BIOSTRATIGRAPHICAL STUDIES ON SOME MICRO-FORMS IN U.A.R.

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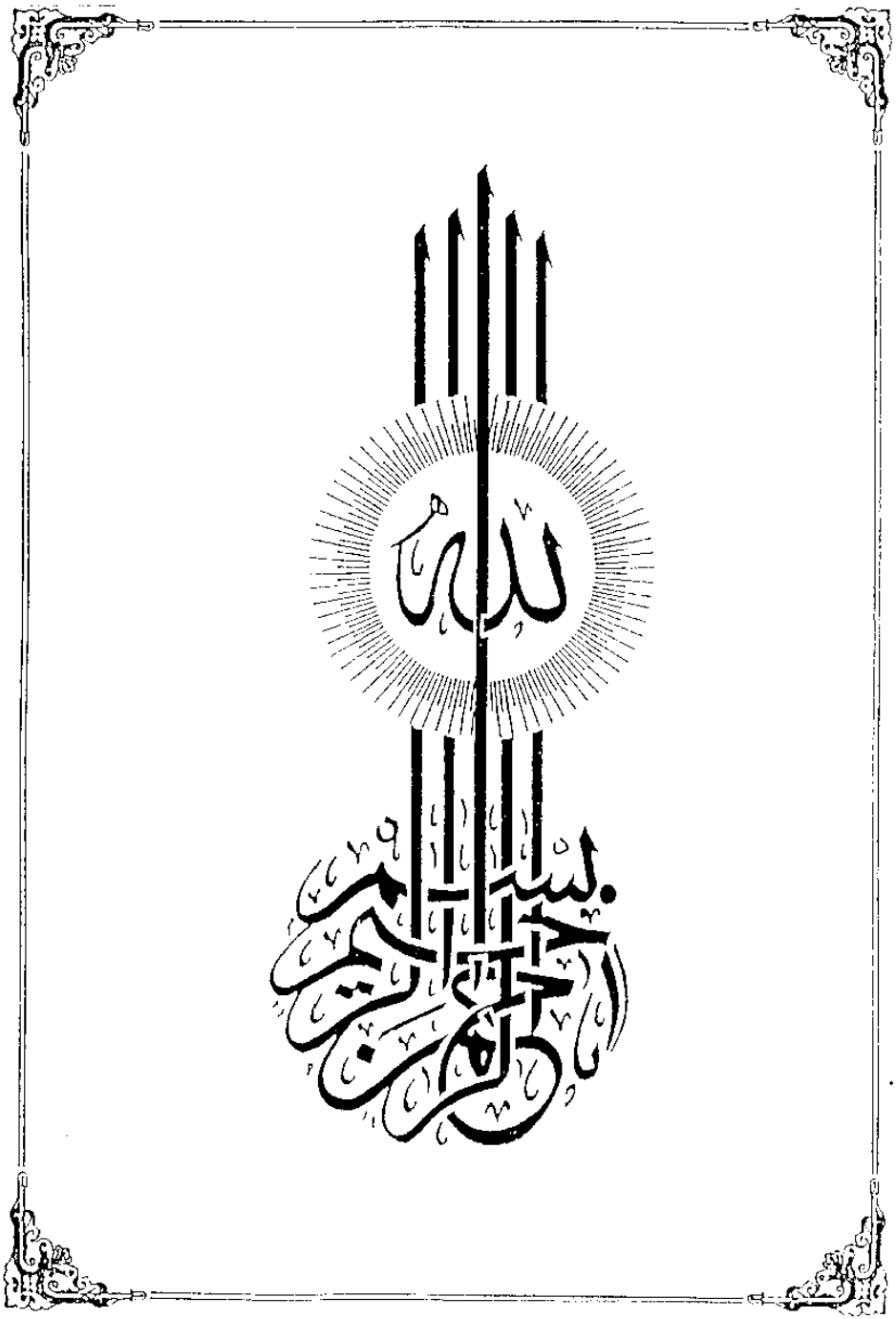

