

2 Bertrand Russell—The New Method as a Logic

1. RUSSELL REJECTS NEO-HEGELIANISM

(I) RUSSELL'S LOGIC OF THE SCIENCES. Despite the fact that at the time Russell believed himself to be a neo-Hegelian, 'the most direct philosophical influences on him in the period from 1895 to 1898 were Kant, Bradley, and Ward' (Griffin 1991, p. 299), and also Lotze,¹ not Hegel. It was his devotion to Kant and to neo-Kantians that led him to choose exact philosophy as a type of investigation. The latter, called the 'Logic of the Sciences'² by Russell, was to be developed like the other exact academic disciplines: mathematics and the natural sciences.

The main principle of Russell's Logic of the Sciences, dating from late 1896, runs thus:

[E]very Science may be regarded as an attempt to construct a universe out of none but its own ideas. What we have to do, therefore, in a logic of the sciences, is to construct, with the appropriate set of ideas, a world containing no contradictions but those which unavoidably result from the incompleteness of these ideas. (1896a, p. 5)

As we shall see in a moment, this programme of starting off from a specific 'minimal vocabulary', and further building up a strict scientific theory, remained fundamental to Russell and was unaffected by the later metamorphoses of his philosophy.

Russell chose geometry as the topic of his dissertation. During his first stay in Berlin, between January and March 1895, he worked on it intensively, reading Kant, Helmholtz, Stumpf, Lotze and Klein. In the dissertation, part of which was published in 'The Logic of Geometry' (1896b), Russell was 'concerned with Geometry simply as a body of reasoning' (p. 267) which can be constructed with logical means only.

The historical importance of this project lies in the fact that it shaped the further developments of Russell's branch of the New Look philosophy: the search for the minimal conceptual scheme of logic, arithmetic, analysis and dynamics.

It is worth noticing that, even in these early years, Russell, usually regarded as then neo-Hegelian, was not a monist but a pluralist. It is true that at certain moments he was inclined to monism; but he never embraced it. Thus, *An Essay on the Foundations of Geometry* (1897b) is explicitly a pluralistic work. It assumes that space and time consist of mutually related atoms, which two years later (in 1899) were called 'points' and 'instances'. Russell was never an idealist either. His criticism of psychology had already been manifested in his 'Review of Heymans' (1895).

(II) THE REVOLT AGAINST NEO-HEGELIANISM. Unfortunately, Russell started realising the programme for a Logic of the Sciences in the wrong direction. Under the influence of some German Idealists, he accepted that the fundamental concept of mathematics is that of quantity. This understanding grew in shape in early 1898 (before March), when Russell hatched a plan for a book 'On Quantity and Allied Conceptions' (1898b).

¹ On Lotze's influence on Russell see Milkov 2000.

² Apparently, Russell was negatively motivated to embrace scientific philosophy. This was because of the example of Herbert Spencer, from whom he wanted to keep as far away as possible. See on this Cunningham 1994.

Despite the fact that he soon abandoned this view, many of its problems remained central to his philosophy—above all, infinity, continuity, the infinitesimals related to operating with quantities, the inclination to articulate problems as paradoxes.

The transformation of this conception was, characteristically of Russell, abrupt. It was caused by two experiences he gathered in the spring of 1898. First, in March he read the just-published *A Treatise on Universal Algebra* by A. N. Whitehead. Now he came up with the idea of basing the project for a Logic of the Sciences on a symbolic logic of Boolean type, which is nothing but a theory of manifolds.

The second factor in this change were the extensive discussions with Moore. These were stirred up by Russell's criticism of Moore on 11 December 1897 in 'Seems Madam? Nay, It Is' to the effect that he was too contemplative and thus not scientific enough. Moore's reaction was intensive work on philosophical logic.³ In the course of these discussions, sometime between March and June 1898, Moore and Russell embarked on a joint programme in philosophical logic.⁴ Thus, on 10 May 1898 Russell reported: 'Moore . . . seemed on the whole inclined to assent to what I had to say' (1992a, p. 186).

The first discussion between Moore and Russell within the framework of this joint programme took place on 11 March 1898. The problem discussed was 'existence'. Moore's new discovery was very philosophic-logical: 'Only propositions exist'⁵ (Letter of Russell to Alys, 12 March 1898); and a proposition 'is a *complex*' (Monk 1996b, p. 117). Only a few days later Russell began writing 'An Analysis of Mathematical Reasoning'—the first variant of *The Principles of Mathematics*.

