Book Reviews

Some Reassessments

Essays in the History of Mechanics. C. TRUESDELL. Springer-Verlag, New York, 1968. xii + 384 pp., illus. $19.50.

This book consists of eight articles, being (with slight revisions) lectures given by the author in a wide variety of places. It is lavishly illustrated with explanatory diagrams and reproductions of pages of old manuscripts and books, of portraits of scientists, and also of works of art. These last appear in the first article, "The mechanics of Leonardo da Vinci," a lively study, likely for obvious reasons to interest a wider circle than the other seven. A quotation will reveal Truesdell as the anti-humbug-man par excellence and at the same time serve as a good sample of his vigorous style and short way with dissenters:

> Rather, I suggest, the critics of the past hundred years have deluded themselves and us into seeing something that was not there, something as foreign to the sixteenth century as would be democracy or Freudism or strategic bombing or public welfare. If we could look upon LEONARDO's paintings dispassionately, without feeling the social duty to spout superlatives over them between each gasp of wonder, we might apply to them a simple term from the science of mechanics: LEONARDO's image is kinematic, not dynamic. He shows us motions, with little or no grasp of the forces that give rise to them.

Truesdell gives Leonardo a pretty low mark in mechanics, and this judgment is backed up by so much close study that one must refrain from seeing in it merely a debunker cutting a reputed genius down to size. The balance is in some measure restored by kind words about Leonardo's faculty for asking questions (even though they remained unanswered) and his intuitive grasp of the general fact that air and water are alike in their motions, with valid ideas about the superposition of wave motions, careful observations of vortices, and other hydrodynamical matters.

This is not an easy book to review briefly because it can be considered on two levels: first, as a straightforward contribution to the history of science, and, second, as a blowing off of steam under high pressure. Of the two, the second is probably of more general interest.

But to deal very briefly with the first, Truesdell chooses to treat professional historians of science with some contempt, but it is merely coy affectation on his part to pretend that his amateur status in this game is above suspicion. He admits to publishing "major historical treatises" in three volumes of the *Opera Omnia* of Euler, and the present book ranges from Archimedes to the present century, with emphasis on the 18th century, the heroic age in continuum mechanics, with D'Alembert and the Bernoullis as well as the incomparable Euler. All this represents a vast amount of highly skilled labor, for Truesdell is not a man to quote glib platitudes—he must dig into everything for himself. And here I have a sin to confess. For some years I have been spreading it round that it was Boscovich (1711–1787) who was responsible for introducing the concept of the point-particle into modern physics. Not so, says Truesdell (p. 107); the credit should go to Euler, and he dismisses "the learned Slovenian Jesuit" in a disparaging footnote (p. 282). My only excuse is incredible credulity. I believed what I read in L. L. Whyte's *Roger Joseph Boscovich* (Humanities Press, 1961, p. 121): according to him, Faraday, Maxwell, Kelvin (and indeed anybody who was anybody in the 19th century) saluted Boscovich as the originator of this concept, which, when you come to think of it, is a very queer concept indeed.

As for the blowing off of steam, if I had more space I might do a little of that myself, for basically I am in sympathy with Truesdell. His honesty encourages me to be honest and say what the trouble is. It is, it seems to me, a deep psychological trouble due to inconsistent urges. Scientists, if they are not mere drudges, are passionate people, pulled in several directions, and when I say scientists I include mathematicians (it would be absurd to exclude them). They want to solve problems which excite them and which they feel they have the skill to solve, they want to create order out of a mass of confused ideas, they want to earn personal distinction, and they want to feel that humanity as a whole sympathizes with, and will benefit (perhaps indirectly) from, what they do. These urges are not always consistent with each other.

Moreover, in the background stands that extraordinary goddess fashion, who, besides prescribing miniskirts and maxicoats, dictates, at least to some extent, the fields in which scientists ought to do their stuff. Unfortunately the fields so warmly recommended by Truesdell ("rational mechanics" and "natural philosophy" as he interprets it) are not fashionable at present. He has my sympathy, for the relevant problems (some of great difficulty) excite me and make me wish that I had the skill to deal with them and the strength of mind to accept them as of prime importance. This last I cannot do because fashion told me that I should try to understand something about those ideas that were new and revolutionary at the beginning of this century, and I think fashion was right in this instance.

The rancor which may mar this book for those readers who do not take pleasure in pugilistics stems, I think, largely from the administrative and intellectual separation of mathematics from physics. They should overlap, as they have in Princeton for many years. I would like to see Truesdell turn from the 18th century to the present epoch and use his critical and creative faculties to bring order and clarity to the concepts of modern physics.

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