

A NEW FORAMINIFERAL FAUNA FROM THE UPPER EOCENE OF EGYPT

BY

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ABSTRACT

Of the 112 foraminiferal species and varieties studied from three Upper Eocene localities in Egypt, 12 species and 3 varieties are recorded as new. These are herein described in detail and figured by Camera-Lucida. The type specimens are all deposited in the British Museum, (Natural History), London.

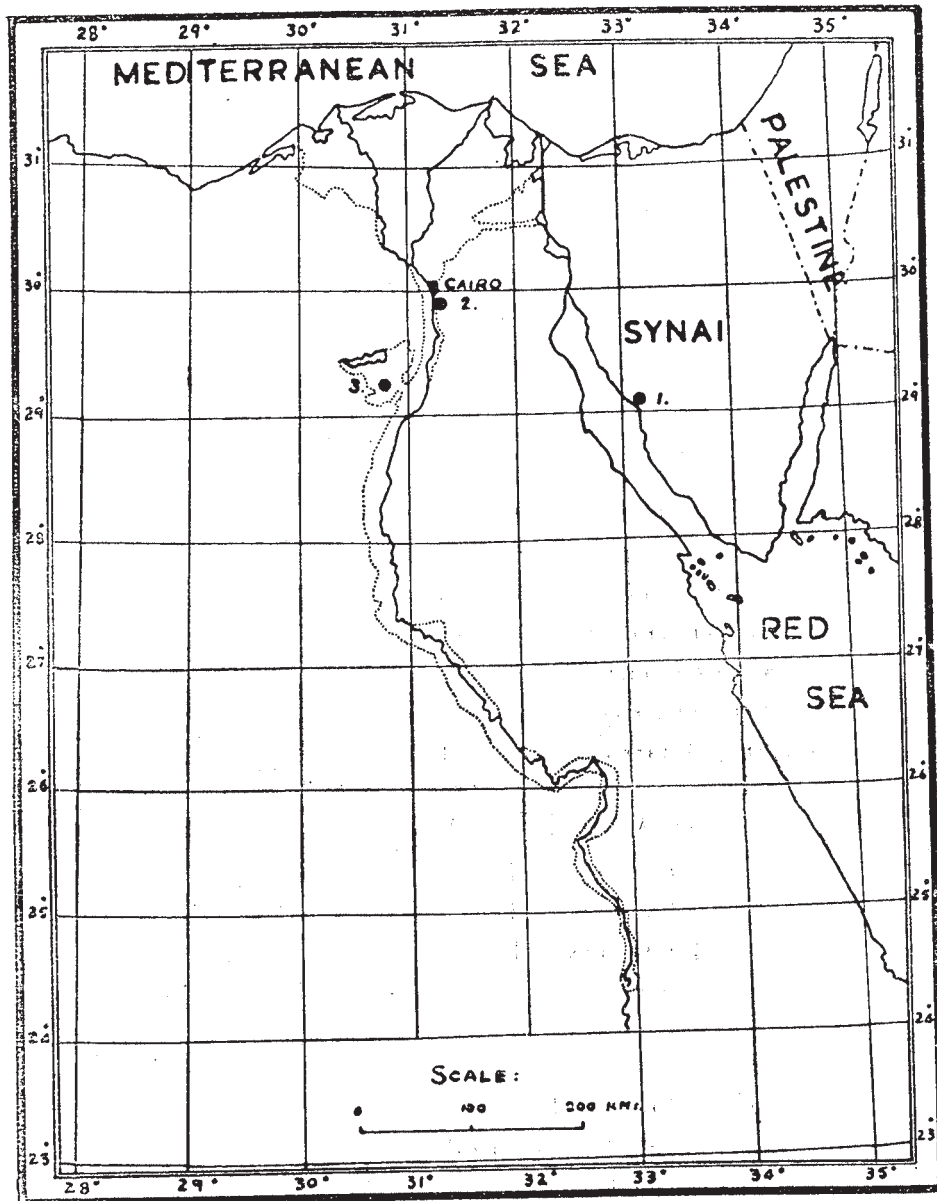
INTRODUCTION AND ACKNOWLEDGEMENT

This is a little detached report, which is, in fact, part of a big work based on the examination of 73 samples collected from three widely separated localities in Egypt. It only deals with the detailed taxonomic description of some new foraminiferal fauna. The localities of these sections are shown on the accompanying map (Fig. 1), namely :

1. Wadi Tayiba Area, (Synai) Lat. $29^{\circ} 05'$, Long. $33^{\circ} 07'$.
2. The Fayoum Area ,, $29^{\circ} 15'$, ,, $30^{\circ} 49'$.
3. The Maadi Area ,, $29^{\circ} 55'$, ,, $31^{\circ} 15'$.

