

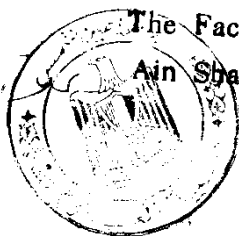
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**SOME PALEONTOLOGICAL STUDIES ON THE
UPPER CRETACEOUS - LOWER TERTIARY
ROCKS FROM CENTRAL SINAI, EGYPT**

THESIS

Presented To

**The Faculty of Science
Ain Shams University**



By

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NOTES

The present thesis is submitted to the Faculty of Science, Ain Shams University in partial fulfilment for the requirements of the degree of Master of Science in Geology.

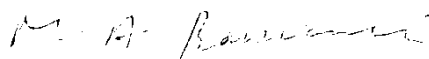
Beside the research work materialized in this thesis, the candidate has attended eight post-graduate courses for one year in the following :

- 1- Field Geology
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- 5- Biostratigraphy
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- 8- Paleocology

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In fulfillment of the language requirement of the degree he also passed the final examination of a course in the English Language.

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CHAPTER I

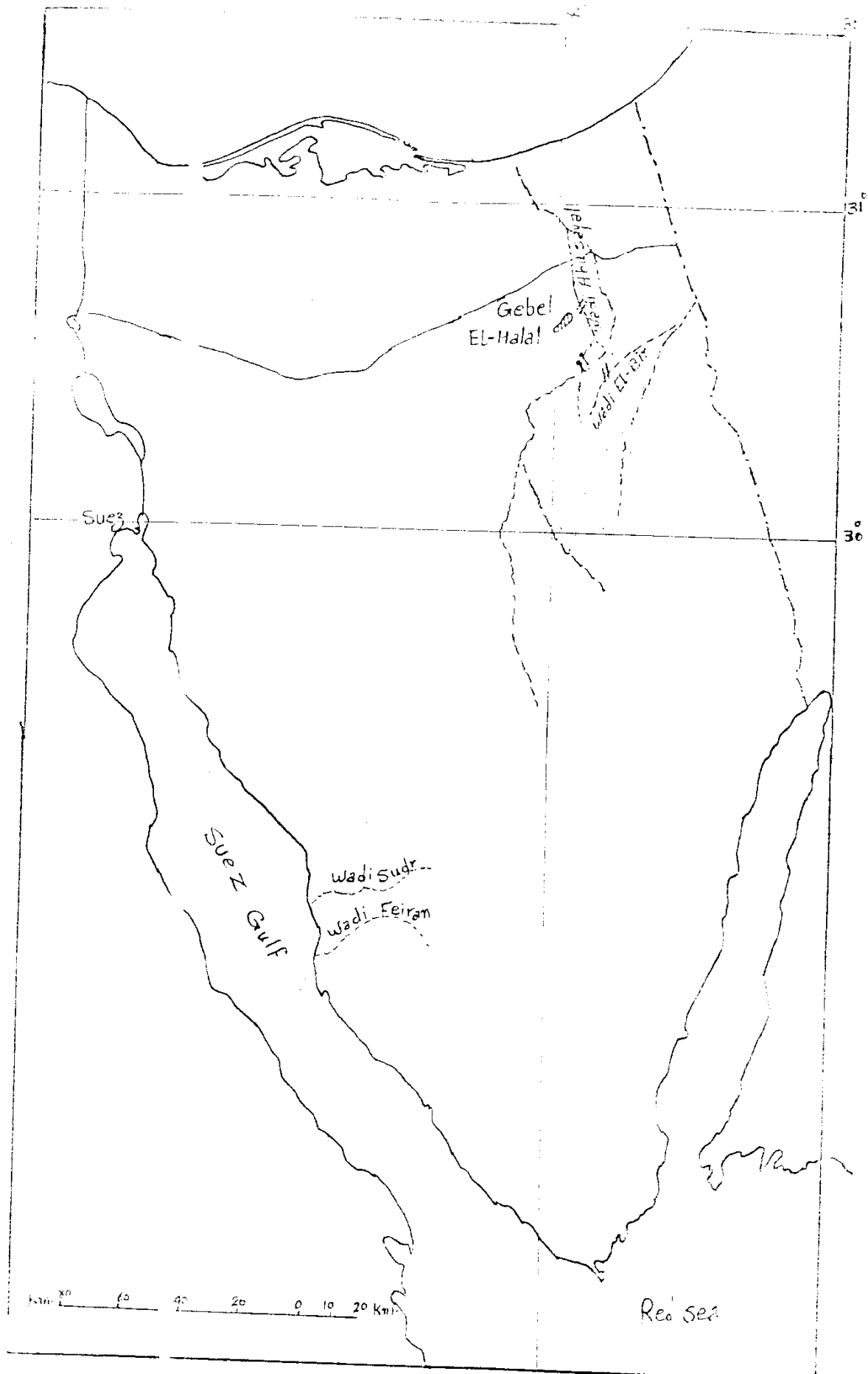
I N T R O D U C T I O N

The present work depends primarily on a systematic study of the foraminiferal faunas of the Upper Cretaceous-Lower Tertiary rocks from Wadi Abu Sayal and Wadi El Bir Sections, North Central Sinai, Egypt.

