much greater detail in *Truth, Thought, Reason*, pp. 37–9.

individual minds.) In this discussion, Frege clearly has idiolects in mind. Some have taken this last quotation to count as stating a constitutive condition on senses—that senses *must* be shareable. In ‘Thought’, however, Frege writes that language users can on occasion think first-person thoughts that involve cognitive values that only they can grasp. Although he does not state that they can attach a *sense* to the word ‘I’ that can be grasped only by themselves, the passage strongly implies that he believes that they can. At the very least, a thought component associated with a person’s use of ‘I’ can on occasion be graspable only by the speaker/thinker.<sup>24</sup> If the interpretation that holds that senses are *constitutively* graspable by different people were correct, the passage in ‘Thought’ would seem to contradict Frege’s own doctrine. I believe that the interpretation is mistaken.<sup>25</sup> Frege clearly believed that the senses of many expressions are in fact shared among different language users. I think Frege maintained that *nearly* all senses—and *all* senses usable in a science—are graspable by different people, whereas no ideas are graspable by different people. But I think that he allowed certain exceptions. In any case, Frege’s remarks about constitutively idiosyncratic senses of ‘I’ are not central to his main philosophical work.

Frege argues that senses can be grasped by different people, claiming ‘mankind has a common store of thoughts that is transmitted from one generation to another.’<sup>26</sup> Laid out more fully: Different people have the same thoughts. Such thoughts are transmitted through language. So different people understand language as expressing the same thoughts. Thoughts expressed by declarative sentences just *are* propositional senses. So senses—some senses, at least ones involved in thoughts understood in common through language—are understandable (graspable) by different people.

Frege’s focus on idiolects is most prominent when he discusses indexicals, demonstratives, and ordinary proper names.<sup>27</sup> He regarded such devices as largely or entirely absent from an ideal scientific language, at least one used to state the basic principles of a science. With respect to such linguistic devices, he notes that different people associate different senses with the same words. For example, he writes that in uses of ‘now’ by

<sup>24</sup> ‘Thought’ in *Collected Papers*, and in *The Frege Reader*. The passage occurs on p. 66 in the original pagination. See also pp. 71–2. Frege makes it clear that he thinks that a language user can attach senses to ‘I’ that are graspable by others. But he implicates that in solitary thought expressed in language, the user can also, on occasion, think thoughts in which the thinker is presented to him- or herself in a way in which he/she is presented to no one else, and which he or she alone can grasp.

<sup>25</sup> Some commentators have charged Frege with inconsistency or outrageous error on this point. See P. T. Geach, Preface to G. Frege, *Logical Investigations*, tr. P. T. Geach and R. H. Stoothoff (New Haven: Yale University Press, 1977), p. viii; J. Perry, ‘Frege on Demonstratives’, *The Philosophical Review* 86 (1977), p. 474, reprinted with postscript in J. Perry, *The Problem of the Essential Indexical and Other Essays* (Oxford: Oxford University Press, 1993). But nothing in Frege’s texts convicts him of inconsistency. And I believe that his idea that each person has a special cognitive access to himself, which could be an idiolectal sense or cognitive value, is obviously true. If sense is properly understood as cognitive mode of presentation, rather than as linguistic meaning in a garden variety sense, Frege’s claim seems simply commonsensical.

<sup>26</sup> ‘On Sense and Denotation’, p. 29 in the original pagination.

<sup>27</sup> ‘On Sense and Denotation’, pp. 27–32 in the original; ‘Thought’, pp. 64–7 in the original; I intend *ordinary* proper names to contrast with canonical names, like numerals.

different people at different times, or by the same person at different times, the sense of 'now' changes. Clearly, the ordinary linguistic meaning of 'now' does not change so easily. Frege also sometimes elaborates the possibility of failures of communication in cases in which different people associate different senses with the same symbol, even though the symbol has the same reference for the different people.

In making these points, Frege is not claiming that the words have different *meanings* for different people. His notion of *sense* is very specifically associated with the thoughts that people associate with their uses of language. His notion of 'expressing a sense' is specifically part of the project of understanding thought and knowledge conveyed, engaged in, or attained through language. His notion of sense is thus not as separated from epistemic and psychological issues as modern notions of meaning commonly are. I shall return to this matter in section 10.5.

I think that Frege's views about the *senses* of proper names are not correct. I think that he probably underrates the role of context-dependent linguistic devices in making possible an ideal scientific language. But I think that his view that one might think specific thoughts in using demonstrative-infused sentences that are not shared or easily understood by interlocutors is clearly correct. His view that there is room for context dependence and a variety of thoughts 'expressed' when demonstratives are used seems to me to target a still under-developed feature of linguistic communication.

On the other hand, Frege carried out most of his work, even his work on natural language, on the assumption that senses (thought components) are commonly shared when words are used. Much of his impact on philosophy lay in emphasizing the shared aspects of language use, and their role in communicating knowledge. Frege is interested in natural language inasmuch as it is the basis for development of a communal scientific language. He is primarily interested in those aspects of natural language that might be worked into, or toward, scientific language. These aspects are shareable, and largely shared, among different natural language users. Indeed, he associates *objectivity* not only with law but with common use by different individuals.<sup>28</sup> Despite the fact that in 'On Sense and Denotation' he writes with idiolects almost constantly in mind, that work led to a widespread focus in philosophy on a common, public, communal language—dialects of English, German, or the like. The reason for this influence lay in Frege's effective and insightful emphasis on shared senses and a 'common store' of thoughts.

Most subsequent work in the philosophy of language assumed that the language being analyzed was a public, shared language. Some even claimed that the notion of an idiolect is suspect, and that it is at best an artificial abstraction from the more basic communal language.<sup>29</sup> On the other hand, a few philosophers took idiolects to be basic and doubted the respectability of the notion of a common language. Such philosophers

<sup>28</sup> *Foundations of Arithmetic*, sections 26–7; 'On Sense and Denotation', p. 30 in the original.

<sup>29</sup> Michael Dummett, 'The Social Character of Meaning', in *Truth and Other Enigmas*; 'Indexicality and *Oratio Obliqua*', chapter 6 of *The Interpretation of Frege's Philosophy* (Cambridge, MA: Harvard University Press, 1981), pp. 113–14; 'Language and Communication', in *Reflections on Chomsky*, ed. A. George (Oxford: Blackwell, 1989); 'Thought and Language', chapter 13 in *Origins of Analytic Philosophy* (Cambridge, MA: Harvard University Press, 1994).

tended to model linguistic understanding within a community on interpreting a foreigner.<sup>30</sup> Or they rejected the notion of a communal language because they deemed it unscientific. They regarded a notion of language as a branch of individual psychology as the only legitimate one.<sup>31</sup>

These issues are extremely complex. I believe that neither of the extreme views just sketched is tenable. Frege would certainly have accepted neither of them. He took idiolects seriously, but emphasized and tried to understand the elements of common understanding in scientific and natural-language communities.

