

*This book explores an important central thread that unifies Russell's thoughts on logic in two works previously considered at odds with each other, the Principles of Mathematics and the later Principia Mathematica.*

It is certainly well over-due for reassessment. Since the opening of the Russell Archives in a mass of new Russell material has become available which has led to very radical changes in our understanding of his philosophy. The theory failed because propositional paradoxes emerged within it. For a long time many of us believed that that was the end of the unrestricted variable -- which some of us had come to love. Landini, however, maintained that the unrestricted variable lived on in the type theory of Principia; that there was only one type of entity in Principia and that the ramified hierarchy of types and orders had a nominalist semantics, as against the standard view, which owed much to Quine, according to which it had a realist semantics with different styles of variable ranging over different styles of entities. The realist interpretation of the theory of types in Principia is one of two dogmas of Russellian interpretation that Landini introduces early in his book p. Landini distinguishes between elimination and reductive identity as two forms of ontological reduction, illustrating the distinction from the history of science pp. In the former, an item e. Relativity theory did not reduce the aether to space-time, but got rid of it altogether. When Russell says that tables and chairs are logical fictions he is to be understood entirely literally: In other words, Russell used the unrestricted variable to effect an eliminative reduction: How does all this relate to Wittgenstein? Formerly, embracing realist semantics for type theory, I held that the different argument positions did carry different type restrictions, but that Wittgenstein had pointed out that every elementary judgment would presuppose prior higher-order judgments assigning objects to their appropriate type. Since the point of the theory in Principia was to build higher-order judgments up from elementary ones, the process was viciously circular. I now think that this was misplaced ingenuity, forced on me by the assumption that Russell intended a realist interpretation of type theory. Secondly, and more generally, Landini ch. All such could only be shown by means of grammar; to admit them as representatives, i. The task was to specify a grammar by which they could be shown. Where Wittgenstein differed from Russell was in how far he wanted to take this. More things had to be eliminated than Russell had yet contemplated. This seems to me a considerably more plausible reading of the Tractatus than most of those hitherto proposed. The Tractatus is strewn with claims for which no support is offered, as if proof were something with which great minds should not be taxed. Subsequent generations have laboured long, hard, and ingeniously to fill in the gaps, attributing, with selfless generosity, their best efforts to the genius of the master. So far as I can see, the exclusive quantifiers are entirely successful. Both were intended to show, via a practice of calculation on formulae and numerals, respectively, what was previously said in formal, axiomatized systems of logic and arithmetic, thereby eliminating any appearance of ontologies of logical constants or numbers and of any truths about them. Landini offers a very extended discussion of each in chs. As Landini says of the N-operator: It is not, evidently, the form of logicism that is usually recognized, that in which arithmetic theorems are derived from logical principles, and arithmetic concepts defined in terms of logical concepts. But it is only an analogy, and not a perfect one: It is rather that both are intended to be part of the scaffolding shared by logic and arithmetic; though to count the result as logicism would, I think, require showing that there really was a single scaffolding and not two distinct but analogous ones. Unlike Wittgenstein, Russell was not content to gesture towards solutions with elegant declarations, but actually undertook the necessary constructive work, even though many commentators suppose him to have given up serious work in logic by this time. But not, Landini argues, mathematical induction. Russell concludes his analysis, not by rejecting real analysis, but by hoping that some replacement for the Axiom of Reducibility might salvage it PM2, vol. Wittgenstein, for example, is quite widely credited with having invented truth-tables. This was hardly a world-shaking achievement -- once truth-conditions for the truth-functors were fully stated as Russell stated those for material implication in Principles of Mathematics, p. Given the amount that has been written on this topic, it is astonishing that this could have been missed: To my knowledge, no one has ever considered just what Wittgenstein was expected to do with the first eleven chapters of Principia.

But there are reasons for doubting whether this was the project. As Landini amply demonstrates, the technical material in the *Tractatus* is markedly deficient, as Russell acknowledged with the mildest of reproofs in his Introduction. He would surely have known in that a single-axiom reformulation would likely have been beyond the powers of his favourite student. They will have their work cut out for them. Allen and Unwin, Bibliopolis, , pp. Open Court, ; 1st edn.

**Chapter 2 : Gregory Landini, Russell's substitutional theory of classes and relations - PhilPapers**

*Russell's Hidden Substitutional Theory Book* This book explores an important central thread that unifies Russell's thoughts on logic in two works previously considered at odds with each other, the *Principles of Mathematics* and the later *Principia Mathematica*.