In 'An Analysis of Mathematical Reasoning' Russell followed A. N. Whitehead and still rejected Cantor, while there was no sign of any proximity to Frege. The text was expressly Kantian in the sense of assuming that the most fundamental concepts of mathematics are intuitive. Such concepts are indefinables (or 'categories', 1898c, p. 163); they are apprehended intuitively. The same is true of the fundamental axioms of arithmetic. At that point, Russell was sure that a 'sound philosophy of Mathematics' begins with the endeavour '[to] distinguish clearly these different forms, to enumerate and characterise those that are relevant, and to discuss the type of judgement in which each form occurs' (p. 167). Fundamental ideas like 'identity, diversity and unity', but also all universals, such as red, sweet and hot, were accepted as indefinables, and so as different from the immediate sense-data to which they apply (p. 164).

In 'An Analysis of Mathematical Reasoning' Russell still used a form of transcendental argument, for example, in his assumption that 'the logical calculus is necessary if judgement is to be possible'.⁶ Soon, however, he began to reject arguments of this type and to move towards a full-blooded structuralism. So towards July 1898 Russell realised that his problem was not 'How is pure mathematics possible?' but the old question from 'Notes on the Logic of the Sciences', 'What are the fundamental ideas and axioms of mathematics?' Now this question was transformed into

³ See ch. 1, § 1, (ii).

⁴ A collaborative method of working was typical for Russell. Thus in 1912–13 he had a joint philosophical programme with Wittgenstein (see Milkov 1988, 2002b). In 1903–10 he had a joint programme with Whitehead in symbolic logic.

⁵ This was also the first idea which the young Wittgenstein accepted from Russell: 'There is nothing in the world except asserted propositions' (Letter of Russell to O. Morrell, 13 November 1911).

⁶ See Griffin 1991, p. 305. On Russell's transcendental arguments before 1898 see Grayling 1996.

the more promising project of building mathematics out of indefinables (numbers, parts and wholes) and primitive laws.⁷

The transition to formal structuralism can be traced in two letters of Russell's to Couturat. On 3 June 1898 he wrote: 'I am preparing a work of which this question [*Wie ist reine Mathematik möglich?*] could be the title' (1992a, p. 188). Some 45 days later (on 18 July 1898) he wrote that the purpose of his book is 'the discovery of the fundamental ideas of Mathematics and the necessary judgements (axioms) which one must accept on the basis of these ideas'. The shift can be dated precisely. On 5 July 1898 Russell wrote to his wife Alys: 'I had just discovered the question I had been asking myself for the last months.'

As could be expected, the acceptance of structuralism took place after a discussion with Moore. The specific occasion for it was apparently Russell's attempt to write an answer to Couturat's review of *An Essay on the Foundations of Geometry*, and, more precisely, to justify 'the empirical nature of the Euclidean axioms' (ibid.). The answer itself was published in 'Are Euclid's Axioms Empirical?' (1898a).

Russell's new philosophy of mathematics gave rise to another (cognate) idea: to the assumption, in Moore's words, that there are 'several kinds of ultimate relation between concepts—each of course necessary' (Moore's letter to Russell, 11 September 1898). Two days later Russell replied: 'I agree emphatically with what you say about the several kinds of necessary relations among concepts, and I think their discovery is the true business of Logic.'

Russell's new logic suggested the subject and the title not only of the manuscript 'The Fundamental Ideas and Axioms of Mathematics' (1899c), but also of two drafts of books (papers?): 'An Inquiry into the Mathematical Categories', and 'The a priori Concepts of Mathematics'. He was finally able to realise his dream dating from 1896: to investigate the ultimate ideas of a Logic of the Sciences and the constructions that can be made out of them.

(III) THE LEIBNIZ CONNECTION. The conviction, connected with a mathematical structuralism, that the world consists of different types of unanalysable relations, crystallised further during Russell's work on Leibniz between the summer of 1898 and the spring of 1899. In *A Critical Exposition of the Philosophy of Leibniz* (1900a) the new logical ideas were applied to historical material, apparently in order both to demonstrate their truth and to deepen their point.

Above all, Russell was displeased with what he considered Leibniz's subject-predicate radicalism in logic. In this view, Leibniz assumed that

[e]very proposition is ultimately reducible to one which attributes a predicate to a subject. In any such proposition, unless existence be the predicate in question, the predicate is somehow contained in the subject. (p. 9)

So 'a perfect knowledge of the subject would enable us to deduce all its predicates' (p. 10).

Russell's argument against this understanding was that it cannot explain the acquisition of new knowledge. He argued further that mathematical propositions, in particular, cannot be reduced in this way. 'All assertions of numbers, such as *e.g.* "There are three men", essentially assert plurality of subjects' (p. 12). His conclu-

⁷ In spite of this change, some remnants of transcendentalism remained after 1898. For example, Russell's method in *Principia Mathematica* of justifying the choice of axioms not by their self-evidence but 'by the fact that the true propositions of the science in question followed from them' (Griffin 1991, p. 81) was clearly transcendental.



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