## 10.5 SENSE AND DENOTATION

So far I have emphasized sources of Frege's influence that derive from his methodology or from areas of focus in his work. His most famous and influential *substantive* contribution is his distinction between sense and denotation (*Bedeutung*).<sup>32</sup> Frege's isolating a

<sup>30</sup> W. V. Quine, 'Speaking of Objects', in *Ontological Relativity and Other Essays* (New York: Columbia University Press, 1969); *Word and Object*, chapter 2; Donald Davidson, *Inquires into Truth and Interpretation* (Oxford: Clarendon Press, 1984), especially 'Radical Interpretation' and 'Communication and Convention'; 'A Nice Derangement of Epitaphs', in *Truth, Language, and History* (Oxford: Clarendon Press, 2005). For criticism of these views, see my 'Comprehension and Interpretation', in *The Philosophy of Donald Davidson*, ed. Lewis Hahn (Chicago: Open Court, 1999).

<sup>31</sup> Noam Chomsky, *Aspects of the Theory of Syntax* (Cambridge, MA: MIT Press, 1965); *Rules and Representations* (Oxford: Blackwell, 1980); *Knowledge of Language: Its Nature, Origin, and Use* (New York: Praeger, 1986). For engagement with Chomsky's view from a different standpoint, see my 'Wherein is Language Social?' in *Reflections on Chomsky*, ed. George.

<sup>32</sup> The translation of '*Bedeutung*' is controversial. Some translators leave the term untranslated. Although the normal translation of the term into English is 'meaning', I believe that this translation is a very bad one for helping to understand Frege. Frege's understanding of '*Bedeutung*' is, in numerous ways, deeply different from ordinary understandings of the term 'meaning'. I prefer 'denotation' to 'reference' as a translation because '*Bedeutung*' is a more technical term than 'reference' is, and because 'reference' (like '*nominatum*', another prominent translation) is strongly associated with representation by singular or plural noun phrases. Frege applied '*Bedeutung*' to a representational relation (or the entity represented in such a relation) that is associated with *predicates* and *functional expressions*—a representational relation that I call 'indication' below—as well as to a representational relation associated with noun phrases. It is at best awkward to speak of the referents of predicates or functors. Moreover, Frege takes sentences to have a '*Bedeutung*'—which he took to be their truth value. Speaking of the reference of sentences is very odd to most ears. Frege himself saw his claim that sentences have a *Bedeutung* as a technical usage that exploited theoretically important analogies between the semantical behavior of sentences, on one hand, and the semantical behavior of singular terms and predicates, on the other. (For discussion, see my 'Frege on Truth' in *Truth, Thought, Reason*.) So a translation that lacks heavy ordinary-language associations and that is amenable to special, technical usage is desirable. 'Denotation', my choice of translation, has the mild disadvantage of being associated with Russell's famous 'On Denoting', which takes denoting phrases to be noun phrases. But a broader usage in which denotation is contrasted with connotation, and in which that pair is closely associated with the pair *extension* and *intension*, is present in the history of logic—for example, in the work of William Hamilton (1788–1856) and J. S. Mill (1806–73). This usage takes predicate expressions as well as noun phrases to have denotations. Of course, Frege's particular theory of *Sinn* and *Bedeutung* differs from any earlier theory. My translation follows that of Alonzo Church in 'A Formulation of the Logic of Sense and Denotation', in P. Henle, et al. (eds.), *Structure, Method, and Meaning* (New York: Liberal Arts Press, 1951). I regard '*designatum*' as another viable translation of '*Bedeutung*'.

clear notion of denotation is an accomplishment almost as pervasively and beneficially influential as his methodological concentration on propositional structure and truth conditions.

The notion of denotation is integral to his explanation of how truth conditions figure in inferential structure. For the truth value of a proposition depends only, on his view, on the denotations of the proposition's component parts, given their arrangement in the logical form of the proposition.

*Denotation* for singular propositional components is reference. Thus the denotation of a singular term, or singular thought component, is its *referent*. For names, the referent is the named object, if any. For definite descriptions, the referent is the entity, if any, that is uniquely described. The denotation of a predicate is the attribute (which Frege took to be a function) that is predicated of the (purported) referent of a singular expression. Let us call the denotation relation between predicates and the functions (or attributes) that they predicate *indication*. Let us call the denotations of predicates *indicants*. Frege assimilated predication to functional application. So the denotations (indicants) of both predicates and functors are functions. First-order functions take the referents of singular expressions as their arguments or inputs. Higher-order functions take lower-order functions as their arguments or inputs.<sup>33</sup>

The details of Frege's ontology—and his literal assimilation of predication to functional application—are less important than his isolation of denotation as a distinctive aspect of semantics, his identification of singular denotation with reference, and his recognition of a distinction between functional (including predicative) denotation and singular denotation. The key explanatory roles of denotation are two-fold. One is a role in understanding the connection of language and thought to a subject matter. The other is a role in explaining how the truth value of propositional entities—whether sentences or thought contents—depends structurally (for Frege, literally functionally) on the semantical values of propositional sub-parts.

Frege's use of the notion of denotation in these two enterprises constituted the birth of modern semantics. Although there has been controversy over both Frege's ontology of denotation and the details of his explanation of how truth values depend on the semantical values of propositional sub-parts, the influence of this side of his sense-denotation distinction has been pervasive and broadly unitary.

The effect of his notion of sense has been less unified, although nearly all philosophers have recognized some role for something like his notion of sense in explaining cognitive aspects of language use.

Frege used the notion of sense to fulfill four explanatory roles: (a) to mark certain thoughts and thought components that figure in linguistic usage—roughly, to constitute the ways denotations (or purported denotations) are understood or cognitively thought (as) of in uses of language; (b) to mark the determination of denotation by thought components; (c) to be the denotations of expressions that report thoughts; and (d) to

<sup>33</sup> 'Function and Concept'. The terminology of 'indication' derives from my 'Predication and Truth'.

constitute what is understood in language use, especially what is shared in much successful linguistic communication.<sup>34</sup>

Frege's notion of sense has been much more controversial than his notion of denotation.