If you wish to become a logician, there is one piece of advice which I cannot urge too strongly, and that is: Do Not learn the traditional formal logic. To teach either in the present day is a ridiculous piece of antiquarianism. Though both held that a system of cp-Logic is consistently recursively axiomatizable, neither made it definitive of Logicism. But this is also irrelevant to Logicism as Frege and Russell understood it. Let us put forth the following definition that altogether separates the deductive thesis from the Logicist thesis. Cp-Logic is not modern quantification theory with identity. It is a quantification theory that enables the binding of predicate variables as well as individual variables and which embraces the impredicative comprehension of relations independently of whether these relations are exemplified. Its impredicativity indicates that no restrictions are to be placed on the quantifiers occurring in the wffs which give the exemplification conditions for comprehension of universals. It simply maintains that, as a study of relational structures, mathematics is a part of cp-Logic as the synthetic a priori science studying all the kinds of relational structures there are by studying the way relations, exemplified or not, order their fields. This is not a movement coming outside of mathematics. It comes from within. It implies that mathematicians are doing cp-Logic—that is, studying relation structures—when they do mathematics. It was responsible for transforming the field of logic into cp-Logic, which, as Frege saw it, embraces the informative impredicative comprehension of functions. It was precisely this impredicative comprehension that enabled his new cp-Logic to be an informative science capable of capturing the notions of the ancestral and cardinal number, and to arrive at a theorem of mathematical induction. Frege had seen this already in his *Begriffsschrift* Russell came to appreciate it slowly. Frege never quite embraced what Russell regarded as the Cantorian revolution and certainly did not have the Russellian agenda of eliminating abstract particulars—not from geometry and certainly not from the arithmetic of numbers cardinal, natural, and so on. Quite to the contrary, Frege was adamant in maintaining that cardinal numbers are objects. They are mind and language independent entities some of which have the unanalyzable property of being true while others are false. The work was to have a second volume which worked out in a technically formal symbolic way the doctrines of the first volume. The second volume was to have been coauthored with Alfred North Whitehead who had been a long-time mentor of Russell in mathematics and whose work on abstract algebra is a natural ally of the logicist agenda. But, the project was abandoned. Instead, Whitehead and Russell produced *Principia Mathematica*. The Preface goes so far as to say that the work of *Principia Mathematica* had begun in , even prior to the publication of *The Principles of Mathematics*. It explains that instead of a second volume for *The Principles of Mathematics* couched in an ontology of logical necessary existing propositions, the work offers a fresh start avoiding abstract particulars not only in all the branches of mathematics but avoiding them in the field of cp-Logic itself *Principia Mathematica*, p. Ultimately, Russell went on to endeavor to eliminate abstract particulars from philosophy altogether. The program, Russell thought, held promise for solving all philosophical problems—problems arising from the paucity of imagination among speculative metaphysicians that results in an inadequate logic that produces indispensability arguments for abstract particulars and kinds of non-logical necessity governing them. Ample evidence can be found in *Principia Mathematica* in the following: The theory of Deduction p. Prolegomenon to Cardinal Arithmetic p. *Principia Mathematica* says, for example, that the subject of cardinal arithmetic is regarded as different only in degree from the subject matter of logic discussed in Part I. *Principia Mathematica* is surely advocating Logicism just as in *The Principles of Mathematics*, but some quite striking changes occur between the two works. For example, in *Principia Mathematica* Whitehead and Russell no longer regard the infinity of natural numbers to be a subject for mathematics to decide. This result so surprised Boolos that he concluded that work no longer advances Logicism. But quite to the contrary, it stems from the same source as the discovery in non-Euclidean geometry that not all right triangles obey the Pythagorean theorem. The