The area of study extends from Lat. $30^{\circ} 50'$ in the North to $30^{\circ} 40'$ in the South and from Long. $34^{\circ} 00'$ in the West to $38^{\circ} 10'$ in the East, and the studies are based on two surface sections (see text-fig. 1).

This work furnishes further morphologic description of the Upper Cretaceous-Lower Tertiary faunal assemblages and unravels completely their detailed stratigraphic distribution.

Also the paleoenvironmental conditions which were prevalent during that time are manifested by the observations made from the study of the interrelation between the internal structure of the fauna and the enclosing rocks. Finally the stratigraphy of the area is determined by correlating the data obtained from the two different sections.



Text-Fig.1: Key map

CHAPTER II

REVIEW OF THE PREVIOUS LITERATURE

Nakkady (1949, 1950, 1951, 1952, 1955) was the first to attempt planktonic foraminiferal zonation for the Upper Cretaceous-Lower Tertiary in Egypt. He studied the foraminiferal content of six sections from widely separated areas in Egypt and established in this transition period three biozones from base to top :-

1- An assemblage characterized by the presence of Globotruncana spp. This zone was considered as upper Cretaceous (Maestrichtian age).

2- An assemblage characterized by abundant Globigerina spp., Nakkady's "Buffer Zone", which was referred to the Danian.

3- An assemblage characterized by the presence of sharp keeled Globorotalia spp. which was considered as Paleocene.

Le Roy (1953) studied the Maqfi section, on the north-eastern corner of the Farafra Oasis, Western Desert, Egypt. He described the Upper Cretaceous-Lower Tertiary sequence of the succession overlying the Nubia variegated clay-stones and sandstones, pre-Maestrichtian age, and recognized two major divisions, a lower "Unit A" chalk unit of Upper Cretaceous (Maestrichtian) age, and an overlying succession of four rock units (IV, III, II and I) of Lower Tertiary age. He believed that an important hiatus exists between the Cretaceous and the Lower Tertiary in his studied sections.

Nakkady & Osman (1954) briefly discussed the genus Globotruncana in Egypt and its value in stratigraphical correlation, using Nakkady's previous sections and two other sections in western Sinai namely the Qabeliat and the Sudr sections.

Nakkady (1955) supposed that the rapid evolution of seven Mesozoic-Cenozoic foraminiferal species reflects the unstable environment during very Late Cretaceous and the early Tertiary.

Said & Kenawy (1956) described the Foraminifera of the Upper Cretaceous-Lower Tertiary succession of the Nekhl and the Giddi sections, in Northern Sinai, Egypt. They recognized in the two sections three unit from base to top.

1- A unit characterized by the abundance of Globotruncana and Guembelina species, which was considered as Maestrichtian age.

2- A unit characterized by the presence of a flood of Globigerina spp. and absence of Globotruncana spp. which was considered as Danian age.

3- A unit characterized by the appearance of various species of Truncorotalia and Globorotalia, which was considered as Paleocene age.

Nakkady (1957) reviewed the biostratigraphy of the Upper Senonian and the Paleocene of Egypt. He correlated 9 sections from western Sinai, the Eastern Desert, the Nile

valley and the Western Desert. He considered the Senonian to include the Coniacian and the Santonian as its lower part, and the Campanian and the Maestrichtian as its upper, and divided the Paleocene into a lower part including the Danian and Montian, and an upper including the thanetian and sparn-acian. His study on the 9 correlated sections indicates a marked break between the Upper Cretaceous and the overlying Tertiary rocks.

Nakkady (1959) studied the biostratigraphy of Gebel Um El-Ghanayem, Kharga Oasis. He recognized three biozones belonging to the Maestrichtian, the Danian and the Montian. The result of his recorded planktonic Foraminifera shows that his Danian actually represents the whole Paleocene, while the Montian represents the Lower Eocene.

Said (1960) studied the biostratigraphy of Gebel Gurnah section, at thebes (on the western bank of the Nile, facing Luxor), and recorded fourteen planktonic foraminiferal species from what described as Esna shale and the overlying Thebes Formation in the mentioned section. He concluded that the "Esna Shale" is Landian in age while the Thebes limestone is Ypresian.

Said and Kerdany (1961) studied the biostratigraphy of the Maqfi section, Farafra Oasis, Egypt. They described about 23 planktonic foraminiferal species from the Maestrichtian-Lower Eocene succession in the studied section and believed that there is an important hiatus between the Maestrichtian and the Landian.

