IN THE NAME OF ALLAH,

MOST GRACIOUS, MOST MERCIFUL

MICROPALEONTOLOGY

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دار جامعة الملك سعود للنشر
KING SAUD UNIVERSITY PRESS
P. O. Box 68953, Riyadh 11537, Kingdom of Saudi Arabia

King Fahd National Library Cataloging-in-Publication Data

Ali, Mohamed Youseff
Micropaleontology. / Mohamed Youseff Ali ; Mohamed N El-Sabrouty ; Abdelbaset S El-Sorogy .- Riyadh, 2015

134 p., 21 x 28 cm

ISBN: 978-603-507-366-0

1- Paleontology
2- Fossils - Saudi Arabia
I-Mohamed N El-Sabrouty (co. author)
II-Abdelbaset S El-Sorogy (co. auhtor)
III-Title

564.80 dc
1436/3659

L.D. No. 1436/3659
ISBN: 978-603-507-366-0

This book has been published based on the approval of the Academic Council of the University in its 16th session of the academic year 1434/1435 H., which was convened on 9-5-1435 H. (10-3-2014), after meeting the terms of scientific refereeing.

دار جامعة الملك سعود للنشر
KING SAUD UNIVERSITY PRESS

PREFACE

Micropaleontology is designed to be a primary textbook for college courses in the marine microfossils for students in the Arab countries. This book will deal with an introductory survey of the major groups of microfossils, including calcareous, siliceous, phosphatic and organic-walled types (Foraminifera, Ostracodes, Calcareous Nannofossils, Radiolaria, and Conodonts). The skeletal anatomy, biology, mode of life, and geologic history of these benthic and planktic, marine and nonmarine organisms will be reviewed. Applications of micropaleontology to interdisciplinary research in biostratigraphy, paleoecology, paleoceanography, paleoclimatology and environmental science will be featured.

The specific goals of the *Micropaleontology* are:

- To identify the geologic range of the different fossil groups.
- To understand the general features of different group.
- To analyze the components of tests.
- To explain the basis of classification of the different fossil group.
- To identify the stratigraphic importance of the different fossil group.
- To understand the ecology and mode of life of the different group.
- To provide adequate principles for a foundation for graduate training in micropaleontology.
- To provide a sufficient base for graduates entering industry to apply micropaleontology to the solution of geologic problems.

In this book, we will deal with five major groups of microfossils that are important not only for biostratigraphy and paleoenvironments constructions, but also are applied in the hydrocarbon exploration in six chapters, each chapter followed by a series of questions that are added for the different chapters and in different styles to train the students for the micropaleontology exams. These groups of microfossils are:

- Foraminifera (small foraminifera and larger foraminifera).
- Ostracodes.
- Calcareous nannofossils.
- Radiolaria.
- Conodonts.

Chapter I gives an introduction to micropaleontology. Micropaleontology is the study of large numbers of taxonomically unrelated groups united solely by the fact that they must be examined with a microscope. Most marine microfossils are protists (unicellular plants and animals), but others are multicellular or microscopic parts of macroscopic forms. Thus, their grouping into one discipline remains essentially practical and utilitarian.

Chapter II deals with the most important group of microfossils, foraminifera which are a diverse group of protists. 220 foraminiferal families and 25,000 species have been recognized. They range in size from microforaminiferans as small as 0.02 mm to giant forms which can be 110 mm or more.

Chapter III is organized to explain larger foraminifera. Larger foraminifera are species from foraminifera that attain a large size more than 3 mm. They have complex internal morphologies. The numbers of large foraminifera include 40 families (Loeblish & Tappan, 1982). They are found both as fossils and in modern seas. The most abundant genus of larger foraminifera is Nummulites which is abundant in the limestone used by Egyptians to build the pyramids.

Chapter IV is devoted to ostracods which are the most complex organisms studied within the field of micropalaeontology. They are Metazoa and belong to the Phylum Arthropoda, Class Crustacea. They are found today in almost all aquatic environments including hot springs, caves, within the water table, semi-terrestrial environments, in both fresh and marine waters, within the water column as well as on (and in) the substrate.

Chapter V deals with calcareous nannofossils, which include the coccoliths and coccospheres of haptophyte algae and the associated nannoliths which are of unknown provenance. The organism which creates the coccosphere is called a coccolithophore, and they are phytoplankton (autotrophs that contain chloroplasts and photosynthesise).

In Chapter VI, we try to give brief information about Radiolarian and Conodonts. Radiolaria are holoplanktonic protozoa and form part of the zooplankton. Conodont elements are phosphatic tooth-like structures whose affinity and function is now believed to be part of the feeding apparatus of an extinct early vertebrate.

Chapter VII deals with the application of micropaleontology. One of the aims of micropaleontological studies is to resolve the geological history of the surface of the earth in a state that can be achieved, in relatively quick time and at the same time be economically being reasonable.

The appendixes to the book include a glossary of the scientific terms used in the book chapters. The authors would like to thank many colleagues who have contributed to the emergence of this book, even by moral support. A special word of thanks goes to Dr. Hisham Ahmed Hussein, South Valley University, Egypt. We would like also to thank Mr. Khaled Mohamed, E-learning Center, South Valley University, Egypt for his help in the modification of some figures.

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Internet Sites Related to Micropaleontology

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