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A first course in rational continuum mechanics, vol. I, by C. Truesdell, Pure and Applied Mathematics, Academic Press, New York, San Francisco, London, 1977, xxiii + 280 pp., $23.00.

The cornerstones of modern research into problems of nonlinear continuum mechanics can be said to have been laid in the late forties and early to mid-fifties by R. S. Rivlin and W. Noll. In the period following the end of the Second World War, Rivlin exploited the fact that internal constraints present in a nonlinearly elastic body, such as incompressibility, reduce the class of possible motions of such a body but greatly expand the set of stress fields which are compatible with such motions as may occur. Noting that the pressure field in an incompressible elastic body is not determined by the deformation of that body, and thus may be adjusted so as not only to help satisfy the boundary conditions, but also the equations of motion, Rivlin was able, in a rather short period of time, to produce exact solutions for a varied class of boundary value problems of nonlinear elasticity, i.e., torsion of an elastic circular cylinder, eversion of an incompressible elastic circular cylinder, etc. Reprints of several of Rivlin's pioneering papers may be found in the series of volumes [**1**] edited by Professor Truesdell; also included in this series are reprints of several of the early foundation papers of Walter Noll which appeared during the period 1955–58. In these latter papers Noll approaches the problem of formulating constitutive theories for elastic solids, fluids, and (the more general) simple materials with fading memory so as to be consistent with the principle of material frame indifference; essentially his arguments, which are now an integral part of modern continuum mechanics, serve to delimit those functions which may enter a hypothetical class of constitutive equations, and hence lead to reduction arguments that produce certain specific normalized forms for elastic and fluid materials as well as more general bodies which exhibit a precise sense of fading memory. Further reduction arguments based on the nature of the symmetry (or peer) group of a particular material, as well as the corresponding precise definitions of such commonly used (and abused) terms as solid, fluid, isotropic body, etc., also make their appearance for the first time, in a completely rigorous manner, in Noll's early work during the mid fifties.

Since the pioneering work of Rivlin and Noll there has been, in the last two and one-half decades, an explosion of work in the general area of modern continuum mechanics. Aside from the studies of new models of continua, much recent work has been directed into two major areas. First of all, considerable effort has been expended in trying to impart a concrete basis to the science of thermodynamics (at least in as much as to try to put it on an equal footing with classical mechanics and modern continuum mechanical theories of solids and fluids); a lucid account of the current state of affairs in this area may be found in the article by Serrin [**2**] and the recent texts by Truesdell [**3, 4**]; one central notion in almost all the current researches into