agenda is to reject indispensability arguments for abstract particulars; the results follow from there. Similarly, that the infinity of the natural numbers is not a mathematical issue follows from the rejection of classes or sets as abstract particulars. There are many such surprises in Principia Mathematica. Though the conception of Logicism has not changed, it is easy to see that quite a lot happened in the interim between The Principles of Mathematics and Principia Mathematica. For a great many years the interim period has been akin to the dark ages whose role in modern science has only recently come to light. In this period, Russell worked steadfastly to emulate the impredicative comprehension of cp-Logic in an ingenious substitutional logic of propositional structure. The foundations of the idea to find a substitutional theory to emulate a simple type of universals and thereby classes is already manifest in Appendix B of The Principles of Mathematics itself. The theory of denoting concepts of The Principles of Mathematics proved to be a quagmire and without the theory of definite descriptions, Russell could not execute the plan for a substitutional theory see, Landini b. In summary, the whole of Russell philosophical work in mathematical logic may be seen in terms of his trials and tribulations at emulating an impredicative simple-type regimented cp-Logic of universals. Our focus, therefore, is squarely on the evolution of the cp-Logic of Principia Mathematica. When Russell abandoned the propositions of his substitutional theory, he abandoned the idea of a second volume for The Principles of Mathematics. But he did not abandon hope that an emulation of an impredicative simple-type stratified regimentation of the cp-Logic of universals might still be found. In the introduction to the first edition of Principia Mathematica, Whitehead and Russell propose an informal nominalistic semantic interpretation of the object-language bindable predicate variables. But by , Russell had come to realize that such a nominalistic semantics could not validate impredicative comprehension axioms. Russell never stopped trying, however. In its second edition, Russell experimented with Wittgensteinian ideas for emulating impredicative comprehension, imagining an altered grammar to accommodate extensionality. Whitehead was not happy with this experiment being included in the new edition since neither he nor Russell intended to advocate it. Alas, Whitehead was right see, for example, Lowe , Monk

**Chapter 3 : god love her the russells book 2 Manual**

*Get this from a library! Russell's hidden substitutional theory. [Gregory Landini] -- Explores a central thread unifying Russell's thoughts on logic in two works considered at odds with each other: "Principles of Mathematics" and "Principia Mathematica".*

History of Principia Mathematica Logicism is the view that some or all of mathematics can be reduced to formal logic. It is often explained as a two-part thesis. First, it consists of the claim that all mathematical truths can be translated into logical truths or, in other words, that the vocabulary of mathematics constitutes a proper subset of the vocabulary of logic. Second, it consists of the claim that all mathematical proofs can be recast as logical proofs or, in other words, that the theorems of mathematics constitute a proper subset of the theorems of logic. The logicist thesis appears to have been first advocated in the late seventeenth century by Gottfried Leibniz. Later, the idea was defended in much greater detail by Gottlob Frege. During the critical movement of the 19th century, mathematicians such as Bernard Bolzano, Niels Abel, Louis Cauchy and Karl Weierstrass succeeded in eliminating much of the vagueness and many of the contradictions present in the mathematics of their day. By the mid- to late 19th century, William Hamilton had gone on to introduce ordered couples of reals as the first step in supplying a logical basis for the complex numbers and Karl Weierstrass, Richard Dedekind and Georg Cantor had all developed methods for founding the irrationals in terms of the rationals. Using work done by H. Grassmann and Richard Dedekind, Giuseppe Peano had then gone on to develop a theory of the naturals based on his now famous axioms for the natural numbers. Even so, it was not until 1879, when Frege developed the necessary logical apparatus, that logicism could finally be said to have become technically plausible. By 1910, both Whitehead and Russell had reached this same conclusion. Both men were in the initial stages of preparing second volumes to their earlier books on related topics: Since their research overlapped considerably, they began collaborating on what would eventually become Principia Mathematica. The two men then collaborated on the technical derivations. As Russell writes, As for the mathematical problems, Whitehead invented most of the notation, except in so far as it was taken over from Peano; I did most of the work concerned with series and Whitehead did most of the rest. But this only applies to first drafts. Every part was done three times over. When one of us had produced a first draft, he would send it to the other, who would usually modify it considerably. After which, the one who had made the first draft would put it into final form. There is hardly a line in all the three volumes which is not a joint product. Unfortunately, after almost a decade of difficult work on the part of the two men, Cambridge University Press concluded that publishing Principia would result in an estimated loss of pounds. Although the press agreed to assume half this amount and the Royal Society agreed to donate another pounds, this still left a pound deficit. Only by each contributing 50 pounds were the authors able to see their work through to publication. Whitehead, Russell and James, Publication involved the enormous job of type-setting all three volumes by hand. In 1913, the printing of the second volume was interrupted when Whitehead discovered a difficulty with the symbolism. Today there is not a major academic library anywhere in the world that does not possess a copy of this landmark publication. Primarily at issue were the kinds of assumptions Whitehead and Russell needed to complete their project. Although Principia succeeded in providing detailed derivations of many major theorems in finite and transfinite arithmetic, set theory, and elementary measure theory, two axioms in particular were arguably non-logical in character: The axiom of infinity in effect states that there exists an infinite number of objects. Arguably it makes the kind of assumption generally thought to be empirical rather than logical in nature. Although technically feasible, many critics concluded that the axiom was simply too ad hoc to be justified philosophically. Kanamori sums up the sentiment of many readers: In the minds of many, the issue of whether mathematics could be reduced to logic, or whether it could be reduced only to set theory, thus remained open. In response, Whitehead and Russell argued that both axioms were defensible on inductive grounds. As they tell us in the Introduction to the first volume of Principia, self-evidence is never more than a part of the reason for accepting an axiom, and is never indispensable. The reason for accepting an axiom, as for accepting any other proposition, is always largely inductive, namely that many propositions which are nearly indubitable can be deduced from it, and that no

