Selected Scientific Papers of Alfred Landé

Fundamental Theories of Physics

*A New International Book Series on The Fundamental Theories of
Physics: Their Clarification, Development and Application*

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Selected Scientific Papers of Alfred Landé

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ALFRED LANDÉ

circa 1935.

(Portrait furnished by courtesy of Prof. Carl H. Landé.)

Alfred Landé

ALFRED LANDÉ

circa 1947.

(Portrait furnished by courtesy of Prof. Carl H. Landé.)

EDITORS' PREFACE

Theoretical physicists all over the world are acquainted with Landé's celebrated computation of the g factor or splitting factor or, more precisely, the magnetogyric factor. The so-called anomalous Zeeman effect had intrigued, if not vexed, some of the most distinguished physicists of that time, such as Bohr, Sommerfeld, Pauli, and others. Landé realized that this recalcitrant effect was inseparable from the multiplet line structure – a breakthrough in understanding which he achieved in 1922 at the age of thirty four. It was in the same year that Landé discovered the interval rule for the separation of multiplet sublevels, a significant result that holds in all cases of Russell-Saunders coupling and renders comparatively easy the empirical analysis of spectral multiplets.

In the twenties, Landé succeeded in constructing some original concepts of axiomatic thermodynamics by employing Caratheodory's somewhat esoteric approach as his guiding concept. Published in the *Handbuch der Physik*, his comprehensive treatise, evincing several novel ideas, has become a classic.

Landé, Sommerfeld's student though never a true disciple, published two monographs on quantum mechanics that are remarkable for their content and exposition. In this connection it may be apposite to stress that Landé had subscribed for many years to the (infelicitously named) Copenhagen interpretation. Physicists are prone to forget that already Born at first propounded a unitary particle theory, which he only later on, after a visit to Bohr in Copenhagen, disowned on becoming 'converted' to the generally accepted dualism of complementarity – the reconciliation of the corpuscle and wave pictures.

In numerous papers and lectures and in three formidable, polemical books, Landé assailed the Copenhagen ideology. He critically examined the Stern-Gerlach experiment and invoked the work of Duane, Ehrenfest, Epstein, and several other physicists to attack and often even to ridicule the wave-particle 'church'.

And thus the classical quantum theorist Landé became a renegade, a heretic among the adherents to Bohr's and Heisenberg's tenets.

Throughout his academic pursuits, Landé had been almost obsessed with the so-called 'quantum riddle'. His objective was to create the whole mathematical edifice of quantum theory without having to resort to quantal concepts. In 1966 he presented a paper at an international colloquium held at the University of

*W. Yourgrau and A. van der Merwe, 'Alfred Landé and the Development of Quantum Theory', in *Perspectives in Quantum Theory*, W. Yourgrau and A. van der Merwe, eds. (The MIT Press, Cambridge, 1971).

Denver, later published in its proceedings, in which he constructed quantum mechanics by invoking only three nonquantal postulates.**

Alfred Landé was a reserved, modest, and rather aloof man. It is almost ironical that this unpretentious and mild-mannered scholar should dare to challenge some of the most brilliant physicists of his time and should risk antagonizing old colleagues and friends along the way. He was in no sense a wild eccentric; on the contrary, his outstanding training, his formidable powers of reasoning, and his masterly handling of the physicist's tools have ensured Landé a place in the galaxy of original thinkers and architects of modern theoretical physics. His name will endure.

Asim O. Barut
Alwyn van der Merwe

W. Yourgrau, 'Alfred Landé', *Phys. Today* **29 (5), 82 (1976).

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