LARGER FORAMINIFERA FROM CENTRAL FALCON (VENEZUELA)

BY

NETTIE E. GORTER and I. M. VAN DER VLERK.

(With 2 tables and plates 11—17).

Dr. H. G. KUGLER, chief geologist of the North Venezuelan Petroleum Company, at Puerto Cabello, entrusted us with the examination of a collection of larger foraminifera, selected from material collected by the geologists of this Company in Central Falcon. Dr. A. SENN kindly added material that had already been collected from the same region by Prof. Dr. M. REINHARD and Dr. M. BLUMENTHAL. The material thus combined should give us a clear picture of the distribution of the larger foraminifera in 7 stages of the Tertiary in this Venezuelan region.

We are very much indebted to Dr. KUGLER not only for entrusting us with this material, but also for the constant aid given us during the investigation. We also wish to thank Dr. A. SENN, Dr. W. T. KELLER and Dr. E. LEHNER for information and the directors of the Museum of Natural History at Bâle for lending material. Last but not least we wish to express our thanks to the Direction of the North Venezuelan Petroleum Company who not only were so broadminded as to permit the publication of the results, but who also voted a sum for the costs of investigation and publication.

The last mentioned author intends to prepare a second, similar paper dealing with material from Trinidad that was placed at his disposal by the chief geologists, Dr. KUGLER and Dr. LEHNER.

In order to obtain a survey of the numerous species of *Lepidocyclina* described from America the first mentioned author compiled a determination table, similar to that already compiled for the Far East.

It soon transpired that several specific names have been introduced that cannot be maintained.

To these must be counted, in the first place the 71 species, all described as *novae species* by W. BERRY from the Verdun-formation of north western Peru (Bibl. 5). BERRY gives the diameter and thickness of each "species" with an accuracy of hunderdths of a millimeter. The size of the pillars, lateral chambers and nucleoconch are often stated with an accuracy of tenths of μ. Taking into consideration the wide variability of these elements we are forced to assume that the entire description of each species is based on one single specimen. The impression is received, that many so-called species might well be brought together under one single name. Unfortunately the illustrations are so indistinct and

incomplete that this revision could only be undertaken on the material itself. It is to be hoped that Dr. BERRY may find occasion to give a new description of this material. In this we should find how many specimens of each species are present. Further each description of a new species should be accompanied by a clear illustration of the surface, of a horizontal and of a vertical section. The use should also be avoided of names, that have already been employed (e. g. *Lepidocyclina parva,* already described by OPPENOORTH from northern Sumatra in 1918 — Verh. Geol. Mijnbouwkundig Genootschap, geol. ser., dl. 2, 6e stuk), and of those that are not formed according to the generally accepted rules (*Lepidocyclina descarnada var. pequeña*).

Untill this revision has been undertaken, however, the paper mentioned above will have to be left out of account.

The fossil-contents of the samples.

1. Misoa-Trujillo-Formation.

Sample no. 4: Rio S. Juan, coll. Dr. Blumenthal.
Foraminifera: *Discocyclina sp.*

Sample no. 7: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Miliolina sp.*
? Cristellaria sp.
Carpenteria sp.
Amphistegina sp.
Operculinella sp.
Lepidocyclina (Lepidocyclina) cf. trinitatis H. DOUVILLÉ
Discocyclina sp.
Algae: *Archaeolithothamnium sp.*

Sample no. 3: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Miliolina sp.*
? Cristellaria sp.
Gypsina globulus Reuss
Carpenteria sp.
Amphistegina sp.
Operculinella sp.
? Pellatispira sp.
Lepidocyclina (Lepidocyclina) cf. trinitatis H. DOUVILLÉ
Algae: *Archaeolithothamnium sp.*

2. Pauji-shales.

Sample no. 1165.
Foraminifera: *Cristellaria sp.*
Orbulina universa d'Orb.
Globigerina sp. sp. (abundant)

3. Mene Grande-series.

Sample no. 148: Cerro Campana (E. Falcon).

Foraminifera: *Cristellaria sp.*
Operculinella sp.
Lepidocyclina (Lepidocyclina) r. douvillei LISSON
Discocyclina (Asterocyclina) sp.

Sample no. 41: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) r. douvillei* LISSON

Sample no. 40: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) r. douvillei* LISSON
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Lepidocyclina (Lepidocyclina) kugleri nov. sp.
Discocyclina (Asterocyclina) cf. georgiana CUSHMAN
Operculinella sp.
Algae.

Sample no. 39: Cerro Campana (E. Falcon).
Foraminifera: *Carpenteria sp.*
Operculinella sp.
Lepidocyclina (Lepidocyclina) r. douvillei LISSON
Lepidocyclina (Polylepidina) sp.
Lepidocyclina sp.
Discocyclina (Asterocyclina) sp.
Discocyclina sp. sp.
Algae: *Archaeolithothamnium sp.*
Corallina sp.

Sample no. 264: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUVILLÉ
Lepidocyclina sp. sp.
Discocyclina sp. sp.
Algae: *Archaeolithothamnium sp.*

Sample no. 159: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) sp.*
Discocyclina (Discocyclina) sp.
Operculinella sp.
Algae.

Sample no. 165: Cerro Campana (E. Falcon).
Foraminifera: *Operculinella sp.*
Lepidocyclina (Lepidocyclina) kugleri nov. spec.
Lepidocyclina (Lepidocyclina) pustulosa H. DOUVILLÉ
Algae.

Sample no. 164: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) pustulosa H. DOUVILLÉ
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Algae: *Archeolithothamnium sp.*

Sample no. 163: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) r. douvillei LISSON
Lepidocyclina (Lepidocyclina) pustulosa H. DOUVILLÉ
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Lepidocyclina (Polylepidina) sp.
Lepidocyclina (Helicolepidina) spiralis TOBLER
Discocyclina (Asterocyclina) sp.
Discocyclina (Discocyclina) sp.
Operculinella sp.
Algae.

Sample no. 12: Cerro Campana (E. Falcon).
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) r. douvillei LISSON
Operculina sp.
Amphistegina sp.
Rotalia sp.
Carpenteria sp.
Algae: *Corallina sp.*

Sample no. 11: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Lepidocyclina (Helicolepidina) spiralis TOBLER
Discocyclina (Asterocyclina) maracaibensis nov. spec.
Discocyclina (Discocyclina) blumenthali nov. spec.
Discocyclina (Asterocyclina) georgiana CUSHMAN
Operculinella sp.

Sample no. 10*a*: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) r. douvillei* LISSON
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Operculina sp.
Carpenteria sp.
Algae.

Sample no. 10: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUVILLÉ
Operculinella sp.
Algae.

Sample no. 9: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ

Sample no. 2*b*: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Lepidocyclina (Lepidocyclina) pustulosa H. DOUVILLÉ
Lepidocyclina (Pliolepidina) sp.
Lepidocyclina (Helicolepidina) spiralis TOBLER
Discocyclina (Discocyclina) flintensis CUSHMAN
Discocyclina (Asterocyclina) georgiana CUSHMAN
Discocyclina (Asterocyclina) maracaibensis nov. spec.
Operculina sp.
Dictyoconus sp.

Sample no. 2*a*: S.E.-shore of Lake Maracaibo, coll. Dr. Blumenthal.
Foraminifera: *Lepidocyclina (Lepidocyclina) kugleri nov. spec.*
Lepidocyclina (Lepidocyclina) trinitatis H. DOUVILLÉ
Discocyclina (Asterocyclina) georgiana CUSHMAN
Discocyclina (Discocyclina)sp.
Operculina sp.
? *Camerina sp.*
Spiroclypeus sp.
Gypsina globulus Reuss

Planorbulina sp.
Carpenteria sp.

Algae.

Sample no. R 7*b*: La Palma, S.E.-shore of Lake Maracaibo, coll. Dr. Reinhard.
Foraminifera: *Lepidocyclina (Lepidocyclina) pustulosa* H. DOUVILLÉ
Lepidocyclina sp.

Sample no. R 7*a*: La Palma, S.E.-shore of Lake Maracaibo, coll. Dr. Reinhard.
Foraminifera: *Lepidocyclina (Lepidocyclina) pustulosa* H. DOUVILLÉ

Sample no. R 6: La Palma, S.E.-shore of Lake Maracaibo, coll. Dr. Reinhard.
Foraminifera: *Lepidocyclina (Polylepidina) cf. adkinsi* VAUGHAN
Discocyclina (Asterocyclina) sp.
Discocyclina (Discocyclina) sp.
? *Camerina sp.*

Algae.

4. Paloma alta series (failing in Central Falcon).

Sample no. 1220:
Foraminifera: *Lepidocyclina sp.*
Textularia sp.
? *Camerina sp.*

Spines of Echinoids.

Sample no. 1162: El Oso-Paujicito.
Foraminifera: *Carpenteria sp.*
? *Camerina sp.*
Lepidocyclina sp.
Discocyclina sp.

Sample no. 1152: El Oso-Paujicito.
Foraminifera: *Sporadotrema sp.*
Lepidocyclina (Lepidocyclina) sp.
Lepidocyclina (Polylepidina) adkinsi VAUGHAN
Discocyclina (Asterocyclina) georgiana CUSHMAN
Discocyclina sp.
Spiroclypeus sp.
Camerina sp.

Spines of Echinoids.
Algae.

Sample no. 1149: El Oso-Paujicito.
Foraminifera: *Lepidocyclina (Polylepidina) adkinsi* VAUGHAN

Lepidocyclina sp.
Discocyclina sp.
Camerina sp.

Algae.

Sample no. 2632*b*: Cerro de los Indios.
Foraminifera: *Heterostegina sp.*
Camerina sp. (numerous)

Sample no. 1142: El Oso-Paujicito.
Foraminifera: *Camerina sp.*
Discocyclina (Discocyclina) flintensis B CUSHMAN
Lepidocyclina sp.

5. Churuguara-series.

Sample no. 2665.
Foraminifera: *Sporadotrema sp.*
Rotalia sp.

Sample no. 1573.
Foraminifera: *Miliolina sp.*
Sporadotrema sp.
Camerina sp. (numerous)

Sample no. 1560.
Foraminifera: *Camerina sp.*

Sample no. 1558.
Foraminifera: *Camerina sp.* (numerous)

Sample no. 1556.
Foraminifera: *Camerina cf. variolaria* SOWERBY (numerous)
? *Miogypsina sp.*

Sample no. 1554.
Foraminifera: *Lepidocyclina sp. sp.* (large specimens)

Sample no. 1550.
Foraminifera: *Carpenteria sp.*
Globigerina sp.
Rotalia sp.
Lepidocyclina cf. (Eulepidina) undosa CUSHMAN
Lepidocyclina sp.
Camerina sp.

Algae.

Sample no. 1547.
Foraminifera: *Orbitolites sp.*
Camerina sp.

Sample no. 1283.
No foraminifera.

Sampe no. 514.

Foraminifera: *Carpenteria sp.*
Orbitolites sp.
Heterostegina sp.
Camerina sp.
Lepidocyclina sp. sp.
Corals.
Spines of Echinoids.
Algae.

Sample no. 476.

Foraminifera: *Carpenteria sp.*
Globigerina sp.
Camerina sp.
Lepidocyclina sp. (small specimens)
Algae.

Sample no. 469.

Foraminifera: *Miliolina sp.*
Rotalia sp.
Carpenteria sp.
Globigerina sp.
Lepidocyclina sp. (small specimens)

Sample no. 2688: Cerro de los Indios.
Foraminifera: *Lepidocyclina cf. undosa* CUSHMAN
Heterostegina sp.

Sample no. 1147.

Foraminifera: *Heterostegina sp.* (numerous)
Operculinella sp. (numerous)

Sample no. 2.

Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN (numerous)

Sample no. 1.

Foraminifera: *Lepidocyclina cf. (Eulepidina) undosa* CUSHMAN (numerous)

Sample no. 2685: Cerro de los Indios.
Foraminifera: *Lepidocyclina (Eulepidina) falconensis nov. spec.*
Lepidocyclina (Eulepidina) undosa CUSHMAN
Lepidocyclina (Eulepidina) senni nov. spec.
Lepidocyclina (Lepidocyclina) spec. indet.

Sample no. 2705.

Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN
Operculinella sp.

Sample no. 1571: Cerro de los Indios.
Foraminifera: *Lepidocyclina cf. (Eulepidina) undosa* CUSHMAN

Sample no. 1545.
Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN
Lepidocyclina sp.

Sample no. 1223.
Foraminifera: *Lepidocyclina sp.* (large specimens)
Amphistegina sp.

Sample no. 1222.
Foraminifera: *Triloculina sp.*
Sporadotrema sp.
Camerina sp. (numerous)

Sample no. 1221.
Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN
Camerina sp.
Heterostegina sp.

Sample no. 1219.
Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN

Sample no. 1200.
Foraminifera: *Heterostegina sp.*
Camerina sp.
Algae.

Sample no. 1195.
No foraminifera.

