Existence and Propositional Attitudes:

A Fregean Analysis*

Leila Haaparanta Department of Mathematics, Statistics and Philosophy University of Tampere P.O. Box 607 FIN-33101 Tampere Finland

Abstract

It is a commonly held view that Frege's doctrine of senses and references is not compatible with the idea that there are *de re* beliefs. The present paper is meant to challenge that view. Moreover, it seeks to show that, instead of forcing Frege's semantic framework to answer questions raised by twentieth-century philosophy of language, we had better find those questions to which it might be a proper answer. It is argued that the proper treatment of Frege's views requires the acknowledgment of the central role of individualistic epistemology in his thought. Once that feature is recognized, Frege's doctrine of senses and references can be considered a theory, or at least a sketch of a theory, of cognition, which has interesting connections with Kant's and Husserl's views.

1. Introduction

Tyler Burge argued in his paper 'Belief *de re*' (1977) that *de re* beliefs, which place the believer in a relation to objects, are more fundamental than *de dicto* beliefs. He assumed that Frege's theory of sense and reference backs the view that *de re* is a species of *de dicto*, which he wanted to oppose. However, Burge emphasized quite correctly, I think, that Frege's concept of sense does not correspond to the notion of linguistic meaning but it has to do with 'how people acquire and pass on knowledge by using language'. Contrary to Burge, Gareth Evans argued in *The Varieties of Reference* (1982) that Frege is committed to the *de re* senses of singular terms. John McDowell continued Evans's argumentation in 1984 by challenging the common belief that a Fregean philosophy of language and thought can represent a propositional attitude as being about an object only by crediting it with a content that determines the object by specification. John McDowell assumed that what rules out accommodating the essential *de re* within Fregean theory is probably a certain conception of the contrast between *de re* and *de dicto*, which was represented by Tyler Burge.

What is the meaning of the distinction between *de re* and *de dicto* modalities which Burge and many others accept? *De dicto* modalities are normally characterized as modalities which are attributed to propositions, whereas *de re* modalities are modal properties which are attributed to entities, particularly to individuals.¹ For example, in the case of alethic modalities the following two alternatives are available for us:

- (1) It is necessary that Plato is a man.
- (2) Plato is necessarily a man.

The former, de dicto modality as well as the latter, de re modality can be formalized as follows:

- (1') $\Box M(P)$
- (2') $\Box M(P)$

The intuitive distinction can be seen in the grammatical structure, but this kind of formalization does not bring out the difference between the two modalities. It is only the quantification in relation to these contexts that makes it urgent to consider in formula language the distinction that is suggested by the above examples. The respective existential generalizations of the above mentioned expressions are the following:

- $(1'') \qquad \Box(\exists x)(x = P \& M(x))$
- (2") $(\exists x)(x = P \& \Box M(x))$

As for Frege's philosophy, we must confine ourselves to considering epistemic and doxastic attitudes, since Frege eliminates alethic modalities from his logic. For example, in the case of doxastic attitudes we have the following alternatives illustrated by Burge's examples:

- (3) Ortcutt believes the proposition that someone is a spy.
- (4) Someone in particular is believed by Ortcutt to be a spy.

Their respective formalizations are the following:

 $(3') \qquad B_{0}(\exists x)S(x)$

Following Burge, we may say that in the former case the epistemic modality modifies a completely expressed statement (*dictum* - what is said), whereas in the latter case it modifies a predication (Burge, 1977, p. 343). Burge states as follows:

... purely *de dicto* attributions make reference to complete propositions - entities whose truth or falsity is determined without being relative to an application or interpretation in a particular context. *De re* locutions are about predication broadly conceived. They describe a relation between open sentences (or what they express) and objects. (Burge, 1977, p. 343)

The gist of Frege's theory of *Sinn* and *Bedeutung* is described by Burge as follows:

(1) All thought or belief about public objects is from a conceptual perspective - we always think about them from one of a variety of possible standpoints or in one of a variety of possible ways. (2) When we think about particular public objects, this conceptual perspective determines which object we are thinking about. (Burge, 1977, p. 353)

Burge assumes - and, indeed, it seems to be natural to assume - that if we are Fregeans, we can only accept *de dicto* attitudes, since we believe that we know objects only *via* their senses. In this broad sense, every attitude to an object is a *de dicto* attitude. Frege seems to assume that in indirect contexts the subject's attitude is directed to an object which is a complete thought. He even remarks that being apprehended is an inessential property of a thought ('Der Gedanke', 1918, KS, p. 361), which implies that it is a property of a thought anyway. Admittedly, it is odd to consider being thought about, or apprehended, by someone to be a property of a thing, whether that thing is concrete or abstract.

