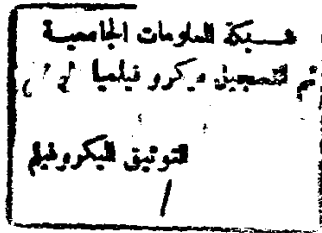




PALEONTOLOGIC AND PALEOECOLOGIC STUDIES
ON SOME LATE CRETACEOUS MEGAINVERTEBRATES
OF WEST-CENTRAL SINAI



BY

ROUKAYA ABDEL RAHMAN MOHAMED EL MAHALLAWY
(B.Sc., M.Sc.)

551.77
R.A

THESIS
SUBMITTED FOR THE DEGREE OF PH.D.
IN GEOLOGY

57601

DEPARTMENT OF GEOLOGY
FACULTY OF SCIENCE
AIN SHAMS UNIVERSITY
1996





Approval Sheet

**Paleontologic and Paleoecologic Studies on Some Late Cretaceous
Megainvertebrates of West-Central Sinai.**

**Thesis
Submitted for The Degree
of Ph. D. in Geology**

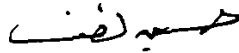
by

Roukaya Abdel Rahman Mohamed El Mahallawy
(B.Sc., M.Sc.)

Supervisors

Prof. Dr. Hussein L. Abbass

Prof. of Stratigraphy & Macropaleontology
Department of Geology,
Faculty of Science, Ain Shams University.



Prof. Dr. Omar H. Cherif

Prof. of Stratigraphy & Micropaleontology
Chairman of the Department of Geology,
Faculty of Science, Kuwait University



Prof. Dr. Wagih M. Abdel-Malik


Chairman of The Department of Geology

بسم الله الرحمن الرحيم

To The Memory of My Parents
and
To My Sons Mohamed Noha and Adel

ACKNOWLEDGMENT

The author wishes to express her deep gratitude to Prof. Dr. WAGIH ABDEL-MALIK, Chairman of the Department of Geology, Faculty of Science, Ain Shams University for his kind consideration and encouragement during the progress of the present work.

The author is deeply indebted to Prof. Dr. HUSSEIN L. ABBASS, Prof. of Stratigraphy and Macropaleontology, Department of Geology, Ain Shams University and Prof. Dr. OMAR H. CHERIF, Prof. of Stratigraphy and Micropaleontology and Chairman of the Department of Geology, Faculty of Science, University of Kuwait, for suggesting the problem, supervising the work, helping collecting the study fauna and in checking the identification of the fauna present, helpful discussion during the progress of the work and for critical reading of the manuscript.

Thank are due to Dr. AHMED A. ISMAIL, Department of Geology, Ain Shams University for helping in the field work and collecting the studied fauna and in many ways during the progress of this work.

I wish also to thank Ass. Prof. Dr. ADEL A. EL-BASSYOUNI and Dr. ALI I. HUSSEIN, Department of Geology, Ain Shams University for their help in the field work and collecting the study fauna.

A special word of thanks to Dr. ANNIE. DHONDT, Institute Royal des Sciences Naturelles de Belgique, Brussel, Dr. SUZANNE FRENEIX, Institute de Paleontologie, Museum National d'Histoire Naturelle, Paris, France and NIKOLAUS MALCHUS, Department of Geology, Technischen University, Berlin, for their facilities and help during the course of this study.

The would like to express her deep gratitude to all the staff members and colleagues of the department of Geology.

The photographic illustrations are kindly taken by Ass. Prof. Dr. ADEL A. EL-BASSYOUNI, Department of Geology, Ain Shams University.

Table of Contents

	Page
List of Tables.....	vii
List of Figures.....	viii
Abstract.....	
1-Introdduction.....	1
1- Generalities.....	1
2- Aims of the present work.....	1
3- Location of the studied sections.....	2
4-Previous work.....	2
2-Stuctural Development of Sinai	11
1. Generalities.....	11
2. Tectonic setting of Sinai.....	11
3. The geological history of Sinai.....	16
3.1. Tectonic framework of the study area.....	17
3-Stratigraphy.....	20
1. Generalities.....	20
2. General stratigraphy of late Cretaceous.....	21
2.1. Cenomanian.....	21
2.2. Turonian.....	24
2.3. Senonian.....	26
2.3.1. Coniacian	26
2.3.2. Santonian, Campanian and Maastrichtian.....	30
3. Biostratigraphic Correlation.....	33
1. Rah3 Formation.....	33
1.1. Abu Had Member	35
1.2. Mukattab Member.....	36
1.3. Ekma Member.....	37
2. Abu Qada Formation (early Turonian).....	37
3. Wata Formation (middle Turonian).....	38
4. Matulla Group.....	38
4.1. Taref Sandstone (Turonian to Santonian)..	38
4.2. Variegated Shale (early Campanian).....	39
4.3. Duwi Formation (early late Campanian).....	40
5. Sudr Chalk	41