Sample no. 1187.
Foraminifera: *Camerina sp.*

Sample no. 1186.
Foraminifera: *Camerina sp.*

Sample no. 1166.
Foraminifera: *Heterostegina sp.*
Camerina sp.

Sample no. 1164.
Foraminifera: *Miliolina sp.*
Heterostegina sp.
Camerina sp.

Sample no. 1157.
Foraminifera: *Heterostegina sp.* (numerous)
Camerina sp.
Algae.

Sample no. 1151.
No foraminifera.

Sample no. 1141.
Foraminifera: *Camerina sp.*

Sample no. 1121.
Foraminifera: *Camerina sp.*

Sample no. 497.
Foraminifera: *Heterostegina sp.*
Camerina sp.

Sample no. 496.
Foraminifera: *Heterostegina sp.*
Camerina sp.

Sample no. 482.
Foraminifera: *Heterostegina sp.*
Camerina sp.

Sample no. 481.
Foraminifera: *Sporadotrema sp.*
Heterostegina sp.
Camerina sp. (numerous)

Sample no. 478.
Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN

Sample no. 477.
Foraminifera: *Lepidocyclina (Eulepidina) undosa* CUSHMAN

6. San Luis-series.

Sample no. 3: Cerro Boccaina.
Foraminifera: *Lepidocyclina (Nephrolepidina) cf. marginata* MICHELOTTI
Lepidocyclina sp. sp.

Sample no. 1209: Cerro Boccaina.
Foraminifera: *Globigerina sp.*
Camerina sp. (rare)
Lepidocyclina sp. sp.
Rotalia sp.

Sample no. 1117: Cerro Boccaina.
No foraminifera.

Sample no. 498: Cerro Boccaina.
Foraminifera: *Operculina sp.*
Lepidocyclina sp.

Sample no. 4: San Luis.
Foraminifera: *Camerina sp.* (numerous)
Lepidocyclina sp.

Sample no. 1119: Guasiqui.
Foraminifera: *Lepidocyclina sp.*

Sample no. 1299: Pedregoso.
No foraminifera.

Sample no. 1295: Pedregoso.
Foraminifera: *Lepidocyclina (Nephrolepidina) marginata* MICHELOTTI

Sample no. 1123: Pedregoso.
No foraminifera.

Sample no. 1120: Pedregoso.
Foraminifera: *Lepidocyclina (Nephrolepidina) marginata* MICHELOTTI

Sample no. 1116: Pedregoso.
Foraminifera: *Lepidocyclina (Nephrolepidina) marginata* MICHELOTTI

Sample no. 1218: Baño aguaclara.
No foraminifera.

Sample no. 1214: Baño aguaclara.
Foraminifera: *Lepidocyclina sp.*

Sample no. 1210: Baño aguaclara.
Foraminifera: *Globigerina sp.*
Heterostegina sp.
Amphistegina sp.

Sample no. 1208: Baño aguaclara.
Foraminifera: *Globigerina sp.*
Operculinella sp.
Lepidocyclina cf. (Nephrolepidina) marginata MICHELOTTI
Lepidocyclina sp.

Sample no. 1206: Baño aguaclara.
Foraminifera: *Operculinella sp.*
Lepidocyclina sp. sp.
Algae.

Sample no. 500: Baño aguaclara.
No foraminifera.

7. Aguaclara-series.

Sample no. 2622.
Foraminifera: *Lepidocyclina sp.*
Miogypsina sp.
Algae.

Sample no. 67.
Foraminifera: *Miogypsina sp.*
Operculinella sp.

Sample no. 68.
Foraminifera: *Heterostegina sp.*
Camerina sp.

Sample no. 1213.
No foraminifera.

Sample no. 502.

No foraminifera.

Sample no. 468.

Foraminifera: *Operculinella sp.*

Palaeontological part.

LEPIDOCYCLINA (LEPIDOCYCLINA) R. DOUVILLEI LISSON

(Pl. 11, 1—3)

1921. Lepidocyclina (Isolepidina) r. douvillei, Bibl. 72, p. 53, Lám. III—V.
1924. Isolepidina r. douvillei, Bibl. 38, T. I, p. 36.
1927. Lepidocyclina r. douvillei, Bibl. 98, p. 419.

Description: Test with a distinct flat peripheral border; central part much raised and with pustules (± 175 μ). Diameter of the A-forms 2,7—3,2 mm. and of the B-forms ± 8 mm. Ratio of diameter to thickness 1,5—2,5 : 1. The nucleoconch consists of two chambers of approximately the same size. They are separated by a straight wall. Diameter of the nucleoconch 410—530 μ. The chambers of the median layer are arranged in circles. They are ogival; their average radial diameter is 65 μ and their average tangential diameter 50 μ. Thickness of their walls ± 10 μ. In vertical section we see that no pillars are developed. Near the centre the lateral chambers have a hor. diam. of ± 100 μ and a vert. diam. of ± 35 μ; the thickness of their walls is ± 30 μ.

Remarks: We believe, that VAUGHAN (Bibl. 103, p. 797) and NUTTALL (Bibl. 77, p. 104) are wrong when they say that *L. peruviana* CUSHMAN (Bibl. 24*a*) is a synonym of *L. r. douvillei*. *L. peruviana* differs from the latter by having a flange and well-developed pillars.

Occurrence in Central Falcon: Menegrande-series.

Occurrence elsewhere: Lobitos-formation of N. Peru, together with *Lepidocyclina (Helicolepidina) spiralis* TOBL. and *Discocyclina (Asterocyclina) asterisca* GUPPY.

LEPIDOCYCLINA (LEPIDOCYCLINA) FALCONENSIS NOV. SPEC.

(Pl. 11, 4—6)

Description: Outline polygonal. Test very flat with a raised central part, the thickened portion occupying about one seventh of the whole diameter. The surface is ornamented with 5—8 raised ribs, radiating from the centre to the corners. The whole surface is covered with papillae, which are largest in the central part and on the ribs (± 70 μ). Diameter 5,7—9,9 mm. Thickness 0,6—0,8 mm. The aequatorial chambers are arranged in polygons, following the outline of the test. They are mostly hexagonal, sometimes spatulate. Their radial diameter is 65—105 μ and their tangential diameter 60—100 μ. Thickness of the walls 15—25 μ. The two chambers of the nucleoconch are nearly of the same size. The intermediate wall is straight. Of only 1 specimen the diameter of the embryonic apparatus could be measured, because nearly all the others were broken. Its diameter is: 406 μ. The lateral chambers have near the centre a horizontal diameter of ± 125 μ.

Remarks: The polygonal outline, the aequatorial chambers arranged in polygons and the surface ornamented with ribs are characters that serve to distinguish this species from all the other American *Lepidocyclinae*.

Occurrence in Central Falcon: Churuguara-series.

LEPIDOCYCLINA (LEPIDOCYCLINA) KUGLERI NOV. SPEC.

(Pl. 11, 7—8 and Pl. 12, 1—3)

Description: Test circular, small. Central portion strongly umbonate, rapidly decreasing in thickness towards the periphery. Peripheral portion thin and flattened. The central part is one half to one third of the entire diameter. There are specimens where the central, umbonate part is very small and the peripheral flange broad and flat (Pl. 11, 7). Only in the central part large papillae are developed. The diameter of the A-form is 2,7—4,8 mm. and the diameter of the B-form ± 9 mm. Ratio diameter to thickness 2,2—3,4:1. The aequatorial chambers are ogival and arranged in circles. Their radial diameter at a distance of 0,5 mm. from the centre is 35—50 μ and their tangential diameter 45—60 μ. Thickness of their walls 25 μ. The nucleoconch is of the type of *Lepidocyclina s. str.* Sometimes there are one or two chambers at both ends of the intermediate wall, having a larger diameter than the other equatorial chambers. Thus a transition is developed to the subgenus *Polylepidina*. The diameter of the nucleoconch is 350—480 μ. The vertical section shows in the centre 8—10 lateral chambers at both sides of the aequatorial layer. Also the central well developed pillars are seen. The largest pillars are in the centre and there they have a diameter of ± 145 μ.

Remarks: The nearest related form appears to be *Lepidocyclina r. douvillei var. armata* RUTTEN. Our form, however, is larger and is distinctly flanged; the pillars being restricted to the central part. *L. hubbardi* HODSON is also a related species, but differs from *L. kugleri* by having a less extremely swollen central part.

Occurrence in Central Falcon: Menegrande-series.

LEPIDOCYCLINA (LEPIDOCYCLINA) PUSTULOSA H. DOUVILLÉ

(Pl. 12, 4—8)

1917. Isolepidina pustulosa, Bibl. 34, p. 843, fig. 1, 2 and 4 (non fig. 3).
1922. Lepidocyclina (Isolepidina) pustulosa, Bibl. 95, p. 345.
1924. Isolepidina pustulosa, Bibl. 38, p. 41, fig. 27—32, Pl. I, fig. 2—3.
1926. Isolepidina pustulosa, Bibl. 124, p. 103.
1928. Isolepidina pustulosa, Bibl. 67, p. 52.
1929. Isolepidina pustulosa, Bibl. 68.

Description: Test strongly biconvex, without a central thickened part or a peripheral flange. Surface coarsed, but when a little worn showing the ends of several pillars. Diameter of the A-forms 3—4 mm. and of the B-forms ± 8 mm. Thickness of the A-forms 1,2—1,8 mm. and of the B-forms 3,1—4 mm. The aequatorial chambers are ogival, sometimes rhombic, and arranged in circles. Their diameter is at a distance of 1 mm. from the centre radially 55—65 μ and tangentially

60—67 μ. Thickness of the walls 15—20 μ. The nucleoconch is of the *Lepidocyclina s. str.*-type, the two chambers being nearly of the same size. Diameter of the nucleoconch 500—600 μ. The lateral chambers are very different in size because of the irregularly placed pillars. In the centre there are about 7 on each flank of the aequatorial layer. Their horizontal diameter is ± 150 μ and their vertical diameter ± 30 μ. Thickness of the walls ± 10 μ. The pillars are spread over the whole surface, their thickness ranging from 45 μ to 100 μ.

Occurrence in Central Falcon: Menegrande-series.

Occurrence elsewhere: At Point Bontour, near San Fernando, Trinidad, together with: *Lepidocyclina (Pliolepidina) tobleri* H. DOUVILLÉ, *Lepidocyclina (Helicolepidina) spiralis* TOBL., *Discocyclina (Asterocyclina) asteriscus* GUPPY, *Camerina floridensis* HEILPRIN. At the E. part of the meridional chain of Trinidad, together with *Lepidocyclina (Eulepidina) formosa* SCHLUMB., *L. (Eulepidina) cf. dilatata* MICH.. At San Fernando and Soldado (Trinidad) together with *Lepidocyclina (Pliolepidina) tobleri* H. DOUVILLÉ, *Discocyclina (Asterocyclina) asteriscus* GUPPY and *Camerina floridensis* HEILPRIN. At the W. slope of Seru di Cueba, Curacao (KOCH) together with *Lepidocyclina (Lepidocyclina) macdonaldi* CUSHMAN, *L. (Lepidocyclina) trinitatis* H. DOUVILLÉ, *L. (Polylepidina) sp.*, *L. (Pliolepidina) panamensis* CUSHMAN, *L. (Nephrolepidina) tournoueri* LEM. et DOUV., *L. (Nephrolepidina) morgani* LEM. et DOUV., *L. (Nephrolepidina) yurnagunensis* CUSHMAN, *L. curasavica* KOCH. At Seru di Cueba, Curacao (RUTTEN) together with *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUVILLÉ, *L. (Pliolepidina) tobleri* H. DOUVILLÉ, *L. brachiofera* RUTTEN, *L. curasavica* KOCH, *Camerina striatoreticulata* RUTTEN.

LEPIDOCYCLINA (LEPIDOCYCLINA) TRINITATIS H. DOUVILLÉ

(Pl. 13, 1—5)

1917. Isolepidina pustulosa (partim), Bibl. 34, p. 844, fig. 3 (non fig. 4).
1924. Isolepidina trinitatis, Bibl. 38, p. 34, fig. 7—12, Pl. I, fig. 1.
1926. Lepidocyclina (Lepidocyclina) trinitatis, Bibl. 60, p. 19, Pl. IV, fig. 10.
1926. Isolepidina trinitatis, Bibl. 57, p. 104.
1927. Isolepidina trinitatis, Bibl. 98, p. 415—422.
1928. Lepidocyclina (Lepidocyclina) trinitatis, Bibl. 112, p. 289, Pl. 49, fig. 11—13.
1928. Lepidocyclina (Lepidocyclina) trinitatis, Bibl. 77, p. 103, Pl. VIII, fig. 12—13.
1928. Isolepidina trinitatis, Bibl. 67.
1928. Isolepidina trinitatis, Bibl. 88, p. 1066.
1929. Isolepidina trinitatis, Bibl. 68.

