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Preface

The recognition of a scientific truth generally passes through several stages of certainty. Perhaps first guessed from a limited number of particular cases, a universal proposition becomes more and more firmly established by being connected with other truths through chains of inference – whether conclusions that find confirmation in other ways are derived from it, or whether, conversely, it is recognized as following from already established propositions. It can thus be asked, on the one hand, by what path a proposition was gradually reached, and on the other hand, in what way it is now finally to be most firmly established. The former question possibly needs to be answered differently for different people; the latter is more definite, and its answer is connected with the inner nature of the proposition concerned. The firmest proof is obviously the purely logical, which, prescindng from the particularity of things, is based solely on the laws on which all knowledge rests. Accordingly, we divide all truths that require justification into two kinds, those whose proof can be given purely logically and those whose proof must be grounded on empirical facts. But there is no inconsistency in a proposition belonging to the first kind and yet being such that it can never be apprehended by a human mind without the operation of the senses.^A Thus it is not psychological origination but the most perfect method of proof that lies

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| at the basis of the division. Now in considering the question of to which of these two kinds arithmetical judgements belong, I first had to see how far one could get in arithmetic by inferences alone, supported only by the laws of thought that transcend all particulars. The course I took was first to seek to reduce the concept of ordering in a series to that of *logical* consequence, in order then to progress to the concept of number. So that nothing intuitive could intrude here unnoticed, everything had to depend on the chain of inference being free of gaps. In striving to fulfil this requirement in the strictest way, I found an obstacle in the inadequacy of language: however cumbersome the expressions that arose, the more complicated the relations became, the less the precision was attained that my purpose demanded. Out of this need came the idea of the present *Begriffsschrift*. It is thus intended to serve primarily to test in the most reliable way the validity of a chain of inference

^A Since without sense perception no mental development is possible for beings known to us, the latter holds for all judgements.

and to reveal every presupposition that tends to slip in unnoticed, so that its origin can be investigated. The expression of anything that is without significance⁶ for *logical inference* has therefore been eschewed.⁷ I have called, in §3, that which solely mattered to me *conceptual content* [*begrifflicher Inhalt*]. This point must therefore always be kept in mind if the nature of my formula language is to be understood correctly. From this the name 'Begriffsschrift' also arose. Since I restricted myself in the first place to the expression of such relations as are independent of the particularity of things, I was also able to use the expression 'formula language of pure thought'. The modelling on the formula language of arithmetic, which I indicated in the title, refers more to the fundamental ideas than to the detailed construction. Any attempt to establish an artificial similarity by construing a concept as the sum of its marks was far from my mind.⁸ My formula language comes closest to that of arithmetic in the way that letters are used.⁹ |

V I believe I can make the relationship of my *Begriffsschrift* to ordinary language clearest if I compare it to that of the microscope to the eye. The latter, due to the range of its applicability, due to the flexibility with which it is able to adapt to the most diverse circumstances, has a great superiority over the microscope. Considered as an optical instrument, it admittedly reveals many imperfections, which usually remain unnoticed only because of its intimate connection with mental life. But as soon as scientific purposes place great demands on sharpness of resolution, the eye turns out to be inadequate. The microscope, on the other hand, is perfectly suited for just such purposes, but precisely because of this is useless for all others.

⁶ Throughout this translation of *BS*, unless otherwise indicated, 'Bedeutung' (or any of its cognates) has been rendered as either 'meaning' or 'significance' (or their corresponding cognate). Conversely, unless otherwise indicated, any occurrence of either 'meaning' or 'significance' (or any of their cognates) in the English version should be taken as the translation of 'Bedeutung' (or its corresponding cognate). For discussion of the problems involved in translating 'Bedeutung', see the Introduction, §4 above.

⁷ Frege's idea here is that any feature of the overall meaning of an expression that makes no difference to the validity of any argument in which that expression is used is irrelevant for logical purposes; an idea that is later reflected in the distinction that Frege draws between 'sense' (corresponding, in this context, to his earlier 'conceptual content') and 'tone' or 'shading' ('Beleuchtung'); cf. especially *PWLB*, pp. 239–44 below.

⁸ By 'marks' ('Merkmale') of a concept Frege means those concepts into which the concept can be analysed. The concept *mammal*, for example, is a mark of the concept *whale*. Cf. *GL*, §53 (pp. 102–3 below); *CO*, pp. 189–90 below.

⁹ What Frege is referring to here is the use of *variables*, fundamental to both logic and arithmetic.