

**DR. D.R. JONES****The Comparative Physiology of Diving in Vertebrates****P. J. BUTLER***Department of Zoology and Comparative Physiology,  
University of Birmingham, Birmingham, United Kingdom*

AND

**DAVID R. JONES***Department of Zoology,  
The University of British Columbia,  
Vancouver, British Columbia, Canada*

I. Introduction . . . . .	180
II. Diving Behavior and Performance . . . . .	181
III. Cutaneous Gas Exchange . . . . .	187
IV. Oxygen Stores . . . . .	192
A. Myoglobin . . . . .	192
B. Lungs . . . . .	193
C. Blood . . . . .	196
V. Metabolism during Diving . . . . .	204
A. Forced Submersion . . . . .	205
B. Free-Range and Natural Dives . . . . .	211
VI. Biochemical Adaptations . . . . .	217
VII. Cardiovascular System and Circulatory Adjustments during Diving . . . . .	221
A. Amphibians and Reptiles . . . . .	222
B. Birds and Mammals . . . . .	228
VIII. Control of Cardiovascular Adjustments to Diving . . . . .	243
A. The Expression of the Diving Response and Its Efferent Control . . . . .	243
B. Factors Influencing the Expression of the Cardiovascular Adjustments to Diving . . . . .	261
IX. Control of the Respiratory Responses to Diving . . . . .	291
A. Sensitivity to Blood Gases . . . . .	294
B. Initiation and Maintenance of Apnea . . . . .	297
C. Postdive Hyperpnea . . . . .	303
X. Temperature Regulation and Adaptations to Low Temperature . . . . .	306
XI. Deep Diving and the Effects of Hydrostatic Pressure . . . . .	314
XII. Respiratory Properties of the Blood . . . . .	319
XIII. The Diving Response and Man . . . . .	323
References . . . . .	326