This paper is an attempt to show that more clarifications are needed as to what we mean by *de dicto* attitudes when we talk about Frege's philosophy. The following two theses will be defended in the present paper:

(a) The idea that propositional attitudes can be *de re* is compatible with Frege's doctrine of senses and references.

(b) The strength of Frege's doctrine of senses and references cannot be found in its way of handling those problems which are posed by twentieth-century philosophy of language. In order to see the value of Frege's distinction, we had better find the questions to which it might be a proper answer.

One methodological remark is important. The title of this paper includes the term 'Fregean'. But what is Fregean, or what is to give a Fregean analysis? If we say that a view is Fregean, we mean that if Frege had happened to think of this problem, he would have come to hold this view. When we say that Frege thought that there are only *de dicto* attitudes, we cannot literally ascribe this kind of attitude to the historical person called Frege. Instead, what we do is to use our own concepts or the concepts used by some other philosopher or some other period and describe Frege's thought by means of those concepts. Accordingly, instead of construing the claim as 'If Frege had happened to think of this, he would have come to hold this view', we may also say 'If Frege had had the concepts we use, he would have thought that p', where p describes a certain view by means of our concepts. Frege does not use the distinction between *de re* and *de dicto*, and therefore what I shall say in what follows is meant to be a Fregean view rather than Frege's, i.e., the historical person's, analysis of existence and propositional attitudes.

2. Frege's Distinction between *Sinne* and *Bedeutungen*

What we must do first of all is to describe Frege's treatment of doxastic and epistemic contexts by means of the distinction between *Sinn* and *Bedeutung* and then to find out his motivation for the distinction. Then we are able to consider existential quantification together with propositional attitudes in the Fregean framework. That is something that Frege did not do himself.

For Frege, the *Sinne*, senses, of sentences are thoughts and the *Bedeutungen*, references, of sentences are truth-values, the True and the False. Sentences are compounded out of proper names, which refer to objects, and function-names, which refer to functions. The *Sinne* of function-names are simply parts of thoughts.² But what are the *Sinne* expressed by proper names? In 'Über Sinn und Bedeutung' (1892) Frege remarks that the sense of a proper name is a way in which the object to which this expression refers is presented, or a way of 'looking at' this object. Furthermore, he states that the sense expressed by a proper name *belongs* to the object to which the proper name refers. In other words, for Frege, senses are not primarily senses of names but senses of references. Hence, it is more

advisable to speak about senses expressed by names than senses of names. Frege also gives some wellknown examples of senses, like 'the Evening Star' and 'the Morning Star' as senses of Venus, and 'the teacher of Alexander the Great' and 'the pupil of Plato' as senses of Aristotle ('Über Sinn und Bedeutung', KS, p. 144).

Frege regards it as possible for an object to be given to us in a number of different ways. He observes that it is common in our natural language that one single proper name expresses many of those senses which belong to an object. For Frege, to each way in which an object is presented there corresponds a special sense of the sentence that contains the name of that object. The different thoughts that we get from the same sentence have the same truth-value. In Frege's view, we must sometimes stipulate that for every proper name there is just one associated manner of presentation of the object denoted by the proper name ('Der Gedanke', 1918, KS, p. 350). However, he believes that different names for the same object are unavoidable, because one can be led to the object in a variety of ways ('Über den Begriff der Zahl', 1891/92, NS, p. 95). For Frege, our knowledge of an object determines what sense, or what senses, the name of the object expresses to us. One sense or a number of senses provides us only with one-sided knowledge (*einseitige Erkenntnis*) of an object. Frege argues:

Complete knowledge [*allseitige Erkenntnis*] of the reference would require us to be able to say immediately whether any given sense belongs to it. To such knowledge we never attain. ('Über Sinn und Bedeutung', KS, p. 144; Geach and Black, p. 58.)³

