



# The Physiology and Medicine of Diving

Peter Bennett  
David Elliott



4<sup>th</sup> Edition

In the ten years since the third edition of this work, recreational diving has become increasingly available worldwide and commercial diving has consolidated its operational experience at record depths.

From continued research there has come a greater understanding of many of the problems associated with the physiological, bio-engineering and medical aspects of exposure to raised environmental pressure. Increased human activity in this unforgiving environment requires a fresh appraisal of the current state of knowledge in this field.

An authoritative team of contributors has been assembled to produce a new edition of this established series of scientific and medical reviews. It contains much new material: every chapter has been revised and many have been completely rewritten. The physiological basis of safe diving, the pathogenesis of diving illnesses and the management of diving accidents are all covered, many from the perspectives of new authors, and new chapters include fitness to dive, hyperbaric oxygen therapy and the possible long-term effects of diving.

This volume will be valuable for all divers who wish to be expert in this field and is essential reading for health professionals of every speciality who, at any time, may become involved with divers or diving, in the assessment and prevention of diving-related illnesses or in response to a diving accident.

*From reviews of earlier editions:*

*"Rarely does a reviewer have the opportunity to state that the book he is considering is a landmark in the field with which it deals."*

BRITISH JOURNAL OF INDUSTRIAL MEDICINE

*"No one concerned in any way with divers, especially when faced with the steadily spreading informed and expert legislation to improve the safety of diving operations, should be without this book at his elbow for constant reference."*

JOURNAL OF THE SOCIETY FOR UNDERWATER TECHNOLOGY

*"With this new edition, Bennett and Elliott solidifies its position as the standard work in its field. The volume is comprehensive and authoritative, the information current, the presentations generally straightforward and clear."*

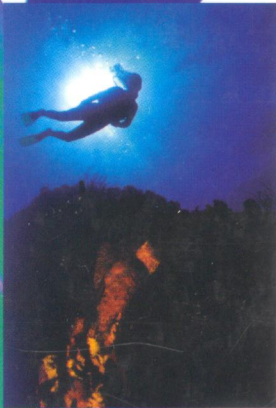
UNDERSEA BIOMEDICAL RESEARCH

ISBN 0-7020-1589-X



9 780702 015892 >

W.B. Saunders Company Ltd., 24-28 Oval Road,  
London NW1 7DX.  
Printed in Great Britain.





# *The Physiology and Medicine of Diving*

*Fourth Edition*

EDITED BY

*Peter B. Bennett and David H. Elliott*



**SSI** SCUBA SCHOOLS INT.  
® Albrecht Salm  
Instructor No. 12333

*AS 6/2000*

W. B. Saunders Company Ltd

LONDON PHILADELPHIA TORONTO SYDNEY TOKYO

---

---

# CONTENTS

---

---

|  |     |
|--|-----|
| PREFACE  | ix  |
| 1. COMPRESSED AIR WORK<br>E. P. KINDWALL                                 | 1   |
| 2. SCUBA-DIVING PROCEDURES AND EQUIPMENT<br>G. H. EGSTROM                | 19  |
| 3. COMMERCIAL DIVING EQUIPMENT AND PROCEDURES<br>J. BEVAN                | 33  |
| 4. FITNESS TO DIVE<br>G. Y. MEBANE AND N. K. I. McIVER                   | 53  |
| 5. RESPIRATION AND EXERTION<br>E. H. LANPHIER AND E. M. CAMPORESI        | 77  |
| 6. OXYGEN TOXICITY<br>J. M. CLARK  | 121 |
| 7. INERT GAS NARCOSIS<br>P. B. BENNETT                                   | 170 |
| 8. THE HIGH PRESSURE NERVOUS SYNDROME<br>P. B. BENNETT AND J. C. ROSTAIN | 194 |
| 9. UNDERWATER ACCIDENTS<br>D. H. ELLIOTT AND P. B. BENNETT               | 238 |
| 10. MANAGEMENT OF DIVING ACCIDENTS<br>D. F. GORMAN                       | 253 |
| 11. OTOLOGICAL AND PARANASAL SINUS PROBLEMS IN DIVING<br>J. C. FARMER JR | 267 |
| 12. THERMAL PROBLEMS: PREVENTION AND TREATMENT<br>J. A. STERBA           | 301 |
| 13. HISTORY OF DECOMPRESSION PROCEDURES<br>H. V. HEMPLEMAN               | 342 |

|  |     |
|--|-----|
| 14. DECOMPRESSION PHYSIOLOGY AND PRACTICE<br>R. D. VANN AND E. D. THALMANN                   | 376 |
| 15. DOPPLER AND ULTRASONIC BUBBLE DETECTION<br>R. Y. NISHI                                   | 433 |
| 16. PATHOGENESIS OF THE DECOMPRESSION DISORDERS<br>T. J. R. FRANCIS AND D. F. GORMAN         | 454 |
| 17. MANIFESTATIONS OF THE DECOMPRESSION DISORDERS<br>D. H. ELLIOTT AND R. E. MOON            | 481 |
| 18. TREATMENT OF THE DECOMPRESSION DISORDERS<br>R. E. MOON AND D. F. GORMAN                  | 506 |
| 19. CLINICAL HYPERBARIC OXYGEN THERAPY<br>E. P. KINDWALL                                     | 542 |
| 20. DYSBARIC OSTEONECROSIS: ASEPTIC NECROSIS OF BONE<br>R. I. MCCALLUM AND J. A. B. HARRISON | 563 |
| 21. LONG-TERM HEALTH EFFECTS OF DIVING<br>D. H. ELLIOTT AND R. E. MOON                       | 585 |
| INDEX  | 605 |