Much of the controversy has, I think, stemmed either from philosophical ideology that has largely lost its steam or from misunderstandings of the point of Frege's notion. Thus I believe that much of the controversy has been pointless, or at least beside Frege's point.

Russell tried to avoid invoking any notion of sense in his analysis of language. He attempted to get by with a variant of Frege's notion of denotation. Russell confronted Frege on his own terms—*attempting to explain the cognitive and epistemic aspects of language use*. Russell's attempt to explain thought and knowledge purely in terms of the psychological analog of a denotation relation rested on his theory that individuals are *acquainted* with every component of a proposition.<sup>35</sup> All knowledge was supposed to rest on acquaintance. Empirical knowledge was supposed to rest partly on acquaintance with sense-data. Mathematical knowledge was supposed to rest entirely on acquaintance with universals (propositional functions). Acquaintance was supposed to be an infallible, omniscient, perspective-free relation to an object or propositional function. Russell's notion of acquaintance, his theory of thought, and his theory of knowledge are all nearly universally recognized to be naïve and unacceptable. His attempt to do the explanatory work that Frege's notion of sense was supposed to do, without appealing to any notion of sense, was a failure.

Russell's animus against sense was followed in later twentieth-century philosophy by a broader hostility to abstract entities. This animus was initiated by logical positivists and was continued by the later Wittgenstein and ordinary language philosophers, such as Austin, and behaviorist philosophers, such as Ryle. The animus was further backed by the idea that the explanatory roles of *sense* (as an epistemic notion, or a notion marking psychological competence and cognitive value) and of *meaning* (as a notion capturing communal linguistic understanding) could be filled by notions of *procedure* or *use*. Hostility to abstraction was thus combined with a broad anti-mentalism. Although in mid-career Quine dropped his earlier hostility to abstraction *per se*, he retained the anti-mentalism and more broadly an opposition to any conceptions that could not be explained in 'extensionalist' language.

All these post-Russellian philosophical movements have run out of steam. None of them justified animus toward abstract entities, mentalistic explanations, or non-extensionalist explanations. The particular attempts to reduce notions of sense (cognitive value) to use or methods of confirmation have all failed. Moreover, unlike

<sup>34</sup> For further discussion of these roles, see *Truth, Thought, Reason*, pp. 31–5.

<sup>35</sup> 'On Denoting'; 'Knowledge by Acquaintance and Knowledge by Description', in *The Problems of Philosophy*; 'On the Nature of Acquaintance', in *Logic and Knowledge*, ed. R. Marsh (London: Hyman, 1956).

Russell, few of these sources of hostility to Frege's notion of sense confronted the legitimate explanatory tasks that he introduced his notion of sense to carry out.

Science appeals freely to abstractions in its mathematical explanations—for example, sets, functions, numbers. It also appeals to properties and other attributes (relations, kinds). These latter are entities that clearly do not meet extensionalist strictures. Psychological explanations that do not meet extensionalist strictures are now part of rigorous mathematicized scientific explanation in psychology (especially perceptual psychology) and semantics. The philosophical ideologies that were dominant in post-Russellian opposition to Frege's notion of sense have not only failed to endure. They have shown themselves to be unscientific.

Since mid-century, misunderstanding, not just principled hostility, has tended to fuel controversy over Frege's notion of sense. The key error has been to construe sense as linguistic meaning. The notion of linguistic meaning became prominent in philosophical discussions of a communal language. In particular, the notion was meant to apply to *what is understood in common by all competent users of a communal natural language by virtue of being competent users*. Given such a construal, it is certainly plausible to say that the meaning of a proper name, if it has one, is very minimal; and the meaning of demonstratives and indexicals is what is understood context-independently. Thus, for example, the restriction to a time that is contextually contemporaneous with an occurrent use is roughly all there is to the linguistic meaning of 'now'. Similar points apply for the demonstrative pronouns 'she' and 'this'.

It is plausible that the linguistic meaning of a proper name, if any, does not suffice to determine its referent. It is even questionable whether most proper names have any linguistic meaning. It is *obvious* that the linguistic meanings of demonstratives and indexicals do not suffice to determine denotation. One needs a context of use, and strictly I think, a use in a context. In some cases, one needs further contextual factors, such as the intentions of the speaker—for example, in many uses of demonstratives. So Frege's claim (b) about sense does not hold true for the linguistic meanings of these devices. And clearly linguistic meaning in these cases does not even approximate a full account of how a denotation is thought of when these demonstrative or indexical devices are used in sentences. So Frege's claim (a) about senses does not hold true of the linguistic meanings of these devices. Similar difficulties can be thought to arise for the third explanatory role, (c), that Frege gives to senses, if senses are thought of as linguistic meanings.<sup>36</sup>

Criticisms, in this vein, of Frege's use of his notion of sense rest on misunderstanding. As noted in section 10.4, Frege's notion of sense is simply not the notion of linguistic meaning.<sup>37</sup> It cannot be over-emphasized that Frege took senses to figure in explanations of thought and knowledge. Every passage in which he employs the notion of sense

<sup>36</sup> These criticisms are frequently part of the exposition of so-called 'direct reference' views of the reference of proper names, demonstratives, and indexicals. Direct reference views focus on linguistic reference and meaning, not cognitive value or sense. But the assumption that sense is just ordinary communal linguistic meaning also permeates the historical work on Frege of Michael Dummett. See, for example, 'Indexicality and *Oratio Obliqua*', chapter 6 of *The Interpretation of Frege's Philosophy*.

<sup>37</sup> See 'Sinning Against Frege'; 'Sense and Linguistic Meaning', both in *Truth, Thought, Reason*; 'Living Wages of Sinn', *The Journal of Philosophy* 109 (2012), 40–84.



centers on these psychological and epistemic matters. The criticisms just discussed do not measure Frege's theories against their own objectives. Usually the linguistic issues that are at stake are not sharply specified. Usually they appear to be concerned with what is minimally understood by all competent speakers of a communal natural language. They certainly do not attempt to explain language users' ways of thinking about denotations or the knowledge that they associate with linguistic usage, thought, or knowledge. Thus the criticisms do not apply to Frege. They apply only to thinking that Frege's notion of sense solves problems that it was not meant to solve.