On the basis of Frege's hints, we may conclude that his concept of *Sinn* is thoroughly cognitive. Many of his formulations suggest that *Sinne* are complexes of individual properties of objects, hence, something knowable. However, there are problems in that interpretation, as I shall show later in the present paper. If the suggested interpretation of the concept of *Sinn* were correct, it would be Frege's view that we know an object completely only if we know all its properties, which is not possible for a finite human being. It would also follow that, according to Frege, each object could in principle have an infinite number of names which would correspond to the modes of presentation of the object. Frege does not hold the position that knowing some arbitrary property or complex of properties of an object constitutes knowing the object completely since, for Frege, a necessary condition for knowing an object would be knowing *all* the properties of that object. Nevertheless, on the suggested interpretation he thinks that in a weaker sense we know an object precisely by knowing some properties of that object. It is true Frege's weaker sense of *knowing an object* is not free from

problems, either, even if it is more natural than the stronger sense. This is because Frege does not explain *which* properties of an object one must know in order to know the object.

In Frege's view, we are not able to speak about the senses of proper names as *senses*, for if we start speaking about them, they turn into objects, which, again, have their own senses. But what are these objects in case we speak about the senses expressed by proper names? Frege says that senses can be named ('Über Sinn und Bedeutung', KS, pp. 144-145) and proposes such examples as 'the teacher of Alexander the Great' and 'the pupil of Plato'. But if senses were complexes of the properties which belong to objects, as suggested above, their names ought to be such as 'being the teacher of Alexander the Great' or 'being the pupil of Plato'. Frege's examples suggest that when we name a sense of an object, we do not name any new object which would be a complex of individual properties of that object, but we name the original object in a new way. Hence, it follows from these examples that we do not succeed in naming a sense of an object as any new object, after all. Instead, we only name the object itself as considered under the description with which the sense provides us.

There has been much discussion on what Frege's motivation for adopting the distinction between senses and references might have been. When Frege introduces the distinction, he primarily refers to identity statements. It seems as if the distinction between *Sinn* and *Bedeutung* were, above all, meant to give an adequate account of the symbol of identity, which Frege wants to preserve in his language. By making the distinction between *Sinn* and *Bedeutung*, he seeks to give a natural reading for identity statements. It is also well known that when introducing the concepts of sense and reference, Frege tries to solve the problems which what we call intensional contexts cause for what we call his idea of extensional language. The principle of functionality, which we may call the principle of compositionality in the case of references, is the core of that idea.⁴ It implies that in a complex expression we may replace a component with another expression. As regards sentences, the principle says that in a sentence we may substitute an expression for another one which is identical with it without affecting the truth-value of the sentence. As for what we nowadays call molecular sentences, the principle of functionality is simply the principle of truth-functionality. Frege presupposes that the condition of uniqueness satisfied by functions should hold in his language.

Everything works well according to our truth-tables when Frege constructs complex sentences out of simple sentences by means of conditionality (BS, § 5). The trouble for Frege is caused by intensional contexts, which do not follow the principle of functionality. Frege tries to deal with those contexts by introducing the concepts of indirect sense and indirect reference, the latter being the same as the normal sense of an expression.⁵ Frege claims that in certain indirect contexts our words

automatically switch their references to what normally are their senses. However, in a letter to Russell Frege recognizes the need for using special signs for words in indirect speech (BW, p. 236). Hence, say, in the complex sentences 'A believes that a is P' and 'A believes that b is P' 'that a is P' and 'that b is P' name two different thoughts, since 'a' and 'b' have different senses. Let us assume that a and b have the same normal reference. Now, given that the truth-value of the complex sentence is considered as the value of a function whose arguments are the references of the components of the sentence, it does no harm to the principle of functionality even if the complex sentences have different truth-values. Since the arguments of the function differ from each other, that is, since a and b have different indirect references, the references of the complex expressions may quite well be different, and the principle of functionality is thus saved.

Frege's theory of *Sinn* and *Bedeutung* is not only a solution offered to the problems which intensional contexts cause to the idea of extensional language, but it also turns out to be a direct consequence of his idea of a universal language. *Frege's Begriffsschrift*, conceptual notation, was meant to be a realization of Leibniz's great idea.⁶ Leibniz thought that the terms of our natural language do not correspond to the things of the world in a proper way and therefore we ought to construct a new language which mirrors correctly the whole universe.⁷ He dreamt of a language which speaks about the actual world in the sense of mirroring the individual concepts instantiated in this world. Frege's world differs from that of Leibniz's in the sense that for him the actual world is the only world.

