

Contents

SECTION I: TEMPERATURE MEASUREMENT AND CALORIMETRY

1. Surface Temperature Measurement with Thermocouples, *George W. Molnar and Joseph C. Rosenbaum, Jr.* 3
2. A Precision Multichannel Body Temperature Measurement System, *H. P. Mansberg and E. Hendler* 13
3. Current Methods of Temperature Telemetry in Physiological Research, *Francis W. Botsch* 21
4. A Gradient Type of Calorimeter for Measurement of Thermoregulatory Responses in the Dog, *Harold T. Hammel and James D. Hardy* 31
5. Microcalorimetry, New Methods and Objectives, *T. H. Benzinger and Charlotte Kitzinger* 43
6. A Stopped-Flow Microcalorimeter for Fast Reaction Measurements, *Robert L. Berger* 61
7. The Measurement of Bioclimatological Heat Exchange, *Alice M. Stoll* 73
8. A Thermal Dilution Method for the Estimation of the Cardiac Output in Small Animals, *Eugene Evonuk* 83
9. Gradient Layer Calorimetry and Human Calorimetry, *T. H. Benzinger and Charlotte Kitzinger* 87
10. Cranial Measurements of Internal Temperature in Man, *T. H. Benzinger and G. W. Taylor* 111

SECTION II: TEMPERATURE EFFECTS IN BIOLOGICAL SYSTEMS

11. The Structure of Water and of Aqueous Solutions, *Charles Tanford* 123
12. Temperature Effects in Plants, *J. Levitt* 131
13. Temperature Effects on Invertebrate Animals, *F. John Vernberg* 135
14. Heat Conservation in Counter-Current Systems, *Knut Schmidt-Nielsen* 143

SECTION III: TISSUE HEATING AND THERMAL SENSATION

15. The Heating of Skin by Radiant Energy, *Thomas P. Davis* 149
16. The Temperatures Associated with Radiant Energy Skin Burns, *W. L. Derksen, T. I. Monahan and G. P. DeLhery* 171
17. The Influence of Time on the Death of HeLa Cells at Elevated Temperatures, *G. Mixer, Jr., G. P. DeLhery, W. L. Derksen, and T. I. Monahan* 177
18. Errors Arising from the Use of Mean Heat Exchange Coefficients in the Calculation of the Heat Exchanges of a Cylindrical Body in a Transverse Wind, *D. McK. Kerlake* 183
19. Electrophysiology of Thermosensitive Nerve Endings, *Herbert Hensel* 191
20. The Thermal Excitation of Afferent Neurones in the Mammalian Cornea and Iris, *William W. Dawson* 199
21. Skin Heating and Temperature Sensation Produced by Infrared and Microwave Irradiation, *Edwin Hendler, James D. Hardy, and Dorothy Murgatroyd* 211
22. The Peripheral Basis of Temperature Sensitivity in Man, *D. R. Kenshalo and John P. Nafe* 231
23. The Dynamics of Subjective Warmth and Cold, *Joseph C. Stevens and S. S. Stevens* 239
24. Pain Limited Heat Exposures, *Paul Webb* 245

SECTION IV: PHYSIOLOGICAL RESPONSES TO HEAT

25. Elevation of Body Temperature in Disease, *David Minard and Louis Copman* 253
26. Sweating and Its Neural Control, *Walter C. Randall* 275
27. Circulatory Adjustments of Men in Hot Environments, *Sid Robinson* 287

28. Thermoregulatory and Circulatory Adjustments During Acclimatization to Heat in Man, <i>David E. Bass</i>	299
29. Assessment of Heat Stress, <i>Theodore Hatch</i>	307
30. Performance and Well-Being in Heat, <i>R. D. Pepler</i>	319
31. Tolerable Limits for Prolonged and Intermittent Exposures to Heat, <i>A. R. Lind</i>	337
32. Evaluation and Control of Heat Hazards, <i>Bruce A. Hertig and Harwood S. Belding</i>	347
SECTION V: PHYSIOLOGICAL RESPONSES TO COLD	
33. Criteria of Physiological Responses to Cold, <i>Loren D. Carlson</i>	359
34. The Pattern of Response to Cold in Animals and the Evolution of Homeothermy, <i>Alan C. Burton</i>	363
35. Physiological Responses to Cold in Nonhibernating Homeotherms, <i>J. S. Hart</i>	373
36. Shivering in Man and Animals, <i>Allan Hemingway and D. G. Stuart</i>	407
37. Metabolic Response to Cooling in the Human: Role of Body Composition and Particularly of Body Fat, <i>E. R. Buskirk, R. H. Thompson and G. D. Whedon</i>	429
38. Acclimatization to Cold in Man, <i>Thomas R. A. Davis</i>	443
39. Homeostasis in Hibernation, <i>Charles P. Lyman</i>	453
SECTION VI: HYPOTHERMIA	
40. Physiological Resistance to Cooling in Hypothermia, <i>Allen D. Keller</i>	461
41. Cellular Mechanisms in the Metabolic Acclimatization to Cold, <i>John P. Hannon</i>	469
42. Methods of Induction and Effects of "Cardiac Arrest" in Relationship to the Hypothermic State, <i>J. Hunter</i>	485
43. Techniques for Inducing Hypothermia, <i>G. B. Spurr</i>	495
44. How Do Infant Mammals Tolerate Deep Hypothermia? <i>E. F. Adolph</i>	511
45. Hypothermia in Medicine, <i>George J. Haupt and John Y. Templeton, III</i>	517
SECTION VII: TEMPERATURE REGULATION	
46. Elevation of Body Temperature in Health, <i>David Minard and Louis Copman</i>	527
47. Neural Regulation of the Rhythm of Shivering, <i>D. G. Stuart, E. Eldred, A. Hemingway and Y. Kawamura</i>	545
48. Regulation of Cutaneous Circulation during Body Heating, <i>Abrick B. Hertzman</i>	559
49. Temperature Regulation Disturbances in Dogs Following Hypothalamic Ablations, <i>Allen D. Keller</i>	571
50. Temperature Pattern Throughout the Hypothalamus in the Resting Dog, <i>Madeline M. Fusco</i>	585
51. Calorimetric Measurements of Thermoregulatory Responses of the Unanesthetized Dog to Hypothalamic Heating at Various Environmental Temperatures, <i>Madeline M. Fusco</i>	589
52. Modifications of the Febrile Response to Pyrogen by Hypothalamic Heating and Cooling in the Unanesthetized Dog, <i>Harald T. Andersen, Harold T. Hammel and James D. Hardy</i>	597
53. An Analysis of Factors Affecting Temperature Levels in the Nude Human, <i>Eugene H. Wissler</i>	603
54. Control System in Physiological Temperature Regulation, <i>James D. Hardy and Harold T. Hammel</i>	613
55. Electrical Analog Simulation of Temperature Regulation in Man, <i>R. J. Crosbie, J. D. Hardy, and E. Fessenden</i>	627
56. The Human Thermostat, <i>T. H. Benzinger, C. Kitzinger, and A. W. Pratt</i>	637
Author Index	667
Subject Index	676