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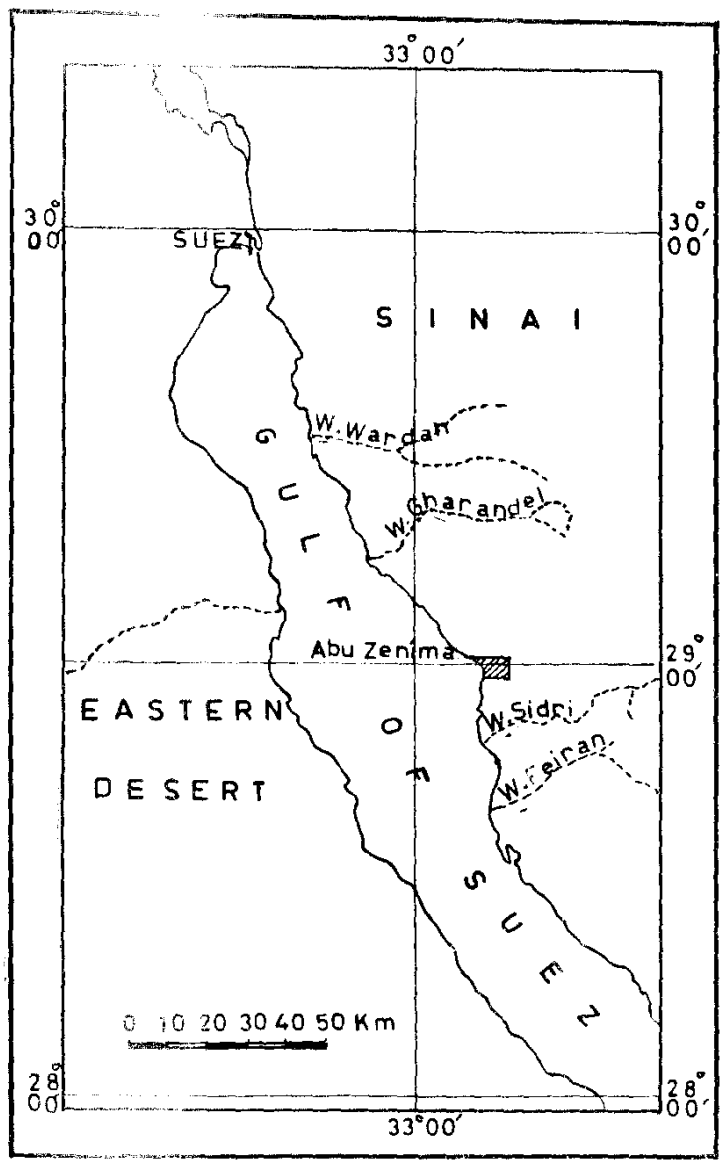
MAP 1



Key map

I

INTRODUCTION

This work deals with the lithostratigraphy and biostratigraphy of the uppermost Cretaceous and the Lower Tertiary rocks around the Abu Zenima area, south-western Sinai, Long. 33° 10′ - 33° 16′ and Lat. 28° 59′ - 29° 2′ (Key map 1).

The study of the uppermost Cretaceous and the Lower Tertiary sequence has been and still is, one of the most controversial problems of stratigraphy. It has attracted the attention of geologists almost allover the world, e.g. Bolli (1957 a,b, 1959, 1966); Loeblich & Tappan (1957), Bolli & Cita (1960 a,b); Pessagno (1960, 1962); Berggren (1960, 1962, 1965), Hofker (1962), etc.

Because of the extensive distribution of rocks of this part of the geological column in Egypt, its stratigraphy has been intensively worked out by a great number of geologists and micropalaeontologists of oil companies, Universities and other research institutes, e.g. Zittel (1883); Beadnell (1901, 1905); Hume (1911); Nakkady (1950, 1951, 1955, 1957, 1959); Tromp (1952); De Roy (1953); Said & Kenawy (1956); Said & Kerdany (1961); Said (1962, 1964); Said & Sabry (1964); Krashninnikov & Ponikarov (1964), El Naggar (1966), etc.

Recently, the importance of calcareous nanoplankton as biostratigraphic markers has been recognized by several

authors in many parts of the world, e.g. Bramlette & Riedel (1954); Bramlette & Sullivan (1961); Stradner (in Gohrbandt, 1963); Mohler & Hay(1967); Hay & Mohler (in Hay & others, 1967); Kerdany (1969), etc.

The study of the calcareous nannoplankton of the part of the sequence in question did not attract the attention of micropalaeontologists in Egypt. The only work that deals with the nannoplankton of middle Egypt is that of Kerdany (1969).

The present work incorporates a detailed study of the planktonic foraminifera and the calcareous nannoplankton of the uppermost Cretaceous-Lower Tertiary in the area under consideration. Stratigraphic range charts were prepared for each of these groups of microfossils. Zones based on the ranges of the species of these different groups were delineated and defined. These zones were compared and correlated with the defined zones in other parts of the world. High resolution faunal zones were then established on the basis of a combination of the planktonic foraminiferal zones and the calcareous nannoplankton zones. These high resolution zones are probably much more accurate and dependable than any of the zonations based on only one of the onvolved faunal groups.

