

# Contents

---

## Part I Introduction

---

<b>1 The Context of Bénard Scientific Work and Nonlinear Science</b> <i>I. Mutabazi, J.E. Wesfreid, and E. Guyon</i> .....	3
<b>2 Scientific Biography of Henri Bénard (1874–1939)</b> <i>J.E. Wesfreid</i> .....	9

---

## Part II Bénard Cellular Structures

---

<b>3 Rayleigh–Bénard Convection: Thirty Years of Experimental, Theoretical, and Modeling Work</b> <i>P. Manneville</i> .....	41
<b>4 Experiments with Rayleigh–Bénard Convection</b> <i>G. Ahlers</i> .....	67
<b>5 Rayleigh–Bénard Convection as a Model of a Nonlinear System: A Personal View</b> <i>Y. Pomeau</i> .....	95
<b>6 Bénard Convection and Geophysical Applications</b> <i>F.H. Busse</i> .....	103

---

## Part III Bénard–Marangoni Cellular Structures

---

<b>7 Bénard Layers, Overstability, and Waves</b> <i>M.G. Velarde</i> .....	129
<b>8 Hydrothermal Waves in a Disk of Fluid</b> <i>N. Garnier, A. Chiffaudel, F. Daviaud</i> .....	147
<b>9 Secondary Instabilities in Surface-Tension-Driven Bénard–Marangoni Convection</b> <i>K. Eckert and A. Thess</i> .....	163

---

**Part IV Bénard and Wakes**

---

**10 Wake Instabilities Behind Bluff Bodies**

*M. Provansal* ..... 179

**11 Spatial Inhomogeneities of Hydrodynamic Instabilities**

*S. Goujon-Durand and J.E. Wesfreid* ..... 203

---

**Part V Extension of Bénard's Work**

---

**12 Patterns and Chaotic Dynamics in Faraday Surface Waves**

*J.P. Gollub* ..... 213

**13 The Taylor–Couette Flow: The Hydrodynamic Twin of  
Rayleigh–Bénard Convection**

*A. Prigent, B. Dubrulle, O. Dauchot, and I. Mutabazi* ..... 225

**Index** ..... 243