The idea of a Leibnizian universal language occurs in Frege's work for the first time in the 'Preface' of the *Begriffsschrift*, in which Frege refers approvingly to Adolf Trendelenburg's exposition of Leibniz's idea. In his article 'Über Leibnizens Entwurf einer allgemeinen Charakteristik' (1867) Trendelenburg suggests that philosophers ought to construct a Leibnizian universal language on the basis of Kant's ideas. Trendelenburg regards Kant's distinction between the conceptual and the empirical component of thought and his study of the conceptual component as a continuation of Leibniz's project. He also mentions Ludwig Trede, who, in an essay 'Vorschläge zu einer nothwendigen Sprachlehre' (1811) had tried to construct a Leibnizian universal language by taking notice of what Kant does in his transcendental logic. According to Trendelenburg, Kant's 'correction' to what Leibniz' dreamt of amounted to laying more emphasis on the codification of formal concepts in the universal notational system and paying less attention to empirical concepts. The limitation which Trede finds in the possibility of constructing a Leibnizian universal language seems to be due to the fact that, as human beings, we are not able to have knowledge of all the empirical properties of objects and hence not able to designate all empirical concepts in an ideal notational system. Frege followed Kant and

Trede in that he paid more attention to formal concepts and less attention to empirical concepts.⁸

For Frege, *Sinne* are something that we cannot avoid when we try to reach the world by means of our language. Frege's belief in the inescapability of *Sinne* can thus be considered a special form of the Kantian belief that we must always consider objects through our conceptual systems. In 'Ausführungen über Sinn und Bedeutung' (1982 - 1985) he remarks:

Thus it is *via* a sense and only *via* a sense that a proper name is related to an object. (NS, p. 135; Long and White, p. 124.)

Hence, the distinction between senses and references is something that Frege would have accepted in any case because of his belief in the role of conceptual machinery in reaching the world.

3. Existence and Propositional Attitudes

What has been said so far does not seem to challenge Burge's view in any way. However, Frege's concept of *Sinn* turns out to be even more intricate than the above discussion suggests. That conclusion must be drawn if we do what Frege did not do himself, namely, if we consider existential quantification and propositional attitudes. Frege himself discusses two concepts of existence. One of them is the concept of being identical with itself, which is an empty first-order concept. The other and more important concept of existence is existence as a meaningful second-order concept, that is, as a property of concepts. For example, the sentence "There is a P' means, for Frege, the same as the sentence "The concept P is instantiated'.⁹ My problem in this paper is how to connect Frege's theory of *Sinn* and *Bedeutung* and his treatment of epistemic and doxastic contexts with his concept of existence.

In 'Über Sinn und Bedeutung' Frege argues that in indirect contexts names refer to their normal senses, not to their normal references. However, the normal sense, which is named in these contexts, must now be construed as the object itself as considered by the person who believes, knows, etc., under some description or descriptions, not as a complex of the properties of the object expressed by those descriptions. Even if Frege suggests that the sense is grasped by anybody who is sufficiently familiar with the language in question, thus taking into account the linguistic community, he normally proceeds with his epistemological considerations in purely individualistic terms. That is also the perspective which I choose in what follows.

Given the framework of individualistic epistemology, what should an existential quantifier range over that from the outside binds a variable occurring in an indirect context? Likewise, what should an existential quantifier range over that occurs in such a context? If we quantify into an indirect context, as in the sentence

(5) $(\exists x) A$ believes that S(x),

it seems to be natural, following Frege's programme, not to extend the rules which apply to indirect contexts outside the scope of the doxastic operator. Hence, our first guess is to understand the quantifier in the same sense as in normal extensional contexts, that is to say, as stating that there is a normal reference *x* such that *A* believes something of this reference. That interpretation does not work, however. The main reason for this is not that existential generalization may fail, but it is Frege's assumption that the belief does not concern the normal reference in any circumstances, but it concerns the indirect reference, which is the same as the normal sense. If we quantify into the doxastic context in the proposed manner, we disturb the original Fregean meaning of the opaque context. Hence, the statement cannot be read as expressing a *de re* belief in the usual sense.

Therefore, we are compelled to interpret the formula in such a way that the quantifier will be affected by the doxastic operator. The reading of the formula will thus be as follows:

(6) There is a sense *x* such that *A* believes that *x* is *S*.

Here the range of the existential quantifier must be different from the range of the normal existential quantifier. That would contradict Frege's famous *Grundsatz der Vollständigkeit*, which says that any function must be defined for all objects (GGA II, §§ 56 - 65).

Let us consider the statement

(7) A believes that $(\exists x)S(x)$.