equally plausible way is known by which these propositions could be true if the axiom were false, and nothing which is probably false can be deduced from it. If the axiom is apparently self-evident, that only means, practically, that it is nearly indubitable; for things have been thought to be self-evident and have yet turned out to be false. And if the axiom itself is nearly indubitable, that merely adds to the inductive evidence derived from the fact that its consequences are nearly indubitable: Infallibility is never attainable, and therefore some element of doubt should always attach to every axiom and to all its consequences. In formal logic, the element of doubt is less than in most sciences, but it is not absent, as appears from the fact that the paradoxes followed from premisses which were not previously known to require limitations. As Russell writes, Both Whitehead and I were disappointed that *Principia Mathematica* was only viewed from a philosophical standpoint. People were interested in what was said about the contradictions and in the question whether ordinary mathematics had been validly deduced from purely logical premisses, but they were not interested in the mathematical techniques developed in the course of the work. Even those who were working on exactly the same subjects did not think it worth while to find out what *Principia Mathematica* had to say on them. I will give two illustrations: *Mathematische Annalen* published about ten years after the publication of *Principia* a long article giving some of the results which unknown to the author we had worked out in Part IV of our book. This article fell into certain inaccuracies which we had avoided, but contained nothing valid which we had not already published. The author was obviously totally unaware that he had been anticipated. The second example occurred when I was a colleague of Reichenbach at the University of California. I told him that this subject was fully treated in the third volume of the *Principia*. When I saw him a week later, he told me that he had verified this. First, it popularized modern mathematical logic to an extent undreamt of by its authors. By using a notation superior to that used by Frege, Whitehead and Russell managed to convey the remarkable expressive power of modern predicate logic in a way that previous writers had been unable to achieve. Second, by exhibiting so clearly the deductive power of the new logic, Whitehead and Russell were able to show how powerful the idea of a modern formal system could be, thus opening up new work in what soon was to be called metalogic. Third, *Principia Mathematica* re-affirmed clear and interesting connections between logicism and two of the main branches of traditional philosophy, namely metaphysics and epistemology, thereby initiating new and interesting work in both of these areas. Just as importantly, it initiated a tradition of common technical work in fields as diverse as philosophy, mathematics, linguistics, economics and computer science. Today a lack of agreement remains over the ultimate philosophical contribution of *Principia*, with some authors holding that, with the appropriate modifications, logicism remains a feasible project. Others hold that the philosophical and technical underpinnings of the project remain too weak or too confused to be of great use to the logicist. For more detailed discussion, readers should consult Quine a, Quine b, Landini, Landini, Linsky, Linsky, Hale and Wright, Burgess, Hintikka and Gandon. There is also lack of agreement over the importance of the second edition of the book, which appeared in Volume 1 and Volumes 2 and 3. The revisions were done by Russell, although Whitehead was given the opportunity to advise. In addition to the correction of minor errors throughout the original text, changes to the new edition included the inclusion of a new Introduction and three new appendices. The appendices discuss the theory of quantification, mathematical induction and the axiom of reducibility, and the principle of extensionality respectively. The book itself was reset more compactly, making page references to the first edition obsolete. Russell continued to make corrections as late as for the printing, the year he and Mrs Whitehead finally began to receive royalties. Appendix B has been notoriously problematic. Urquhart Linsky provides helpful discussion, both of the Appendix itself and of the suggestion that by Russell may have been out of touch with recent developments in the quickly changing field of mathematical logic. He also addresses the suggestion, made by some commentators, that Whitehead may have been opposed to the revisions, or at least indifferent to them, concluding that both charges are likely without foundation. *Principia Mathematica* originally appeared in three volumes. Images of the title page of the first volume of the first edition and of the cover of the first paperback issue may be seen here: Together, the three volumes are divided into six parts.