Description: Test small, lenticular, thickest in the centre; thence gradually sloping to the periphery. Near the periphery, however, not flattened. Sometimes the test is a little sellaeform. The whole surface is covered with large papillae. The hor. diam. of the A-form is 1,6—3,5 mm. and of the B-form ± 9 mm. The ratio of diameter to thickness: 1,6—2,1 : 1. The aequatorial chambers are ogival, exceptionally arcuate or hexagonal. Their radial diameter is, at a distance of 1 mm. from the centre, 60—85 μ and their tangential diameter 70—100 μ. Thickness of the walls 20—32 μ. The nucleoconch is of the *Lepidocyclina s. str.*-type

with sometimes a tendency to the *Polylepidina*-type. Diameter of the nucleoconch: 310—480 μ. The lateral chambers have, near the central part of the surface, a hor. diam. of $\pm$ 240 μ and a vert. diam. of 55 μ. The thickness of the pillars ranges from $\pm$ 60 μ near the periphery to $\pm$ 145 μ near the centre.

Occurrence in Central Falcon: Misoa Trujillo-formation, Paujishales and Menegrande-series.

Occurrence elsewhere: At Jamaica, together with *Lepidocyclina (Lepidocyclina) macdonaldi* CUSHMAN, *Discocyclina (Discocyclina) sp.* and *Discocyclina (Asterocyclina) sp.* At Point Bontour, near San Fernando, Trinidad, together with *Lepidocyclina (Lepidocyclina) pustulosa* H. DOUVILLÉ, *L. (Pliolepidina) tobleri* H. DOUVILLÉ, *L. (Helicolepidina) spiralis* TOBLER, *Discocyclina (Asterocyclina) asterisca* GUPPY, *Camerina floridensis* HEILPRIN. At the W. slope of Seru di Cueba, Curacao, (KOCH) together with *Lepidocyclina (Lepidocyclina) macdonaldi* CUSHMAN, *L. (Lepidocyclina) pustulosa* H. DOUVILLÉ, *L. (Polylepidina) sp.*, *L. (Pliolepidina) panamensis* CUSHMAN, *L. (Nephrolepidina) tournoueri* LEM. et DOUV., *L. (Nephrolepidina) morgani* LEM. et DOUV., *L. (Nephrolepidina) yurnagunensis* CUSHMAN, *L. curasavica* KOCH. At Seru di Cueba, Curacao (RUTTEN) together with *Lepidocyclina (Lepidocyclina) pustulosa* H. DOUVILLÉ, *L. (Pliolepidina) tobleri* H. DOUVILLÉ, *L. brachiofera* RUTTEN, *L. curasavica* KOCH, *Camerina striatoreticulata* RUTTEN.

LEPIDOCYCLINA (POLYLEPIDINA) ADKINSI VAUGHAN

(Pl. 13, 6—7)

1924. Lepidocyclina (Polylepidina) adkinsi, Bibl. 103, p. 809, Pl. 31, fig. 1—5.
1929. Lepidocyclina (Polylepidina) adkinsi, Bibl. 115, p. 288, fig. 4.

Description: The specimens from Central Falcon agree well with VAUGHANS description. The central part is covered with papillae, terminating the pillars. Only macrospheric forms are met with, having a hor. diam. of $\pm$ 3 mm.

Occurrence in Central Falcon: Menegrande- and Paloma alta-series.

Occurrence elsewhere: S. of Hacienda "El Triunfo", Chiapas, Mexico.

LEPIDOCYCLINA (NEPHROLEPIDINA) MARGINATA MICHELOTTI

(Pl. 13, 8—10)

1841. Nummulites marginata, Michelotti, Mem. Soc. ital. d. Sc., XXII, p. 45, Pl. III, fig. 4.
1847. Nummulina marginata, Michelotti, Natuurk. Verh. Holl. Mij. Wetensch., Haarlem, III, p. 16, Pl. I, fig. 10.
1904. Lepidocyclina marginata, Bibl. 41, p. 16, Pl. I, fig. 7, Pl. II, fig. 7, 9, 11, 20, Pl. III, fig. 3, 8, 9, 13.
1907. Lepidocyclina Cottreaui, Bibl. 40, p. 311, Pl. X, fig. 6—8.
1908. Lepidocyclina marginata, Bibl. 40, p. 91, fig. 3, 4*b* and *c*.
1920. Lepidocyclina marginata, Bibl. 19, p. 73, Pl. XXXI, fig. 1—2.
1924. Nephrolepidina marginata, Bibl. 38, T. 1, p. 47, Pl. II, fig. 5—6.
1925. Nephrolepidina marginata, Bibl. 38, T. 2, p. 76, fig. 58—59.
1926. Lepidocyclina sp. cf. L. marginata, Bibl. 105, p. 398, Pl. XXVI, fig. 1—2.

Description: Test circular, with a very small flange. Whole surface, except the flange, covered with large pillar-ends, which may attain a diameter of 300 μ. Diam. 4—5 m.; thickness 1,3—1,5 mm. The aequatorial chambers are ogival, the radial diameter being $\pm$ 40 μ and the tangential diameter $\pm$ 45 μ. The nucleoconch is of the *Nephrolepidina*-type. Its largest diameter is $\pm$ 300 μ. There are about 10 superimposed lateral chambers on each flank of the aequatorial layer. Their horizontal diameter is $\pm$ 35 μ. Thickness of their walls $\pm$ 15 μ.

Occurrence in Central Falcon: San Luis-series.

Occurrence elsewhere: Lower Oligocene of France. Aquatanian of France, Spain and Italy. At different localities from Cuba (Bibl. 19) in beds, which are considered to be the aequivalent of the Meson-formation of Mexico, together with *Lepidocyclina (Nephrolepidina) morgani* LEM. et R. DOUV., *L. (Nephrolepidina) crassata* CUSHMAN and *L. (Lepidocyclina) yurnagunensis* CUSHMAN. In the Meson-formation of Mexico. At Erin Point, Trinidad, together with *Lepidocyclina (Eulepidina) sp.*

LEPIDOCYCLINA (HELICOLEPIDINA) SPIRALIS TOBLER

(Pl. 13, 11—13)

1922. Lepidocyclina (Helicolepidina) spiralis, Bibl. 96, p. 380—384, fig. 1—3.
1922. Lepidocyclina (Helocilepidina) spiralis, Bibl. 95, p. 342—346.
1923. Helicolepidina spiralis, Bibl. 36, p. 566—569, fig. 1—2.
1923. Helicolepidina spiralis, Bibl. 37, p. 376, fig. 3—4.
1926. Helicolepidina spiralis, Bibl. 124, p. 104, Pl. 18, fig. 4—5.
1927. Helicolepidina spiralis, Bibl. 98, p. 415—422.
1928. Helicolepidina spiralis, Bibl. 77, p. 105, Pl. 8, fig. 4.

Description: The specimens agree well with Dr. TOBLERS original description of the specimens from San Fernando (Trinidad) and Rio San Pedro (W. Venezuela).

Remarks: H. DOUVILLÉ (Bibl. 36 and 37) classifies the subgenus *Helicolepidina* in the group *Heterostegina-Spiroclypeus.* As one of us, however, will point out in a forthcoming publication the *Helicolepidinae* miss an interseptal canal-system. Therefore we think that TOBLER is right when he classifies this form as a subgenus of *Lepidocyclina.*

Occurrence in Central Falcon: Menegrande-series.

Occurrence elsewhere: Jackson-formation of Venezuela and Trinidad, together with *Camerina floridensis* HEILPRIN, *Discocyclina (Asterocyclina) georgiana* CUSHMAN, *D. (Asterocyclina) asteriscus* GUPPY, *Lepidocyclina (Lepidocyclina) pustulosa* H. DOUVILLÉ, *L. (Lepidocyclina) trinitatis* H. DOUVILLÉ, *L. (Pliolepidina) tobleri* H. DOUVILLÉ. Lobitos-formation of N. Peru, together with *Lepidocyclina (Lepidocyclina) trinitatis* H. DOUVILLÉ, *L. (Lepidocyclina) r. douvillei* LISSON, *Discocyclina (Asterocyclina) sp.*

LEPIDOCYCLINA (EULEPIDINA) SENNI NOV. SPEC.

(Pl. 14. 1—4)

Description: This species is characterized by its protuberance, ornamented with 4 large pustules (Pl. 14, 1). The whole surface is

covered with small pustules, that are not pillar-ends, however. Hor. diam. ± 13 mm. Thickness ± 3,5 mm. Aequatorial chambers hexagonal, with an average radial diameter of 65—70 μ and an average tangential diameter of 45—65 μ. Thickness of their walls ± 15 μ. The lateral chambers have near the centre of the surface a hor. diam. of ± 120 μ. Thickness of their walls ± 25 μ. The nucleoconch is of the Eulepidina-type. Largest diameter ± 2,5 mm.

Occurrence in Central Falcon: Churuguara-series.

LEPIDOCYCLINA (EULEPIDINA) UNDOSA CUSHMAN

(Pl. 15, 1—4)

1919. Lepidocyclina undosa, Bibl. 18, p. 65, Pl. 2, fig. 1*a*.
1920. Lepidocyclina undosa, Bibl. 19, p. 68, Pl. XXV, fig. 3.
1924. Lepidocyclina (Nephrolepidina) undosa, Bibl. 103, p. 798 and 820, Pl. XXXIV, fig. 5—7.
1926. Lepidocyclina (Nephrolepidina) undosa, Bibl. 105, p. 393, Pl. XXIV, fig. 1—2.
1928. Lepidocyclina (Nephrolepidina) undosa, Bibl. 112, p. 294, Pl. 48, fig. 3.

Description: Test slightly undulate or saddle-shaped. Central part very slightly umbonate; sometimes, however, there is a more distinct central knob developed (Pl. 15, 4). Surface without papillae. Diameter 40—60 mm. Thickness 3—5,1 mm. Aequatorial chambers spatulate, sometimes hexagonal, and arranged in circles. At a distance of 1 mm. from the centre their radial diameter is ± 70 μ and the tangential diameter ± 65 μ. Thickness of their walls ± 30 μ. In the Venezuelan material only microspheric forms are met with. In transverse section there are about 20 superimposed lateral chambers at both sides of the aequatorial layer. Their hor. diam. is 200—400 μ and their vert. diam. ± 45 μ. Thickness of their walls ± 20 μ. No pillars are developed.

Remarks: This species is described by VAUGHAN as belonging to the subgenus *Nephrolepidina*. In our opinion, however, the large diameter and the shape of the nucleoconch, as figured by VAUGHAN, point more to the subgenus *Eulepidina*.

Occurrence in Central Falcon: Churuguara-series.

Occurrence elsewhere: Antigua-formation of Antigua, West-Indies. Meson-formation of Mexico. Glendon-formation of Alabama. In the Moneague-formation of Jamaica, together with *Lepidocyclina (Lepidocyclina) canellei* LEM. et R. DOUVILLÉ, *L. (Lepidocyclina) miraflorensis* VAUGHAN, *L. (Lepidocyclina) forresti* VAUGHAN, *L. (Lepidocyclina) parvula* CUSHMAN, *L. (Lepidocyclina) matleyi* VAUGHAN, *L. gigas* CUSHMAN, *L. (Nephrolepidina) crassata* CUSHMAN.

LEPIDOCYCLINA SPEC. INDET.

(Pl. 16, 1)

In a thin section of sample no. 1149, from El Oso-Paujicito, in the upper part of the Paloma alta-series we found the *Lepidocyclina* figured on Plate 16, 1. It was not possible to attribute this section to any known species.

DISCOCYCLINA (DISCOCYCLINA) BLUMENTHALI NOV. SPEC. (Pl. 16, 2—4)

Description: Test circular, flat, without umbo or raised central part. The whole surface is covered with papillae with a diameter of ± 65 μ. Diameter 2,4—4,1 mm. Ratio diameter to thickness nearly 5:1. The aequatorial chambers have, at a distance of 1 mm. from the center a radial diameter of 60—80 μ and a tangential diameter of 30—35 μ. The nucleoconch is composed of a round embryonic chamber partly embraced by a second one, with a diameter of 225—290 μ. In a vertical section we see ± 5 superimposed lateral chambers on each side of the aequatorial layer. Their hor. diam. is ± 95 μ and their vert. diam. ± 40 μ. On the vertical section we see also, that the papillae represent the ends of the pillars.

Remarks: The related species *D. flintensis* is much flatter. *D. pustulosa*, however, is much thicker than our species and has aequatorial chambers, which show the ratio between the rad. diam. and tangent. diam. 3:1. Also *D. pustulosa* has much larger papillae, which are more numerous near the center.

Occurrence in Central Falcon: Menegrande-series.

DISCOCYCLINA (DISCOCYCLINA) FLINTENSIS CUSHMAN (Pl. 16, 5—6)

1917. Orthophragmina flintensis, Bibl. 16, p. 115, Pl. XL, fig. 1—2.
1920. Orthophragmina flintensis, Bibl. 19, p. 44, Pl. IX, fig. 3—6.
1922. Orthophragmina (Discocyclina) flintensis, Bibl. 95, p. 343.
1928. Discocyclina (Discocyclina) flintensis, Bibl. 110, p. 157.