Frege held that senses, which are components of possible thoughts, are independent for their natures of anything in space or time, although their being senses (being expressed by some linguistic expression) *does* depend on the competence and usage of individual thinkers in space or time.<sup>38</sup> I believe that Frege's eternalistic ontology of sense can be reasonably doubted. There are two general difficulties. One is that Frege's Ontological Platonism about senses appears to be completely general. *Ontological Platonism* about a given entity, as I understand it, is the view that the entity is not only abstract (not localizable in space or time), but completely independent for its existence and nature from anything in space or time. Frege seems to have maintained a completely general Ontological Platonism about senses.<sup>39</sup> Senses that determine contingently existing denotations—denotations that are themselves not eternal or even everlasting—are not plausibly construed as independent of entities in time. The idea that a thought component that is a way of thinking as of pianos or horses is completely independent of anything in space or time for its existence and nature (including minds, artifacts, and biological organisms) is simply not credible. Certainly, Frege's arguments for such a view do not succeed.<sup>40</sup> Whether senses that are certain ways of thinking of numbers, functions, or logical operations are eternal and independent of anything in space or time seems to me less obvious.

The second, more basic difficulty for Frege's ontology of senses is that he used the notion to cover significantly different types of cognitive contents, some of which are not context-independent in the way that the thought components that are senses were supposed to be. Some thought components determine denotations by their natures. Others, contrary to Frege, represent what they represent by virtue of irreducibly occurring mental applications.<sup>41</sup> Thus a thought as of a perceived solidly red ball on a solidly white background depends irreducibly for its referring to the red ball on perceptual

<sup>38</sup> 'Thought'. Frege's idea is that thought contents and their components are independent for their existence and nature of anything in space and time, but that their being senses is a role that they take on through being related appropriately to the capacities and uses of language users. Thus being a sense is not part of the nature of thought contents, but is a relation that they bear to individuals in time.

<sup>39</sup> 'Thought'.

<sup>40</sup> I discuss Frege's Ontological Platonism and Frege's arguments for it in 'Frege on Knowing the Third Realm', in *Truth, Thought, Reason*, and in 'Introduction', *Truth, Thought, Reason*, pp. 50–4.

<sup>41</sup> I discuss these matters with particular reference to Frege in 'Belief *De Re*', *The Journal of Philosophy* 74 (1977): 338–62, also in *Foundations of Mind* (Oxford: Clarendon Press, 2007); and more generally, independently of reference to Frege, in 'Postscript: Belief *De Re*', in *Foundations of Mind*; 'Disjunctivism and Perceptual Psychology', *Philosophical Topics* 33 (2005): 1–78; and 'Five Theses on *De Re* States and Attitudes', in *The Philosophy of David Kaplan*, ed. J. Almog and P. Leonardi (Oxford: Oxford University Press, 2008).

interaction with the ball on a particular occasion. No eternal thought content can plausibly single out that red ball from other ones that have similar appearances and backgrounds. The thought requires an occurrent perceptual application in the psychology of the thinker. Such applications cannot determine their denotations by virtue of abstract, time-independent natures. The applications do not type-identify general patterns or abilities. They determine their denotations contextually, through particular, actual occurrences (acts or other events) in time.

Despite these difficulties, Frege's identification of an explanatory role for sense endures. The notion of sense is an aspect of Frege's theory that was long neglected and seen as fruitless. After the fall of behaviorism and the rise of mentalistic explanations in science, issues regarding thought in the use of language re-emerged as worthy of attention. This development, together with a better understanding of what Frege's real explanatory objectives were, has enabled his notion of sense to be recognized as a significant contribution, relevant to contemporary philosophical concerns. Although perhaps no one now conceives of senses, or modes of presentation in thought, in just the way Frege did, the power and explanatory advantages of his notion have become a source of challenge and inspiration to contemporary thinking about language and mind.<sup>42</sup>

## 10.6 INDIVIDUAL VS. EXTRA-INDIVIDUAL FACTORS IN DETERMINING A TERM'S SENSE AND DENOTATION

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Frege's uses of his notion of sense illustrate the way a rich vein of thought can be neglected or lost, only to be rediscovered. By contrast, his reflection on individual and communal aspects of language (see section 10.3) *as they bear on determining the sense and denotation of an individual's terms* (see section 10.4) illustrates how different strands in a great philosopher's work can inspire very different directions of theorizing.

In understanding how an individual's terms come to be associated with senses and denotations, one must consider both factors that are under the individual's psychological control and factors that are outside that control, including perhaps such factors as the individual's dependence on others in a linguistic community. I will discuss Frege's views on this matter in two areas of his work. I will also discuss the later impact of these views.

The first area again concerns demonstratives and proper names. Frege thinks that the individual's psychology *on an occasion of use* is the primary factor in determining what

<sup>42</sup> See, for example, the work of Gareth Evans, *Varieties of Reference* (Oxford: Clarendon Press, 1982); Christopher Peacocke, *Truly Understood* (Oxford: Oxford University Press, 2007); Burge, *Foundations of Mind*.

senses proper names and demonstratives have, and through such senses (see claim (b) in section 10.5), what denotations such devices have.

It is hard to see a strong basis for doubting Frege's view on this matter with respect to *demonstratives*. An individual's psychology—intentions, perceptions, and so on—determines the cognitive value (sense) associated with demonstratives used in context. That is, when an individual thinks a true thought of the form *that ball is red* on a particular occasion, the individual's thought succeeds in picking out a particular ball and predicating redness of that ball. Different psychological states can be determinative on different occasions in uses of the same demonstrative. For example, an individual's perceptually based way of thinking about a ball—marking different types of psychological states—might vary on different occasions on which the individual uses the demonstrative 'that'. Seen from straight-on, the ball might be presented in a different way than if it were seen at an angle or from a greater distance.

On the other hand, Frege's view that the senses, or cognitive values, associated with *proper names* are determined on occasions of use by the individual's associating, with the name, descriptions or representational devices other than the name itself is, I think, mistaken. It remains mistaken even if one clearly distinguishes sense from meaning. An individual may associate a definite description *d* or perception-governed representational content *p* with a name *a* when the individual thinks a thought of the form *Fa*. The individual may think *Fa*, *Fd*, and *Fp* all at the same time. It does not follow that the sense (cognitive value) of *a* is that of *d* or *p*. In fact, the thought that *a = d* or *a = p* will nearly always be a non-logical truth for the individual on the occasion of use, even if it is true. So the thought *Fa* cannot in those cases be the same thought as the thought *Fd* or *Fp*. Proper names almost *never* have the cognitive value (sense) of associated definite descriptions, or any other type of representation that is not cognate with the name itself.<sup>43</sup>

Frege's view of names influenced Russell. Russell followed Frege in thinking that the thought content of names should be explained in other terms, and that the other terms depend on what other terms the individual associates with the name on an occasion of use. In fact, Russell states a doctrine about names (that they are, for purposes of expressing thought, covert definite descriptions) that is much more specific than any doctrine that Frege states.<sup>44</sup>

Wittgenstein, Strawson, and Searle rejected the view that the individual's associations with the name determine a name's sense or denotation.<sup>45</sup> They maintained that certain relations that hinge on the individual's belonging to a wider linguistic community, together with the descriptions actually available in the wider community, determine the

<sup>43</sup> Saul Kripke, *Naming and Necessity* (Oxford: Blackwell, 1980); Keith S. Donnellan, 'Proper Names and Identifying Descriptions', *Synthese* 21 (1970): 335–58.

