

PIONEER PAPERS IN HEAT AND MASS TRANSFER

FOREWORD TO THE SERIES

MOST serious students of a scientific subject find that their understanding of its significance is deepened by an acquaintance with the works of the comparatively few writers who have made striking developments of a theoretical or experimental nature. Since many of the key papers are somewhat inaccessible however, and since the effort to keep up with current publications leaves few readers with sufficient energy for historical research, the editors of this journal propose to reprint selected works of pioneers in the field of heat and mass transfer. These will appear in alternate issues of the journal, as a rule. The papers will be mostly more than twenty-five years old and will be grouped according to subject. The papers will be reprinted in English, French or German, with editorial abridgement and comment where required.

The Editors

PIONEER PAPERS IN CONVECTIVE MASS TRANSFER

1. OSBORNE REYNOLDS: On the extent and action of the heating surface of steam boilers. (*Scientific Papers of Osborne Reynolds*, Vol. I, pp. 81–85. Cambridge University Press, London, 1901.) Reprinted by permission of The Manchester Literary and Philosophical Society.

Editor's Foreword

The first group of reprints will be devoted to contributions to the knowledge of convective mass transfer. It therefore seems proper to start by presenting Reynolds' often-cited but seldom-read paper relating heat transfer and friction to the "diffusion" processes in pipe flow. It is interesting to note that what has come to be known as the "Reynolds Analogy" is not spelled out in detail in this paper, which is more concerned with the influence of the flow velocity on the heat transfer coefficient: only proportionality is postulated between the constants in (1) and those in (2).

D.B.S.

ON THE EXTENT AND ACTION OF THE HEATING SURFACE OF STEAM BOILERS

OSBORNE REYNOLDS

[*From the Fourteenth Volume of the "Proceedings of the Literary and Philosophical Society of Manchester."*
Session 1874–5.]

(*Read October 6, 1874*)

THE rapidity with which heat will pass from one fluid to another, through an intervening plate of metal, is a matter of such practical importance that I need not apologize for introducing it here. Besides its practical value, it also forms a subject

of very great philosophical interest, being intimately connected with, if it does not form part of, molecular philosophy.

In addition to the great amount of empirical and practical knowledge which has been acquired