



SYDNEY GOLDSTEIN

*(Facing p. 209)*

## Foreword

This Part of *J.F.M.* has been planned as a salutation to Sydney Goldstein on the occasion of his retirement from the Gordon McKay Chair at Harvard. The readiness with which the editors of *J.F.M.* agreed to set aside this part in this way is a mark of the esteem in which S. G. is held throughout the world of fluid mechanics.

The arrangements for this Part have been made in an entirely informal fashion. George Batchelor has been kind enough to delegate certain editorial responsibilities to those (James Lighthill, Jim Murray and me) most closely concerned with the detailed arrangements. We have gathered together in this part a number of authors and papers thought to have particular bearing on some of S. G.'s interests. Most of the papers were prepared by invitation; and some were fortunately available at the right moment by chance.

Goldstein's teaching career extends over forty-one years and three countries. Twenty-one of these years were spent in England—Manchester 1929-31, Cambridge 1931-45 (with leave of absence for the duration of the Second World War and spent at the National Physical Laboratory) and Manchester again from 1945 to 1950. The next five years he spent in Israel at the Haifa Technicon and the remaining fifteen in the U.S.A. at Harvard. The capacity he possesses for stimulating the interest of his students and in bringing out the best in their research has thus been given wider rein than it would had he remained in one place, though he would have been an international figure in our world no matter how closely he had chosen to confine himself geographically.

His qualities, so powerful in their impact on his own students and colleagues, have naturally reached a much wider public through his writings. It is a task beyond my capacity to set these in their true perspective but history will record its own appreciation. However, in a brief attempt at the impossible let me assert that no single work has had more impact on the growth of our understanding of fluid mechanics than has his inspired editorship of *Modern Developments* in 1938. Seldom have a man and an occasion been so well matched. Knowledge of and research into the mechanics of real fluids had in the previous thirty years been given powerful stimuli by the work of amongst others Prandtl, Taylor, von Kármán and in the final decade of these years by Goldstein himself. Yet, the 1930 reprint of Lamb does not even mention the words 'boundary layer' (though admittedly he almost does in a few lines of small print on p. 645). What was needed in the late thirties and what Goldstein's editorship of *Modern Developments* provided was an account starting from basic principles and setting into perspective the exciting developments which had taken place. This was necessary as a foundation for the next steps forward; the actual leaps that ensued give some indication of how successful he was.

Editors vary in the way they undertake their duties. Goldstein was insistent that the authors of individual chapters should not be explicitly identified in the chapter headings. He saw it as a collective work for which, with the Aero-

nautical Research Council's Fluid Motion Sub-Committee (providing as it did a most valuable forum for detailed discussion and scrutiny), there was to be a common responsibility. At the same time the keenest scrutiny of all came from Goldstein himself and there can be few authors who would not acknowledge that their contributions had thereby been greatly improved. In addition, he was able to give the work a homogeneity which few collective works achieve; indeed he took pleasure subsequently in seeing how difficult people found it to 'spot the author'.

It is now no secret that Goldstein himself was the author of the early chapters and the way these chapters even now (more than thirty years later) stand the test of time is some measure of his success.

To lay such emphasis on *Modern Developments* does not mean that the respect in which Goldstein excels as an expositor overshadows his research contribution. On the contrary no such work could have been produced by anyone without his own profound research background. He himself had made and continued to make contributions to many of the subjects included and with the further passage of time since then his horizons widened. Suffice it to remark that his own contributions have ranged over aerofoil and airscrew theories, hydrodynamic stability (his essay on which was awarded the Adams prize), turbulence, supersonic flow, geophysics and of course boundary-layer theory. I do not think it will be put down as prejudice on my part if I say that the latter has been the dominating theme to which he has returned time and again, leaving his own indelible mark on it. Keith Stewartson's paper in the present Part for example shows how farsighted was a paper by Goldstein as long ago as 1930. More recently his work on the semi-infinite flat plate has done much to show how boundary-layer theory fits into the structural hierarchy of mathematical approximations to the Navier-Stokes equations. His record is one of which he can be justly proud.

It is the hope of all those concerned with this Part of *J.F.M.* that Sydney will derive pleasure both from the contents and from the thoughts that accompany them. We all (and many others too) wish him and Rosa a long, happy and active retirement.

L. HOWARTH