Fig. 2 shows the stratigraphic columns, correlations, positions of samples in the various areas, and the lithologic characters of the formations.

The author is greatly indebted to Dr. T. Barnard, of the University College, London, for his help, suggestions and criticism during all stages of his supervision to this work. The author

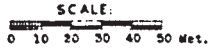


LOCALITIES OF SECTIONS

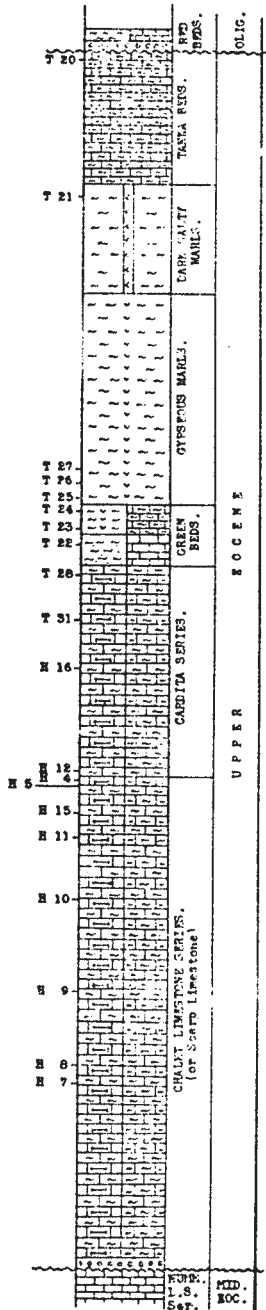
FIG. 1

1. Wadi Tayiba Section.
2. Maadi Section.
3. Fayoum Section.

STRATIGRAPHIC COLUMNS, POSITIONS OF THE SAMPLES AND LITHOLOGY.

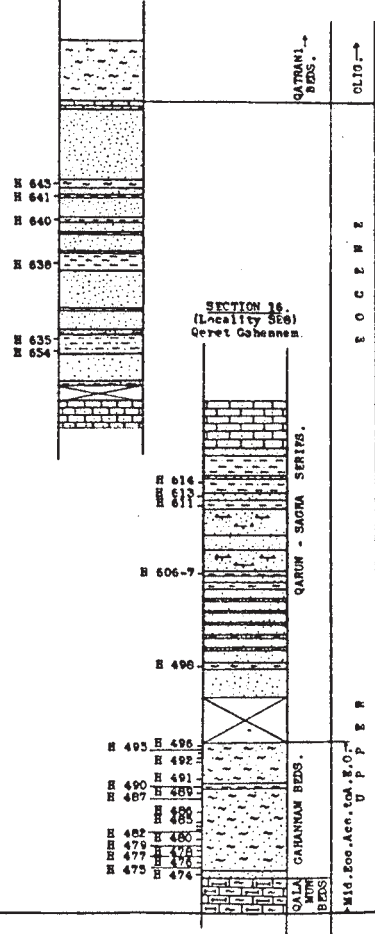


WADI TAYIBA
From Stratigraphic Section
Compiled by Dr. S.W.Tromp.

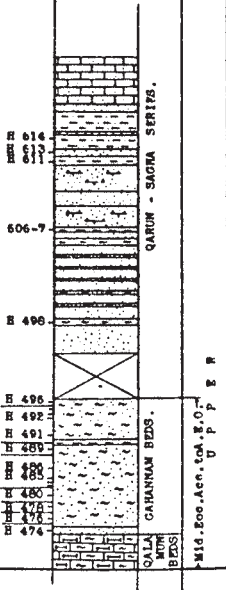


FAYOUM AREA
From Stratigraphic Section
Compiled by Dr. F.Hevbroek, (A.E.O.)

SECTION 17.
(Locality 473)
42 Kms. West Garet Gahannem



SECTION 18.
(Locality 566)
Garet Gahannem.



- LEGEND
- Chalk.
 - Clay.
 - Limestone.
 - Marl.
 - Sand.
 - Conglomerate.
 - Gypsiferous.
 - Salty.

MAADI AREA.

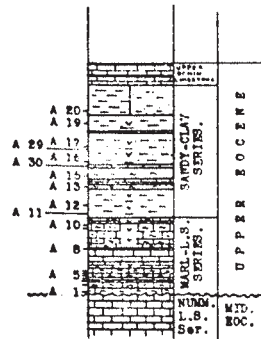


FIG. 2

also wishes to express his gratitude to the Anglo-Egyptian Oil-fields Company, for supplying him with the samples collected from the Fayoum Area upon which part of this investigation is based. The grant given to the author by the Cairo University, Cairo, for the period during which this work had been completed in London, is also acknowledged.