If we are true to Frege's interpretation of indirect contexts, we must assume that the quantifier ranges over senses. This is because the reference of the *that*-clause is the thought expressed by it, which is compounded out of the senses expressed by the constituents of the *that*-clause, not out of the normal references of the constituents of the *that*-clause. Hence, we cannot escape the conclusion which we already met above that the range of the quantifier is restricted to senses, which makes Frege contradict

his one-world view. Accordingly, it seems that we cannot get much out of the effort to treat existential quantification into epistemic and doxastic contexts in the Fregean framework.

However, there is one important distinction to which we must pay special attention and which shows the systematically and historically interesting core of Frege's analysis. We cannot have a grasp of Frege's analysis of doxastic and epistemic modalities if we do not notice that there are two stages in his procedure. It is one thing to defend the doctrine of *Sinn* and *Bedeutung* and another thing to say that modalities must always be ascribed to propositions, or thoughts in the sense described above. Frege's view can be construed so that the former idea is accepted while the latter is rejected, on the condition, however, that the one-world view is given up. First, the existential quantifier must be construed as being affected by the modal operator. The sentence (6) can now be rendered as the sentence

(8) There is A's object x which, for A, is --- such that A believes that x is S (in addition to its being ---).

For example, the sentence

(9) *A* believes that Venus is bright.

receives the following form:

(10) There is A's object *x* which, for *A*, is the Morning Star such that *A* believes that *x* is bright (in addition to its being the Morning Star).

This means that, according to Frege's epistemology, once at least one *de dicto* attitude is fixed, that is, once an object is given to us *via* at least one sense, the rest of the descriptions are ascribed to that object *qua* that kind of object. That these new predications are ascribed to the object means that the modality in question modifies precisely these predications and that the modal property is attributed to an object, even if that object is considered to be the believer's or the knower's object of a certain kind. The range of the quantifier is chosen by the one who believes or knows, and the belief or knowledge statement is attributed to an object together with a predicate which it modifies. What this means is that we can combine the idea of *de re* attitudes in Tyler Burge's and many others' sense with Frege's philosophy, that is, in the sense that *de re* belief and *de re* knowledge place the subject in a relation to

objects. But these curious objects are objects which the subject has constructed on the basis of his or her beliefs or knowledge concerning the object. In terms of another philosophical tradition, we could call them phenomenological objects.

4. Concluding Remarks

What is left for us now is to reveal the historically interesting links between Frege and two other philosophers. The basic conclusion here is that we can evaluate Frege's thought properly only if we realize that, in spite of his numerous remarks which point to a different direction, his distinction between senses and references is built on individualistic epistemology. Given this general programme, what is the historically relevant point in the two-stage analysis we noticed above? This way of treating propositional attitudes brings Frege to the same tradition with Kant and Husserl. For even if for Kant, objects of experience are originally given to us through concepts, which constitute judgements, those objects as constituted by concepts are proper objects to which we are related in our belief and knowledge (KRV, A 89/B 122, A 93/B 126, A 106).

A similar parallel to Frege's line of thought can be found in Husserl's posthumous work Erfahrung und Urteil (1939). Husserl discusses the constitution of objects, that is, our cognitive processes which are reflected in language. Husserl describes the constitution as follows: The basic form of judgement is predication, say, 'S is p'. The next step in our cognitive process is to acquire information of this S which we now know as p. We form a new judgement, for example, 'S as p is q' or 'S, which is p, is q'. In this judgement S is constituted as p and the new piece of information 'S is q' is given in the main clause. The subordinate clause expresses the state of our cognition. Our point of interest is in the judgement 'S is q' (EU, § 55). Here Husserl comes to make a distinction between two stages of cognition which correspond to those of Frege's. What these historical parallels are meant to show is that, instead of forcing Frege's framework to answer questions which it cannot answer, we had better try to find out the problems for which this framework was originally planned. Sokolowski (1987) claimed that Frege's analysis could be improved by means of Husserl's ideas, that is, by recognizing the presence of our activity in meaning relations. Even if we did not see any need for that kind of improvement, we could at least admit that there are certain features in Frege's thought which can be illuminated by showing the similarities between Husserl and Frege. Therefore, I agree with Sokolowski when he argues that Husserl's philosophy can provide a context for understanding Frege's projects (Sokolowski, 1987, p. 528).