Description: Test circular, rather flat. The whole surface covered with pustulus, arranged in concentric circles. Diameter of the A-forms 1,6—3,4 mm. and of the B-forms ± 8 mm. Thickness 0,16—0,35 mm. The radial diameter of the aequatorial chambers is, at a distance of 1 mm. from the center, ± 65 μ and the tangential diameter ± 25 μ. The nucleoconch consists of two chambers, the larger one embracing one half of the initial chamber. Diameter ± 100 μ. No pillars are developed.

Occurrence in Central Falcon: Menegrande- and Paloma alta-series.

Occurrence elsewhere: In the Ocala-limestone of Georgia and Florida, together with *Discocyclina (Discocyclina) floridana* CUSHMAN, *D. (Discocyclina) citrensis* VAUGHAN, *D. (Aktinocyclina) bainbridgiensis* VAUGHAN, *D. (Asterocyclina) georgiana* CUSHMAN, *D. (Asterocyclina) vaughani* CUSHMAN, *D. (Asterocyclina) mariannensis* CUSHMAN, *D. (Asterocyclina) mariannensis* CUSHMAN *var. papillata* CUSHMAN, *D. (Asterocyclina) chipolensis* VAUGHAN, *D. (Asterocyclina) americana* CUSHMAN, *L. (Lepidocyclina) georgiana* CUSHMAN, *L. (Lepidocyclina) mortoni* CUSHMAN, *L. (Lepidocyclina) ocalana* CUSHMAN, *L. (Lepidocyclina) attenuata* CUSHMAN, *L. (Lepidocyclina) floridana* CUSHMAN, *L. (Nephrolepidina) fragilis* CUSHMAN. In the Jackson-formation of Venezuela, together with *Discocyclina (Asterocyclina) georgiana* CUSHMAN, *D. (Asterocyclina) asteriscus* GUPPY and *Lepidocyclina (Helicolepidina) spiralis* TOBLER. In the Brito-

formation of Nicaragua, together with *Discocyclina (Asterocyclina) georgiana* CUSHMAN.

DISCOCYCLINA (ASTEROCYCLINA) GEORGIANA CUSHMAN

(Pl. 17, 4—6)

1917. Orthophragmina georgiana, Bibl. 16, p. 117, Pl. XLI, fig. 2—3, Pl. XLII, fig. 3, Pl. XLIII, fig. 2—3.
1920. Orthophragmina georgiana, Bibl. 19, p. 45, Pl. X, fig. 1.
1922. Orthophragmina (Asterodiscus) georgiana, Bibl. 95, p. 343.
1926. Asteriacites georgiana, Bibl. 106, p. 520.
1928. Asterocyclina georgiana, Bibl. 112, p. 286.
1928. Discocyclina (Asterocyclina) georgiana, Bibl. 110, p. 157.

Description: Test square or almost square. Four arms radiate from the central umbo to the peripheral angles. They increase a little in width towards the periphery. The parts between the arms are flat. Sometimes these flat parts have a small raised spot near the periphery. The surface is covered with very small papillae. Diameter 4,6—5,7 mm. Thickness 0,96—1,2 mm. The aequatorial chambers are larger and narrower in the areas of the arms. Their radial diameter is at a distance of 1 mm. from the center 60—100 μ and their tangential diameter $\pm$ 30 μ. The nucleoconch consists of two chambers. The spherial initial chamber is partly embraced by the much larger second one. Diameter of the nucleoconch $\pm$ 120 μ. The vertical section shows the numerous superimposed lateral chambers and the pillars. These are largest in the central part ($\pm$ 95 μ).

Occurrence in Central Falcon: Menegrande- and Paloma alta-series.

Occurrence elsewhere: In the Ocala-limestone of Florida and Georgia, together with *Discocyclina (Discocyclina) floridana* CUSHMAN, *D. (Discocyclina) flintensis* CUSHMAN, *D. (Discocyclina) citrensis* VAUGHAN, *D. (Aktinocyclina) bainbridgiensis* VAUGHAN, *D. (Asterocyclina) vaughani* CUSHMAN, *D. (Asterocyclina) mariannensis* CUSHMAN and the *var. papillata* CUSHMAN, *D. (Asterocyclina) chipolensis* VAUGHAN, *D. (Asterocyclina) americana* CUSHMAN, *Lepidocyclina (Lepidocyclina) georgiana* CUSHMAN, *L. (Lepidocyclina) mortoni* CUSHMAN, *L. (Lepidocyclina) ocalana* CUSHMAN, *L. (Lepidocyclina) attenuata* CUSHMAN, *L. (Lepidocyclina) pseudomarginata* CUSHMAN, *L. (Lepidocyclina) pseudocarinata* CUSHMAN, *L. (Lepidocyclina) cookei* CUSHMAN, *L. (Lepidocyclina) floridana* CUSHMAN, *L. (Nephrolepidina) fragilis* CUSHMAN. In the Brito-formation of Nicaragua, together with *Discocyclina (Discocyclina) flintensis* CUSHMAN. In the Jackson-formation of Venezuela, together with *Discocyclina (Discocyclina) flintensis* CUSHMAN, *D. (Asterocyclina) asteriscus* GUPPY and *Lepidocyclina (Helicolepidina) spiralis* TOBLER. In the Lep. Chaperi-beds of Haut Chagres (Panama), together with *Discocyclina (Discocyclina) sp.* and *Lepidocyclina (Lepidocyclina) chaperi* LEM. et R. DOUVILLÉ. In the beds above the Yellow limestone and below the Moneague-formation of Jamaica, together with *Dictyoconus puilboreauensis* WOODRING, *Cushmania americana* (CUSHM.), *C. fontabellensis* VAUGHAN, *Discocyclina (Discocyclina) crassa* (CUSHM.), *D. (Discocyclina) perkinsi* VAUGHAN, *Lepidocyclina (Pliolepidina) kinlossensis* VAUGHAN, *L. (Lepidocyclina) macdonaldi* CUSHM.,

L. (Lepidocyclina) trinitatis H. DOUV., *L. (Lepidocyclina) sherwoodensis* VAUGHAN, *L. (Nephrolepidina) haddingtonensis* VAUGHAN.

DISCOCYCLINA (ASTEROCYCLINA) MARACAIBENSIS NOV. SPEC.

(Pl. 17, 1—3)

Description: Test octangular, with a distinct central knob. Central knob with big papillae. On the flat peripheral flange no papillae are developed. From the central portion eight costae radiate to the periphery. Hor. diam. 1,9—3,2 mm. Thickness 0,8—1,2 mm. The aequatorial chambers are rectangular. Their radial diameter is, at a distance of 0,8 mm. from the centre ± 32 μ. Their tangential diameter ± 25 μ. The nucleoconch is of the *Nephrolepidina*-type. Diameter ± 225 μ. In vertical section there are 10—14 superimposed lateral chambers at each side of the aequatorial layer. The average hor. diam. of the lateral chambers in the centre is 65 μ and the vert. diam. 32 μ. In the central part the thickness of the pillars is ± 95 μ. They don't decrease very much in diameter from the centre towards the periphery. Sometimes we see specimens, that differ only in not having eight but only four costae.

Remarks: *Discocyclina (Asterocyclina) antillea* CUSHMAN is much larger than the species, described here. Also *Discocyclina (Asterocyclina) mariannensis* CUSHMAN is larger and is covered with papillae over the whole surface.

Occurrence in Central Falcon: Menegrande and Paloma alta-series.

DISCOCYCLINA (ASTEROCYCLINA) VAUGHANI CUSHMAN

(Pl. 17, 7)

1917. Orthophragmina vaughani, Bibl. 16, p. 118, Pl. XLIII, fig. 4—5.
1920. Orthophragmina vaughani, Bibl. 19, p. 47, Pl. XI, fig. 3.
1928. Discocyclina (Asterocyclina) vaughani, Bibl. 110, p. 157.

Description: In our material is only a single specimen of this *Asterocyclina*. The form agrees well with CUSHMANS photograph of the specimens from the Ocala-limestone.

Occurrence in Central Falcon: Menegrande-series.

Occurrence elsewhere: In the Ocala-limestone of Florida and Georgia together with the same fossil-association as we already mentioned above (see: *D. georgiana*).

Stratigraphical part.

It is not necessary to discuss at length the distribution of the larger foraminifera in the Tertiary of Central-Falcon and the age of the strata in which they occur. The accompanying table speaks for itself.

The correlation of the local stages of the Tertiary of Central America with the standard-subdivision of Europe is no more definitely settled, than is the case for the Far East. For this reason we have avoided the use in table 2 of the European subdivision. There was all the more reason as the genera and subgenera of larger foraminifera show a very different distribution in America to that in the Far East. The difference

would be smaller if the margin between Eocene and Oligocene were drawn at the base of the Paloma alta-series and not at the base of the Churuguara-series. It is not the place here, however, to enter further into this problem, that is so intimately linked up with the phylogenetic development of the Orbitoididae. We hope to be able to discuss this problem in a future publication.

Venezuelan formations		*Phases of crustal-movements (R = regional; L = local)*	
Aquaclara-series	800–900 m.	L. Guorabal-conglomerate	Estuarine shale-formation
San Luis-series	500–600 m.	R. San Luis-unconformity	
Churuguara-series	1700 m.		Camerina and Heterostegina lithogeneous
Paloma alta-series	1303 m.	R. Paloma alta-unconformity	
Menegrande-series	400 m.		
Pauji-shales	900 m.		shale-formation
Misoa Trujillo-formation	2300 – 2500 m.		sandstone-formation
Cretaceous		? probably movements in the south; in Zulia und Lara conformity between Eocene and Cretaceous	

Dictyoconus
Camerina
? Pellatispira
Spiroclypeus
Miogypsina
Disc. (Asteroc.) vaughani
Disc. (Asteroc.) maracaibensis
Disc. (Asteroc.) georgiana
Disc. (Asterocyclina)
Discocyclina (Asterocyclina) dimensis
Disc. (Disc.) blumenthali
Disc. (Discocyclina)
Discocyclina (Discocyclina) spiralis
Lep. (Helic.)
Epidocyclina (Helicolepidina)
Epidocyclina (Pliolepidina)
Lepidocyclina (Polylep.) adkinsi
Lep. (Polylep.)
Lepidocyclina (Polylepidina) marginata
Lep. (Nephr.)
Lepidocyclina (Nephrolepidina) undosa
Lep. (Eulep.) semi
Lep. (Eulep.)
Lepidocyclina (Eulepidina) trinitatis
Lep. (Lepidocyclina)
Lep. (Lepidocyclina) pustulosa
Lep. (Lepidocyclina) kugleri
Lep. (Lepidocyclina) falconensis
Lep. (Lepidocyclina) r. douvillei
Lep. (Lepidocyclina)
Lepidocyclina (Lepidocyclina)

Table I, showing the stratigraphical distribution of the larger Foraminifera in Central Falcon.

Centr. Falcon (Ven.)	Georgia and Florida	Alabama	Jamaica	Mexico	Nicaragua	Panama	Trinidad	Antigua	Curacao	N. Peru
Aguaclara-series										
San Luis-series				Meson-formation						
Churuguara-series		Glendon-formation	Moneague-formation					Antigua-formation		
Paloma alta-series	Ocala-limestone			S. of Hacienda "El Triunfo", Chiapas (Bibl. 103 et 115)	Brito-formation	Lep. Chaperi-beds of Haut Chagres			W. slope of Seru di Cueba (Koch, Bibl. 67–68) Seru di Cueba (Rutten, Bibl. 88)	
Menegrande-series							San Fernando-beds of Point Bontour			Lobitos-formation
Pauji-shales										
Miso-Trujillo-formation										

Table 2, showing a correlation between the stages of Central Falcon and some classic localities and stages of the American Tertiary.

Bibliography.

1. BAGG, R. M. The Tertiary and Pleistocene Foraminifera of the middle Atlantic slope. Bull. Am. Pal., vol. 2, no. 10, 1898, p. 1—54, 3 pls.
2. BERRY, WILLARD. The microspheric form of "Orthophragmina" (Discocyclina) peruviana (Cushman). Ecl. geol. Helv., vol. 20, 1927, no. 3.
3. BERRY, WILLARD. The foraminifera of the Restin shale of north-west Peru. Ecl. geol. Helv., vol. 21, no. 1, 1928, p. 130—135, 6 figs.
4. BERRY, WILLARD. Asterodiscocyclina, a new Subgenus of Orthophragmina. Ecl. geol. Helv., vol. 21, no. 2, 1928, p. 405—407, pl. 33.
5. BERRY, WILLARD. Larger foraminifera of the Verdun formation of northwestern Peru. The John Hopkins Univ. Studies in Geology, no. 9, 1929, p. 1—165, pl. I—XXII, 119 p., 22 pls.
6. BERRY, WILLARD. Two new species of "Orthophragmina" from Calita Sal, Peru. Journ. Washington Acad. Sci., vol. 19, no. 7, April 4, 1929, p. 142—148, 2 pls.
7. BERRY, WILLARD. The larger Foraminifera of the Atascadero Limestone of Northwest Peru, South America. Ecl. geol. Helv., vol. 23, no. 2, 1930, p. 489—496, 1 fig., 2 pl.
8. BERRY, WILLARD. Contributions to the paleontology of Peru, IV: "Orthophragmina" (Discocyclina) meroënsis W. Berry n. sp. Journ. Washington Acad. Sci., vol. 20, no. 17, 1930, p. 432—434, fig. 1 in text.
9. BERRY, WILLARD. Evidence for the spread of East Indian forms to equatorial America during Eocene time. Bull. Geolog. Soc. of America, vol. 41, Sept. 30, 1930, p. 351—358.
10. BROECK, E. VAN DEN. Etude sur les foraminifères de la Barbade. Ann. Soc. Belge Microsc., vol. 2, 1876, p. 55—152, 2 pls.
11. CARPENTER, W. B. Introduction to the study of the Foraminifera. Ray Soc. London, 1872, 320 p., 22 pls.
12. CHAPMAN, F. Kainozoic Foraminifera, etc. from Cyrenaica. Quart. Journ. Geol. Soc., vol. 67, 1911, p. 654—661.
13. COLE, W. STORRS. A foraminiferal fauna from the Guayabal formation in Mexico. Bull. Am. Pal., vol. 14, no. 51, Dec. 1927, p. 1—46, pls. 1—5.