The formational names used for the rock units represented in this area mainly those defined by Said (1962), Barakat & Tewfik (1966), and Awad & Said (1967).

II

REVIEW OF THE PREVIOUS PLANKTONIC FORAMINIFERAL LITERATURE IN EGYPT

Nakkady (1950, 1951, 1955) was the first to attempt planktonic foraminiferal zonation for the Upper Cretaceous-Lower Tertiary sequence in Egypt. He established the following three biozones, from base to top, in different parts of Egypt.

1- An assemblage characterized by the presence of Globotruncana spp. and large Guembelina (= Heterohelix) spp. This zone was considered as Upper Cretaceous.

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.

LeRoy (1953) studied the Maqfi section, Farafra Oasis. He subdivided the Lower Tertiary sequence into four units (I, II, III, IV) which overlay a Maestrichtian unit (A). He believed that an important hiatus exists between the Cretaceous and the Lower Tertiary in the section he studied.

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

Nakkady (1957) discussed the biostratigraphic characters of the upper Senonian and the lower Paleocene of Egypt. He correlated 9 sections from western Sinai, the Eastern Desert, the Nile Valley and the Western Desert. The boundary lines between the micropalaeontologic zones were defined by interregional correlation of the Egyption fauna with those of other parts of the world.

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.

Said and Kerdany (1961) studied the biostratigraphy of the Maqfi section, Farafra Oasis, paying a special attention to the planktonic foraminifera. They believed that there is an important hiatus between the Maestrichtian and the Landenian.

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

1- Globotruncana falsostuarti zone (Maestrichtian).

2- Globigerina daubjergensis-Globorotalia pseudobulloides zone (Danian).

3- Globorotalia uncinata zone (lower Landenian).

4- Globorotalia pusilla pusilla zone (lower-middle Landenian).

5- Globorotalia pseudomenardii zone (upper-middle Landenian).

6- Globorotalia velascoensis zone (upper Landenian).

7- Globorotalia rex zone (Ypresian).

Krasheninnikov and Ponikarov (1964) studied and correlated some Paleogene sections in Egypt and Syria. In Egypt they recognized the following zones from base to top.

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, as follows:

1- A lower zone marked by the first appearance at its base of the genera Globorotalia and Globigerina, and characterized by an assemblage of Globigerina and Globigerina-like, rounded, non-keeled Globorotalia.

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.

3- An upper zone characterized by an assemblage of rugose Globigerina and sharply-keeled and or rugose Globorotalia spp.

He also proposed a planktonic foraminiferal zonation for the top part of the Cretaceous and the Lower Tertiary. This is, from base to top, as follows:

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".

5- Globorotalia angulata zone (G. uncinata subzone; G. pusilla subzone) "middle Paleocene".

6- Globorotalia velascoensis zone (G. pseudomenardii subzone; G. aequa./G. esnaensis subzone)"upper Paleocene".

7- Globorotalia wilcoxensis zone "lower Eocene".

El-Naggar (1966) also mentioned the fact that the upper Paleocene in its type region is represented by non-marine sediments, and that the planktonic foraminifera in the type lower Eocene are hardly known. He concluded that it is difficult to decide where to put the exact Paleocene-lower Eocene boundry.

The controversies between Said and Sabry classification on the one hand and El Naggar's view, on the other, were discussed by Sabry and El Naggar (1969).

Ansary and Tewfik (1966) identified 77 planktonic species from the Upper Cretaceous-Lower Tertiary from the Ezz El Dhan well, Eastern Desert. They described and illustrated 18 new planktonic and 11 new benthonic species and varieties.

Kerdany (1969) studied the calcareous nannoplancton obtained from several sections in Middle Egypt. He delineated the following nannoplankton zones from base to top:

1- Arkhangelskiella cymbiformis zone (Maestrichtian).

2- Markalius astroporus zone (lower Paleocene).

3- Cruciplacolithus tenuis zone (lower-upper Paleocene).

4- Heliolithus kleinpelli zone	(upper Paleocene).
5- Discoaster multiradiatus zone	(upper Paleocene).
6- Marthasterites contortus zone	(upper Paleocene-lower Eocene).
7- Discoaster binodosus zone	(lower Eocene).