<sup>44</sup> Russell, 'On Denoting'; 'The Philosophy of Logical Atomism', in *Logic and Knowledge*.

<sup>45</sup> Ludwig Wittgenstein, *Philosophical Investigations*, tr. G. E. M. Anscombe (Oxford: Blackwell, 1958), section 79; John Searle, 'Proper Names', *Mind* 67 (1958): 166–73; P. F. Strawson, *Individuals* (1958) (London: Routledge, 2002), pp. 26–9.

sense and reference of a name. Kripke and Donnellan retained the role for social relations, postulated by Wittgenstein, Strawson, and Searle. But they showed that the individual's linguistic community need not contain sufficient descriptions to determine the name's denotation. Hence relevant language users need not have access to descriptions sufficient to determine the name's denotation. They showed that a chain of causal connections through shared usage connects a name back through history to its bearer.<sup>46</sup>

This development is usually portrayed as anti-Fregean. It is indeed opposed to his apparent view that the individual's psychology controls the referent of a name by associating it with other cognitive devices independent of the name. But often the lesson has been drawn that proper names lack senses. This lesson depends on conflating sense with linguistic meaning. Names clearly *do* contribute to the cognitive content of thoughts. Thus they are or have cognitive values. Different names commonly contribute different contents, different cognitive values, even when they have the same denotation. What Kripke and Donnellan showed was that these cognitive values are ordinarily not definite descriptions and normally cannot be regarded as independent of the name itself. Moreover, they showed that the denotation of a name is fixed by social-historical relations that are normally *not* represented in the individual's psychology. The right conclusion is that these social-historical relations help determine the nature of the individual's way of thinking with the name. So again, Frege's eternalistic conception of sense is mistaken. In determining what it is that an individual thinks of in using the name—what the denotation is—these social-historical relations help determine the nature of the individual's way of thinking, the cognitive value or sense associated with the name. An individual thinks of Jonah as Jonah even if neither the individual nor anyone in his community can describe Jonah specifically enough to single him out from all other individuals. The individual's way of thinking of Jonah (as Jonah) is what it is partly because the individual is connected to Jonah through a historical chain of uses of the name, a chain that the individual need not be able to describe.<sup>47</sup>

Although Frege did not anticipate this revolutionary development, he provided the basis for it in two ways. First, he delineated the notions of sense and denotation. He posed the question of what the sense (cognitive value) of a name is, and the question of how it determines a name's denotation. Second, through his deeply original focus on shared elements of language, he provided a climate and a source of influence, primarily I think through affecting Wittgenstein, that invited serious thinking about how one individual's linguistic usage and thought might interlock with and depend on others'. The resources for the social-historical turn, in philosophical thinking about proper names, were discovered and articulated by Frege, even though the development of these resources told against his particular views on proper names.<sup>48</sup>

<sup>46</sup> Kripke, *Naming and Necessity*; Donnellan, 'Proper Names and Identifying Descriptions'.

<sup>47</sup> The example is Kripke's, *Naming and Necessity*, pp. 67–8, 87, 160.

<sup>48</sup> Frege's views on indexicals, such as 'now', 'here', 'today', 'I', are not completely explicit. But he appears to believe that frequently, the senses are partly determined by the context—for example, the actual time—not descriptions or other modes of cognition that are completely under the control of the speaker. See 'Thought', p. 64 in the original.

A second area in Frege's work that bears on the relative contributions of individual and extra-individual factors in determining a term's sense and denotation is his reflection on the sense and denotation of number expressions. In *Foundations of Arithmetic*, Frege famously stated, 'To obtain the concept of number, one must fix (*feststellen*) the sense of a numerical identity' by articulating a 'recognition proposition', a 'criterion' (*Kennzeichen*) for the identity of numbers.<sup>49</sup>

Frege's requirement of a criterion of identity and recognition for numbers exerted a huge influence on subsequent philosophy. Demands for criteria for the meaning or denotation of a wide range of terms in a wide range of philosophical projects became commonplace. The logical positivists made and answered such a demand in their general criterion for cognitive meaning and in their attempts to supply specific methods of confirmation associated with specific terms. Wittgenstein and, later, Strawson and Wiggins demanded criteria for identity and recognition for various categories of entities as a requirement on the meaningfulness of discourse about such entities.<sup>50</sup> Quine articulated a completely general principle, 'no entity without identity'. He meant that in the absence of a specific criterion for identity and difference, one could not reasonably believe in the existence of a type of entity.<sup>51</sup> The common theme of these calls for criteria was that the very meaningfulness or reasonability of the use of a type of expression that purports (functions) to apply to a subject matter depends on the individual language user's associating the expression with a *principle* that determines the meaning or application of a term.

Frege's call for a criterion that 'fixes' the sense of number words was thus extended well beyond his own use of it. Indeed, demands for criteria were used for philosophical ends antithetical to Frege's own. In the first place, Frege's remarks were later applied as a general principle about sense, denotation, or reasonable use. In fact, he made the demand strictly within his project to *reduce* the mathematics of number to pure logic. The demand was part of his project of *explaining* uses of numerical expressions as covert uses of logical expressions. He needed to explain use of numerical expressions in a way that made it clear that that use could be taken to be a use of pure logic. There is no evidence that Frege intended the requirement as part of a general theory of language or ontological commitment.

In the second place, and more importantly, Frege's remarks were interpreted—or at least employed—as conditions on *giving* a term sense, denotation, or reasonable use.

<sup>49</sup> *The Foundations of Arithmetic*, sections 62, 106, 109.