13a. COLE, W. STORRS and PONTON, G. M. The foraminifera of the Marianna limestone of Florida. Florida State Geological Survey, Bulletin no. 5, Dec. 1930.

14. COLE, W. STORRS. A foraminiferal fauna from the Chapopote formation in Mexico. Bull. Am. Pal., vol. 14, no. 53, 1928, p. 1—32, pls. 1—4.
15. COOKE, CH. W. The stratigraphic position and faunal associates of the orbitoid foraminifera of the genus Orthophragmina from Georgia and Florida. U. S. Geol. Surv. Prof. Pap. 108-G, 1917.
16. COOKE, CH. W. and CUSHMAN, J. A. Orbitoid foraminifera of the genus Orthophragmina from Georgia and Florida. U. S. Geol. Survey, Prof. Pap. 108-G, 1917, p. 109—118, pl. XL—XLIV.
17. CUSHMAN, J. A. The larger fossil Foraminifera of the Panama Canal Zone. U. S. Nat. Mus. Bull. 103, 1918, p. 90—102, pl. 34—45.
18. CUSHMAN, J. A. Fossil Foraminifera from the West Indies. Carnegie Inst. Wash., Publ. 291, p. 21—27, 15 pls., 8 text-figs.
19. CUSHMAN, J. A. The American species of Orthophragmina and Lepidocyclina. U. S. Geol. Survey, Prof. Pap. 125-D, 1920, p. 39—106, pls. VII—XXXV.
20. CUSHMAN, J. A. The foraminifera of the Vicksburg group. U. S. Geol. Survey, Prof. Pap. 133, 1923, p. 11—57, pls. I—VIII.
21. CUSHMAN, J. A. Lists of Foraminifera in "A geological reconnaissance of the Dominican Republic" by T. W. Vaughan and others. Dominican Republ. Geol. Surv., Mem., vol. 1, 1921.

22. CUSHMAN, J. A. Foraminifera of the Byram Calcareous Marl at Byram, Miss. U. S. Geol. Survey, Prof. Pap. 129-E, 1922, p. 87—122, pls. 14—27.

23. CUSHMAN, J. A. The Foraminifera of the Mt. Spring Calcareous Marl Member of the Marianna Limestone. U. S. Geol. Survey, Prof. Pap. 129, 1922, p. 123—152, pls. 29—35.

24. CUSHMAN, J. A. Foraminifera from the Lobitos-formation. In: Bosworth, T. O., Geology of the Tertiary and Quaternary Periods in the N.W. of Peru, London, 1922, p. 136—139, pl. XXIV.

25. CUSHMAN, J. A. and APPLIN, E. R. Texas Jackson foraminifera. Bull. Amer. Ass. Petr. Geol., vol. 10, 1926, p. 154—189, pls. 5—10.

26. DICKERSON, R. E. Fauna of the Eocene at Marysville Buttes, California. University California Publ., Bull. Dept. Geology, vol. 7, 1913.

27. DICKERSON, R. E. Stratigraphy and fauna of the Tejon Eocene of California. University California Publ., Bull. Dept. Geology, vol. 9, 1916.

28. DIETRICH, W. O. Zur Paläontologie und Stratigraphie der Kreide und des Tertiärs in der ostkaribischen Kordillere Venezuelas. Centralbl. f. Min., 1924, p. 181—187.

29. DOUVILLÉ, H. Sur l'âge des couches traversées par le canal de Panama. Bull. Soc. Géol. France, Sér. 3, t. XXVI, 1898, p. 587—600.

30. DOUVILLÉ, H. Sur les couches à Orbitoides (Lepidocyclina) de l'Adour. Bull. Soc. Géol. France, sér. 3, t. 27, 1899, p. 125—126.

31. DOUVILLÉ, H. Les orbitoides de la près qu'île de Californie. C. R. Acad. des Sciences, t. 161, 1915, p. 409—410.

32. DOUVILLÉ, H. Les Orbitoides de l'île de la Trinité. C. R. Acad. des Sciences, t. 161, 1915, p. 87—93.

33. DOUVILLÉ, H. Les orbitoides en Amérique. C. R. somm. des séances de la Soc. Géol. de France, sér. 4, t. 15, 1915, p. 109—111.

34. DOUVILLÉ, H. Les Orbitoides de l'île de la Trinité. C. R. Acad. des Sciences, vol. 164, 1917, p. 841—847.

35. DOUVILLÉ, H. Les couches à Orbitoides de l'Amérique du Nord. C. R. Acad. des Sciences, t. 167, 1918, p. 261—267.

36. DOUIVLLÉ, H. Quelques observations sur le sous-genre Hélicolepidina. Ecl. geol. Helv. 17, No. 5, 1923, p. 566—570, 2 fig.

37. DOUIVLLÉ, H. Les Orbitoides et leur évolution en Amérique. Bull. Soc. Géol. France, sér. 4, t. 23, 1923, p. 369—376.

38. DOUVILLÉ, H. Révision des Lépidocyclines. Mémoires de la Soc. Géol. de France, Nouv. sér., t. I, Mém. 2, Feuilles 5—11, 1924, p. 1—50, pl. V—VI; Nouv. sér., t. II, Fasc. 2, Feuilles 16—24, Mém. 2, 1925, p. 51—123, pl. III—VII.

39. DOUVILLÉ, H. Les orbitoides de la région petrolifère du Mexique. C. R. Somm. des séances de la Soc. Géol. de France, fasc. 4, Febr. 21, 1927, p. 34—35, 4 figs.

40. DOUVILLÉ, R. Sur des Lépidocyclines nouvelles. Bull. Soc. Géol. France, 4. sér., vol. 7, 1907, p. 307—311, 1 pl., 2 figs.

41. DOUVILLÉ, R. and LEMOINE, P. Sur le genre Lépidocyclina Gümbel. Mémoires de la Soc. Géol. de France, Paléontologie, mém. 32, 1904.

42. Encyclopaedie van Nederlandsch West-Indië, 1914—'17.

43. FELIX, J. and LENK, H. Ueber das Vorkommen von Nummulitenschichten in Mexico. N. Jahrb. f. Min., 1895, II, p. 208—209.

44. GABB, W. M. Catalogue of the invertebrate fossils of the U. S. with references. Ac. Nat. Sci. Philadelphia, 1859—1860.

45. GALLOWAY, J. J. Notes on the genus Polylepidina and a new species. Journ. of Paleontology, vol. 1, no. 4, Jan. 1928, p. 299—303, 3 fig., pl. 51.

46. GALLOWAY, J. J. A revision of the family Orbitoidae. Journ. Paleont., vol. 2, no. 1, Mch. 1928, p. 45—69.

47. GALLOWAY, J. J. and MORREY, MARGARET. A lower Tertiary foraminiferal fauna from Manta Ecuador. Bull. Am. Pal., vol. 15, no. 55, Jan. 1929, p. 1—56, pls. 1—6.

48. GROSSOUVRE, A. DE. Sur la distribution verticale des Orbitoides. Bull. Soc. Géol. France, 1904.

49. GUPPY, R. J. L. On the occurrence of Foraminifera in the Tertiary beds at San Fernando, Trinidad. Transact. Scient. Assoc. Trinidad, 1863—'66, vol. 1. Also: The Geologist, 1863, p. 159 (Reprint in: Bull. Am. Pal., vol. 8, 1919—'21, p. 159—160).

50. GUPPY, R. J. L. On the relations of the Tertiary formations of the West Indies (with a note on a new species of Ranina by HENRY WOODWARD and on the Orbitoides and Nummulinae by T. RUPERT JONES). Quart. Journ. Geol. Soc. London, vol. 22, 1866, p. 570—593, 3 figs., pl. 26.

51. GUPPY, R. J. L. On Foraminifera from the Tertiaries of San Fernando, Trinidad. Proc. Scient. Assoc. of Trinidad, 1872, vol. 2, p. 13. Also: Geol. Mag., vol. 10, 1872, p. 362—363.

52. GUPPY, R. J. L. The Tertiary microzoic formations of Trinidad. Quart. Journ. Geol. Soc. London, vol. 48, 1892, p. 519—541, maps and sections.

53. GUPPY, R. J. L. The microza of the Tertiary and other rocks of Trinidad and the West Indies. Journal of the Field Naturalists' Club, Dec. 1893, p. 277—290. Reprint in Bull. Am. Pal., vol. 8, no. 35, March 1921, p. 113—126, 1 textfig.

54. GUPPY, R. J. L. On some foraminifera from the Microzoic Deposits of Trinidad, West Indies. Proc. Zool. Soc. of London, 1894, p. 647—653, 1 pl.

55. GUPPY, R. J. L. Part I: On some samples of rock borings at Sangregrande, Trinidad.
Part II: The Sangregrande borings (with diagrams).
Part III: Observations on some of the foraminifera of the Oceanic rocks of Trinidad (pls. I and II).
Part IV: Preliminary geological notes on the Manjak-Marbela Mine.
Part V: Note on the Komuto Shell Bed.
Proceed. Victoria Institute, vol. 2, pt. I, 1903, p. 1—17 (parts I, II and III republished in Geol. Mag., 1904, p. 193—199 and p. 241—250, pl. 7, 8, 9).

56. HANNA, G. D. and HANNA, M. A. Foraminifera of the Eocene of Cowlitz River, Lewis County, Washington. Univ. Washington Publ. in Geol., vol. 1, no. 4, 1924, p. 51—63, 1 pl.

57. HARRIS, G. D. Notes on the paleontology of the Island of Trinidad, B. W. I. The John Hopkins University Studies in Geology, no. 7, 1926, p. 87—112, pl. XVI—XX.

58. HEILPRIN, A. Notes on some new Foraminifera from the Nummulitic formation of Florida. Proc. Ac. Nat. Sci. Philadelphia, 1884, p. 321—332, textfigs.

59. HODSON, HELEN K. Names for the stellate "Orthophragmina". Amer. Journ. Science, vol. 12, 1926, p. 353—354, 1926.

60. HODSON, HELEN K. Foraminifera from Venezuela and Trinidad. Bull. Am. Pal., vol. 12, no. 47, December 1926.

61. HODSON, HELEN K. Lower Miocene Fossils from Portuguese East Africa. Journ. Paleontology, vol. 2, no. 1, 1928, p. 1—6, pl. 1—3.

62. ILLING, V. CH. Geology of the Naparima region of Trinidad, B. W. I. Quart. Journ. Geol. Soc. London, vol. 84, no. 333, pt. I, April 30, 1928, 56 p., 5 figs., 2 pls. (Reviewed in Bull. Am. Ass. Petr. Geol., vol. 12, no. 11, Nov. 1928, p. 118—121, by G. A. WARING).

63. JONES, T. RUPERT. On some Nummulinae and Orbitoids from Jamaica. Quart. Journ. Geol. Soc. London, XIX, 1863, p. 514—515.

64. JONES, T. RUPERT. Note on the Orbitoids and Nummulinae of the Tertiary asphaltic bed of Trinidad. See: GUPPY, Bibl. no. 50.

65. KELLUM, L. B. Paleontology and stratigraphy of the Castle Hayne and Trent Marls in North Carolina. U. S. Geol. Surv. Prof. Paper 143, 1926.

66. KOCH, R. Miogypsina staufferi nov. spec., from Northwestern Venezuela. Ecl. geol. Helv., vol. 19, no. 3, 1926, p. 751—753, pl. 28.

67. KOCH, R. Tertiärer Foraminiferenkalk von der Insel Curaçao (Niederländisch West-Indien). Ecl. geol. Helv., vol. 21, 1928, p. 51—56, Taf. III.

68. KOCH, R. Berichtigung und Ergänzung zu der Notiz „Tertiärer Foraminiferenkalk von der Insel Curaçao". Ecl. geol. Helv., vol. 22, 1929, p. 159—161.