THE FORAMINIFERAL FAUNA

One hundred and twelve species and varieties—including twelve new species and three new varieties—are identified from the three sections. They are distributed among 45 genera belonging to 14 families. This, however, does not represent the complete fauna, as in the material examined, a few rare species, mostly represented by badly preserved specimens, have been omitted. Except for a few of the arenaceous forms in the Maadi section, in most cases the preservation was satisfactory.

The following is a systematic list of the identified forms arranged according to Cushman's classification (1940). This facilitates comparison with work carried out in America, which is undoubtedly, useful for correlation purposes. Within each family, the genera and species are arranged alphabetically.

1. *Family Lituolidae* :

Ammobaculites cubensis, Cushman and Bermudez.

Haplophragmoides emaciatus, (Brady).

Haplophragmoides subglobosum, (G. O. Sars).

2. *Family Textulariidae* :

Bolivinopsis nuttalli, (Lalicker).

Textularia communis, (d'Orbigny).

Textularia concava, (Karrer).

Textularia halkyardi, Lalicker.

3. *Family Miliolidae* :

Quinqueloculina seminulum, (Linné).

Massilina decorata, Cushman.

Sigmoilina tenuis, (Czjzek).

4. *Family Lagenidae* :

- Flabellina gahannamensis, sp. nov.
- Lagena hexagona, (Williamson).
- Lagena laevis, (Montagu).
- Lagena sulcata, (Walker and Jacob).
- Lagena sulcata, var. interrupta, (Williamson).
- Lenticulina brantlyi, (Garrett).
- Lenticulina cf. waiparaensis. (Finlay).
- Marginulina costatus, (Batsch).
- Marginulina hantkeni, Bandy.
- Marginulina infracompresa, (Thalman).
- Marginulina pediformis, Bornemann.
- Marginulina similis, d'Orbigny.
- Nodosaria communis, (d'Orbigny).
- Nodosaria consobrina, (d'Orbigny).
- Nodosaria elegantissima, (d'Orbigny).
- Nodosaria ewaldi, Reuss.
- Nodosaria herculea, (Gümbel).
- Nodosaria cf. plicosuturata, Dervieux.
- Nodosaria vagina, (Stache).
- Nodosaria vertebralis, (Batsch).
- Planularia cf. klagshamnensis, (Brotzen).
- Planularia toddae, Cushman.
- Pseudoglandulina abbreviata, (Neugeboren).
- Pseudoglandulina elliptica, (Reuss).
- Pseudoglandulina laevigata, (d'Orbigny).
- Pseudoglandulina synaensis, sp. nov.
- Robulus alabamensis, Cushman.
- Robulus chitanii, Yabe and Asano.
- Robulus mayi, Cushman and Parker.
- Robulus trompi, sp. nov.
- Saracenaria barnardi, sp. nov.
- Saracenaria gibba, (Costa), non d'Orbigny.
- Saracenaria cf. moresiana, Howe and Wallace.

5. *Family Polymorphinidae:*

- Globulina gibba, (d'Orbigny).
- Guttulina communis, (d'Orbigny).
- Guttulina yamazakii, Cushman and Ozawa.

6. *Family Nonionidae:*

- Nonion acutidorsatum, ten Dam.
- Nonion belridgensis, Barbat and Johnson.
- Nonion fayoumensis, sp. nov.
- Nonion maadiensis, sp. nov.
- Nonion microumbilicatus, Le Roy.
- Nonion olssoni, (Berry).
- Nonion scaphum, (Fichtel and Moll).
- Nonion cf. sloanii. (d'Orbigny).
- Nonion trompi, sp. nov.
- Nonionella auris, (d'Orbigny)
- Nonionella longicamerata, Bandy.

7. *Family Heterohelicidae:*

- Amphimorphina haueriana, Neugeboren.
- Gümbelina barnardi, sp. nov.
- Gümbelina cubensis, Palmer.
- Gümbelitrea oveyi, sp. nov.
- Nodogenerina georgianum, Cushman.
- Plectofrondicularia mexicana, (Cushman).

8. *Family Buliminidae:*

- Bolivina atlantisae, Cushman and Mc. Glamery.
- Bolivina gracilis, Cushman and Applin.
- Bolivina moodysensis, Cushman and Todd.
- Bolivina obliqua, Barbat and Johnson.
- Bulimina elegans, d'Orbigny.
- Bulimina inflata, Seguenza.
- Bulimina jacksonensis, Cushman.
- Bulimina jarvisi, Cushman and Parker, var. misrensis, var.
nov.