The above discussion brought up a number of peculiar features of Frege's concepts of *Sinn* and *Bedeutung*. One of them was that senses can be construed in two ways. They can be regarded as aspects of references, or they can be taken to be full-fledged objects. Another peculiarity in Frege's view was that if senses are objects parallel to references, the distinction between senses and references is that between objects as we know, believe etc. them to be, or objects as we have constructed them, and objects which are, as it were, 'out there' or 'parenthesized'. On this phenomenological reading of Frege's view, the existential quantifiers of epistemic and doxastic expressions range over the subject's phenomenological objects, that is, over the objects which the subject has constructed in his or her experience.

NOTES

* I am grateful to the Philosophical Society of Finland for the permission to use extracts from my monograph (1985) in this article.

1 See Burge (1977), pp. 338-340, and Bradley and Swartz (1979), p. 237. Cf. Haaparanta (1985), pp. 144-149.

2 See 'Über Sinn und Bedeutung' (1892), KS, pp. 144-147, GGA I, p. X and § 26, and 'Über die Grundlagen der Geometrie I-III' (1906), KS, p. 285. See also 'Einleitung in die Logik' (1906), NS, p. 203.

3 The word 'complete' is not a good translation for *allseitig*, but it is in any case not so misleading as the word 'comprehensive' chosen by Geach and Black. A better expression would, perhaps, be 'knowledge from every angle'.

4 See Frege's argumentation in 'Über Sinn und Bedeutung'.

5 See, e.g., 'Dialog mit Pünjer über Existenz' (before 1884), in NS, GLA, § 53, 'Über Begriff und Gegenstand', (1891), KS, p. 173, and Frege's letter to Hilbert 6.1.1900, BW, p. 75. See also Haaparanta (1985, 1986).

6 See, e.g., 'Über den Zweck der Begriffsschrift' (1879), BS (1964), p. 98, 'Über die Begriffsschrift des Herrn Peano und meine eigene' (1896), KS, p. 227, and 'Anmerkungen Frege's zu: Philip E.B. Jourdain, The development of the theories of mathematical logic and the principles of mathematics' (1912), KS, p. 341. See also 'Booles rechnende Logik und die Begriffsschrift' (1880/1881), NS, pp. 9-52.

7 See, e.g., Leibniz (1961a), p. 184 and p. 192, and Leibniz (1961b), p. 29, p. 152, and p. 283. See also 'Discourse on Metaphysics', sec. 8.

8 See Sluga (1980), pp. 51-52, and Haaparanta (1985), pp. 113-114.

9 See 'Funktion und Begriff', KS, pp. 132-133, 'Über Sinn und Bedeutung', KS, pp. 149-150, NS, pp. 208-209, pp. 217-218, and p. 275, and BW, p. 127 and p. 156.

BIBLIOGRAPHY

- Bradley, R. and Swartz, N., *Possible Worlds: an Introduction to Logic and its Philosophy*, Basil Blackwell, Oxford, 1979.
- Burge, T., 'Belief de re', The Journal of Philosophy 74 (1977), 338-362.
- Evans, G., *The Varieties of Reference*, ed. by J. McDowell, Clarendon Press, Oxford/Oxford University Press, New York, 1982.
- Frege, G., Begriffsschrift, eine der arithmetischen nachgebildete Formelsprache des reinen Denkens (BS), Verlag von L. Nebert, Halle a.S., 1879; repr. in Frege (1964), pp. 1-88.
- Frege, G., Über den Zweck der Begriffsschrift', in Sitzungsberichte der Jenaischen Gesellschaft für Medizin und Naturwissenschaft für das Jahr 1882, Verlag von G. Fischer, Jena, 1883, pp. 1-10; repr. in Frege (1964), pp. 97-106.
- Frege, G., Die Grundlagen der Arithmetik: eine logisch mathematische Untersuchung über den Begriff der Zahl (GLA), Verlag von W. Koebner, Breslau, 1884; repr. and transl. by J.L. Austin in The Foundations of Arithmetic/Die Grundlagen der Arithmetik, Basil Blackwell, Oxford, 1968.
- Frege, G., 'Über Sinn und Bedeutung', Zeitschrift für Philosophie und philosophische Kritik 100, 1892, pp. 25-50; repr. in KS, pp. 143-162.
- Frege, G., 'Über Begriff und Gegenstand', Vierteljahrschrift für wissenschaftliche Philosophie 16, 1892, pp. 192-205; repr. in KS, pp. 167-178.
- Frege, G., *Grundgesetze der Arithmetik, begriffsschriftlich abgeleitet, I. Band* (GGA I), Verlag von H. Pohle, Jena, 1893.
- Frege, G., 'Über die Begriffsschrift des Herrn Peano und meine eigene', Berichte über die Verhandlungen der königlich sächsischen Gesellschaft der Wissenschaften zu Leipzig, Mathematisch-Physische Klasse 48. Band, 1896, pp. 361-378; repr. in KS, pp. 220-233.
- Frege, G., *Grundgesetze der Arithmetik, begriffsschriftlich abgeleitet, II. Band* (GGA II), Verlag von H. Pohle, Jena, 1903.
- Frege, G., 'Über die Grundlagen der Geometrie I-III', Jahresberichte der Deutschen Mathematiker-