69. LEMOINE, P. et DOUVILLÉ, R. Résultats paléontologiques et stratigraphiques de l'étude des Lepidocyclines. Bull. Soc. Géol. France, 1904.

70. LEMOINE, P. et DOUVILLÉ, R. Sur le genre Lépidocyclina. Mémoires de la Soc. Géol. de France, Paléont. t. 12, fasc. 2, 1904 (See: Bibl. no. 41.)

71. LIDDLE, R. A. The geology of Venezuela and Trinidad. Publ. J. P. Mac Gowan, Forth Worth, Texas, 1928.

72. LISSON, CARLOS I. Contribution al estudio de algunos foraminiferos terciarios provenientes de la region del Norte del Peru. Arch. Asoc. Peruana, Progr. Ciencia, Tomo I, Fax. 1, Año 1921, p. 52—55, 2 pls.

73. LYELL, C. On the relative age and position of the socalled Nummulitic Limestone of Alabama. Quart. Journ. Geol. Soc. London, IV, 1848.

74. MACDONALD, D. F. The sedimentary formations of the Panama Canal Zone with special reference to the stratigraphic relations of the fossiliferous bed. U. S. Nat. Mus. Bull. 103, 1919, p. 525—545, pls. 153—154.

75. MARTIN, K. Bericht über eine Reise nach Niederländisch West-Indien und darauf gegründete Studien. 2. Theil, Geologie. Leiden, E. J. Brill, 1888, 238 p., 2 pls., 4 maps, 40 figs.

76. MOODY, C. L. Fauna of the Fernando of Los Angeles. University California Publ., Bull. Dept. Geology, vol. 10, 1916.

77. NUTTALL, W. L. F. Tertiary foraminifera from the Naparima region of Trinidad, B. W. I. Quart. Journ. Geol. Soc. London, vol. 84, pt. 1, no. 333, 1928, p. 57—116, pls. 3—8.

78. NUTTALL, W. L. F. Notes on the Tertiary foraminifera of southern Mexico. Journ. of Paleont., vol. 2, no. 4, Dec. 1928, p. 372—376, pl. 50.

79. NUTTALL, W. L. F. Eocene Foraminifera from Mexico. Journ. of Paleont., vol. 4, no. 3, Sept. 1930, p. 273—290, pl. 23—25.

80. NUTTALL, W. L. F. Larger Foraminifera from the Tertiary of Somaliland. Geol. Mag., vol. 68, no. 800, 1931, p. 49—65, pl. 1—4.

81. O'CONNELL, MISS. Description of an "Orbitoides" in: Kemp, the Mayari-Ore deposits, Cuba. Transact. Amer. Inst. Min. Eng., 51, 1915—1916, p. 15, fig. 5—6.

82. ORBIGNY, A. d'. Foraminifères. In Ramon de la Sagra: Histoire physique, politique et naturelle de l'île de Cuba. Paris 1839.

83. ORBIGNY, A. d'. Voyage dans l'Amérique méridionale Paléontologie et Géologie. Vol. 3, pt. 5, 1839, p. 1—86, pls. 1—9.

84. ORBIGNY, A. d'. Paléontologie de l'île de Cuba. In Ramon de la Sagra: Histoire physique, politique et naturelle de l'île de Cuba. 1852, 64 p., 8 pls.

85. ROIG, M. S. Breve resena historica de la paleontologia cubana. Soc. Georg. Cuba, Habana, 1926, p. 1—15, 6 pls.

86. ROZLOZSNIK, PAUL. Studien über Nummulinen. Geologica Hungarica, ser. geol., Fasc. 2, p. 89—248, VIII Taf. und 3 Textfig.

87. RUTTEN, L. On Tertiary Rocks and Foraminifera from Northwestern Peru. Proceedings Kon. Ak. Wetensch. Amsterdam, vol. 31, no. 9, 1928, p. 931—946; 2 pl.

88. RUTTEN, L. On Tertiary Foraminifera from Curaçao. Proceedings Kon. Ak. Wetensch. Amsterdam, vol. 31, no. 10, 1928, p. 1061—1070, with 1 pl. and textfig.

89. SHERBORN, C. D. Index to Foraminifera. Smithsonian Inst. Washington, Miscell. Coll. 37, 1893, 243 p., Part. II. do. no. 38, 1896, 249 p.

90. SCHLUMBERGER, CH. Première Note sur les orbitoides. Bull. Soc. Géol. France, sér. 4, I, 1901.

91. SCHLUMBERGER, CH. Deuxième Note sur les orbitoides. Bull. Soc. Géol. France, sér. 4, II, 1902.

92. SCHLUMBERGER, CH. Troisième Note sur les orbitoides. Bull. Soc. Géol. France, sér. 4, III, 1903.

93. SCHLUMBERGER, CH. Quatrième Note sur les orbitoides. Bull. Soc. Géol. France, sér. 4, IV, 1904.

94. SCHLUMBERGER, CH. et DOUVILLÉ, H. Sur deux foraminifères éocènes. Bull. Soc. Géol. France, sér. 4, t. V, 1905, p. 291—304, 1 pl.

95. TOBLER, AUG. Die Jacksonstufe (Priabonien) in Venezuela und Trinidad. Ecl. geol. Helv., Bd. XVII, no. 3, 1922, p. 342—346, pl. 19.

96. TOBLER, AUG. Helicolepidina, ein neues Subgenus von Lepidocyclina. Ecl. geol. Helv., Bd. XVIII, no. 3, 1922, p. 379—384, 3 figs.

97. TOBLER, AUG. Miogypsina im untersten Neogen von Trinidad und Borneo. Ecl. geol. Helv., vol. 19, no. 3, 1926, p. 719—722, pl. 27.

98. TOBLER, AUG. Neue Funde von obereocänen Grossforaminiferen in der nordperuanischen Küstenregion. Ecl. geol. Helv., vol. 20, no. 3, 1927, p. 415—422, 1 fig.

99. VAUGHAN, T. W. Study of the stratigraphic geology and of the fossil corals and associated organisms in several of the smaller West Indian islands. Year book no. 18. Carnegie Inst. Washington 1919, p. 345—346.

100. VAUGHAN, T. W. Contribution to the geology and paleontology of the Canal Zone, Panama and geologically related areas in Central America and the West Indies. Smithsonian Inst., U. S. Nat. Museum, Bull. 103, 1919.

101. VAUGHAN, T. W. The biologic character and geologic correlation of the sedimentary formation of Panama in their relation to the geologic history of Central America and the West Indies. Smithsonian Inst., U. S. Nat. Museum, Bull. 103, 1919, p. 547.

102. VAUGHAN, T. W. Studies of the larger Tertiary foraminifera from tropical and subtropical America. Proc. Nat. Ac. Sci., vol. 9, no. 7, 1923, p. 253—257.

103. VAUGHAN, T. W. American and European Tertiary larger Foraminifera. Bull. Geol. Soc. Amer., vol. 35, no. 4, 1924, p. 785—822, pl. 30—36.

104. VAUGHAN, T. W. Criteria and status of correlation and classification of tertiary deposits. Bull. Geol. Soc. Amer., vol. 35, Dec. 1924, p. 677—742.

105. VAUGHAN, T. W. Species of Lepidocyclina and Carpenteria from the Caiman Islands. Quart. Journ. Geol. Soc. London, vol. 82, pt. 3, 1926, p. 388—400, pl. 24—26.

106. VAUGHAN, T. W. The stratigraphic horizon of the beds containing Lepidocyclina chaperi on Haut Chagres, Panama. — Foraminifera from the Upper Eocene Deposits of the coast of Ecuador. Proc. Nat. Acad. Sci., vol. 12, no. 8, 1926, p. 519—522 and p. 533—535.

107. VAUGHAN, T. W. Results of recent investigations of American Tertiary larger Foraminifera. Proc. 3d. Pan-Pacific Science Congress, Tokyo, 1926, p. 1850—1857.

108. VAUGHAN, T. W. Larger Foraminifera of the genus Lepidocyclina related to Lepidocyclina Mantelli. Proc. U. S. Nat. Museum, vol. 71, art. 8, 1927, pl. 1—5, pls. 1—4.

109. VAUGHAN, T. W. Notes on the types of Lepidocyclina mantelli (Morton) Gümbel and on Topotypes of Nummulites floridanus Conrad. Proc. Ac. Nat. Sci. Philadelphia, vol. 79, 1927, p. 299—303, pl. 23.

110. VAUGHAN, T. W. New species of Operculina and Discocyclina from the Ocala limestone. 19th Ann. rep. Florida State, Geol. Survey, 1928, p. 155—165, 2 pls.

111. VAUGHAN, T. W. Yaberinella jamaicensis, a new genus and species of arenaceous foraminifera. Journ. of Paleontology, vol. 2, no. 1, 1928, p. 7—12, pls. 4—5.

112. VAUGHAN, T. W. Species of larger arenaceous and orbitoidal Foraminifera from the Tertiary deposits of Jamaica. Journ. of Paleontology, vol. 1, no. 4, Jan. 1928, p. 277—298, pls. 43—50.

113. VAUGHAN, T. W. A note on the names Cyclosiphon Ehrenberg, 1856, and Lepidocyclina Gümbel, 1856. Journ. of Paleontology, vol. III, no. 1, March 1929.

114. VAUGHAN, T. W. Actinosiphon semmesi, a new genus and species of orbitoidal foraminifera, and Pseudoorbitoides trechmanni H. Douvillé. Journ. of Paleontology, vol. III, no. 2, June 1929.

115. VAUGHAN, T. W. Studies of orbitoidal Foraminifera: the subgenus Polylepidina of Lepidocyclina and Orbitocyclina, a new genus. Proc. Nat. Acad. of Sciences, vol. 15, no. 3, March 1929, p. 288—295.

116. VAUGHAN, T. W. Descriptions of new species of foraminifera of the genus Discocyclina from the Eocene of Mexico. Proc. U. S. Nat. Museum, vol. 76, art. 3, 1929, p. 1—18, pls. 1—7.

117. VAUGHAN, T. W. Species of Orbitocyclina of Upp. Cret. of Mexico and Louisiana. Journ. of Paleontology, vol. 3, no. 2, June 1929, p. 170.

118. VAUGHAN, T. W. Additional new species of tertiary larger foraminifera from Jamaica. Journ. of Paleontology, vol. 3, no. 4, 1929, p. 373—382, pls. 39—41.

119. VAUGHAN, T. W. Contributions to the Geology of the West-Indies. Carnegie Inst., no. 291, Washington, 1919—1922.

120. VAUGHAN, T. W. (Determinations of the foraminifera) in: DARTON, N. H., Geology of the Guantanamo Basin Cuba. Journ. Washington Acad. Sci., vol. 16, 1926, p. 324—333, 5 figs.

121. VAUGHAN, T. W. Recent additions to knowledge of the correlation of the Tertiary geological formations of northeastern Mexico, Central America, the West Indies, Northern south America, & Lower California. 2nd Pan-Pacific Science Congress, Australia, 1923, Proceed., vol. 1, p. 864—870.

122. VAUGHAN, T. W. The embryonic and meridional chambers of American species of Lepidocyclinae Foraminifera. 2nd Pan-Pacific Science Congress, Australia, 1923, Proc. vol. 1, p. 871—873.

123. VAUGHAN, T. W. Recent progress in the study of the tectonic features of the West Indies and Central America. Proc. Pan-Pacific Sci. Congress, Australia, 1923, vol. 1, p. 735—741.

124. WARING, G. A. The geology of the Island of Trinidad, B. W. I. The John Hopkins University Studies in Geology, no. 7, 1926.

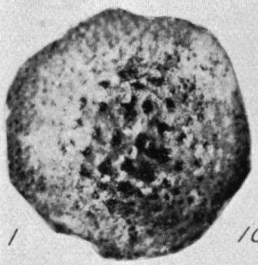
125. WIEDENMEYER, C. Zur Geologie von Ostfalcon. Ecl. geol. Helv., Bd. 18, 1924, p. 509.

126. WHITE, MAYNARD P. Some index foraminifera of the Tampico embayment area of Mexico. Journ. of Paleontology, vol. 2, no. 3, Sept. 1928, p. 177—215, 1 fig., 1 map, pl. 29, 1 table; vol. 2, no. 4, Dec. 1928, p. 280—317, pls. 38—42, 1 table; vol. 3, no. 1, March 1929, p. 30—58.

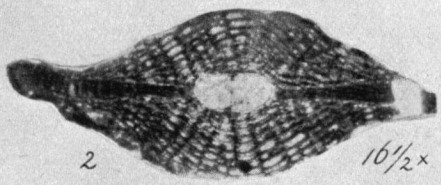
127. WOODRING, W. P. Middle Eocene Foraminifera of the Genus Dictyoconus from the Republic of Haiti. Journ. Washington Acad. Sci., vol. 12, no. 10, May 19, 1922, p. 244—247.

128. WOODRING, W. P. Marine Eocene Deposits on the East slope of the Venezuelan Andes. Bull. Amer. Assoc. of Petrol. Geologists, vol. 11, no. 9, Sept. 1927, p. 992—996.