## Chapter 4 : Russell: Logic | Internet Encyclopedia of Philosophy

*Get this from a library! Russell's Hidden Substitutional Theory.. [Gregory Landini] -- This book explores an important central thread that unifies Russell's thoughts on logic in two works previously considered at odds with each other, the Principles of Mathematics and the later.*

June 03, Nicholas Griffin, ed. In general and with considerable overlap the fifteen papers might helpfully be divided into five categories. To be sure, though, this material is touched on, in less depth, in many other essays. Moral Philosopher or Unphilosophical Moralist? I set myself the more manageable aim of evaluating how well the volume measures up to two of its advertised goals: There is considerable overlap not only between the five categories I just listed, but also between the individual essays. This is practically unavoidable, and, to the extent that the essays are intended to be relatively freestanding resources, this is no defect. However, this does make for laborious reading, at parts, for the specialists and zealots who will read the volume cover-to-cover. Regardless of the quality and subtlety of the expositions, encountering the third or fourth one-paragraph exposition of the theory of descriptions, or synopsis of the logicist thesis, is prone to cause flashbacks to grading papers. There are a number of dimensions along which the individual essays vary quite widely. Most importantly, they demand very different degrees of expertise on the part of the reader. A less important contrastive dimension is broadness vs. Also, while some of the essays are more or less purely expository such as those by Grattan-Guinness, Cartwright, Tully , others are arguments for controversial theses Landini, Hager, Demopoulos, Pidgen. No doubt, some will question the choice of selections. One of the essays on logicism could probably have been sacrificed, cutting down on the overlap. However, this is nitpickingâ€”on the whole, these selections are well balanced. However, again, given the sheer volume of work that the editor has to sift through and rank, for this task, it is hard to be all that critical. Now to explicitly address the advertised goals i. So, specialists who are up to scratch on this secondary literature will already have encountered many of the ideas and theses expounded in the volume. As for goal [1], I have had occasion to remark on a couple of relevant criticisms. As mentioned, for example, some of these essays are a bit narrow and advanced for new readers of Russell, and there is, arguably, room for improvement in the overall balance of the coverage. However, I will certainly recommend this volume to students, from introductory to advanced, in search of secondary literature. Even on the above point about discrepancies in the accessibility and pace of the essays, I should note that these discrepancies are not arbitraryâ€”in general, the most difficult essays are on topics that will only be of interest to more advanced students, while the essays on topics that will draw beginning readers tend to be more elementary. For anyone looking for a broad, general survey of recent secondary literature on Russell, this volume is without parallel. Ohio State University Press.

## Chapter 5 : calendrierdelascience.com: Russell's Hidden Substitutional Theory (): Gregory Landini: Books

*The heart of Landini's book is a careful analysis of Russell's largely unpublished "substitutional" theory. On Landini's showing, the substitutional theory reveals the unity of Russell's philosophy of logic and offers new avenues for a genuine solution of the paradoxes plaguing Logicism.*

## Chapter 6 : Russell's hidden substitutional theory / Gregory Landini - Details - Trove

*Russell's Hidden Substitutional Theory. Ox- ford University Press, New York and Oxford , xi + pp. Russell's work in logic between the publication of The Principles of Mathe- matics in and the theory of types of () that formed the basis of Principia Mathematica has remained terra incognita to most logicians.*

## Chapter 7 : Urquhart : Review: Gregory Landini, Russell's Hidden Substitutional Theory

*Gregory Landini explores an incredible important thread that unifies Russell's innovations on good judgment within the*

*works. the guts of Landini's e-book is a cautious presentation and exploration of Russell's principally unpublished "substitutional" thought of propositions.*

### Chapter 8 : Principia Mathematica (Stanford Encyclopedia of Philosophy)

*3 Other developments deserve attention and we refer the reader especially to Ivor Grattan-Guinness's book [35] for an excellent historical account of many of the concepts discussed in this paper.*

### Chapter 9 : Judith Mary Pelham, Russell on Propositions and Objects - PhilPapers

*Russell Hidden Substitutional Theory Reclaimed voices foundation: holding watchtower to account, the role of reclaimed voices is to support survivors of child sex abuse inside the Jehovah's Witness religion.*