Bulimina ovata, d'Orbigny.
Bulimina Pyrula, d'Orbigny.
Hopkinsina bortotara, Finlay, var. *aegytiaca*. var. nov.
Reussella oberburgensis, (Freyer).
Uvigerina charapotoensis, Cushman and Stevenson.
Uvigerina garzaensis, Cushman and Siegfus.
Uvigerina israelkyi, Garrett.
Uvigerina mediterranea, Hofker.
Uvigerina mediterranea, Hofker, var. *compressa*, var. nov.
Uvigerina szakalensis, Majzon.
Virgulina squamosa, d'Orbigny.

9. *Family Rotuliidae* :

Baggina bradyi, (Brotzen).
Cancris cf. *Amplus*, Finlay.
Cancris cf. *turgidus*, Cushman and Todd.
Discorbis isabelleana, (d'Orbigny).
Discorbis vilardeboana, (d'Orbigny).
Eponides ellisorae, Garret.
Eponides praecinctus, (Karrer).
Gyroidina aegyptiaca, sp. nov.
Gyroidina cibaoensis, Bermudez.

10. *Family Chilostomellidae* :

Chilostomella czizeki, Reuss.
Pullenia quinqueloba, (Reuss).

11. *Family Globigerinae* :

Globigerina adriatica, Fornasini.
Globigerina bulbosa, Le Roy.
Globigerina bulloides, d'Orbigny.
Globigerina crassaformis, Galloway and Wissler.
Globigerina decepta, Martin.
Globigerina dutertrei, d'Orbigny.
Globigerina triloculinoidea, Plummer.
Globigerinella aequilateralis, (Brady).

12. *Family Hantkeninidae* :

Hantkenina mexicana, Cushman.

13. *Family Globorotalidae* :

Globorotalia crassata, (Cushman).

Globorotalia subbotinae, Morozova.

14. *Family Anomalinidae* :

Anomalina cocoaensis, (Cushman and Garrett).

Anomalina Fayoumensis, sp. nov.

Cibicides fletcheri, Galloway and Wissler.

Cibicides lobatulus, (Walker and Jacob).

Cibicides mabahethi, Saïd.

Cibicides mississippiensis, (Cushman), var. *ocalamus*, Cushman.

Planulina ariminensis, d'Orbigny.

Planulina synaensis, sp. nov.

* * *

A pre-Oligocene age is indicated by the absence of *Globigerinoides* and *Orbulina* in samples rich in *Globigerinidae*. It is also shown by the relatively poor development of *Globigerinella* compared with *Globigerina*.

Bolivinoïdes, *Gaudryina*, *Globotruncana* and other typical Cretaceous genera are entirely missing, indicating post-Cretaceous age.

The assemblage indicates that the age of the fauna of the sections studied is late Eocene. Additional evidence for Upper Eocene age is afforded by the limited number of species ranging up to the Oligocene. By comparison with previously published check lists of Upper Eocene faunas, (Howe and Wallace, 1932; Plummer, 1932; Ellis, 1933; Cushman, 1935, 1936; Coryell and Embich, 1937; Cushman and Todd, 1948, etc...), a tentative correlation with the Jackson formation of the United States is suggested.

A comparison of specimens from definite Upper Eocene horizons of the United States also adds confirmation for the Upper Eocene age of the Egyptian sections.

The microfauna of Wadi Tayiba Area is similar to those of standard Upper Eocene sections in Turkey noted by Tromp, (1941 and 1943). However, the richer development of *Gümbelinas* and *Globorotalias* in Wadi Tayiba probably indicates more open sea conditions in Egypt.

In the Fayoum Area, 80 kms S.W. of Cairo, a well-developed section is outcropping. On microfaunal basis, the author is inclined to consider the whole section as far down as sample H474 (see Fig. 2.) as Upper Eocene. This conclusion is also supported by the general lithology of the Gahannam Beds being more sandy compared with the deeper Eocene sections. A similar sandy development of the Upper Eocene can be observed also in the Maadi section.

The Maadi section shows a limited association of microfauna. Both micropalaeontologically and lithologically it can be compared with the upper part of the Fayoum section above sample H496. The Upper Eocene age is more difficult to establish in this section than in the previously mentioned ones, because *Gümbelinas* and other characteristic associations are missing. The pre-Oligocene, and probably Upper Eocene age is based on the abundance of *Bolivina moodyensis*, the occurrence of *Bulimina jacksonnesis*, *Cibicides mississippiensis*, var. *ocalamus*, *Robulus alabamensis*, and other foraminiferal species found in other Upper Eocene sections.

Systematic Descriptions
ORDER FORAMINIFERA
FAMILY LAGENIDAE

Subfamily *NODOSARIINAE*

Genus *FLABELLINA*. d'Orbigny, 1839

Flabellina gahannamensis, Ansary, sp. nov.