<sup>50</sup> Wittgenstein, *Philosophical Investigations*; P. F. Strawson, *Individuals*, pp. 200ff.; 'Entity and Identity', in *Entity and Identity and Other Essays* (Oxford: Clarendon Press, 1997); David Wiggins, *Sameness and Substance* (Oxford: Blackwell, 1980); see the moderation of his views on criteria in *Sameness and Substance Renewed* (Cambridge: Cambridge University Press, 2001), p. xiii.

<sup>51</sup> W. V. Quine, 'Speaking of Objects' (1958) in *Ontological Relativity and Other Essays*, p. 23; 'On the Individuation of Attributes' (1975) in *Theories and Things* (Cambridge, MA: Harvard University Press, 1981), p. 102: 'We have an acceptable notion of class, or physical object, or attribute, or any other sort of object, only insofar as we have an acceptable principle of individuation for that sort of object. There is no entity without identity.'

In fact, Frege's claims occurred against a background assumption that number words already have a sense, denotation, and reasonable use. His requirement of a principle of identity was part of an attempt to understand and state clearly a principle that explicates or explains sense, denotation, and reasonable use that are already in place.

One source of this latter employment of Frege's idea was that the logical positivists and Wittgenstein demanded criteria within projects that started from doubt that certain uses of terms in philosophy have cognitive meaning or reasonable use.

A second source of the use of Frege's idea for ends other than his own may have been Austin's misleading translation of Frege's remarks. Austin translated '*feststellen*' as 'fix'. The German term is at best unspecific between giving a sense and explaining a sense that is already in place. '*Feststellen*' can standardly mean 'state' or 'ascertain'. And the context in which Frege demands the principle of identity for number words makes it clear that he intended such a reading. In *Foundations of Arithmetic*, section 106, he paraphrases '*den Sinn einer Zahlgleichung festzustellen*' ('to state the sense of a numerical identity') as '*[den Sinn] auszudrücken*' ('to express the sense').

Austin also repeatedly translates Frege's word '*erklären*' as 'define', whereas it means *explain* or *explicate*.<sup>52</sup> This translation allows the reader to take Frege to be thinking of *Erklärungen* as stipulations, as *givings* of meaning. Frege sometimes regards his attempt at producing a new ideal language of arithmetic in this way. But he sees stipulation as a momentary act in clarifying a purportedly ideal language. The definitions resulting from stipulations can, however, be evaluated as fruitful or not, and as true or not. His underlying view is that his explanations (*Erklärungen*) of terms attempt to explicate senses that are already in place in mathematical science. Prior to the explanations, the senses are just dimly understood and expressed.<sup>53</sup> They are in need of being associated more perspicuously with expressions (like 'number') newly embedded in an ideal language. Thus his notion of definition is fundamentally one of *real definition*. Real definitions attempt to express an important antecedent truth, rather than to give sense to a neologism, or provide a sense to an old term whose sense is doubtful or non-existent.

The effect of these misinterpretations was to present Frege's call for a principle or criterion of numerical identity as part of a general theory of sense, denotation, and reasonable usage that takes individuals to have cognitive and even stipulative control over the senses of their terms. The idea was that the individual *gives* sense to an expression by being able to state a general principle or criterion for the use of that expression. A consequence of such a view is that if one lacks a principle for a term, the term lacks sense. Another consequence is that if one gives up or otherwise changes a principle, the term changes sense (and perhaps denotation).

There is ample evidence that Frege did not regard sense, denotation, or reasonable usage in mathematics in these ways at all. He saw his logicist project as attempting to

<sup>52</sup> See, for example, *Foundations of Arithmetic*, section 62. For related discussion of the point, see *Truth, Thought, Reason*, p. 116 n13.

<sup>53</sup> Cf. Frege, 'Logic in Mathematics', 228, in *The Frege Reader*, pp. 317–18.

clarify the natures of the sense and denotation of numerical words—natures that had been only dimly understood. He explicitly construes mathematical progress as coming to better understand numerical concepts. He states that what is commonly known as the history of concepts is really a history of our knowledge of concepts or of our knowledge of the *Bedeutungen* of words.<sup>54</sup> His view is that the sense and denotation of numerical words had been fixed all along. That is, the senses and denotations of numerical words had always been attached to the words or symbols that were in mathematical theory and practice—even though those senses and denotations may not have been clearly understood. Our stating principles of identity are, when successful, discoveries or clarifications of basic principles long implicitly associated with those senses and denotations. Frege's logicist project was an attempt to clarify a structure and content of thought that was present in mathematics all along.

Frege's view of cognitive values (including senses) associated with mathematics is exactly opposite to the view of much of twentieth-century philosophy. The post-Fregean view maintained that the cognitive value, denotation, and reasonable usage of an individual's terms constitutively depends on the individual's being able to produce definitions or criteria—principles—that govern such use. Frege's view is that the human mind has a basic capacity to track the subject matters of its thought.<sup>55</sup> Thus the sense and denotation of an individual's terms is, for Frege, assured by the individual's root ability to make true judgments about an antecedent and mind-independent subject matter. The individual need not be able (even in principle) to provide principles under which these true judgments are made. The growth of an ability to provide principles constitutes growth in the capacity to understand clearly what was already minimally, but dimly or incompletely, understood in the making of the judgments in the first place.

Obviously, this picture is closely associated with Frege's context principles. Understanding sufficient to carry out mathematics resides in a capacity to understand mathematical truths and a capacity to make inferences from those truths. Understanding the basic principles on which the truths rest, and understanding the exact form of the inferences that one competently carries out, come later. Thus what thoughts an individual thinks—the cognitive values of those states, the senses minimally understood in using terms—is to be explained in terms of judgments and inferential capacities that are explained in terms of their tracking a mind-independent subject matter. A capacity to abstract and understand the basic *principles* governing those inferences comes later. Such a capacity constitutes a deepening and refining of the minimal understanding needed to think the thoughts in the first place.

<sup>54</sup> *Foundations of Arithmetic*, Introduction pp. vii–viii. See also 'Über das Trägheitsgesetz', pp. 157–61. For extensive discussion of this view, including further passages in Frege, see 'Sinning Against Frege', 'Frege on Sense and Linguistic Meaning', 'Frege on Knowing the Foundations', and 'Frege on Apriority', all in *Truth, Thought, Reason*.

<sup>55</sup> See, for example, *The Foundations of Arithmetic*, Introduction, p. viii and section 105.