Said and Sabry (1964) studied the planktonic foraminiferal content of the type locality of Esna shale in Egypt. They distinguished seven planktonic zones from base to top, as follows :

- 1- Globotruncana - Heterohelix Zone (Maestrichtian).
- 2- Globigerina daubjergensis - Globorotalia pseudobulloides Zone (Danian).
- 3- Globorotalia uncinata Zone (Lower Landian).
- 4- Globorotalia pusilla pusilla Zone (Lower-Middle Landian)
- 5- Globorotalia pseudomenardii Zone (Upper-Middle Landian).
- 6- Globorotalia velascoensis Zone (Upper Landian).
- 7- Globorotalia rex Zone (Ypresian).

Krasheninnikov and Ponikarov (1964) studied and correlated some Paleocene sections in Egypt and Syria. They recognized the following zones, from base to top, in Egypt.

- 1- Globigerina pseudobulloides Zone (Danian).
- 2- Acarinina uncinata Zone (Danian).
- 3- Globorotalia angulata Zone (Paleocene).
- 4- Globorotalia velascoensis Zone (Paleocene).
- 5- Globorotalia subbotina Zone (Lower Eocene).
- 6- Globorotalia aragonensis Zone (Lower Eocene).
- 7- Acarinina pentacamerata Zone (Lower Eocene).

El-Naggar (1966), discussed the time-stratigraphic boundaries between the different time rock units of the uppermost Cretaceous-Lower Tertiary in the Gebel Oweina section and the usage of the stage terms by various authors.

He subdivided the Paleocene into three planktonic foraminiferal zones, each of these zones corresponds to a definite evolutionary stage, They are as follows :

1- A lower zone characterized by an assemblage of Globigerina and Globigerina-like, rounded, non-keeled Globorotalia, and marked by the first appearance at its base of the genera Globorotalia and Globigerina. The planktonic Foraminifera of this zone characterizes the Danian in its type section or the oldest stage of the Paleocene.

2- A middle zone characterized by an assemblage of Globigerina and truncated, non-keeled Globorotalia, in addition to the rounded forms which first appeared in the underlying zone. The lower boundary of this zone is marked by the first appearance of its index species, G. angulata angulata (white), and its upper boundary is marked by the first appearance of sharply keeled Globorotalia assemblages as Globorotalia velascoensis velascoensis (Cushman) and G. pseudomenardii Bolli, the position of this zone is at the Middle of Paleocene.

3- An upper zone characterized by an assemblage of rugose Globigerina and sharply-keeled and/or rugosa Globorotalia species. This zone is considered to represent the Upper Paleocene.

He also studied the Upper Cretaceous-Lower Tertiary succession in the Esna-Idfu region and described the following planktonic foraminiferal zonation, starting from base to top:

- 1- Globotruncana fornicata Zone (Lower Maestrichtian).
- 2- Globotruncana gansseri Zone (Middle Maestrichtian).
- 3- Globotruncana esnehensis Zone (Upper Maestrichtian).
- 4- Globorotalia compressa-Globigerina daubjergensis Zone (Lower Paleocene) Upper Danian.
- 5- Globorotalia angulata Zone (Middle Paleocene).
- 6- Globorotalia velascoensis Zone (Upper Paleocene).
- 7- Globorotalia wilcoxensis Zone (Lower Eocene).

El-Naggar (1966) concluded that it's difficult to decide the position of the Paleocene-Lower Eocene boundary with certainty, according to the fact that the Upper Paleocene in it's type region is represented by non-marine sediments, and that the planktonic Foraminifera in the type Lower Eocene are hardly known.

Ansary and Tewfik (1966) identified 77 planktonic foraminiferal species from the Upper Cretaceous-Lower Tertiary from the Ezz El Orban well, Eastern Desert. He described and illustrated 12 new planktonic and 11 new benthonic species and varieties.

Issawi (1972) described the Upper Cretaceous-Lower Tertiary sedimentary rocks in central and southern Egypt. He attempted to correlate the different rock units and elucidate the geologic history of this period. He concluded that the Coniacian and Santonian stages probably are not represented, but Santonian carbonate strata are well developed in Sinai which represented by a 72 m of carbonate section. He added

that during the Paleocene, a thick carbonate section (10-60m) was deposited in Northern Sinai.

Abdelmalik, Bassiouni and Obeid (1978) classify, discuss and illustrate fifty five planktonic foraminiferal species separated from 37 samples collected from Upper Cretaceous-Lower Tertiary rocks at Bir El-Markha, West Central Sinai. They recognized eight planktonic foraminiferal zones from top to base they are :

- 8- Globorotalia rex Concurrent-range zone.
- 7- Globorotalia velascoensis Concurrent-range zone.
- 6- Globorotalia pseudomenardii Range-zone.
- 5- Globorotalia pusilla pusilla Concurrent-range zone.
- 4- Globorotalia uncinata Concurrent-range zone.
- 3- Globigerina daubjergensis-Globorotalia pseudobulloides Assemblage-zone.
- 2- Abathomphalus mayaroensis Range-zone.
- 1- Globotruncana gansseri Concurrent-range zone.