(Pl. I, Fig. 1)

Diagnosis:

Test large, rhomboid, compressed, initial end thick and coiled; chambers numerous, narrow, chevron-shaped; sutures distinct, flush with the surface; wall ornamented by closely spaced, fine, raised longitudinal ridges running almost the whole length of the test, becoming obsolete at apertural end; aperture small rounded.

Dimensions of holotype:

Length : 1.90 mms.

Breadth : 1.40 ,,

Thickness : 0.22 mm.

Horizon:

Sample H482.

Locality:

Fayoum, Egypt.

Depository:

British Museum (Natural History), P40993, No. 91.

Genus *BSEUDOGLANDULINA*, Cushman, 1929

Pseudoglandulina synaensis, Ansary, sp. nov.

(Pl. I, Fig. 14)

? *Pseudoglandulina* sp., Cushman, J. A., and Mac Masters, J. H., Journ. Pal., vol. 10, No. 6, 1936, p. 512, Pl. 75, Fig. 14.

Diagnosis:

Test elongate, nearly $1\frac{1}{2}$ times as long as broad, greatest breadth attained by the penultimate chamber, initial end bluntly pointed; chambers few, about five, uniserially arranged, broader than high, increasing gradually in size, but the end chamber is smaller than the previous one and is conical, bearing the aperture at its pointed end; sutures distinct, depressed, straight, parallel and horizontal; wall smooth; aperture radiate, terminal and central.

Dimensions of holotype:

Length : 0.52 mm.

Breadth : 0.19 „

Remarks:

This species resembles to a great extent the megalospheric form of the Cretaceous species *Pseudoglandulina marginulini-formis*, Frizzell (1943).

Horizon:

Sample H5.

Locality:

Synai, Egypt.

Depository:

British Museum (Natural History), P40940, No. 38.

Genus *ROBULUS*, Montfort, 1808

Robulus trompi, Ansary, sp. nov.

(Pl. I, Fig. 2)

Diagnosis:

Test small, rounded in outline, close coiled, thick; periphery subacute; chambers numerous, about 11 in last whorl; sutures distinct, very slightly curved, depressed near periphery, but become raised and join each other to form a raised network on

central umbonical area ; apertural face triangular, small ; aperture narrow, radiate, at top of apertural face ; median slit clear and more or less rounded.

Remarks :

This species differs from *Robulus jamicensis*, Cushman and Todd (1945) from the Miocene of Jamaica in being smaller, thicker and not keeled. Chambers here are more numerous and the test ornament is different in the specimens from Jamaica being present over the peripheral ends of the sutures.

It cannot be confused with *Cristellaria costata*, (Fichtel and Moll), var. *subdecorata*, Cushman (1917), described from the Philippines. The Egyptian specimen is different in that it never has fine striae on the surface of the chambers and the sutural ridges become obsolete towards the periphery.

Dimensions of holotype

Length : 0.44 mm.
Breadth : 0.40 ,,
Thickness : 0.24 ,,

Horizon :

Symple H8.

Locality :

Synai, Egypt.

Depository :

British Museum (Natural History), P40946, No. 44.

Genus *SARACENARIA*, DeFrance, 1824

Saracenaria barnardi. Ansary, sp. nov.

(Pl. I, Fig. 3)

Diagnosis :

Test small, slightly longer than broad, bi-umbonate, showing a comparatively wide, clear, raised, circular umbo on each side ;

periphery acute, with a conspicuous sharp keel, running right to the aperture; first-formed chambers close coiled, then increase gradually in length and show tendency to uncoiling, 9 chambers form the last whorl; sutures distinct, depressed, slightly curved: wall smooth; apertural face flat, or very slightly convex at its base, almost like an isosceles triangle with its two equal limbs curving towards each other near the base, the base of the triangle is split into two short limbs by a small inverted V formed by the peripheral keel of the first formed coil; the apertural face occupies about half the length of the whole test; aperture small, radiate, slightly protruding, at pointed end of apertural face.

Dimensions of holotype:

Length : 0.36 mm.
Breadth : 0.22 ,,
Thickness : 0.17 ,,

Remarks:

This species is characterised by the shape and size of its apertural face, and the conspicuously bi-umbonate test. *Saracenaria denvillensis*, Howe and Wallace, (1932), is a similar form but has a short triangular apertural face, and a non-radiate, longitudinal slit-like aperture.

Cristellaria (Robulina) cultrata, d'Orbigny, var. *antipodum*, Stache, (1865), has fewer chambers and raised sutures.

Horizon:

Sample H482.

Locality:

Fayoum, Egypt.