Vereinigung, 15. Band, 1906, pp. 293-309, 377-403, 423-430; repr. in KS, pp. 281-323.

- Frege, G., 'Anmerkungen zu: Philip E.B. Jourdain, The development of the theories of mathematical logic and the principles of mathematics', *The Quarterly Journal of Pure and Applied Mathematics* 43, 1912, pp. 237-269; repr. in KS, pp. 334-341.
- Frege, G., Translations from the Philosophical Writings of Gottlob Frege, ed. by P. Geach and M. Black, Basil Blackwell, Oxford, 1952.
- Frege, G., Begriffsschrift und andere Aufsätze, hrsg. von I. Angelelli, Georg Olms, Hildesheim, 1964.
- Frege, G., *Kleine Schriften* (KS), hrsg. von I. Angelelli, Wissenschaftliche Buchgesellschaft, Darmstadt und Georg Olms, Hildesheim, 1967.
- Frege, G., *Nachgelassene Schriften* (NS), hrsg. von H. Hermes, F. Kambartel, und F. Kaulbach, Felix Meiner Verlag, Hamburg, 1969.
- Frege, G., Wissenschaftliche Briefwechsel (BW), hrsg. von G. Gabriel, H. Hermes, F. Kambartel, C. Thiel, und A. Veraart, Felix Meiner Verlag, Hamburg, 1976.
- Frege, G., Posthumous Writings, transl. by P. Long and R. White, Basil Blackwell, Oxford, 1979.
- Haaparanta, L., Frege's Doctrine of Being, Acta Philosophica Fennica 39, 1985.
- Haaparanta, L., 'Frege on Existence', in L. Haaparanta and J. Hintikka (eds.), Frege Synthesized: Essays on the Philosophical and Foundational Work of Gottlob Frege, D. Reidel, Dordrecht, 1986, pp. 155-174.
- Husserl, E., *Erfahrung und Urtheil: Untersuchungen zur Genealogie der Logik* (EU), red. und hrsg. von L. Landgrebe (1939), Claassen Verlag, Hamburg, 1964.
- Kant, I., Kritik der reinen Vernunft, 1781 (a), 2nd ed. 1787 (B), in Kant's gesammelte Schriften, Band III, G. Reimer, Berlin, 1904; transl. by N. Kemp Smith, The Macmillan Press, London and Basingstoke, 1929.
- Leibniz, G.W., *Die philosophischen Schriften von Gottfried Wilhelm Leibniz, Siebenter Band* (1961a), hrsg. von C.I. Gerhardt, Georg Olms, Hildesheim, 1961 (originally published in Berlin 1890).
- Leibniz, G.W., *Opuscules et fragments inédits de Leibniz* (1961b), ed. by L. Couturat, Georg Olms, Hildesheim, 1961 (originally published in Paris 1903).
- Leibniz, G.W., *Philosophical Papers and Letters*, transl. and ed. by L.E. Loemker, 2. ed., D. Reidel, Dordrecht, 1969.
- Leibniz, G.W., 'Discourse on Metaphysics', in Leibniz (1969), pp. 303-330.
- McDowell, J., 'De re senses', The Philosophical Quarterly 34 (1984), 283-294.
- Sluga, H.D., Gottlob Frege, Routledge & Kegan Paul, London, Boston and Henley, 1980.

Trendelenburg, A., 'Über Leibnizens Entwurf einer allgemeinen Charakteristik', in A. Trendelenburg, *Historische Beiträge zur Philosophie, Dritter Band: Vermischte Abhandlungen*, Verlag von G. Bethge, Berlin, 1867, pp. 1-47.