mechanics level. In other places only advanced students can benefit.

A great strength of this book is its conciseness. For a reader with adequate mathematical preparation this book presents the solutions of a large number of important problems, with sufficient details so that it is not difficult to follow.

Weaknesses are few. If some of them remain, they probably crept in because of the desire to be brief. For example, on discussing the flow properties of blood, a section "The effect of slip at the wall" is presented on pp. 38–40. In this section the author said that "in the arterial system there are numerous minute branches that carry blood out of the main flow. A simple representation of this arrangement can be made by assuming that the walls of the vessels are made of a porous material. Even if the radial component is very small, and can be neglected, there is still the longitudinal component that must be introduced into the boundary condition." The author then made this longitudinal velocity to be proportional to the shear stress on the wall, and quote Jone's (1966) paper for the effect of this added term. What he did not explain is why the longitudinal component "must be" introduced. What experimental basis does it have? Is this in conflict with other theories? Just because the result seems to be in the right direction does not justify that it "must be" correct. The concept of "no-slip" condition for a viscous flow in contact with a solid boundary is always puzzling to the students. On what basis is the "no-slip" condition to be believed? In this book the no-slip condition was introduced casually, and then destroyed equally casually. I believe that the student will be confused to no end. The author is probably aware of this, because he said at the end of the section that "this analysis should be used very carefully since it introduces the concept of slip as a continuous slip." But he did not say how carefully, or careful in which way. He only adds one sentence mysteriously and lets the whole discussion end: "In reality a particle moving near the boundaries will be acted upon by a repellent force (34), causing the particle to move at a slower speed than the continuous (plasma), thus forming a completely different flow condition at the boundaries."

There are other passages with which the reviewer cannot agree, but they are minor. Overall, this is a very good contribution.

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Mathematics for Biomedical Applications, by Stanton A. Glantz, 435 pages. $24.50. University of California Press, Berkeley, California, 1979.

The author said in the preface that this text has its origin in an applied mathematics course he developed in Stanford University Cardiology Division. "Because this audience is traditionally skeptical about the value of mathematics, the first two chapters formulate more-or-less real problems in terms of differential equations, but defer solving these equations until Chapter 3. Chapter 3 summarizes direct methods to solve linear ordinary differential equations." The rest of the chapters presents the method Laplace transformation, ways to characterize linear processes, Fourier analysis, spectra, and filters, and digital computers and numerical methods. In an appendix a review of calculus is presented.

The choice of examples close to cardiologists's interests is a strong feature of this book. For a course to teach linear ordinary differential equations to physicians, this would be my choice of a textbook.

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Advances in Fluid Mechanics, edited by Egon Krause. 361 pages. Being Proceedings of a Conference Held at Aachen, March 26–28, 1980 and Vol. 148 of the series *Lecture Notes in Physics*. Springer-Verlag, Berlin, Heidelberg, New York, 1981.

The conference referred to in the title was organized to commemorate the dedication of the new building of the Aerodynamisches Institute in Aachen. It followed a tradition. In 1929 the Aerodynamisches Institute inaugurated the first extension of its building with a scientific meeting to which the then director of the Institute, Theodore von Kármán, invited scientists from all over the world. The present conference was a sequel 50 years later, organized by its present director, Dr. Egon Krause.

Von Kármán is a great name in mechanics. He did not work directly on biomechanics, but his influence is felt in all branches of biomechanics. It is not surprising, then, to find a large and substantial program of biomechanical research in progress at the Aerodynamisches Institute in Aachen. This program includes work on heart valves, blood circulation, peristalsis, microcirculation, etc. Embedded in an Institute famous for its high quality in mechanics research, this program is proceeding very well, and has acquired a character quite unique in the world.

This volume contains 14 lectures. Other than F. Schultz-Grunow's historical survey and Hans Liepmann's observations on engineering and culture, it contains papers on numerical analysis by H. O. Kreiss and V. Rusanov, R. W. MacCormack, and R. Peyret, vortex dynamics by L. Ting, aircraft aerodynamics by J. E. Green, boundary-layer shock-wave interaction in transonic flow by Sirieix, Delery, and Stanewsky, conformapping of multiply-connected domains by Prosnak, boundary-layer waves and transition by F. X. Wortmann, shear flow by Eckelmann.

On biomechanics there are two papers: "Biological flow in deformable vessels," by Y. C. Fung, and "Steady transport of material in the artery wall," by C. G. Caro. Both articles are in the nature of a general survey addressed to an audience which is composed of experts in fluid mechanics but not necessarily specialized in biomechanics.

Y. C. Fung, UCSD

A Series of Doctoral Dissertations from the Netherlands

On January 20–23, 1982, I attended the Third Meeting of the European Society of Biomechanics, which was held in the University of Nijmegen, Nijmegen, The Netherlands. I presented a plenary lecture, and visited colleagues at the University, and was given a number of doctoral theses. In Holland, a doctoral thesis must be published as a book at considerable expense to the candidate. One friend said the presentation of his thesis and getting through the ceremony cost him DF 10,000 (or approximately $4000.). These theses can be purchased from the authors. The following are from the University of Nijmegen:

Some Fundamental Aspects of Human Joint Replacement: Analysis of Stresses and Heat Conduction in Bone Prosthesis Structures, by Rik Huiskes, 1979. Also published as Supplementum No. 185 of *Acta Orthopaedica Scandinavica*, Munksgaard Copenhagen, 1980, 208 pages.

The Alinear Viscoelastic Properties of Human Skin in Vivo for Small Deformations, by Pieter Wijn 1980, 325 pages.

A Three-Dimensional Mathematical Model of the Human Knee Joint, by Jacobus S. H. M. Wismans, 1980, 143 pages.

Strength and Ingrowth Aspects of Porous Acrylic Bone