Depository:

British Museum (Natural History), P40922, No. 20.

FAMILY *NONIONIDAE*

Genus *NONION*, Montfort, 1808

Nonion fayoumensis, Ansary, sp. nov.

(Pl. I, Fig. 4)

Diagnosis:

Test involute, bilaterally symmetrical, slightly longer than broad: periphery rounded, slightly lobulate; chambers numerous, 12 in last whorl, slightly inflated at their umbilical ends, increasing gradually in size, first two or three fuse at their inner ends and form a slightly swollen projection into the umbilical region, the area between this and the inner ends of later chambers is depressed, comparatively wide, and is filled with calcareous nodes; sutures slightly curved, distinct, depressed near the umbilicus, being less so at the periphery; wall smooth, finely perforate; apertural face broad, roughly triangular or heart shaped, slightly convex; aperture narrow, curved slit, at the base of the apertural face.

Dimensions of holotype:

Length : 0.51 mm.

Breadth : 0.39 ,,

Thickness : 0.20 ,,

Remarks:

The characteristics of the first two or three chambers, fusing and projecting inwardly so that they partly cover the umbilicus, distinguishes this species from *Nonion japonicum*, Asano, (1938).

It also differs from *Nonion scaphum*, (Fichtel and Moll), var. *inflatum*, Cushman and Ellisor, (1932), which has 9-10 chambers to the last whorl.

It resembles *Nonion struma*, Ellis, (1939), from which it is distinguished by its almost circular outline, fewer chambers, and depressed sutures.

Horizon:

Sample H476.

Locality:

Fayoum, Egypt.

Depository:

British Museum (Natural History), P41022, No. 13.

Nonion maadiensis Ansary, sp. nov.

(Pl. I, Fig. 5)

Diagnosis:

Test planispiral, $1\frac{1}{2}$ times as long as broad, bilaterally symmetrical, sides nearly parallel; periphery moderately rounded, lobulate in the later part of the test: umbilical region exposed, showing the inner ends of the earlier chambers; chambers long, narrow, numerous, as many as 13 in the last coil, increase gradually in size, outer convolutions slightly embracing the more internal ones; sutures distinct, depressed, slightly curved; wall smooth; apertural face broad, roughly triangular, aperture a comparatively wide arched slit at base of apertural face.

Remarks:

This species is longer than *Nonionina hantkeni*, Cushman and Applin (1926), and has almost parallel sides, lobulate periphery and a broader apertural face.

It can be distinguished from *Nonionina whitsettensis*, Cushman and Applin (1926), by its open umbilical region and its triangular apertural face.

Dimensions of holotype:

Length : 0.42 mm.

Breadth : 0.28 „

Thickness : 0.18 „

Horizon :

Sample A 3.

Locality :

Maadi, Egypt.

Depository :

British Museum (Natural History), P41002, No. 100.

Nonion trompi, Ansary, sp. nov.

(Pl. I, Fig. 6)

Diagnosis :

Test large, lenticular, close coiled, completely involute, thick, biconvex, bilaterally symmetrical; periphery entire, rounded; chambers numerous, about 11, the free sides of the end chamber grow so as to form two flaps, almost covering the umbilical areas; sutures indistinct; wall smooth; apertural face high and wide, slightly convex; aperture arcuate, narrow, at base of apertural face, almost extending to the umbilici.

Dimensions of holotype :

Length : 0.44 mm.

Breadth : 0.40 ,,

Thickness : 0.28 ,,

Remarks :

Nonionina clarki, Hanna, G.D., (1923), described from the Middle Eocene of California, differs from this species by having fewer chambers, slightly lobulate periphery, roughened and granular surface, and a slightly oblique apertural face.

Horizon :

Sample H 494.

Locality :

Fayoum, Egypt.

Depository:

British Museum (Natural History), P 40920, No. 18.

FAMILY *HETEROHELICIDAE*

Subfamily *GÜMBELININAE*

Genus *GÜMBELINA*, Egger, 1899

Gümbelina barnardi, Ansary, sp. nov.

(Pl. 1, Fig. 7)

Diagnosis:

Test small, triangular; periphery rounded; chambers biserially arranged, 12-14, broader than high, increasing gradually in size, the last pair attain a comparatively large size and occupy nearly one-third of the whole test; sutures distinct, depressed, oblique, and slightly curved towards the initial end; wall ornamented by minute low elevations which form an independent series on each chamber, these ridges become obsolete half-way on the penultimate chamber, the end chamber is almost smooth or very feebly ridged; aperture high arched crescentic opening at the base of the end chamber.

Dimensions of holotype:

Length : 0.24 mm.

