

Preface

On March 15, 1901, Henri Bénard defended his thesis entitled “Les Tourbillons cellulaires dans une nappe liquide propageant de la chaleur par convection en régime permanent”¹ at the University of Paris, Sorbonne. The results contained in this thesis have been at the origin of recent intensive research activities on cellular structures observed in many physicochemical systems far from equilibrium: instabilities, spatio-temporal patterns, chaos, and turbulence.

The French Physical Society organized a scientific meeting to commemorate the centenary of Bénard’s thesis, at the Ecole Supérieure de Physique et Chimie Industrielles de Paris (ESPCI). This meeting, which gathered approximately one hundred scientists and graduate students working in nonlinear science, was honored by the presence of the director of the ESPCI, Professor Pierre-Gilles de Gennes, Nobel laureate in physics (1991), who gave the opening talk.

At the conference, lectures were given by internationally recognized scholars who have contributed to the development of Bénard’s work: J.E. Wesfreid, P. Manneville, Y. Pomeau, M. Velarde, J. Gollub, M. Provansal, G. Nicolis, B. Castaing, and P. Couillet. A poster session and a round table on further developments in nonlinear physics were organized.

In the present book, we have extended the list of contributors in order to cover all the aspects involved with Bénard’s work, with a main focus on thermal convection, on Bénard–Marangoni instability and on Bénard–von Karman instability.

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¹ Cellular vortices in a thin liquid layer propagating heat by convection in a stationary regime.

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