CABANNES, H. and TEMAM, R. (Eds.) *Proceedings of the Third International Conference on Numerical Methods in Fluid Mechanics* 1972, Volumes I and II (Springer-Verlag, Berlin).

These issues of the Lecture Notes in Physics Series (Volumes 18 and 19) contain the Proceedings of the Third International Conference on Numerical Methods in Fluid Mechanics held at the University of Paris in July 1972. This is the second of these Conferences to be published in this series. These Conferences started informally at the National Physical Laboratory in 1966 and now attract many contributors in a rapidly-developing subject which spans the disciplines of Fluid Mechanics and Numerical Analysis. General lectures were given by the Soviet Academician A. A. Dorodnitsyn (fully viscous flows), the French meteorologist P. Morel (geophysical flows) and the American mathematician R. D. Richtmyer (ideal compressible flows with shocks) Forty-eight individual contributions have been placed in two volumes, the first dealing with fundamental techniques, the second with individual problems. Forty-three papers are in English and the remaining eight are in French.

Almost every aspect of Fluid Mechanics computation is covered in these volumes. In the first, the general lectures give the non-specialist a helpful orientation. Then follow twelve papers on " fundamental " numerical techniques, involving where appropriate, initial-value (step-by-step) methods, the method of characteristics, boundary-value (difference) methods and the finite-element method. There is also a (Russian) paper on the computer processing and representation of the results using a given numerical algorithm, which is a formidable problem for time-dependent flows with more than one space variable, even with today's most powerful computers.

In Volume II there are thirty-five papers on individual problems and of these three are directly concerned with boundary layers. There are ten papers involving the numerical solution of the viscous, " viscoelastic " and " turbulent " forms of the Navier-Stokes equations. Subsonic, transonic and supersonic inviscid flow problems are taken up in eight papers and there is one paper on the hypersonic blunt body problem. There are six papers on shock waves, blast waves and separated flows, two papers explicitly concerned with turbulence and two on heat transfer. Two papers are on meteorological problems and one considers an oceanographic problem. Two of the papers in this Volume employ basically the so-called Method of Singularities and hence might better have been placed in Volume I.

In fairness to any one new to the field, it should be pointed out that Volume I does not contain a systematic exposition of " standard " numerical methods for Fluid Mechanics, though the general lectures help in this direction. Nor are the expositions always self-contained. The subject matter is so diverse and the numerical techniques that are being applied are proliferating at such a pace that it is still difficult to identify a class of good " fundamental " techniques. In fact, no-one to date seems to have ventured forth with a text on Numerical Fluid Mechanics.

The approach adopted in most of the papers is that of devising a numerical algorithm or modifying a well-known one and testing it by " numerical experiment " on selected flow problems. Not much is devoted to the difficult theoretical questions of convergence, consistency and stability, and error analysis. One would like to see rather more of this kind of research effort in this subject and also more attempts to complement numerical work with analytical work so as to try to understand better the nature of the flows.

These remarks apart, a wealth of interesting material and ideas is presented, coming from some of the most active workers in the field. Both volumes must be recommended to all interested in this highly complex subject.

R. D. MILLS