This type of explanation is anti-individualistic. Anti-individualism is the view that the nature of many of an individual's mental states is constitutively determined by relations between the individual and a reality beyond the individual.<sup>56</sup> The natures of the individual's states are in effect constitutively dependent on relations to the reality that is the subject matter of the individual's psychological states. Frege's anti-individualism was obscured for almost a century because his remarks on sense were systematically misunderstood and misappropriated for projects very different from his own. His anti-individualism came to be recognized only when anti-individualism itself had been developed and articulated.<sup>57</sup> Although Frege's anti-individualism centered on thoughts about mathematics, there is reason to believe that he held the view about empirical thought as well.<sup>58</sup>

Frege's anti-individualism is compatible with his recognition of the role of an individual's psychology in determining the sense and denotation of demonstratives *on particular occasions of use*. His anti-individualism is also compatible with his exaggeration of individual control in determining the sense of names on occasions of use. Anti-individualism is primarily concerned with constitutive conditions under which an individual has certain psychological capacities. Even if an individual's intentions or perceptions determined what senses are associated with names on particular occasions of use, the understanding of the associated senses, including understanding of alleged descriptive senses of names, would be determined partly by the individual's relations to a reality that is independent of the individual. (In the empirical case, these include causal relations as well as representational tracking relations.) Anti-individualism is primarily, though not entirely, concerned with patterns of relations between subject matters and individuals that determine individuals' abilities—relation types, not particular occurrences of relations.

Similarly, Frege's anti-individualism is compatible with both his focus on communal languages and his focus on idiolects. Anti-individualism concerns the ways individuals' mental states and capacities constitutively depend on relations to a wider reality. The wider reality can be physical, abstract, or social. Even the thoughts expressed in individuals' idiolects can depend on such relations, including relations to the idiolects of others. Individuals' understanding of senses in idiolects is not constitutively sealed off from social connections, simply by virtue of being idiolectal understanding. Frege's focus on idiolects is compatible with his generalized anti-individualism.

Frege's anti-individualism has philosophical value beyond just being a late-recognized antecedent of more modern work. It has contemporary philosophical interest in its own right. First, Frege's extreme Ontological Platonism about all thought components that

<sup>56</sup> See my *Foundations of Mind*, Introduction, pp. 1–27.

<sup>57</sup> See my 'Frege on Extensions of Concepts: From 1884 to 1903', *The Philosophical Review* 93 (1984): 3–34, reprinted with 'Frege on Sense and Linguistic Meaning' in *Truth, Thought, Reason*. See also Introduction, *Truth, Thought, Reason*, pp. 56–9.

<sup>58</sup> Frege, 'Über das Trägheitsgesetz', pp. 157–61. For further discussion see *Truth, Thought, Reason*, pp. 262–3, 297–8.



are senses brings home the importance of understanding anti-individualism as a doctrine about the natures of mental states, not the natures of mental contents or senses. It is natural, and I think correct, to regard at least empirical mental contents (and where these are associated with linguistic expressions, senses) as *constitutively* type-identifying individuals' conceptual abilities. The very content of basic empirical cognitive modes of presentation depends on perceptual capacities of individuals in time. Regardless of this ontological issue about the nature of thought contents, Frege regarded the *understanding of* and *thinking with* such contents as constitutively dependent on relations between individuals and a subject matter, including temporal subject matters. Despite his extreme Platonism about the nature of thought components (which senses *are*—see note 38), Frege was an anti-individualist. Anti-individualism concerns the natures of mental states, not the natures of mental contents. The natures of mental contents themselves is a further matter.

Second, Frege's anti-individualism about mathematical thought provides one source for broadening anti-individualism beyond the focus on *empirical* thought that marked the initial modern development of anti-individualism. Anti-individualism is not to be understood as confined to contingencies of twin-earth thought experiments. The fundamental idea is that the natures of mental states are constitutively determined by their relations to a wider reality, the subject matter of the individual's thought. Frege shows one way in which anti-individualism regarding logical and mathematical thought can be supported, without arguing that differences in mental states depend on possible differences in contingent subject matters. Features of minds can be explained in terms of *necessary* features of a mind-independent reality—for example, logical or mathematical reality.<sup>59</sup>

## 10.7 RATIONALISM

Frege's rationalism was fundamental to his work in philosophy of logic and philosophy of mathematics. He was primarily a theorist of knowledge. He regarded justification or warrant for knowledge of logic and mathematics to be fundamentally independent of sense experience—fundamentally an exercise of reason.<sup>60</sup> Frege took rationalism in these areas to be natural and relatively obvious. But he defended it through devastating criticisms of the best-known types of empiricism in his day—formalism and Millian empiricism.<sup>61</sup>

<sup>59</sup> *The Foundations of Arithmetic*, pp. vii–viii and section 105; *The Basic Laws of Arithmetic*, vol. I, Introduction, p. xvi. See 'Frege on Knowing the Foundations' and 'Frege on Sense and Linguistic Meaning' in *Truth, Thought, Reason*.

<sup>60</sup> *The Foundations of Arithmetic*, sections 2–3, 5, 8–11, 64, 90, 105; *The Basic Laws of Arithmetic*, vol. I, p. 253 in the original; vol. II, section 60. See also 'Frege on Knowing the Foundations' and 'Frege on Apriority' in *Truth, Thought, Reason*.

<sup>61</sup> *Foundations of Arithmetic*, sections 7–10.

Frege's rationalism contained both traditional and original elements. It was traditional in taking mathematical knowledge to rest fundamentally on a set of axioms that were to be discovered, not stipulated or laid down. Axioms had to be true, fundamental, rationally certain, and self-evident, to *be* axioms. The structure of mathematical knowledge was for him fundamentally the structure of mathematical proof. With such predecessors as Euclid and Leibniz, Frege regarded this structure as a natural one. Thus proofs were taken to be not just any valid derivations. They were derivations that started with the *real* axioms and followed an order that *explained* the truth of the theorems—a natural order.

