

contents



one

geologic environments 1

PALEOECOLOGY AND ENVIRONMENTAL STRATIGRAPHY, 2

ENVIRONMENTAL RECONSTRUCTION
AND THE EARTH SCIENCES, 4

ENVIRONMENTAL CLASSIFICATION, 6

ENVIRONMENTS THROUGH TIME, 9

PLAN OF THE BOOK, 11

SUMMARY, 11

two

sediments and environments 13

ORIGIN OF SEDIMENTARY GRAINS, 13

TRANSPORTATION AND DEPOSITION OF SEDIMENTS, 16

PRIMARY STRUCTURES, 21

ORGANIC INFLUENCES ON SEDIMENTS, 26

DEPOSITIONAL SYSTEMS
AND THE STRATIGRAPHIC RECORD, 37

SUMMARY, 48

three

organisms and environments 49

ADAPTIVE RESPONSES OF ORGANISMS, 49

FUNCTIONAL MORPHOLOGY, 52

SOME IMPORTANT ENVIRONMENTAL FACTORS:
PHYSICAL AND CHEMICAL, 55

SOME IMPORTANT ENVIRONMENTAL FACTORS:
BIOLOGICAL, 68

ASSEMBLAGES AND COMMUNITIES, 75

SUMMARY, 81

four

taphonomy 83

SOURCES OF BIAS IN THE FOSSIL RECORD, 85

AN OLIGOCENE OYSTER COMMUNITY, 91

A PLIOCENE VERTEBRATE COMMUNITY, 94

SUMMARY, 97

five

environmental analysis 99

THE PRESENT IS A KEY TO THE PAST, 99

SEDIMENTARY FACIES DEFINITION AND RECOGNITION, 103

DETERMINING ECOLOGIC GRADIENTS, 105

GEOCHEMICAL ENVIRONMENTAL EVIDENCE, 113

SUMMARY, 118

six

environmental synthesis 119

EARLY DEVONIAN SEA OF NEW YORK, 120

EARLY PERMIAN DELTA OF TEXAS, 130

LATE PLEISTOCENE EPOCH OF THE NORTH ATLANTIC, 141

SUMMARY, 148

suggestions for further reading 151

credits 153

index 157

geologic time scale 166