

Schlichting H. *Boundary-layer theory*. New York: McGraw-Hill, 1955. 535 p.

Boundary layer theory is the cornerstone of modern fluid dynamics as founded by Ludwig Prandtl in 1904. It gives a physical explanation of our knowledge of the flow of air and other fluids of small viscosity under circumstances of interest in many engineering applications. [The SCⁱ® indicates that this paper has been cited over 3,270 times since 1961.]

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"The first edition of this book was published in the German language in 1951¹ and the latest edition (seventh edition) in the English language in 1979.² But there was a forerunner already ten years earlier, namely, a lecture series on boundary layers which I had given during the war in the German Aeronautical Research Institute in Braunschweig and which had been published in the year 1942.³ An English translation was given a limited distribution as NACA Technical Memorandum No. 1217 in 1949. These lectures were completely rewritten to include material previously classified, or secret. The result was the above mentioned book of 1951.

"There were also several translations of the book into the Russian language between 1955 and 1974, and one translation into the Spanish language in 1972.

"Boundary layer theory is the cornerstone of modern fluid dynamics as founded by Ludwig Prandtl in the year 1904. In this theory the classic theory of inviscid incompressible fluid flow is extended by taking in-

to account the following two parameters simultaneously, the Mach number for the effects of the compressibility of the fluid and the Reynolds number for the effects of the viscosity of the fluid. In a paper on "Fluid Motion with Very Small Friction," read before the Mathematical Congress in Heidelberg in 1904, Prandtl showed how it was possible to analyse by boundary layer theory viscous flows precisely in cases which had great practical importance.^{4,5} The boundary layer theory finds its application in the calculation of the drag of a flat plate at zero incidence, the form drag of a ship and of an aeroplane wing, and a turbine blade, but also in the prediction of the maximum lift of an aerofoil and the heat transfer along a heated plate in uniform flow. In his foreword of 1954 to the first English edition of the book, Hugh L. Dryden has described the historical development of the subject as follows: 'The development of boundary layer theory during its first fifty years is a fascinating illustration of the birth of a new concept, its slow growth for many years in the hands of its creator and his associates, its belated acceptance by others, and the subsequent almost exponential rise in the number of contributors to its further development.' Also, in the seventh edition the book starts with first principles, such as the Navier-Stokes equations, and carefully develops the subject, including the most current developments and knowledge of turbulent flow. The chapters on the Navier-Stokes equations and on thermal boundary layers have earned particular acclaim in previous editions. The two chapters on stability theory contain one of the best available accounts of this subject in fluid mechanics.

"Starting from first principles, the Navier-Stokes equations, this book develops the subject to the frontiers of present day knowledge, with emphasis on the physical sciences, thus accounting for its frequent citation."

1. Schlichting H. *Grenzschicht-Theorie*. Karlsruhe: G. Braun, 1951. 483 p.
2. *Boundary-layer theory*. New York: McGraw-Hill, 1979. 817 p.
3. *Grenzschichttheorie*. Braunschweig: German Aeronautical Research Institute, 1942. p. 1-279.
4. Prandtl L. Über Flüssigkeitsbewegung bei sehr kleiner Reibung. (Krazer A, ed.) *Verhandlungen des dritten internationalen Mathematiker-Kongresses in Heidelberg von 8. bis 13. August 1904*. Leipzig: B.G. Teubner, 1905. p. 484-91.
5. *Gesammelte Abhandlungen der angewandten Mechanik. Hydro- und Aerodynamik (Collected works)*. (Tollmien W, Schlichting H & Görtler H, eds.) Berlin: Springer, 1961. Vol. II, p. 575-84.