## Contents

## Ecosystem Research in Upwelling Regions

Ecosystem Analysis and the Definition of Boundaries in Upwelling Regions
R. BOJE and M. TOMCZAK
What is an Upwelling Ecosystem? R. MARGALEF (With 1 Figure) 12
Mesoscale Heterogeneities of the Phytoplankton Distribution in the Upwelling Region of NW Africa M. ESTRADA (With 9 Figures)
On the Ecological Significance of <i>Thalassiosira par-</i> <i>theneia</i> in the Northwest African Upwelling Area M. ELBRÄCHTER and R. BOJE (With 7 Figures) 24
Zooplankton Communities in the West African Up- welling Area A. THIRIOT
Relative Abundance of Zooplankton Groups in the Northwest African Upwelling Region During 1968 and 1972
P.M. HARGREAVES (With 8 Figures) 62
<i>Mesodinium rubrum</i> in the Baja California Upwelling System
T.T. PACKARD, D. BLASCO, and R.T. BARBER (With 5 Figures)
Regeneration of Nitrogen by Zooplankton and Fish in the Northwest Africa and Peru Upwelling Eco- systems
T.E. WHITLEDGE (With 1 Figure) 90
Upper Trophic Levels in Upwelling Areas D.H. CUSHING (With 2 Figures)
Food Consumption of Pelagic Fish in an Upwelling Area
O.A. MATHISEN, R.E. THORNE, R.J. TRUMBLE, and M. BLACKBURN (With 5 Figures)
Benthos in Upwelling Regions H. THIEL (With 4 Figures)
Role of Bacteria in an Upwelling Ecosystem S.W. WATSON (With 2 Figures)

## VIII

Heterotrophic Activity in the Mauritanian Up- welling in March 1973: Assimilation and Minerali- zation of Amino Acids A. HERBLAND (With 11 Figures)
Physical Aspects and Biological Consequences of Ghanaian Coastal Upwelling R.W. HOUGHTON and M.A. MENSAH (With 13 Figures) . 167
Oceanographic Conditions in the Galapagos Archi- pelago and Their Relationships with Life on the Islands G.T. HOUVENAGHEL (With 15 Figures)
Hydrographical Aspects of Upwelling Regions
Role of Mixing in the Dynamics of Upwelling Sys- tems J.D. THOMPSON (With 6 Figures) 203
The Circulation of Large Lakes J.R. BENNETT (With 6 Figures) 223 Hydrologic Aspects of the Main Upwelling Areas
off Peru S. ZUTA, T. RIVERA, and A. BUSTAMANTE (With 16 Figures) 235
Geological Aspects of Upwelling Regions
Sediments as Indicators of Upwelling L. DIESTER-HAASS (With 14 Figures)
Sedimentation Influenced by Upwelling in the Sub- tropical Baie Du Levrier (West Africa) B. KOOPMANN, M. SARNTHEIN, and HJ. SCHRADER (With 7 Figures)
General Aspects of Upwelling Research
Upwelling Research and Ocean Affairs W.S. WOOSTER 291

Subject Index ..... 301