

Preface to the Ninth English Edition

For this edition corrections have been carried out and additional important literature published in recent years have been included (66 additional references). Section 22.8 on plane turbulent wall jets has been completely rewritten. I am very thankful for valuable assistance to Prof. Dr. E. Krause, Prof. Dr. H. Oertel, Prof. Dr. W. Schneider, Prof. Dr. M. Breuer, Prof. Dr. H.-D. Papenfuß and last but not least Gertraude Odemar.

Bochum, March 2016

Klaus Gersten

Preface to the Eighth English Edition

According to the tradition of this book, a German edition has always been soon followed by the English translation. I am very grateful to Springer-Verlag for undertaking this version and for securing a translator. My particular thanks go to Katherine Mayes for this excellent translation. In the course of the translation, some errors in the German edition were corrected and a number of additions carried out. In this connection I am very thankful to Prof. Dr. W. Schneider, Vienna, for several suggestions and improvements. I would like to thank Ursula Beitz again for her careful checking of the bibliography. I hope that the English edition will attain the same positive resonance as the ninth German edition.

Bochum, May 1999

Klaus Gersten

Preface to the Ninth German Edition

There is no doubt that *Boundary-Layer Theory* by Hermann Schlichting is one of most important books within the sphere of fluid mechanics to appear in the last decade. Shortly before his death, Hermann Schlichting brought out the eighth edition which he revised together with his friend and former colleague Wilhelm Riegels.

When this edition went out of print and a new edition was desired by the publishers, I was very glad to take on the task. During the fifteen years I spent at the institute of my highly respected teacher Hermann Schlichting, I had already been involved with earlier editions of the book and had revised some chapters. The burden was also eased by the fact that boundary-layer theory in its widest sense has been my preferred direction of research for many years.

It quickly became clear that a complete revision was necessary; indeed this was also known to Hermann Schlichting. In the preface to the eighth edition he wrote: "Noting the systematic of our knowledge of today, it would have been desirable to fully revise this work; however such a process would have pushed back the appearance of this book by years." Compared to the eighth edition, the literature of the last 15 years had to be taken into account and recent developments, in turbulence models for example, had to be incorporated. In order to keep the size of the book tractable, some results – those which no longer seem so important with today's computing potential – had to be curtailed, or in some cases, left out altogether.

Thus the necessity to completely rewrite the text emerged. The fundamental divisions within the book were retained; as before it consists of the four major sections: basic laws of the flows of viscous fluids, laminar boundary layers, the onset of turbulence, turbulent boundary layers. However a new fifth section on numerical methods in boundary-layer theory has been added.

The partition into chapters had to be somewhat modified in order to improve the style of presentation of the material. Because of the necessary restrictions on the material, the aim was to concentrate on boundary-layer theory as the theory of high Reynolds number flows. Accordingly the chapter on "creeping flows", that is flows at very small Reynolds numbers, was omitted.

It seemed natural to steer towards the style and level of presentation with the same target audience as with Hermann Schlichting.

The research area of boundary-layer theory is continuously growing, and it has become so extensive that no single person can possess a complete overview. Consequently I am extremely grateful to two colleagues who supported me actively. Professor E. Krause wrote the new additional chapter on numerical methods in boundary-layer theory, and Professor H. Oertel provided the revision of the section on the onset of turbulence (stability theory).

Further assistance was furnished from different sources. I am indebted to Dr.-Ing. Peter Schäfer and Dr.-Ing. Detlev Vieth for a great many new sample calculations. Dr. Vieth also read the entire text discerningly. I am grateful to him for numerous improving suggestions. Renate Gölzenleuchtner deserves particular thanks for generating the figures which almost all had to be newly drawn up. I would like to thank Ursula Beitz particularly for her careful and exhaustive checking of the bibliography, while Marianne Ferdinand and Eckhard Schmidt were of first class assistance. It was by far impossible to adopt all citations, so that it may be necessary to revert to the eighth edition for specific references to earlier pieces of work.

The printing firm of Jörg Steffenhagen is due particular praise for an extremely fruitful collaboration. My thanks also go to Springer-Verlag for our most agreeable work together.

I hope we have been able to carry on the work of Hermann Schlichting as he would have wished.

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