

Fritz Reiche's 1921 Quantum Theory Textbook

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Abstract:

“Astonishing successes.” “Bitter disappointment.” With these words, the German physicist Fritz Reiche (1883–1969) summed up the state of quantum theory in his 1921 textbook. Reiche had earned his Ph.D. with Max Planck at Berlin in 1907.

He had thus watched quantum theory unfold almost from the beginning, and had made notable contributions himself. In 1921 he was appointed Professor of Physics at Breslau (now Wroclaw, in Poland) and in the same year, published *The Quantum Theory* [*Die Quantentheorie : ihr Ursprung und ihre Entwicklung*]. Reiche's book was comprehensive in its coverage, clearly written, and pitched at a comparatively elementary level. It was quickly translated into English, and sold widely—inexpensive copies in both languages abound on the used book market. Remarkably, both the German and English editions are still in print.

The background to Reiche's book is as interesting as the book itself. In 1913, Arnold Berliner founded *Die Naturwissenschaften*, a journal that like *Nature* in Britain and *Science* in the United States, aimed to publish articles on all of the sciences that would be readily understood by all scientists. Beginning in the very first volume, Reiche, Max Born, and others were writing accounts of the new quantum theory. Reiche's 1913 article was followed in 1918 by a longer one that led directly to his 1921 book.

In addition, between 1913 and 1936, Reiche published some 20 book reviews in the pages of *Die Naturwissenschaften*, many of them treating books on quantum theory. These works include, as one might expect, Arnold Eucken's translation of the proceedings of the 1911 Solvay conference, and the lectures that Max Planck and Wilhelm Wien delivered at Columbia University in New York, in 1908 and 1913 respectively. But three others, two by Siegfried Valentiner (1913) and a third by Hermann Sieveking (1914), are more surprising: Although both authors were physicists, neither was a specialist in quantum theory. Yet both had written sophisticated and up-to-date works treating quantum theory, pitched at an introductory level, and directed towards a general audience of physicists, chemists, and students. Such efforts were not restricted to Germany. In 1914, the British physicist Owen Richardson, an experimentalist concerned with the emission of electricity by heated bodies, published a long volume, titled *The Electron Theory of Matter*, that included a detailed discussion of quantum theory.

Reiche's book tells us a great deal about both the state of quantum theory around 1920 and the audience for this strange new theory. And even earlier, the articles and reviews that he and others wrote for *Die Naturwissenschaften* show us that by 1913 or so, interest in quantum theory had spread well beyond

the small circle of physicists and physical chemists who undertook its initial theoretical and experimental development.