This way of looking at axioms, proof, and mathematical knowledge came, even in Frege's time, to be regarded as outmoded. Already in the first decade of the twentieth century, Zermelo was arguing for axioms that he did not think of as self-evident. Hilbert's attitudes toward proof and modelling of axiomatic systems were antithetical to regarding mathematical systems as resting on natural, self-evident axioms.<sup>62</sup> In foundation studies, mathematicians were more interested in what could be derived from what than in the springs of mathematical knowledge, or natural, 'correct' starting points for mathematical reasoning. The very idea of a natural, correct starting point began to lose favour in a mathematics less allied to philosophy than it was in the work of Leibniz, Frege, and Russell.<sup>63</sup>

Frege was deeply serious about the idea that self-evidence was not a psychological feature of fundamental mathematical truths. That is, he took 'evidence' for believing a fundamental mathematical truth to reside in the truth itself. The evidence could be fully appreciated through and only through fully understanding the proposition. He thought that an axiom could be self-evident but, because of a mathematician's incomplete understanding, unobvious. Conversely, he thought that a proposition that seemed obvious could be false. Ironically, one of Frege's own proposed logical axioms (the notorious Law V) turned out to be false. He did *not* regard the proposition to be obvious. In fact, he feared—correctly as it turned out—that he did not sufficiently understand it and its implications, even though he took it to be self-evident.<sup>64</sup>

This much of Frege's rationalism was in accord with traditional views. What was original in Frege's rationalism was that he combined these views with a thoroughly original conception of understanding that features the role of inference, as opposed to reflective insight, in understanding, and that incorporates a conception of inference that is informed by his original development of logic. The original conception of understanding is part of what is expressed in the sense-version of his methodological context principle

<sup>62</sup> Ernst Zermelo, 'Proof that Every Set Can Be Well-Ordered' (1904) and 'Investigations in the Foundations of Set Theory I' (1908), both reprinted in *From Frege to Gödel*; Hilbert, 'On the Foundations of Logic and Arithmetic' (1904), reprinted in *From Frege to Gödel*.

<sup>63</sup> I have no doubt that freeing mathematical investigation from difficult traditional issues about what principles are epistemically basic was pragmatically liberating for opening a variety of valuable approaches to mathematical logic and foundations studies. But I believe that these traditional issues have not disappeared; nor are they pointless.

<sup>64</sup> See my 'Frege on Extensions of Concepts: From 1884 to 1903'.

(a): only by understanding how a proposition fits into a system of deductive derivations can one fully understand the sense expressed by the proposition. Thus Frege's theory of understanding helped articulate, in his own terms, the practice of Zermelo and others who argued for axioms by discussing their fruitfulness in yielding interesting mathematical consequences. For genuine axioms, he would have regarded the inferences from them as part of understanding them, but not part of the fundamental justification for them.<sup>65</sup>

Frege's rationalism was also original in that it was developed in conjunction with his deep understanding of mathematical practice. His epistemology was rooted in an understanding of actual reasoning in mathematics. Thus his epistemology was in effect a philosophy of mathematical science.<sup>66</sup>

In criticizing Mill's empiricism, Frege articulated a strong pragmatic ground for rejecting the more sophisticated Quinean form of empiricism (developed well after Frege's death). The Quinean form maintains that logic and mathematics are justified exactly inasmuch as they have explanatory roles in *empirical science*. Quine's idea is that mathematics is warranted only through its contributing to empirical explanation.<sup>67</sup> In criticizing Mill, Frege articulated the principle that statements of number are *aposteriori* or *apriori* 'according as the general laws on which their proofs depend are so.'<sup>68</sup> The implication is that one should look to the types of justification or warrant used in *mathematical science* to decide the nature of mathematical warrant or justification.

Quine's empiricism imposes an external standard (mathematics' role in empirical science) as the sole determiner of the epistemic status of mathematical principles. Quine imposed this standard without offering any criticism of the epistemic methods actually employed within mathematics. Such an empiricist philosophy appears dogmatic and poorly connected to scientific method. In fact, Frege's implicit criticism of Quinean empiricism is analogous to his use of his context principles in ontology. In both cases, Frege points out that philosophy—whether epistemology or ontology—is stronger when it looks for guidance to the substance and practice of science, rather than imposing 'principles' that are not grounded in well-established cognitive procedures. This is not to say that a science is beyond criticism from the outside. It is rather to say that to be credible, any such criticism must find an epistemic basis that is at least as strong as the epistemic basis of the science being criticized. Quine's empiricism does not meet this standard.

Frege's rationalism is another aspect of his work that was neglected or laid aside for much of the twentieth century. Just as Russell shared Frege's interest in the cognitive

<sup>65</sup> See 'Frege on Sense and Linguistic Meaning', in *Truth, Thought, Reason*, especially pp. 262–3, and 'Frege on Knowing the Foundation', in *Truth, Thought, Reason*, especially pp. 297–8.

<sup>66</sup> For further discussion of how Frege's rationalism relates to the classical conceptions of Kant and Leibniz, see 'Frege on Apriority', in *Truth, Thought, Reason*.

<sup>67</sup> Quine, *Word and Object*, chapter 1; W. V. Quine and J. S. Ullian, *The Web of Belief* (New York: Random House, 1970).

<sup>68</sup> *The Foundations of Arithmetic*, section 7.

and epistemic aspects of language use, so he shared his rationalism.<sup>69</sup> But after Russell's early work, rationalism fell into disfavor or neglect. The logical positivists were aggressively empiricist. Austin and Strawson took philosophical analysis to be recovering a largely empirical wisdom embedded in common sense conceptions.<sup>70</sup> Neither British philosopher had much to say about mathematics. Although Quine rejected the empiricism of logical positivism, he replaced it with his own version (see note 67). Except for Quine's empiricism and the empiricism of Sellars, which is even less oriented to discussion of mathematical practice,<sup>71</sup> after the mid-twentieth century, epistemology receded to being a specialized sub-field, rather than one of philosophy's driving sources. For all these reasons, Frege's rationalism came to be seen as mistaken, or at best old-fashioned and irrelevant, to contemporary philosophical concerns.

With gradual loosening of the stranglehold that empiricism maintained on philosophy through much of the twentieth century, Frege's rationalism is being rediscovered as a valuable resource. His combination of pragmatism and contextualism with a recognition of the deep difference between methods of coming to know in mathematics and logic, on one hand, and empirical science, on the other, provides materials for better understanding the nature and place of apriori knowledge. It remains to be seen how this rediscovered strength in Frege's work will fructify contemporary philosophy.

<sup>69</sup> Russell, 'On Our Knowledge of General Principles', in *The Problems of Philosophy*.

<sup>70</sup> J. L. Austin, 'A Plea for Excuses', in *Philosophical Papers*, ed. J. O. Urmson and G. J. Warnock (Oxford: Oxford University Press, 1961); Strawson, *Individuals*, chapter 1; *The Bounds of Sense* (1966) (London: Routledge, 1989), e.g. p. 42.

<sup>71</sup> W. S. Sellars, 'Is There a Synthetic A Priori?' in *Science, Perception, and Reality* (London: Routledge, 1963).