

On A.Ya. Khinchin's paper 'Ideas of intuitionism and the struggle for a subject matter in contemporary mathematics' (1926): A translation with introduction and commentary

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Abstract

The translation into English of Aleksandr Yakovlevich Khinchin's (1894–1959) 1926 paper entitled 'Ideas of intuitionism and the struggle for a subject matter in contemporary mathematics' is made available for the first time. Here, Khinchin presented the famous foundational debate between L.E.J. Brouwer and David Hilbert of the 1920s in terms of a search for a mathematics with content. His main aim seems to have been to make intuitionism ideologically acceptable to his audience at the Communist Academy by means of the claim that insofar as Brouwer's intuitionism had a clear 'subject matter' and Hilbert's new program was a concession to intuitionism, the alleged victory of intuitionism not only implied the defeat of 'empty' formalism, but also showed the compatibility and affinity of Marxism with the newest developments in modern mathematics. This introduction provides a tentative exploration of the issue of what was tactical (or due to ideological pressure) and what was real scientific interest (or due to ignorance) (or what was both) in Khinchin's 1926 paper in the form of a detailed commentary, especially, on the tactical side of his presentation of the positions of Brouwer and Hilbert.

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Samenvatting

De Engelse vertaling van Aleksandr Yakovlevich Khinchins (1894–1959) artikel getiteld 'Ideas of intuitionism and the struggle for a subject matter in contemporary mathematics' wordt hier voor het eerst beschikbaar gemaakt. Khinchin presenteerde het beroemde grondslagendebat van de jaren '20 tussen L.E.J. Brouwer en David Hilbert in termen van een zoektocht naar een wiskunde met inhoud. Zijn hoofddoel lijkt te zijn geweest om het intuïtionisme ideologisch acceptabel te maken voor zijn publiek aan de Communistische Academie door middel van de claim dat voor zover Brouwers intuïtionisme een helder 'onderzoeksobject' had en Hilberts nieuwe programma een concessie was ten opzichte van het intuïtionisme, de vermeende overwinning van het intuïtionisme niet alleen het verlies van het 'lege' formalisme betekende, maar ook liet zien dat het marxisme verenigbaar was met de nieuwste ontwikkelingen binnen de moderne wiskunde en er een nauwe verwantschap mee vertoonde. Deze inleiding biedt een verkennend onderzoek naar de kwestie van wat tactisch (of te wijten aan ideologische druk) was en wat daadwerkelijke weten-

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schappelijke interesse (of te wijten aan onwetendheid) was (of beide) in Khinchin's artikel uit 1926. Dit doet het in de vorm van een gedetailleerd commentaar op, met name, de tactische kant van zijn weergave van de posities van Brouwer en Hilbert.
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1. Introduction

Aleksandr Yakovlevich Khinchin's (1894–1959) semi-popular paper 'Ideas of intuitionism and the struggle for a subject matter in contemporary mathematics'¹ was presented in the winter of 1925–1926 at a special colloquium on intuitionism in his own regular seminar on foundations of analysis held at the Department for Natural and Exact Sciences of the Communist Academy (Lyusternik, 1967c, 75, Yushkevich, 2007, 18). Among the participants were Igor V. Arnol'd (1900–1948) and Grigory B. Gurevich (1898–1980), who both delivered a lecture, and Valeri Glivenko (1896–1940) Andrey Kolmogorov (1903–1987), Sofya A. Yanovskaya (1896–1966) and some others,² who commented on Khinchin's lecture that was subsequently published in the sixteenth issue of the *Bulletin* (or *Herald*) of the Communist Academy (*Vestnik Kommunisticheskoi Akademii*) in 1926. The seminar itself had been established with the aim of creating working relations between Marxist theorists and prominent Russian mathematicians like Kolmogorov, Lazar Lyusternik (1899–1981) and Lev Schnirel'man (1901–1938) – who all presented papers there at the end of the 1920s (see Vucinich, 1999, 121, see also Ermolaeva, 1999, 263). Their task was to 'acquaint Marxist theorists with the salient trends in contemporary mathematical thought' (Vucinich, 1999, 121) with which these theorists were largely unfamiliar and which they tended to dismiss as manifestations of 'mathematical idealism' in the West (see *ibid.*, 113).

Before Stalin's 'revolution from above' of 1928–1931 brought an end to the pragmatic years of Lenin's New Economic Policy (NEP), mathematicians in the Soviet Union still had the freedom to try to convince the Marxist theorists that modern mathematics was not in conflict with the central doctrines of dialectical materialism. Following this approach, Khinchin presented the famous foundational debate between L.E.J. Brouwer (1881–1966) and David Hilbert (1862–1943) of the 1920s as a search for a mathematics with content. The underlying aim of his presentation seems to have been to make intuitionism ideologically acceptable to his audience at the Communist Academy by means of the claim that insofar as Brouwer's intuitionism had a clear 'subject matter' and Hilbert's new program was a concession to intuitionism, the alleged victory of intuitionism not only implied the defeat of 'empty' formalism, but also showed the compatibility and affinity of Marxism with the newest developments in mathematics.

Given Khinchin's standing as an internationally acclaimed mathematician with a firm grasp of the mathematical literature, the relative superficiality of (the interpretative arguments put forward for) his main claim gives rise to the issue as to what was tactical (or due to ideological pressure) and what was real scientific interest (or due to ignorance) (or what was both) in his 1926 paper. What follows shall provide a tentative exploration of this issue in the form of a detailed commentary, especially, on the tactical side of Khinchin's presentation. The analysis of Khinchin's genuine mathematical and philosophical interest in

¹ Originally published as 'Idei intuitzionizma i bor'ba za predmet v sovremennoi matematike' in *Vestnik Kommunisticheskoi Akademii* 16, (1926), 184–192.

² Yushkevich uses the phrase 'some others' to refer to those who commented on Khinchin's lecture (see Yushkevich, 2007, 18), but does not give names. The present author has not been able to either identify these mathematicians and/or theorists or to find more information about their comments.

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