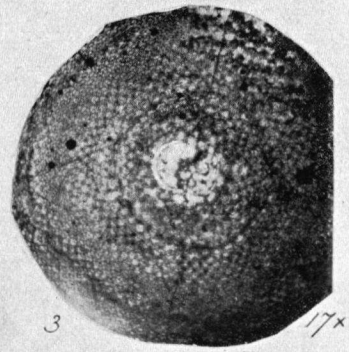
129. WOODRING, W. P. Upper Eocene Orbitoid Foraminifera from the Western Santa Ynez Range, California, and their stratigraphic significance. Transact. San Diego Soc. Nat. Hist., vol. VI, no. 4, p. 145—170, pl. 13—17.



1 10×

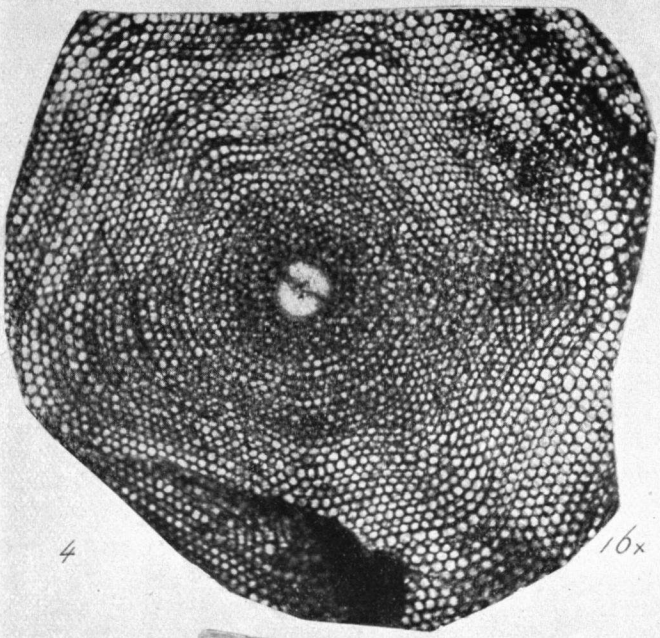


2 16½×

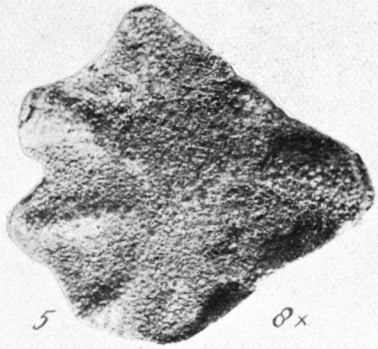


3 17×

1-3 *Lepidocyclina (Lepidocyclina) rdouvillei* Lisson



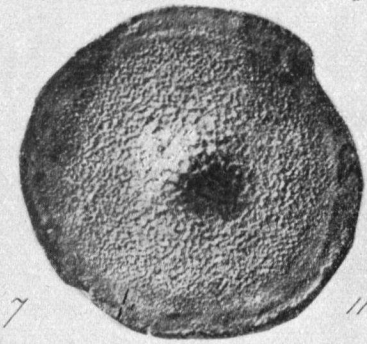
4 16×



5 8×

6 16×

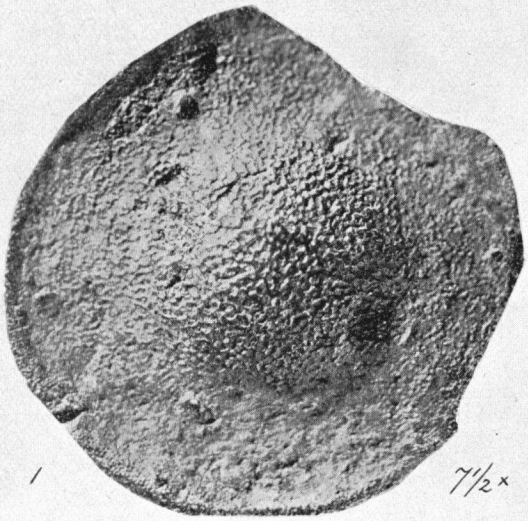
4-6 *Lepidocyclina (Lepidocyclina) falconensis* nov. spec.



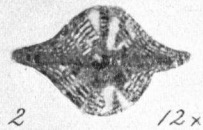
7 11×

8 13×

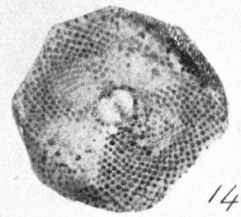
7-8 *Lepidocyclina (Lepidocyclina) kugleri* nov. spec.



1 7½×

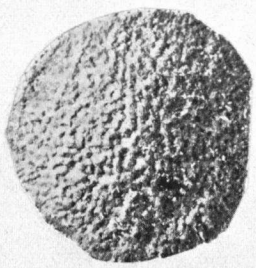


2 12×



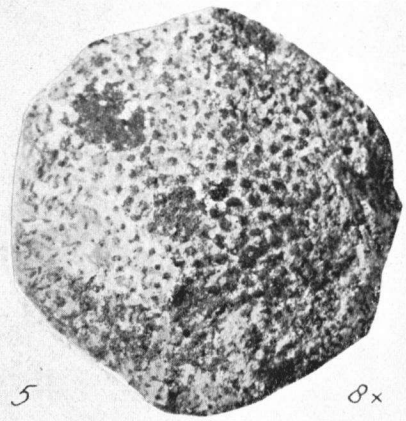
3 14×

1-3 Lepidocyclina(Lepidocyclina) kugleri nov. spec.



4 8×

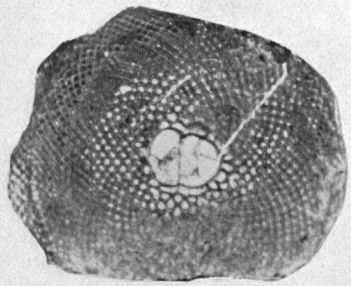
A-form.



5 8×

B-form.

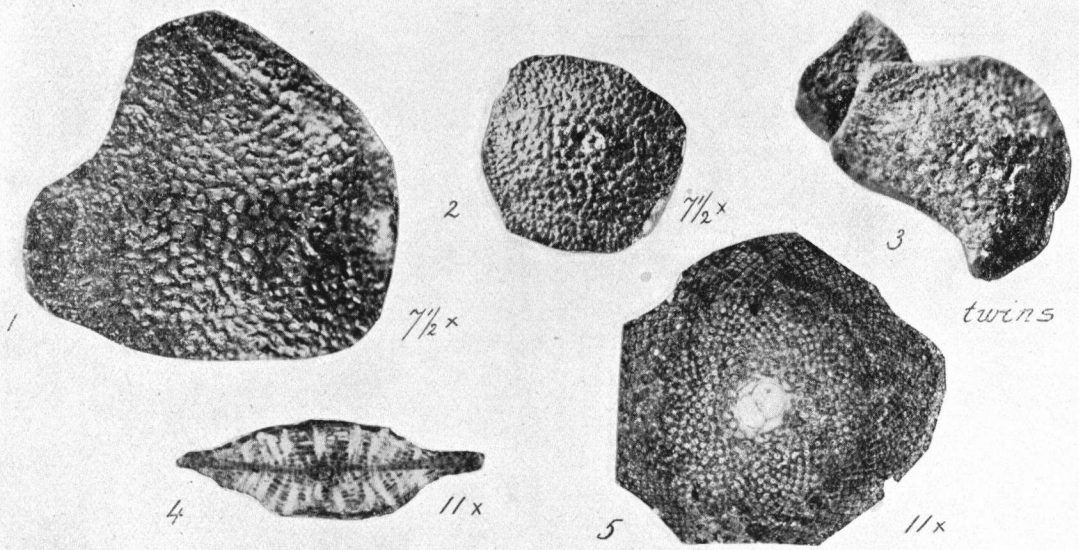
6 8×



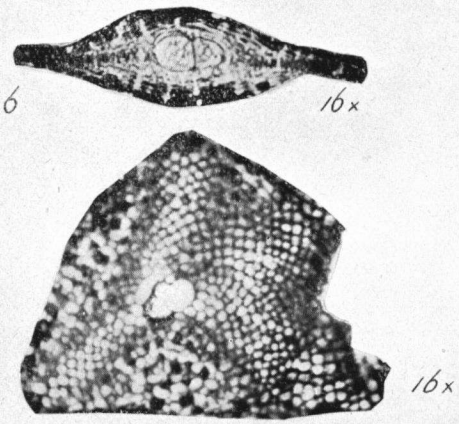
8 8×

7 14×

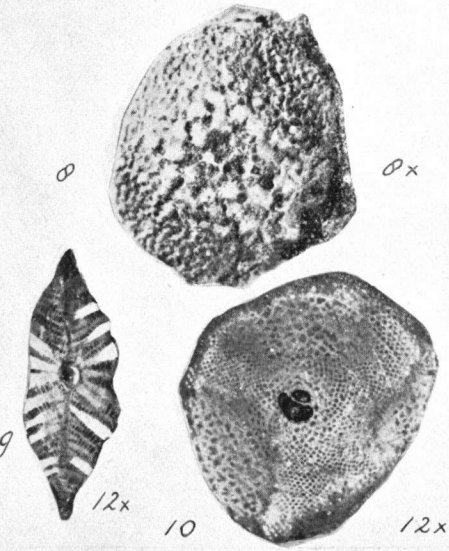
4-8 Lepidocyclina(Lepidocyclina) pustulosa H. Douvillé



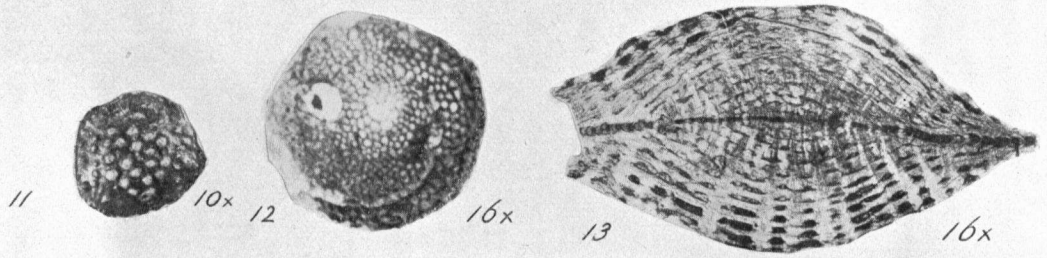
1-5 Lepidocyclina (Lepidocyclina) trinitatis H. Douvillé.



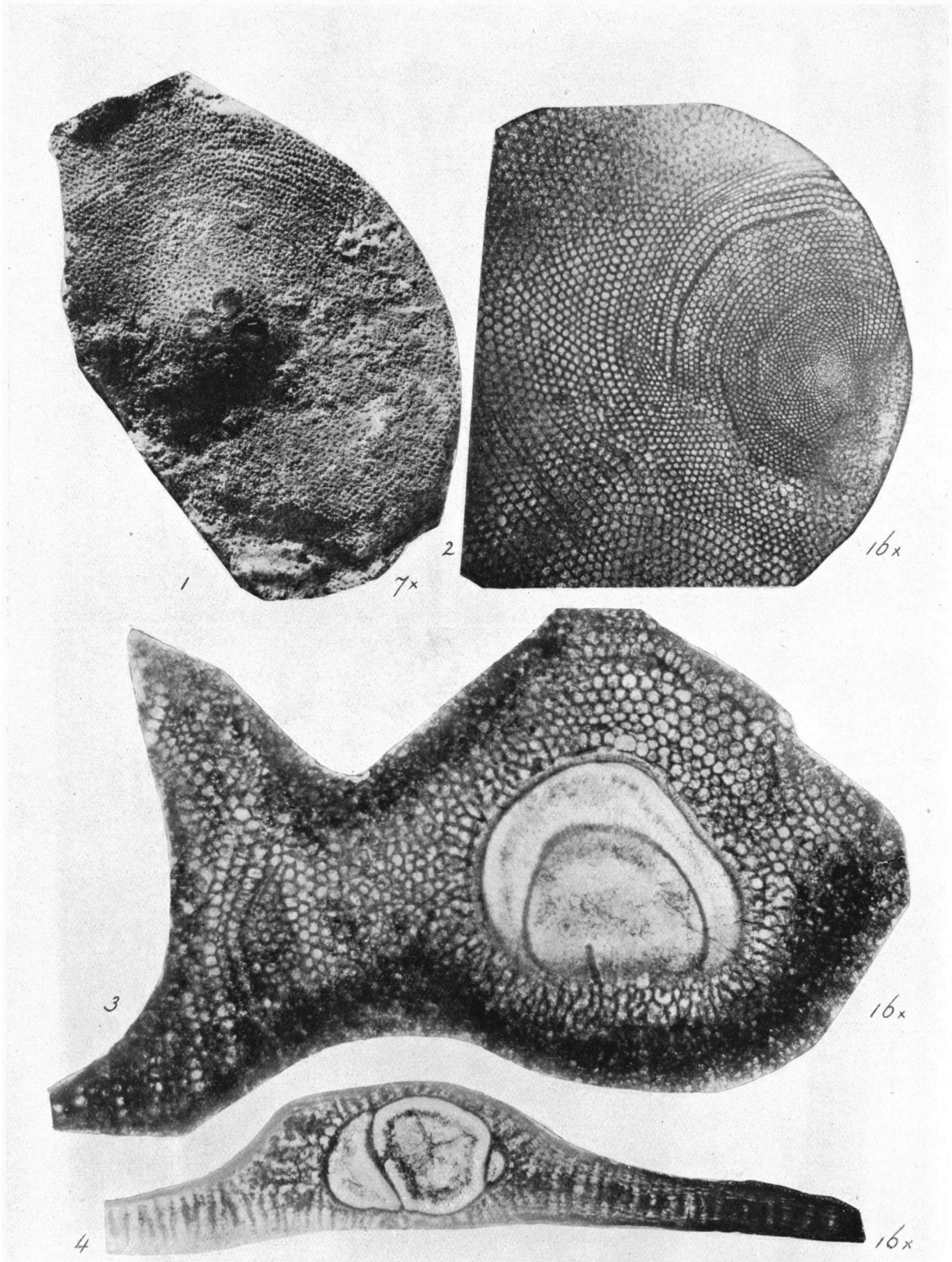
6-7 Lepidocyclina (Polylepidina) adkinsi Vaughan