Breadth: 0.14 „

Remarks:

This species differs from *Gümbelina garretti*, Howe (1939) by the following:—

1. *Gümbelina garretti* has longitudinal striations which are restricted to the early chambers, later chambers become smooth.
2. *Gümbelina garretti* has a small ovate aperture with a lip.

Horizon:

Sample H 8.

Locality:

Sinai, Egypt.

Depository:

British Museum (Natural History), P 40907, No. 5.

Genus *GÜMBELITRIA*, Cushman, 1933

Gümbelitra oveyi, Ansary, sp. nov.

(Pl. I, Fig. 8)

Diagnosis:

Test small, triserial; chambers globular, about 4-5 chambers in each row, gradually increasing in size, maximum breadth attained by last three chambers; wall smooth; aperture a comparatively high arched, crescentic opening at the base of the last chamber.

Dimensions of holotype:

Length : 0.21 mms.

Breadth : 0.13 „

Remarks:

This species differs from *Gümbelitra columbiana*, Howe (1939), by having smooth surface and comparatively wide aperture. It resembles to a greater extent *Gümbelina cenomana*, Keller, (1935), but differs in the fact that in the latter species the aperture is wide but not high, and is situated at the point of junction of the last three chambers. This is also the case in *Gümbelitra columbiana* (as seen in figures). This species may be isomorphous with the Cretaceous species *Gümbelitra harrisi*, Tappan, (1940).

Horizon:

Sample H 5.

Locality:

Synai, Egypt.

Depository:

British Museum (Natural History), P 40980, No 78.

FAMILY *BULIMINIDAE*

Genus *BULIMINA*, d'Orbigny, 1826

Bulimina Jarvisi, Cushman, and Parker,

var. *misrensis*, Ansary, var. nov.

(Pl. I, Fig. 9)

Diagnosis:

Test small, twice as long as broad: chambers numerous, slightly inflated, 18-21, arranged biserially in 6-7 whorls; sutures distinct, depressed; ornament consists of numerous fine, longitudinal costae, running the whole length of the test, costae on the later part of the test are more regular than those on the initial part; aperture loop-shaped, with a slight lip.

Dimensions of holotype:

Length : 0.26 mms.

Breadth : 0.13 „

Remarks:

The species *Bulimina jarvisi*, Cushman and Parker, (1936), differs from this variety by being larger in size, with more inflated chambers, and with only the initial portion of the test, finely costate whilst the later portion is coarsely perforate.

Horizon:

Sample H 9.

Locality:

Synai, Egypt.

Depository:

British Museum (Natural History), P 40905, No. 3.

Genus *HOPKINSINA*, Howe, and Wallace, 1933

Hopkinsina bortotara, Finlay

var. *aegyptiaca*, Ansary, var. nov.

(Pl. I. Fig. 10)

Diagnosis:

Test elongate, fusiform, initial end bluntly pointed; slightly inflated chambers arranged triserially, later becoming biserial; sutures distinct, depressed; ornament consists of 7-9 longitudinal ribs on each chamber; the ribs do not extend over the sutures and on the pen-ultimate and end chamber they become broken to form spines; aperture rounded, simple, at the end of a short, comparatively wide neck.

Dimensions of holotype:

Length : 0.78 mms.

Breadth : 0.24 „

Horizon:

Sample H 480.

Locality:

Fayoum, Egypt.

Depository:

British Museum (Natural History), P 40954, No. 52.

Genus *UVIGERINA*, d'Orbigny, 1826

Uvigerina mediterranea, Hofker, var. *compressa*, Ansary, var. nov.

(Pl. I, Fig. 15)

Diagnosis:

This variety differs from the species described by Hofker, (1932), by being smaller and very much compressed. The ornament is not as prominent as in the species.

Dimensions of holotype.

Length : 0.40 mm.

Breadth : 0.20 „

Thickness: 0.14 „

Horizon:

Sample H9.

Locality:

Synai, Egypt.

Depository:

British Museum (Natural History), P 40982, No. 80.

FAMILY *ROTALIIDAE*

Subfamily *DISCORBINAE*

Genus *GYROIDINA*, d'Orbigny, 1826

Gyroidina aegyptiaca, Ansary, sp. nov.

(Pl. I, Fig. 12.)

Diagnosis:

Test trochoid, composed of two whorls, strongly compressed at the periphery, but not keeled, biconvex, distinctly umbilicate on the ventral side, evolute on the dorsal side with a comparatively large initial chamber; periphery moderately rounded very slightly lobulate; chambers numerous, of uniform shape, increasing gradually in size, early chambers indistinct about 12 chambers make up the last whorl; the sutures are distinct, slightly depressed, curved, ventral sutures radiate from the umbilicus and are slightly curved; from the dorsal side the spiral suture is distinct and depressed; wall smooth or very finely pitted apertural face roughly triangular, aperture a narrow slit at the base of the apertural face, running almost from the umbilicus to the periphery.

