

of which are generally regarded as inadequate, has had in consequence to reduce considerably its planned activity, and its present report also refers to the embarrassment in which the Conservancy finds itself on account of the many urgent requests for advice and help from overseas territories, which, the report remarks quite rightly, the United Kingdom cannot disclaim responsibility for giving. Moreover, Lord Hailsham is well aware of the conditions which must be observed if university autonomy is not to be undermined, particularly in times of financial stringency. Concern for the future cannot absolve him from the responsibility of seeing that short-sighted or illusory attempts at economy to-day do not engender far-reaching frustrations and failures two or three decades hence.

AEROFOIL SECTIONS

Aerofoil Sections

Results from Wind-Tunnel Investigations; Theoretical Foundations. By Dr. Friedrich Wilhelm Riegels. Translated from the German by D. G. Randall. Pp. xi+281. (London: Butterworth and Co. (Publishers), Ltd., 1961.) 200s.

THIS book is devoted to aerofoil sections, and it is written by a German author who is a specialist in this field. About one-third of the book is text which is devoted to the various topics affecting aerofoil design and performance. These include the derivation of aerofoils, the theoretical prediction of velocity and pressure for irrotational, incompressible, inviscid flow, the effects of compressibility, viscosity, roughness, boundary layer control and cavitation. The remaining two-thirds of the book is devoted to tables and graphs displaying experimental and theoretical results for aerofoils developed in Germany, in the United States and in the United Kingdom. The layout of the book is tolerably good; section headings are clear, and quick reference is possible. Each chapter carries a fairly comprehensive list of references. The diagrams on the whole are satisfactory, but a few are rather small and the symbols on these are not easy to read.

Chapter 1 is devoted to the geometrical and algebraic description of the various families of aerofoils and it is a very necessary and valuable chapter. Chapter 2 is concerned with experimental methods, wind-tunnels and corrections. The information relating to high-speed wind-tunnels is not up to date. There are discussions on the effects of turbulence on test results and on tunnel-wall interference—this latter is very short. Chapter 3 deals with the force and moment characteristics of aerofoils and how these are influenced by Reynolds number and by Mach number in typical cases. Chapter 4 gives a condensed account of the effects of surface finish and there is a short section devoted to cavitation effects. Chapter 5 describes the effect of flaps, and, in relation to the magnitude of information on the subject, the account is inadequate and the reference to an important summary paper on the subject by A. D. Young is left out. Chapter 6 gives a short account of boundary layer control. Some important British contributions to this subject are not quoted in the references. Chapter 7 deals with theoretical camber lines and thickness distributions and the velocity distributions

for these are quoted; the theory for these is given in Chapter 8. It is based on the assumption of small thickness and camber and it makes use of the method of singularities developed by the author. The chapter ends with an account of the methods of conformal mapping for aerofoils which are no longer thin. This is far too short and it would have been more valuable if, in the account of the Theodorsen-Garrick method, the author had shown how the method of singularities can be obtained from this. The important contributions of Goldstein, Thwaites, Lighthill and others are dismissed in six lines. Chapter 9 deals with viscosity effects on aerofoil characteristics, and includes a compact account of the methods of computing laminar and turbulent boundary layers. Boundary layer stability and transition are briefly covered and methods of estimating the drag of aerofoils are mentioned. The short account of the effect of the boundary layer on lift is out of date. Finally, Chapter 10 gives a compact account of the effects of compressibility on aerofoil characteristics and both subsonic and supersonic flow are dealt with.

We come now to the tables and diagrams, comprising Chapters 11 and 12, and which take up about two-thirds of the book. The tables in Chapter 11 are a collection of geometrical and aerodynamic data for almost all known aerofoils and including high lift devices. Tables of coefficients for determining the surface velocity distribution, given the aerofoil co-ordinates, are also provided. A page of explanatory notes and definitions at the beginning of this chapter would have been a great help as the list of symbols at the back of the book is not complete; for example, the symbols W_c , W_s in Tables 11.4 do not appear to have been defined anywhere. Chapter 2 commences with a list of section headings, followed by graphs of pressure distributions (theoretical and experimental) for incompressible flow for a large number of aerofoils and a few results for compressible flow. Finally, polar curves for a wide range of aerofoils are given, including some results for compressible flow and some for cavitation conditions.

The conclusion is that this book is essentially for reference, and as such it will be invaluable to engineers, aerodynamicists and research workers who require information about specific aerofoils. The textual part of the book is for experts and, even so, many aspects affecting aerofoil design are so briefly touched on as to make some of these accounts of little use to the reader.

J. H. PRESTON

LARGE ELASTIC DEFORMATIONS

Large Elastic Deformations and Non-Linear Continuum Mechanics

By Prof. A. E. Green and J. E. Adkins. Pp. xiii+348. (Oxford: Clarendon Press; London: Oxford University Press, 1960.) 55s. net.

THIS book forms a natural extension of the well-known earlier book by Green and Zerna. To quote from the introduction: "The general theory of elasticity for finite deformations has been given in *Theoretical Elasticity*. This theory is presented in compact form with the aid of tensor notation and the results are applied to solve a number of special problems, mainly for isotropic incompressible materials. In the present book attention is concentrated on subsequent developments".