

## REVIEWS

**Modern Developments in the Mechanics of Continua.** Edited by S. ESKINAZI. Academic Press, 1966. 203 pp. 80s.

**Advances in Applied Mechanics, Volume 9.** Edited by G. KUERTI. Academic Press, 1966. 387 pp. 120s.

The first book is the complete proceedings of an international conference on rheology at Syracuse University in mid-1965. Papers on solids predominate and are exclusively theoretical. They reflect, however, just one approach to solid mechanics, as favoured by the American 'rationalist' school, represented at this conference by B. D. Coleman, C. Truesdell and C. C. Wang, among others. The main subjects were basic thermodynamics, the structure of constitutive laws, and the decay of acceleration waves. The analysis is for the most part concerned with very simple deformations of extremely general (hypothetical) materials. By contrast the papers on fluids have to do with technically significant problems, and in consequence are specific and largely experimental. The main topics are the Toms phenomenon in turbulent flow of dilute polymers, measurements on wave propagation in birefringent viscoelastic liquids, and the use of the Galerkin technique to estimate the critical Taylor number for stability of Couette flow of second-order fluids. There seems to be little justification for juxtaposing research papers, differing so much in spirit, outlook and context, within a single small volume.

The other book under review contains four substantial survey articles. P. G. Drazin and L. N. Howard give a systematic and unified account of the theory of hydrodynamic stability in relation to parallel flows of inviscid fluids. The subject-matter is expounded in minute detail and is closely argued. N. N. Moiseev and A. A. Petrov deal with 'sloshing' of inviscid incompressible liquid in a partly full container. Numerical results for variously shaped containers are obtained by the Ritz variational method, as outlined by Moiseev in Volume 8 for a more extensive class of oscillation problems. R. M. Rosenberg presents a closely knit and logically developed study of periodic solutions in the non-linear vibration of systems with many degrees of freedom. Rather than duplicate Minorski's book, he has chosen to concentrate on the classical geometric approach, as extended by Synge, and shows its effectiveness even for strongly non-linear systems (in which the potential energy is not a quadratic form). Finally P. Perzyna writes on viscoplastic theory, especially stress waves, from the standpoint that all apparently dynamic phenomena in the properties of metals are attributable to viscosity (this view probably needs substantial qualification after J. F. Bell's recent experimental work). This is a useful article, the first of its kind on this subject; it tends, however, to be somewhat indiscriminating in the choice of material and references, and does not attain the balance of the three other contributions.

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