	Page
5.1. Markha Member.....	41
5.2. Abu Zeneima Member.....	42
4- Description of stratigraphic sections.....	44
1. Generalities.....	44
2. Wadi Matulla section.....	44
3. Gebel Nezzazat section.....	49
3. Gebel Qabiliat section.....	58
5- Systematic Paleontology.....	71
1. Generalities.....	71
Class: Bivalvia.....	73
Subclass: Palaeotaxodonta.....	73
Order: Nuculoida.....	73
Superfamily: Nuculacea.....	73
Family: <u>Nuculidae</u>	73
Genus: <i>Nucula</i>	73
Subgenus: <i>Nucula</i>	73
Superfamily: Nuculanacea.....	74
Family: <u>Nuculanidae</u>	74
Genus: <i>Nuculana</i>	74
Subgenus: <i>Jupiteria</i>	74
Subclass: Pteriomorphia.....	76
Order: Arcoida.....	76
Superfamily: Arcacea.....	76
Family: <u>Cucullaeidae</u>	76
Genus: <i>Cucullaea</i>	76
Subgenus: <i>Idonearca</i>	76
Order: Mytiloida.....	79
Superfamily: Mytilacea.....	79
Family: <u>Mytilidae</u>	79
Subfamily: Modiolinae.....	79
Genus: <i>Modiolus</i>	79
Subgenus: <i>Modiolus</i>	79
Order: Pterioida.....	82
Suborder: Pteriina.....	82

	page
Superfamily: Pteriacea	82
Family: <u>Inoceramidae</u>	82
Genus: <i>Inoceramus</i>	82
Subgenus: <i>Inoceramus</i>	82
Superfamily: Pectinacea	83
Family: <u>Plicatulidae</u>	83
Genus: <i>Plicatula</i>	83
Order: Pterioida	90
Suborder: Ostreina	90
Superfamily: Ostreacea	90
Family: <u>Gryphaeidae</u>	90
Subfamily: Gryphaeinae	90
Genus: <i>Liostrea</i>	90
Genus: <i>Fatina</i>	91
Subfamily: Pycnodonteinae	94
Genus: <i>Pycnodonte</i>	94
Subgenus: <i>Phygraea</i>	94
Genus: <i>Hyotissa</i>	103
Subfamily: Exogyrinae	105
Tribe: Exogyrini	105
Genus: <i>Exogyra</i>	105
Genus: <i>Costagyra</i>	106
Genus: <i>Vultogryphaea</i>	109
Genus: <i>Ceratostreon</i>	111
Genus: <i>Ilymatogyra</i>	122
Subgenus: <i>Afrogyra</i>	122
Genus: <i>Rhynchostreon</i>	124
Tribe: Gryphaeostreini	126
Genus: <i>Gyrostrea</i>	126
Genus: <i>Acutostrea</i>	132
Family: <u>Ostreidae</u>	134
Subfamily: Ostreinae	134

	page
Genus: <i>Crassostrea</i>	134
Subfamily: <i>Lophinae</i>	135
Genus: <i>Lopha</i>	135
Subgenus: <i>Lopha</i>	135
Subgenus: <i>Actinostreon</i>	137
Genus : <i>Camelopha</i>	141
Genus: <i>Nicaisolopha</i>	143
Genus: <i>Rastellum</i>	149
Subgenus: <i>Rastellum</i>	149
Family: <u>Palaeolophidae</u>	158
Subfamily: <i>Palaeolophinae</i>	158
Tribe: <i>Oscillophini</i>	158
Genus: <i>Oscilopha</i>	158
Family: <u>Ostreidae</u>	159
Subfamily: <i>Liostreinae</i>	159
Tribe: <i>Curvostreini</i>	159
Genus: <i>Curvostrea</i>	159
Tribe: <i>Ambigostreini</i>	163
Genus: <i>Ambigostrea</i>	163
Subclass <i>Palaeoheterodonta</i>	168
Order <i>Trigonioda</i>	168
Superfamily <i>Trigoniacea</i>	168
Family <u>Trigoniidae</u>	168
Genus <i>Trigonia</i>	168
subgenus <i>Climacotrigonia</i>	170
Genus <i>Pterotrigonia</i>	170
Subgenus <i>Scabrotrigonia</i>	170
Subclass <i>Heterodonta</i>	172
Order <i>Veneroida</i>	172
Superfamily <i>Carditacea</i>	172
Family <u>Carditidae</u>	172
Subfamily <i>Carditesinae</i>	172