Remarks:

This species can be distinguished from *Gyroidina complanata*, Cushman and Stainforth, (1945), by having a compressed periphery, giving an almost triangular apertural face, fewer chambers, and more curved sutures.

Gyroidina planulata, Cushman and Renz, (1941) shows more than two whorls dorsally, a greater number of chambers, and an almost lobulate spiral suture.

Dimensions of holotype:

Length : 0.28 mm.

Breadth : 0.22 „

Thickness : 0.14 „

Horizon:

Sample H 489.

Locality:

Fayoum, Egypt.

Depository:

British Museum (Natural History), P 40931, No. 29.

FAMILY ANOMALINDAE

Genus ANOMALINA, d'Orbigny, 1826

Anomalina fayoumensis, Ansary, sp. nov.

(Pl. I, Fig. 11)

Diagnosis:

Test biconvex, evolute, dorsal side slightly more convex, about two whorls visible from both sides, depressed at the umbilici; periphery acute, slightly lobulate, with a narrow keel; chambers distinct, compact and small in initial whorl, last whorl which consists of 9 chambers forms the greater part of the test, the

last two or three chambers are much larger and slightly inflated; sutures slightly curved on both sides, broad, limbate, and raised, spiral suture depressed; wall coarsely punctate; aperture peripheral, narrow, moderately arched opening, at the base of the apertural face, placed almost symmetrically in the median line.

Dimensions of holotype :

Length : 0.58 mm.

Breadth : 0.45 ,,

Thickness : 0.16 ,,

Remarks :

Anomalina bradyi, Said, of which the holotype is the *Anomalina ammonoides* of Brady, (1884), (non Reuss), differs from the present species by having more chambers, rounded periphery, and depressed sutures.

It may be distinguished from *Anomalina insecta*, Schwager, (1883) which has rounded periphery, depressed sutures, and smooth surface.

Anomalina bassensis, Parr, (1950) shows some resemblance to *Anomalina Fayoumensis*, sp. nov., but has flush sutures, rounded periphery, and more chambers.

Except for the shape and position of the aperture, this species seems isomorphous with *Valvulinaria menloensis*, Rau, (1951), in which the aperture is ventral, beneath a distinct valve.

Horizon :

Sample H 482.

Locality :

Fayoum, Egypt.

Depository :

British Museum (Natural History), P 40965, No. 63.

Genus *PLANULINA*, d'Orbigny, 1826

Planulina synaensis, Ansary, sp. nov.

(Pl. 1, Fig. 13)

Diagnosis:

Test distinctly evolute, bi-umbonate, dorsal side flat, ventral side slightly convex, the raised boss on the ventral side may be entire or formed of a series of irregularly shaped bosses in a cluster in the umbilical region; periphery sub-acute, slightly lobulate, with a narrow keel of clear calcareous material, chambers distinct, eight in the final whorl, increasing gradually in size; sutures moderately raised, curved, and limbate, spiral suture distinct, limbate, raised; wall coarsely punctate: aperture a low arched opening, at the base of the final chamber.

Dimensions of holotype:

Length : 0.53 mm.

Breadth : 0.40 ,,

Thickness : 0.17 ,,

Remarks:

This species can be identified by its bi-umbonate test. It differs from *Anomalina ariminiensis*, d'Orbigny, (1902), described by Fornasini (R. Accad. Sci., Bologna, Mem. Sci., Nat., Italia, 1903, p. 16, tf. 62), which has more chambers, distinctly lobulate periphery, and finely punctate wall.

Planulina cocoaensis, Cushman, (1928), from the Upper Eocene of Alabama, lacks the smooth, rounded, umbonal bosses; its periphery is very much lobulate, and the sutures are more curved.

Planulina synaensis, Ansary, sp. nov. is more compressed, has more curved sutures, and only 8 chambers in the last whorl, and thus differs from *Anomalina cocoaensis*, Cushman, (1928). This species is also similar to *Anomalina mantaensis*, Calloway

and Morrey, (1929), from the Upper Eocene of Ecuador, though the latter can be distinguished by having fewer chambers, more raised sutures; the aperture is covered with a valvular flap and there are also supplementary apertures.

Planulina charapotoensis, Cushman and Stevenson, (1948), from the Miocene of Ecuador differs from this species by having depressed sutures and more chambers in the last whorl.

Horizon:

Simple H5.

Locality:

Synai, Egypt.

Depository:

British Museum (Natural History), P40964, No. 62.

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