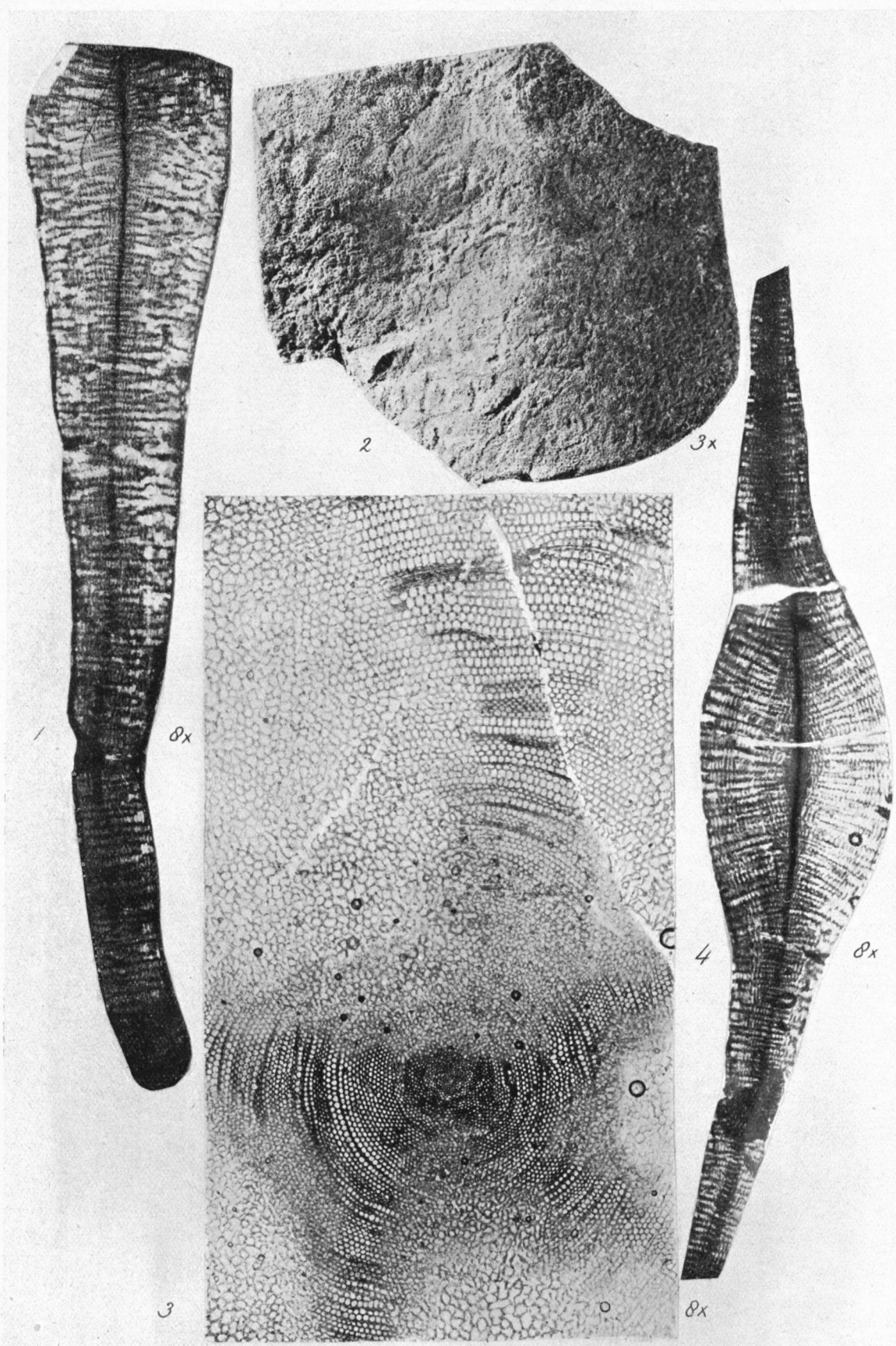
8-10 Lepidocyclina (Nephrolepidina) marginata Michelotti



11-13 Lepidocyclina (Helicolepidina) spiralis Tobler

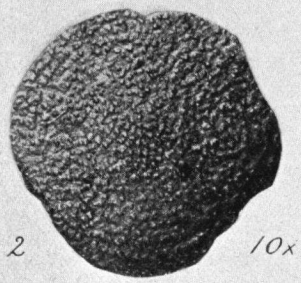


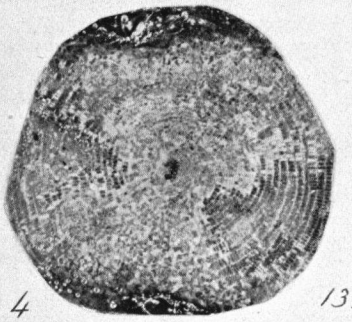
1-4 Lepidocyclina (Eulepidina) senni nov. spec.



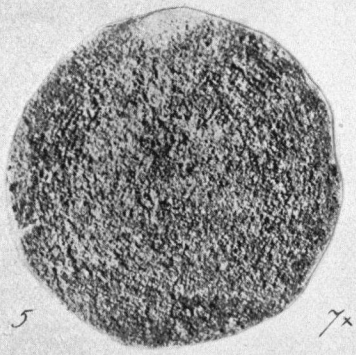
1-4 Lepidocyclina (Eulepidina) undosa Cushman

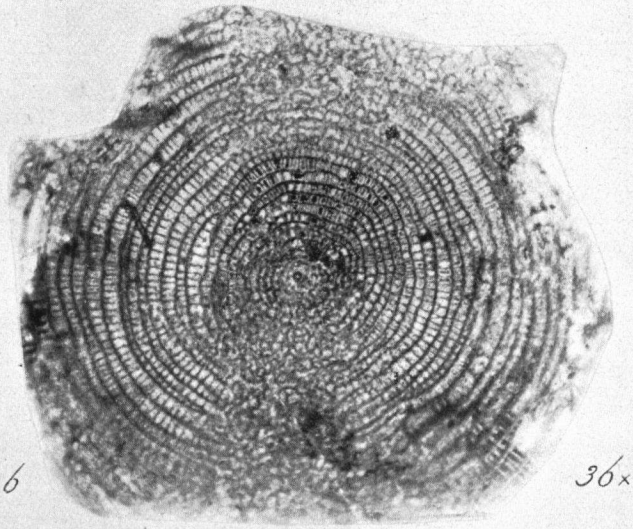
1 Lepidocyclina spec. indet.



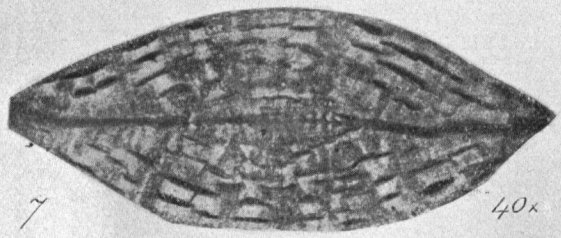


2-4 Discocyclina (Discocyclina) blumenthali nov. spec.

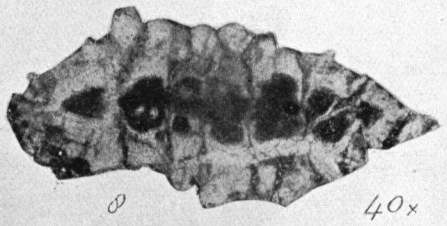




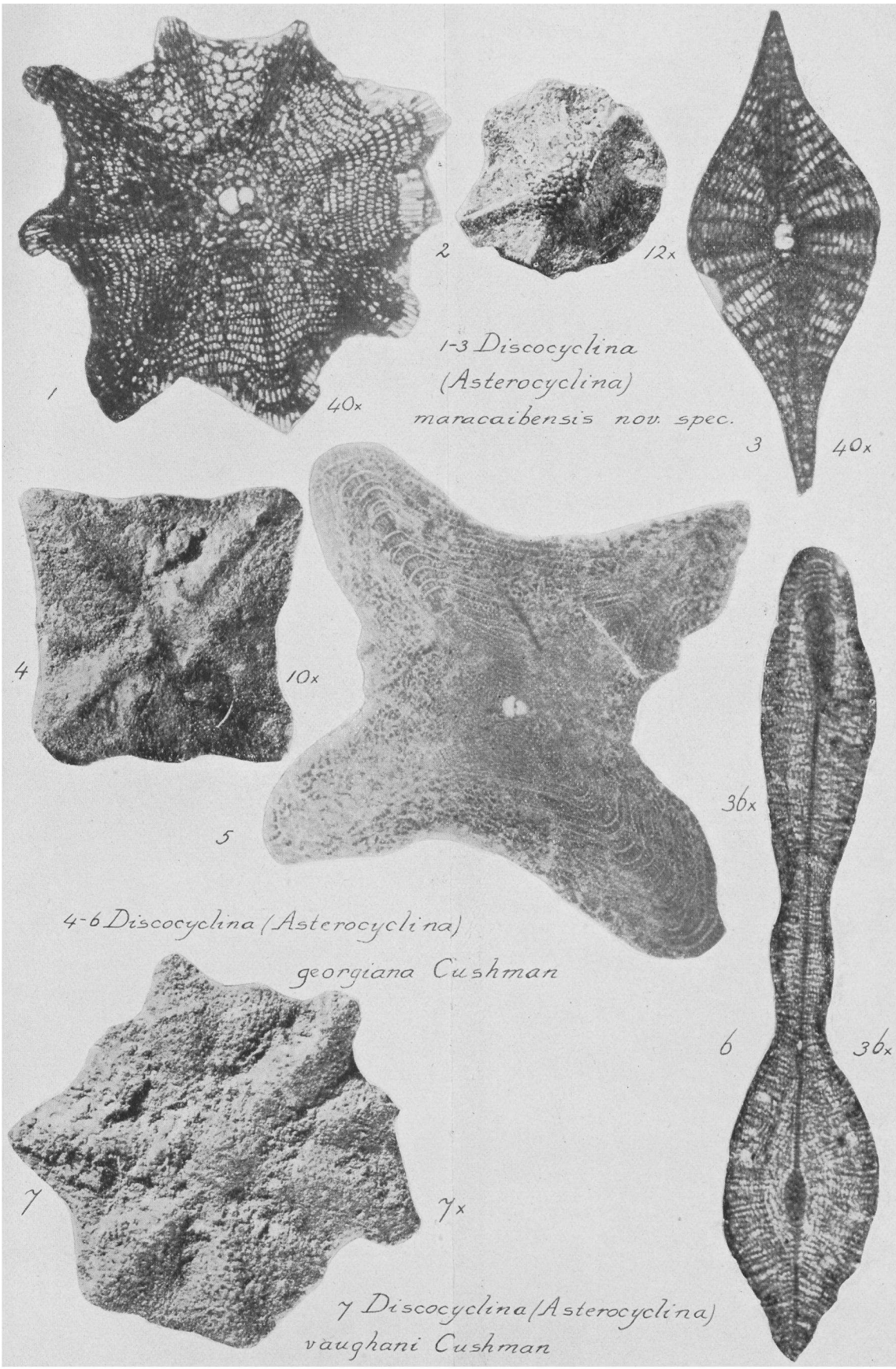
5-6 Discocyclina (Discocyclina) flintensis Cushman



Spiroclypeus sp.



Pellatispira sp. ?


1
40x
2
12x
1-3 Discocyclina
(Asterocyclina)
maracaibensis nov. spec.
3
40x
4
10x
5
36x
4-6 Discocyclina (Asterocyclina)
georgiana Cushman
6
36x
7
7x
7 Discocyclina (Asterocyclina)
vaughani Cushman